Sigma Theta Tau International's 29th International Nursing Research Congress

Correlation of Hormonal Biomarkers With Mental Health and Healthy Behaviors of Mothers With Very-Low-Birthweight Infants

June Cho, PhD
School of Nursing, Duke University, Durham, NC, USA

Purpose:

Maternal mental health is important for infant health and development. However, about 13 – 19% of mothers experience psychological problems during the postpartum period, including 18% with elevated postpartum anxiety symptoms and 19-35% with elevated depressive symptoms, that adversely affect maternal health and infant development (O'Hara & McCabe, 2013). Postpartum mental health problems usually occur within 4 weeks of birth and the first 6 months is a particularly difficult time for mothers with these problems (O'Hara & McCabe, 2013). Also, mothers of infants with negative birth outcomes such as very preterm (gestational age < 32 weeks) and very-low-birthweight (VLBW, birthweight < 1,500gm) reported more problematic mental health than mothers of normal birthweight full-term infants (Staehelin, Kurth, Schindler, Schmid, & Zemp Stutz, 2013).

Accurate assessment of maternal health problems is important in helping not only mothers but also their infants because maternal health problems adversely affect infant development. Mental health has been generally assessed using self-report questionnaires, which may over- or under-estimate the problems (Gao et al., 2015). Use of self-report questionnaires along with hormonal biomarkers, such as testosterone and cortisol, could provide a more objective report than those with the questionnaires alone. Among many factors, healthy behaviors such as physical activity and healthy eating have been known to lessen mental health problems (Hartman, Hosper, & Stronks, 2011), and thus, postpartum mental health can be improved if mothers engage in healthy behaviors.

The purposes of this study were thus to examine whether (1) maternal sociodemographic characteristics erre associated with maternal hormonal biomarkers [testosterone and cortisol levels], maternal mental health, and healthy behaviors, (2) maternal hormonal biomarkers were associated with maternal mental health and healthy behaviors, (3) maternal mental health and healthy behaviors improved as their VLBW infants grew older, and (4) maternal mental health improved when mothers engaged in more healthy behaviors. We hypothesized that maternal testosterone and cortisol levels would be predictive of maternal mental health as well as healthy behaviors, and maternal health and healthy behaviors would be improved as their VLBW infants grew up.

Methods:

A total of 40 mothers of VLBW infants were recruited from a neonatal intensive care unit (NICU) of a tertiary medical center in the Southeast US. Data were collected through medical record review, interview of mothers, standard questionnaires, and biochemical measurement. Maternal mental health was measured 4 to 5 times (birth, 40 weeks postmenstrual age [PMA], and 6, 12, and 24 months ages of infant's corrected age) using the Center for Epidemiologic Studies Depression (CES-D), State-Trait Anxiety Index-short form (STAI/SF), Perceived Stress Scale (PSS-10), the 12 Item Short Form Health Survey (SF-12), and Parenting Stress Index (PSI-4). Healthy behaviors were measured 4 times using a modified Lifestyle Index Questionnaire (LIQ). The levels of salivary testosterone and cortisol were measured using enzyme immunoassay (EIA) at 5 time periods.

Results:

Descriptive statistics was used for presenting maternal sociodemographic characteristics. The results of general linear models for continuous variables and of one-way analysis of variance (ANOVA) for

categorical variables showed that having smaller gravida and larger parity; being younger, married, and non-White; and having fewer medical complications; and private health insurance were associated with better maternal mental health. The levels of maternal salivary testosterone and cortisol were constant throughout the 5 time points and were not correlated each other, except that the levels of testosterone at 40 weeks PMA and cortisol at 12 months (r = -.344, p = .046) as well as the levels of cortisol at 40 weeks PMA and testosterone at 24 months (r = -.490, p = .008) were negatively correlated.

Body mass index was the only maternal characteristic that was negatively associated with maternal cortisol levels at 24 months (β = -0.007, SE = 0.003, $t(df)$ = -2.168(1), p = 0.045). The results of maternal mental health using CES-D, STAI/SF, and PSS-10 showed that maternal mental health improved towards 12 months then worsened through 24 months. The results of parenting stress (PSI-4) also showed that mothers were more stressed at 24 months than 6 and 12 months. However, in contrast to the results using CES-D, STAI/SF, PSS-10, and PSI-4, the results of maternal mental health status using SF-12 showed that maternal mental health status was worsened until 12 months then improved through 24 months. Similar to the results of SF-12, maternal healthy behaviors using LIQ worsened until 12 months then improved through 24 months.

Testosterone levels were positively associated with maternal mental health after 40 weeks PMA, whereas cortisol levels were not associated with any maternal health. For example, high testosterone levels were associated with poor maternal mental health at birth and 40 weeks PMA, however they were associated with less parenting stress at 24 months. Both testosterone and cortisol levels were negatively associated with maternal healthy behaviors at 12 and 24 months such that mothers with high levels of testosterone and cortisol enjoyed healthy food and physical activity less often than other mothers.

Conclusion:

Health assessment using a variety of measurements during postpartum period, especially after 12 months, is important for helping mothers of VLBW infants who have difficulties in maintaining their health. Our findings may provide support for nursing interventions that integrate health screening into routine primary care for postpartum women. Assessment of maternal mental health, however, needs to be done with care because our results showed differences depending on the time period and the type of measurement.

Title:

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Symposium

Keywords:

Hormonal biomarkers, Maternal healthy behaviors and Maternal mental health

References:

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Abstract Summary:

For learning about possible hormonal biomarkers that could explain maternal mental health problems; as well as, possible resources that could improve maternal health during postpartum period when mothers of very-low-birthweight infants experience more difficulties than other mothers because of extra burden for childcare.

Content Outline:

Background: Maternal mental health is important for infant health and development. However, about 13 – 19% of mothers experience psychological problems during the postpartum period, including 18% with elevated postpartum anxiety symptoms and 19-35% with elevated depressive symptoms, that adversely affect maternal health and infant development (O'Hara & McCabe, 2013). Postpartum mental health problems usually occur within 4 weeks of birth and the first 6 months is a particularly difficult time for mothers with these problems (O'Hara & McCabe, 2013). Also, mothers of infants with negative birth outcomes such as very preterm (gestatational age < 32 weeks) and very-low-birthweight (VLBW, birthweight < 1,500gm) reported more problematic mental health than mothers of normal birthweight full-term infants (Staehelin, Kurth, Schindler, Schmid, & Zemp Stutz, 2013).

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First Primary Presenting Author

Primary Presenting Author

June Cho, PhD
Duke University
School of Nursing
Associate Professor
Durham NC
USA

Professional Experience: 2015-present – Associate Professor, School of Nursing, Duke University, Durham, NC 2008-2015 -- Assistant Professor, School of Nursing, University of Alabama at Birmingham, Birmingham, AL 2007-2007 – Postdoctoral fellow, School of Nursing, University of North Carolina at Chapel Hill, Chapel Hill, NC Principal investigators for the federally funded independent research projects since 2010. Author or coauthor of 14 publications primarily relating to infant health, mother-infant interactions, infant development, and mental and physical health of mothers with very-low-birthweight infants during postpartum period. Numerous presentations at (inter)national scientific meetings.
Author Summary: 2016-present - Chair, A research interest group of the Asian American Pacific Islanders Nurses Association 2015-present – Associate Professor, School of Nursing, Duke University, Durham, NC 2008-2015 -- Assistant Professor, School of Nursing, University of Alabama at Birmingham, Birmingham, AL 2007-2007 – Postdoctoral fellowship in pediatric and biobehavioral nursing, School of Nursing, University of North Carolina at Chapel Hill, Chapel Hill, NC