

Chronic Stress and Coping: Relationships Between Hair Cortisol and Lifestyle Behaviors in Low-Income Mother-Child Dyads

Lauren Marie Pageau, BSN, RN¹

Jiying Ling, PhD, MS, RN¹

Dongjuan Xu, PhD, RN²

(1)College of Nursing, Michigan State University, East Lansing, MI, USA

(2)School of Nursing, Purdue University, West Lafayette, IN, USA

Purpose: Socioeconomic differences in lifestyle behaviors contribute to health disparities and mortality.¹ Low-income families are more likely to engage in unhealthy lifestyle behaviors including reduced sleep and physical activity (PA), increased screen time, tobacco, and alcohol use.²⁻⁶ Chronic stress, prevalent in low-income families, has been shown to adversely influence lifestyle behaviors.⁷ Hair cortisol concentration (HCC) is a biomarker for chronic stress,^{8,9} and an optimal cutoff of 4.1 pg/mg has been identified to divide low-income mothers into low- and high-HCC groups.¹⁰ However, research on the relationships between HCC and lifestyle behaviors is scarce and mixed. In response to this literature gap, the purpose of this study was to examine the variation in relationships between HCC and lifestyle behaviors, including sleep, PA, screen time, tobacco, and alcohol use, by mothers' HCC groups, in low-income mother-child dyads.

Methods: A cross-sectional, correlational study was conducted with a convenience sample of 35 low-income mother-child dyads. HCC was extracted from hair samples using enzyme immunoassay method. Lifestyle behaviors were assessed with reliable and valid surveys. Spearman's rank correlations and multivariate linear regression models were performed in STATA.

Results: Mothers were 29.74 years old, 17.1% Hispanic, 54.3% Black, 60% single, and 37.1% unemployed. Children were 4.69 years old, 48.6% female, 22.9% Hispanic, and 60% Black. As shown in Table 1, in the low-HCC group, mothers' HCC was negatively related to both mothers' and children's sleep time and PA, while in the high-HCC group, the relationships became positive. Mothers' HCC had a strong, positive correlation with their own screen time. The relationship between HCC and alcohol use was negative in the low-HCC group, but positive in the high-HCC group. Children's HCC was negatively related to their own sleep time and PA. All relationships remained following adjustment for demographic factors.

Table 1. Correlations between HCC and lifestyle behaviors

Lifestyle Behavior	Mother HCC	Mother Low-HCC Group		Mother High-HCC Group	
		Mother HCC	Child HCC	Mother HCC	Child HCC

Sleep time	Mother	0.09				-0.39		0.22
	Child	0.20	-0.17	-0.04	-0.50*		0.39	0.08
PA	Mother	0.02				-0.22		0.46
	Child	-0.45*	-0.26	-0.25	0.08		0.31	-0.15
Screen time	Mother	0.51*				0.38		0.41
	Child	0.26	0.09	0.07	0.10		-0.10	0.12
Mother tobacco use		0.17				0.04		-0.01
Mother alcohol use		-0.13				-0.38		0.33

* $p < .05$

Conclusion: The relationships between HCC and lifestyle behaviors varied between low-HCC and high-HCC groups, suggesting the likelihood of hypothalamic–pituitary–adrenal (HPA) axis dysfunction in low-income mothers due to persistent stress exposure. Increased cortisol release in response to stress among low-income mothers may be an indicator of normal functioning of the HPA axis, which may promote lifestyle behaviors used to cope with stress. Similarly, mothers’ normal HPA axis functioning may attenuate the influence of stress on their children’s sleep time and PA. Moreover, low-income mothers may use screen time and alcohol to cope with stress. Although further investigation is needed, findings suggest that interventions focusing on reducing stress and promoting positive coping skills may help improve lifestyle behaviors.

Title:

Chronic Stress and Coping: Relationships Between Hair Cortisol and Lifestyle Behaviors in Low-Income Mother-Child Dyads

Keywords:

hair cortisol, lifestyle behaviors and low-income

Abstract Summary:

This study examined the variation in relationships between hair cortisol concentration (HCC) and lifestyle behaviors, including sleep, PA, screen time, tobacco, and alcohol use, based on low- and high-HCC groups in low-income mother-child dyads.

References:

- Williams DR, Priest N, Anderson NB. Understanding associations among race, socioeconomic status, and health: Patterns and prospects. *Health Psychol.* 2016;35(4):407-411.
- Fletcher EN, Whitaker RC, Marino AJ, Anderson SE. Screen time at home and school among low-income children attending Head Start. *Child Indic Res.* 2014;7(2):421-436.
- Hager ER, Calamaro CJ, Bentley LM, Hurley KM, Wang Y, Black MM. Nighttime sleep duration and sleep behaviors among toddlers from low-income families: Associations with obesogenic behaviors and obesity and the role of parenting. *Child Obes.* 2016;12(5):392-400.
- Levinson AH. Where the U.S. tobacco epidemic still rages: most remaining smokers have lower socioeconomic status. *J Health Care Poor U.* 2017;28(1):100-107.
- Collins SE. Associations between socioeconomic factors and alcohol outcomes. *Alcohol Res.* 2016;38(1):83-94.
- Shuval K, Li Q, Gabriel KP, Tchernis R. Income, physical activity, sedentary behavior, and the 'weekend warrior' among U.S. adults. *Prev Med.* 2017;103:91-97.
- Clark MM, Jenkins SM, Hagen PT, et al. High stress and negative health behaviors: A five-year wellness center member cohort study. *J Occup Environ Med.* 2016;58(9).
- Wells S, Tremblay PF, Flynn A, et al. Associations of hair cortisol concentration with self-reported measures of stress and mental health-related factors in a pooled database of diverse community samples. *Stress.* 2014;17(4):334-342.
- Stalder T, Steudte-Schmiedgen S, Alexander N, et al. Stress-related and basic determinants of hair cortisol in humans: A meta-analysis. *Psychoneuroendocrino.* 2017;77:261-274.
- Ling J, Xu D, Robbins LB, Meyer JS. Does hair cortisol really reflect perceived stress? Findings from low-income mother-preschooler dyads. *Psychoneuroendocrino.* 2020;111:104478.

First Primary Presenting Author

Primary Presenting Author

Lauren Marie Pageau, BSN, RN

Michigan State University

College of Nursing

PhD Student

East Lansing, Michigan

USA

Author Summary: Lauren Pageau is a PhD student at the Michigan State University College of Nursing. Her research focuses on the relationship between stress and cardiovascular disease risk, especially in younger, low-income populations. She is interested in the use of hair cortisol as a biomarker for chronic stress, and the role that cortisol and lifestyle behaviors play in cardiovascular disease development.

Second Author

Jiying Ling, PhD, MS, RN
Michigan State University
College of Nursing
Assistant Professor
East Lansing, Michigan
USA

Author Summary: Jiying Ling, an Assistant Professor from U.S. Michigan State University College of Nursing. She earned her PhD in Nursing in 2013. Her research focuses on health behavior promotion and obesity prevention among low-income families.

Third Author

Dongjuan Xu, PhD, RN
Purdue University
School of Nursing
Assistant Professor
West Lafayette, Indiana
USA

Author Summary: Dr. Xu's research focuses on aging and long-term care, health outcomes and policy, prevention and management of chronic conditions, quality of care, and quality of life. Her career goal is to translate research into practice and policy to manage complex care needs of older adults, promote their health, and achieve optimal quality of life. she has published 36 peer-reviewed papers which have been cited more than 400 times.