



Intimate partner violence and diurnal cortisol patterns in couples



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Summary This study examined whether physical intimate partner violence (IPV) victimization was associated with diurnal patterns of salivary cortisol in a community sample of 122 couples in their 30s from predominantly lower socioeconomic status backgrounds. Findings indicate that women with higher levels of victimization exhibited flatter patterns of diurnal cortisol characterized by both higher midday levels and more attenuated decreases in cortisol levels across the day, compared to women with lower levels of victimization. However, men's victimization was not associated with their diurnal cortisol levels. This study advances our understanding of the association between physical IPV victimization and dysregulated hypothalamic–pituitary–adrenal (HPA) axis functioning in women, which is likely to have further implications for their subsequent mental and physical health.

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1. Introduction

Victimization of physical intimate partner violence (IPV), which ranges from being pushed, slapped, or kicked to severely beaten and assaulted with a knife or gun, may have long-lasting physical and psychological health consequences – including anxiety, depression, chronic pain, and psychosomatic disorders (Lawrence et al., 2012). However, despite the high prevalence of IPV (Slep and O'Leary, 2005), the underlying mechanisms that may explain the

effects of IPV on health outcomes are not well understood. Growing evidence suggests that the quality of the romantic relationship may influence individuals' health outcomes through physiological processes including cardiovascular, endocrine, and immune functioning (Robles and Kiecolt-Glaser, 2003). From this perspective, one pathway that links IPV with negative health outcomes may be via the impact of IPV victimization on dysregulation of stress-linked endocrine processes (Repetti et al., 2002), more specifically, alterations in hypothalamic–pituitary–adrenal (HPA) axis activity (Feinberg et al., 2011). Increasing the understanding of the direct associations between IPV and HPA axis activity may help explain individual differences in vulnerabilities to IPV-related health problems, which would facilitate the development of more effective treatment programs (Inslight

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et al., 2006). In a community sample of couples, the present study examined associations between physical IPV victimization and diurnal patterns of the glucocorticoid hormone cortisol (as measured in saliva), a major hormonal end product of the HPA axis.

1.1. IPV and HPA axis activity

As a primary component of the stress reactivity and regulation system, the HPA axis releases the adrenocortical steroid hormone cortisol in response to stress, which then activates various systems throughout the brain and body to manage challenges (Sapolsky et al., 2000). Well-regulated cortisol production exhibits a strong circadian rhythm with levels typically peaking 20–30 min after waking (i.e., a cortisol awakening response [CAR]), declining rapidly in the next few hours, and more gradually throughout the day until reaching a low point in the late evening (Saxbe et al., 2008). Although activation of the HPA axis is critical to adaptive functioning, chronic or prolonged activation of the system is detrimental for physical, psychosocial, and cognitive functioning (Heim et al., 2000; Sapolsky et al., 2000; Fries et al., 2005; Chrousos, 2009). Chronic stress or psychosocial maladjustment is often associated with “flat” or “blunted” diurnal cortisol patterns with low cortisol levels in the morning without the typical steep nonlinear decline across the day (Fries et al., 2005; Saxbe et al., 2008) – which is in turn linked to a range of poor outcomes such as coronary heart disease and obesity (e.g., Brotman et al., 2007; Ruttle et al., 2013).

HPA axis activity is sensitive to interpersonal stressors (Diamond, 2001; Powers et al., 2006), including conflicts within romantic relationships (Kiecolt-Glaser and Newton, 2001; Heffner et al., 2004). Married couples’ hostile and negative behaviors were associated with increases in cortisol levels (Kiecolt-Glaser et al., 2003; Robles et al., 2006). Recent evidence suggests dysregulation in HPA axis activity among individuals with a history of physical IPV victimization, especially in women (Seedat et al., 2003; Pico-Alfonso et al., 2004; Inslicht et al., 2006). Using plasma cortisol collected once in the morning, Seedat et al. (2003) found that women who were victims of physical IPV showed lower levels of morning cortisol relative to women who were not victims of IPV. Women who were physically abused also showed higher evening salivary cortisol levels compared to women who were not abused, even after controlling for women’s age, childhood abuse, and other adulthood victimization history (Pico-Alfonso et al., 2004). Similarly, Johnson et al. (2008) found that women’s chronic exposure to physical IPV was associated with lower waking cortisol response. However, prior studies on cortisol activity in relation to IPV relied on limited measures of cortisol and IPV and relatively small samples of women recruited through service centers for abused women (e.g., women’s resource center). Thus, whether these findings can be generalized to couples in the community is unclear.

1.2. Gender differences in response to IPV

Although few studies have examined gender differences in HPA axis activity in relation to IPV, evidence suggests that

the association between IPV and HPA axis activity may differ for men and women. Robles et al. (2006) found that negative interaction patterns were related to flatter declines in cortisol for wives only. Similarly, Saxbe et al. (2008) found that greater marital satisfaction was associated with diurnal cortisol patterns (higher morning values and a steeper decline across the day) for wives only. Greater physiological reactivity to marital conflict for women compared to men may be partly because of the women’s tendency to be more attuned to the emotional quality of marital interactions compared to the husbands (Kiecolt-Glaser and Newton, 2001; Robles et al., 2006; Saxbe et al., 2008). However, most of the existing studies have focused only on women victims, emphasizing the need for further evidence regarding potential gender differences in the HPA axis activity associated with IPV victimization.

1.3. The present study

Using multivariate hierarchical modeling (Raudenbush et al., 1995), we examined associations between physical IPV victimization and men’s and women’s diurnal patterns of salivary cortisol. Men and women with higher levels of physical victimization were hypothesized to exhibit dysregulated diurnal cortisol patterns, as indexed by (1) lower CAR – defined as 30-min post-awakening cortisol levels minus awakening cortisol levels; (2) higher midday cortisol levels; (3) less linear decline in midday cortisol levels; and (4) low and flat cortisol levels across the day, without the typical steep nonlinear decline than those with lower levels of physical victimization. The present study extends previous work by investigating (1) whether findings from prior research would generalize to a community sample of couples from predominantly lower socioeconomic status (SES) backgrounds; (2) multiple parameters of diurnal cortisol patterns by modeling intra-individual variability and inter-individual differences among couples; (3) effects of physical IPV controlling for psychological IPV (e.g., yelling, insulting, and threatening behavior) and other factors that have been found to be associated with diurnal cortisol patterns (i.e., women’s employment, number of children, and relationship satisfaction); and (4) gender differences in the associations between IPV and HPA axis activity.

2. Methods

2.1. Participants

Data for the present study were from the Oregon Youth Study (OYS)-Couples Study. The men were originally recruited to the OYS through fourth-grade classes (ages 9–10 years) from public schools in a midsized Pacific Northwest city that had higher-than-average incidences of juvenile delinquency in their neighborhoods ($N=206$, participation rate = 74%). The men have been almost annually assessed over the past 30 years. The men’s parents were predominantly of lower SES; approximately 50% of the men had juvenile arrest records and only 52% graduated from high school with their class. When the men were ages 17–19 years, the OYS-Couples Study was initiated to examine these men’s adjustment with

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