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Article

Neighborhood disadvantage and preterm delivery in Urban African Americans: The moderating role of religious coping

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ABSTRACT

Evidence suggests that neighborhood disadvantage predicts preterm delivery (PTD). However, the design of most existing studies precludes within-group analyses, which would allow the identification segments of the population at highest risk, as well as preventive factors. African Americans (AA) are disproportionately affected by PTD, are disproportionately concentrated in disadvantaged neighborhoods, and frequently use religious coping in response to chronic stressors. Our objective was to examine the association between neighborhood disadvantage and PTD, and whether religious coping moderated the associations, among postpartum AA women. Addresses from participants of the Life Influences on Fetal Environments Study (n = 1387) were geocoded and linked to data from the American Community Survey. An index of neighborhood disadvantage was derived from a principal components analysis of the following variables: % below poverty, % unemployed, % receiving public assistance income, % college educated, % AA, % female-headed households, % owner occupied homes, median income, and median home value. Three domains of religious coping were assessed: organizational (church attendance), non-organizational (praying for self and asking others for prayer), and personal or subjective (experiences, perceptions, and sentiments about religion), and all were dichotomized as frequent/infrequent or satisfied/not satisfied. Preterm delivery was defined as birth before 37 completed weeks of gestation. Prevalence ratios and 95% confidence intervals were estimated with log binomial regression models. Neighborhood disadvantage did not predict PTD rates in the overall sample. However, there was evidence of moderation by asking others for prayer (*P* for asking for prayer X disadvantage index interaction term: 0.01). Among women who infrequently asked others for prayer, neighborhood disadvantage was positively associated with PTD rates (adjusted Prevalence ratio: 1.28, 95% Confidence Interval: 1.01, 1.63), and a null association was found for those who frequently asked others for prayer. No evidence of moderation by the other religious coping variables was present. Non-organizational religious coping may buffer against the adverse effects of neighborhood disadvantage on PTD rates, among urban AA women. Future research should examine the mechanisms of the reported relationships.

1. Introduction

Racial disparities in preterm delivery (PTD), or birth prior to 37 completed weeks of gestation, have existed for decades, with African American (AA) women being disproportionately impacted (Branum & Schoendorf, 2002; Costa, 2004). While the leading cause of infant mortality in the United States is PTD, the etiology of PTD remains unknown (Romero, Dey, & Fisher, 2014). Social conditions have been posited as fundamental causes of health inequalities (Phelan, Link, & Tehranifar, 2010). For instance, the quality of the residential environment (or neighborhood) is patterned by racial/ethnic status and social position, (Diez Roux & Mair, 2010) such that AAs compared to Non-Hispanic whites (NHW), are more likely to reside in disadvantaged neighborhoods, including those with inadequate municipal services and health care resources, increased crime, violence, and poor housing quality (Culhane & Elo, 2005).

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Much of the literature on the relationship between neighborhood context and PTD uses vital statistics data (Miranda, Messer & Kroeger, 2012; Farley 2006; Masho, Munn & Archer, 2014; O'Campo, Burke & Culhane, 2008; Janevic et al., 2010; Vinikoor-Imler, Messer, Evenson & Laraia, 2011; Ma, Liu, Hardin, Zhao & Liese, 2015; Masi, Hawkley, Piotrowski & Pickett, 2007; Wallace et al., 2013; Messer, Kaufman, Dole, Savitz & Laraia, 2006; Ncube, Enquobahrie, Albert, Herrick & Burke, 2016). Results from a recent meta-analysis, which included three studies focused on AAs, all of which used vital statistics data, suggested modest positive associations, with a stronger relationship among Whites compared to AAs (Ncube et al., 2016). However, limitations of using vital statistics data include inaccurate reporting of clinical information including gestational age, and that the data is collected for public health surveillance, rather than to answer specific clinical or population-based research questions (Schoendorf & Branum, 2006).

Studies which use primary collected data can include a more complete assessment and control for social determinants which may confound or modify the association between neighborhood context and PTD. In the most recently published study using primary collected data, Bastek and colleagues reported no significant association between neighborhood context and PTD in a cohort of 817 mostly AA women from Philadelphia (Bastek et al., 2015). Similarly, Phillips et al. examined the association between an aggregate socioeconomic measure of neighborhood quality and spontaneous PTD, using data from the Black Women's Health Study and found no significant associations (Phillips, Wise, Rich-Edwards, Stampfer, and Rosenberg, 2013).

Social exposures have complex and dynamic relationships and interactions, (Hertzman & Boyce, 2010) but only a few studies examined whether the impact of neighborhood exposures on PTD varies by social factors. Philips et al., found no evidence that the association between neighborhood quality and spontaneous PTD varied by sociodemographic or geographic variables. On the other hand, Ahern et al., using data from a case-control study of AA and Whites, reported that among AAs, the association between neighborhood characteristics and PTD was modified by individual-level socioeconomic status (Ahern, Pickett, Selvin, & Abrams, 2003). Further, our group recently published results from a study where we found evidence of effect modification of the association between subjective reports of the residential environment and PTD, by educational attainment, among AA women (Sealy-Jefferson, Giurgescu, Helmkamp, Misra, & Osypuk, 2015).

Religiosity has been conceptualized as a social determinant of health, (Idler, 2014) and includes several domains, including organizational (formal church attendance), non-organizational (private of informal activities), and personal or subjective (experiences, perceptions, and sentiments about religion) (Pargament, 1997; Chatters, Levin & Taylor, 1992; Taylor, Mattis & Chatters, 1999). Specifically, non-organizational religiosity, including prayer, reading religious materials, and soliciting support and prayers from a religious community, is a common response to health issues, chronic poverty, racism, and adverse residential environment among AAs (Dunn and Horgas, 2000; Krause, 1998). Religious coping is also more prevalent among women, (Ellison and Taylor, 1996) and praying for oneself or asking someone to 'pray on your behalf' is among the most utilized forms of coping with individual problems and stress, among AAs (Taylor, Chatters, & Levin, 2004). Since neighborhood disadvantage is conceptualized as a stressor, and stress during pregnancy has been established as a risk factor for adverse birth outcomes,(Dunkel Schetter, 2011) examining the associations between neighborhood stressors, religious coping, and PTD among urban AA women could help to identify subgroups of the population which are most susceptible to the influences of adverse neighborhood conditions.

As a result, our objective was to examine the associations between a composite measure of neighborhood quality and PTD, among urban AA women, and to determine whether the associations were modified by different approaches to religious coping. We tested the following hypotheses: (1) The association between neighborhood disadvantage (composite measure) and PTD is moderated by religious coping among urban AA women, and (2) the neighborhood disadvantage -PTD association is attenuated in those who utilize religious coping more frequently. Further, in exploratory analyses, we examined the same hypotheses as above, but for each neighborhood variable which comprised the composite disadvantage index, separately.

2. Methods

2.1. Study design

Details of the study design have been previously published (Sealy-Jefferson et al., 2015). In brief, the Life Influences on Fetal Environments (LIFE) study is a retrospective cohort, with enrollment occurring from 2009 to 2011 (but the current analysis uses cross-sectional data). The primary objective of the study was to determine how racism is associated with PTD (Slaughter-Acey, Sealy-Jefferson, & Helmkamp, 2016). Self-identified African American women ($\geq$ 18 years old) who delivered a singleton infant, were recruited at a hospital in Oakland County, Michigan. Women were excluded from the study if they: (1) did not speak English or (2) had intellectual disabilities, serious cognitive deficits, or significant mental illness, on the basis of history or any prior records. In-person interviews were conducted during women's postpartum hospital stay and medical history was abstracted from medical records. The final study sample included 1411 women which represented 71% of the women approached for study participation. This study was approved by institutional review boards at St. John Providence Health System, University of Michigan and Wayne State University. All study participants gave written informed consent.

2.2. Outcome ascertainment

PTD was defined as delivery prior to 37 completed weeks of gestation. Gestational age was determined using data obtained from the medical record. We employed a hierarchical algorithm, with priority given to the provider's estimate of gestational age based on early ultrasound (between 6-20 weeks gestation) as this is considered the most valid measure of gestational age (Kalish, Thaler & Chasen, 2004; Verburg, Steegers & De Ridder, 2008). Early ultrasound estimates of gestational age (n=692) were compared to other estimates including date of last menstrual period. In the case of an inconsistency, the estimate based on the early ultrasound was used, unless it was implausible ($<$ 22 weeks or $>$ 44 weeks gestation) (Talge, Mudd, Sikorskii, & Basso, 2014). When a gestational age estimate based on an early ultrasound was not available, the last menstrual period was used (n=465). In rare cases where both the early ultrasound and last menstrual period estimates of gestational age were missing or implausible, we used the late ultrasound estimate (after 20 weeks gestation) (n=169) or the provider's estimate of gestation at birth (n=62), or that from the medical record at birth, if all else was missing (n=22).

2.3. Exposure ascertainment

Current addresses were self-reported (n=1181), and if incomplete or missing (n=230), were ascertained from the medical record, and were geocoded. Twenty four addresses could not be matched, and were omitted from the analysis; the final analytic sample included 1387 women. The latitude and longitude of each