Heterogeneity in chronic disease outcomes among women and men in midlife: examining the role of stability and change in childhood economic hardship

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(Received April 2015 Revised September 2015) dx.doi.org/10.14301/llcs.v7i1.352

Abstract

In this study, we advance existing research on the long-term effects of childhood disadvantage on health in adulthood by examining how the timing and duration of childhood economic hardship differentiates between those at low and high risk of chronic disease onset in midlife for women and men, across four different health outcomes. The study uses prospective data on childhood and adulthood from the US Panel Study of Income Dynamics and discrete time hazard models are estimated using logistic regression. Results indicate that, in general, childhood economic context results in an increased risk of multiple diseases for women but not for men. Specifically, women who experienced long-term economic hardship in childhood, or began life in poverty but moved out of poverty in childhood, were more likely to experience the onset of diabetes, arthritis, and cardiovascular diseases in midlife, net of other factors, such as adult resources. The impact of childhood economic hardship on disease onset also varied by age for women but not for men, and this relationship was also dependent on the health outcome examined. This study draws attention to the importance of conceptualising and measuring childhood disadvantage as dynamic, and reveals that the process of cumulative disadvantage may be different for women and men.

Keywords

Cumulative disadvantage, gender and health, life course, childhood economic hardship

Introduction

Improving gender equity in health has been recognised by the World Health Organization as "one of the most direct and potent ways to reduce health inequities overall and ensure effective use of health resources" (Sen & Ostlin 2007: viii.). Gender differences in health are well documented in the United States (US) (see Read & Gorman, 2010 for a review), with women experiencing greater morbidity than men despite living longer. Yet attempts to explain and reduce disparities in health faced by women and men have typically focused on the relationship between health and resources in adulthood, with limited attention to the early origins

of disease and health over the life course.

Through its emphasis on human development and aging as lifelong processes (Elder, Johnson, & Crosnoe, 2003), the life course perspective has directed attention to the 'long arm' of childhood disadvantage, or how early life conditions impact health and other outcomes in adulthood. Research increasingly has recognised the importance of childhood origins in shaping health disparities (Diprete & Eirich, 2006; Murray et al., 2011), yet little work has examined how childhood context may differentially affect men and women. Existing research treats gender as a control variable rather than a focal point (e.g. Bowen, 2010), often attempting to 'explain away' gender differences rather than examining how social factors may operate differently for women and men and lead to divergent health trajectories and heterogeneity within groups (Evans-Campbell, Lincoln & Takeuchi, 2010). Further, childhood disadvantage has been treated as static, rather than as a dynamic process involving stability and change over time (e.g. Lemelin et al., 2009; Pudrovska & Anikputa, 2013; Walsemann, Ailshire, Bell & Frongillo, 2012), and its effects rarely compared across health outcomes.

The current study advances research on childhood disadvantage, gender, and health by conceptualising and measuring childhood economic context as a dynamic process that may affect disease onset in midlife differently for women and men. Specifically, we take into consideration stability and change in the experience of childhood poverty and its impact on health in midlife. Using the US Panel Study of Income Dynamics (PSID), these relationships are examined across four chronic disease outcomes that are among the most prominent causes of morbidity and mortality in the United States.

Background

Diabetes, hypertension, arthritis, stroke, heart attack and heart disease are among the most common causes of morbidity and mortality in the US (Centers for Disease Control and Prevention, 2014; Gluckman & Hanson, 2005; Heron 2007). In general, men tend to experience more life-threatening chronic diseases at younger ages, while women have higher rates of chronic debilitating conditions (Bird & Rieker, 2008). Across all age groups, heart disease is more prevalent among men than women, although it remains the leading cause of death for both genders (National Center for Health Statistics, 2009). Partly due to heart attack occurring at later ages for women, nearly half of all fatal heart attacks each year in the US occur in women. For men up to age 75, the incidence of stroke is higher than in women, but this trend reverses in adults 85 years and older (Petrea et al., 2009). Women also have a higher lifetime risk of stroke (Petrea et al., 2009). Gender differences do not appear with regard to the overall prevalence of hypertension (33.6% of men and 32.3% of women), but prevalence is higher for men under 25 (Doumas, Papademetriou, Faselis & Kokkinos, 2013). Finally, women experience higher rates of arthritis than men (26% vs. 19%) while a slightly higher percentage of men have diabetes than women (14% vs. 11%) (Centers for Disease Control and Prevention, 2014).

Social explanations of differences in men and women's health outcomes have centred on differential access to protective resources, including income and education, as well as exposure to factors that negatively affect health, such as behavioural risk factors, in adulthood (Bird & Rieker, 2008). Life course research in both the United States and many European countries, however, has consistently linked each of these chronic disease outcomes to childhood socioeconomic circumstances (Blackwell, Hayward, & Crimmins, 2001; Danese, Pariante, Caspi, Taylor & Poulton, 2007; Drakopoulos, Lakioti, & Theodossiou, 2011; Hamil-Luker & O'Rand, 2007; Johnson & Schoeni, 2011; Kivimaki et al., 2006; Luo & Waite, 2005; Maty, Lynch, Raghunathan & Kaplan, 2008; Mckenzie, Carter, Blakely & Ivoer, 2011; Mensah & Hobcraft, 2008). Cumulative dis/advantage is a key framework used to conceptualise this link, referring to a process through which initial disadvantage or advantage is compounded or amplified over time to produce heterogeneity in life course outcomes, such as health (O'Rand, 1996). In other words, the relationship between socioeconomic resources and health begins in early life and is magnified over time. Widening health disparities between advantaged and disadvantaged groups with age suggest that processes of cumulative dis/advantage operate across the life course (Brown, O'Rand, & Adkins, 2012;

Dupre, 2007; Lynch, 2003; Shuey & Elder, 2008; Shuey & Willson, 2014; Willson et al., 2007).

Early life inequalities in socioeconomic environment are thought to initiate processes of cumulative advantage and disadvantage which lead to divergent trajectories of health across the life course (Corna, 2013). Research also indicates that the timing, duration, and sequencing of childhood exposure to economic hardship are critical for many adulthood outcomes, including health (Shuey & Willson, 2014; Wagmiller, Lennon, Kuang, Alberti & Aber, 2006). Existing models of cumulative dis/advantage, however, differentially emphasise the importance of each temporal complexity (see Shuey & Willson, 2014, for a review). Such approaches also do not take into account heterogeneity in childhood circumstances, ignoring the way in which socioeconomic circumstances can improve or deteriorate throughout childhood, as well as issues of timing related to the onset of disadvantage. Instability in resources in childhood and throughout the life course often occurs, challenging notions of disadvantage that view poverty as a long-term and irreversible state (McDonough & Berglund, 2003; McDonough, Sacker, & Wiggins, 2005; Western, Bloome, Sosnaud & Tach, 2012). Little attention has been given to patterns of change in childhood circumstances. Existing research has also relied heavily on retrospective data and static measures of childhood socioeconomic status (SES). Measures of childhood SES used in previous studies have included: parents' education (e.g. Bowen, 2010; Lemelin et al., 2009; Walsemann et al., 2012), parents' occupation (e.g. Gustafsson & Hammarstrom, 2012; Hallqvist, Lynch, Bartley, Lang & Blane, 2004; Lidfelt, Li, Hu, Manson, & Kawachi, 2007; Maty et al., 2008; Pudrovska & Anikputa, 2013), family income at a single point in childhood (e.g. Fothergill, Ensminger, Green, Robertson & Juon, 2009), or some combination of factors, such as receipt of welfare, parental divorce, and father's education (e.g. Montez & Hayward, 2014; Schafer, Markus & Ferraro, 2012).

While these studies have made key contributions to our understanding of life course processes of health, they are not able to addresses the effects of dynamic and differing experiences of economic hardship. For example, long-term exposure to childhood disadvantage appears to have the strongest negative effect on adult achievement outcomes and is harmful to health in adulthood (e.g., Shuey & Willson, 2014; Wagmiller et al., 2006). However, research also suggests that transitions into or out of sustained poverty in childhood have distinct effects on health. For example, deteriorating health in mid-life is more likely among those who transition into sustained economic hardship in childhood, while those whose families move out of poverty during childhood have health trajectories similar to those who never faced economic hardship (Shuey & Willson, 2014). Accordingly, the timing and duration of experiences of disadvantage in childhood are important to understanding life course trajectories of health. Yet studies tend to draw conclusions about long-term processes based on single snapshots in time (e.g. Pudrovska & Anikputa, 2013).

Although research demonstrates processes of cumulative advantage and disadvantage begin early in life, it should not be assumed that they operate similarly across groups (George, 2005). Little empirical attention has been given to whether cumulative processes of inequality that begin in childhood may differ for men and women. Such differences are likely given gender differences in biological disease processes, responses to stressors and social conditions, and access to resources (Taylor et al. 2000; Zunzunegui, Alvarado, Béland & Vissandjee, 2008). For example, women earn less than men even after controlling for education, work experience, and marital status (Hogan & Perrucci, 2007), dominate temporary and part-time jobs (Fuller & Vosko, 2008; Prokos, Padavic, & Schmidt, 2009), and are more likely to experience discontinuity in their employment histories due to their role as primary caregiver (Moen, Robison, & Fields, 1994). Research that has incorporated gender into the study of childhood disadvantage and adult health suggests that childhood socioeconomic disadvantage predicts psychological distress, depressive symptoms, body mass index (BMI), cardiovascular disease, metabolic syndrome, diabetes and risk of heart attack for women significantly more than for men (Fitzmaurice & Buka, 2002; Gilman, Kawachi, Pudrovska & Anishkin, 2013; Gustafsson & Hammarstrom, 2012; Hamil-Luker & O'Rand 2007; Lemelin et al., 2009; Lipowicz, Kozieł, Hulanicka & Kowalisko, 2007; Maty et al., 2008; Walsemann et al., 2012). Pudrovska and

particularly useful for this analysis as, during the observation period, these individuals enter a stage of the life course in which many health problems begin to emerge. Latent classes of childhood economic hardship experience were estimated for the full sample of these respondents (N=4,167) using data collected from PSID families from 1968-1977 (see Shuey & Willson, 2014). The sample used in multivariate analyses includes the subsample of individuals who remained in the study in adulthood and were a PSID 'head' or a 'wife' at the start of the observation period in 1999 as these are the household members that the PSID collects detailed information on in each survey year (Number of individuals=1,229; 697 women, 532 men).

Missing data is a challenge in any longitudinal study. This paper uses survival analysis, which allows the use of unbalanced panels, meaning individuals who attrited from the PSID after the initial observation year (1999) are still included in the analysis. Additionally, one advantage of the PSID is that, unlike retrospective studies, which do not begin studying individuals until much older ages, many selection processes are observable. Multiple studies have extensively examined the effects of the attrition of this cohort of children from the PSID sample on intergenerational models (e.g., those using family income during the respondent's childhood) with covariates that predict adult health outcomes and demonstrate that the PSID maintains its representativeness over time without strong evidence of attrition bias, with the exception that the effect of higher education on sample attrition is stronger than that of health and that female subsamples demonstrate weaker effects of attrition than males (Fitzgerald, 2011; Halliday, Kimmitt, & Kimmitt, 2012; Meer, Miller, & Rosen, 2003). Previous research also has found that individuals who experienced childhood poverty are less likely to have remained in the PSID to have an observed health outcome in 1999 when health data began to be collected (see Shuey & Willson, 2014). Any selective attrition with respect to health will likely lead to an underestimate of the impact of childhood economic hardship. Taken together, this indicates that, while not significantly biased, results from this study are likely conservative estimates of the association of childhood economic hardship and adult health (Shuey & Willson, 2014).

Measures

Disease outcomes

Four disease outcomes are assessed in this study: high blood pressure, diabetes, arthritis, and a measure consisting of heart attack, heart disease, and stroke. Stroke, heart attack, and heart disease were grouped together due to relatively low prevalence levels in middle age in addition to all affecting the heart and circulatory system (Johnson & Schoeni 2011). The conditions are measured by responses to the question: "Has a doctor or health professional ever told you that you have had–?" Respondents were asked this question in each survey wave from 1999 to 2011. It is possible for individuals to have comorbidities, but each condition was examined separately and each measure included all those individuals who reported having been diagnosed with that particular health condition. It should be acknowledged that these measures are somewhat non-specific and the measure of arthritis does not distinguish between types of arthritis, which are experienced at different rates by men and women and have differing etiologies. Variation in the experience of arthritis could contribute to gender differences in association with childhood economic hardship, however we believe this is minimal given the similar rates of arthritis among the men and women in the sample. We further discuss the potential implications in the discussion section.

Childhood economic hardship

Children's histories of economic hardship were analysed over a 10-year period, from 1968 (when the children were 0-8 years old) to 1977. A child was considered to be living in poverty in a given year if the family's total annual income fell below 125% of the official US poverty threshold.[i] These indicators and repeated measures of latent class analysis were used to identify subgroups of individuals with similarities in their experience of economic hardship in childhood (see Shuey & Willson, 2014, for a detailed discussion). Based on fit statistics from the latent class models, and the previous literature (Wagmiller et al., 2006), it was determined that there were four groups into which respondents could be classified: non-poor, moving into poverty, moving out of poverty, and

Table 2. Discrete-time logistic regression estimated effects of childhood economic hardship on the risk of onset of Diabetes within 12 years, by gender: 1999-2011 PSID

Independent variable	Model 1				Model 2[a]				Model 3[b]				Model 4[c]			
	Women		Men		Women		Men		Women		Men		Women		Men	
	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value
Childhood economic hardship (non-poor)																
Move into poverty	0.92	0.889	2.15	0.285	1.17	0.819	1.75	0.371	0.94	0.929	1.83	0.350	0.70	0.652	1.54	0.433
Long-term poverty	0.20	0.026	0.76	0.289	0.17	0.019	0.73	0.422	0.15	0.011	0.72	0.401	0.10	0.007	0.49	0.168
Move out of poverty	0.15	0.081	2.21	0.279	0.15	0.126	1.78	0.429	0.13	0.091	1.63	0.518	0.10	0.051	1.29	0.718
Age (40-45)																
46-52	2.04	0.096	7.42	0.000	2.44	0.045	8.90	0.000	2.51	0.076	9.01	0.000	2.57	0.062	9.82	0.000
Childhood economic hardship X age																
Move into poverty X 46-52	1.06	0.921			0.76	0.688			1.02	0.982			0.90	0.887		
Long-term poverty X 46-52	8.17	0.006			8.43	0.006			9.07	0.008			9.01	0.007		
Move out of poverty X 46-52	15.67	0.022			12.37	0.034			11.88	0.038			12.97	0.032		
Constant	0.29	0.002	0.12	0.000	19.75	0.190	0.00	0.002	6.27	0.465	0.00	0.002	6.77	0.437	0.00	0.002

Notes:
Number of observations (women) = 810. Number of observations (men) = 594.
[a] Model 2 controls for adult resources: education, income, employment status, and marital status.
[b] Model 3 controls for the variables specified in Model 2 and adds adult health behaviours: smoking, drinking, and physical activity.
[c] Model 4 controls for the variables specified in Models 2 and 3 and adds race/ethnicity.

Table 3. Discrete-time logistic regression estimated effects of childhood economic hardship on the risk of onset of high blood pressure within 12 years, by gender: 1999-2011 PSID

Independent variable	Model 1				Model 2[a]				Model 3[b]				Model 4[c]			
	Women		Men		Women		Men		Women		Men		Women		Men	
	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value
Childhood economic hardship (Non-poor)																
Move into poverty	1.13	0.758	1.52	0.280	1.22	0.635	1.65	0.200	1.40	0.412	1.63	0.235	1.50	0.321	1.66	0.228
Long-term poverty	0.65	0.108	0.97	0.861	0.72	0.259	0.98	0.937	0.78	0.396	1.01	0.953	0.85	0.589	0.95	0.838
Move out of poverty	0.59	0.192	0.95	0.808	0.68	0.340	1.03	0.873	0.70	0.392	1.03	0.891	0.76	0.504	0.96	0.897
Age (40-45)																
46-52	5.90	0.000	7.69	0.000	6.85	0.000	8.30	0.000	6.65	0.000	8.17	0.000	6.70	0.000	8.17	0.000
Childhood economic hardship X age																
Move into poverty X 46-52	0.62	0.289			0.53	0.170			0.55	0.191			0.55	0.194		
Long-term Poverty X 46-52	1.51	0.191			1.31	0.394			1.34	0.366			1.33	0.379		
Move out of poverty X 46-52	1.81	0.202			1.52	0.380			1.65	0.294			1.62	0.310		
Constant	0.17	0.000	0.12	0.000	0.20	0.082	0.17	0.049	0.26	0.147	0.17	0.062	0.30	0.225	0.15	0.055

Notes:
Number of observations (women) = 2592. Number of observations (men) = 2020.
[a] Model 2 controls for adult resources: education, income, employment status, and marital status.
[b] Model 3 controls for the variables specified in Model 2 and adds adult health behaviours: smoking, drinking, and physical activity.
[c] Model 4 controls for the variables specified in Models 2 and 3 and adds race/ethnicity.

Table 4. Discrete-time logistic regression estimated effects of childhood economic hardship on the risk of onset of arthritis within 12 Years, by gender: 1999-2011 PSID

Independent variable	Model 1				Model 2[a]				Model 3[b]				Model 4[c]			
	Women		Men		Women		Men		Women		Men		Women		Men	
	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value
Childhood economic hardship (Non-poor)																
Move into poverty	0.35	0.085	0.82	0.535	0.30	0.043	0.64	0.233	0.29	0.034	0.67	0.340	0.31	0.053	0.66	0.297
Long-term poverty	0.55	0.066	0.77	0.268	0.49	0.033	0.65	0.193	0.48	0.030	0.65	0.219	0.54	0.105	0.47	0.108
Move out of poverty	0.19	0.005	1.62	0.203	0.18	0.008	1.39	0.435	0.17	0.008	1.47	0.357	0.19	0.011	1.07	0.901
Age (40-45)																
46-52	4.03	0.000	6.07	0.000	4.38	0.000	6.40	0.000	4.60	0.000	6.43	0.000	4.57	0.000	6.62	0.000
Childhood economic hardship X age																
Move into poverty X 46-52	2.56	0.167			2.57	0.162			2.49	0.174			2.58	0.151		
Long-term poverty X 46-52	1.63	0.209			1.46	0.329			1.45	0.333			1.48	0.307		
Move out of poverty X 46-52	6.18	0.006			5.55	0.011			5.53	0.012			5.75	0.011		
Constant	0.27	0.000	0.15	0.000	1.11	0.931	0.30	0.481	1.03	0.981	0.18	0.330	1.39	0.804	0.18	0.330

Notes:
Number of observations (women) = 1944. Number of observations (men) = 950
[a] Model 2 controls for adult resources: education, income, employment status, and marital status.
[b] Model 3 controls for the variables specified in Model 2 and adds adult health behaviours: smoking, drinking, and physical activity.
[c] Model 4 controls for the variables specified in Models 2 and 3 and adds race/ethnicity.

childhood adversity differentiates risk of onset within each group. Instead of simply controlling for gender, we explore the unique patterns of cumulative disadvantage among women and men. In so doing, we not only find childhood economic hardship to produce heterogeneity in women's chronic disease outcomes (Hamil-Luker & O'Rand, 2007), but also, that the impact of childhood poverty varies by age for women. Little empirical research has examined whether the process of cumulative disadvantage is the same across different sub-groups of the population over time or when the effects of childhood economic hardship may emerge for particular groups. This study suggests that cumulative disadvantage may be a gendered process, with age-dependent effects and heterogeneous health outcomes generally emerging for women, but not for men.

Acknowledgements

This study was supported by an operating grant from Canadian Institutes of Health Research as well as an Ontario Women's Health Scholars Award to Nicole Etherington. The collection of data used in this study was partly supported by the National Institutes of Health under grant number R01 HD069609 and the National Science Foundation under award number 1157698. The authors wish to thank the anonymous reviewers for their constructive and invaluable comments.

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Endnotes

[i] Consistent with previous literature using the PSID, 125% of the US poverty threshold was used because the PSID consistently finds higher reported incomes than the Census Bureau (Wagmiller et al., 2006).