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Economic Adversity Transitions From Childhood to Older Adulthood Are Differentially Associated With Later-Life Physical Performance Measures in Men and Women in Middle and High-Income Sites

Phoebe W. Hwang, MS, DrPH¹, Cristiano dos Santos Gomes, MS², Mohammad Auais, PhD³, Kathryn L. Braun, DrPH¹, Jack M. Guralnik, MD, PhD⁴, Catherine M. Pirkle, PhD¹

¹University of Hawai'i at Mānoa, Honolulu, USA

²Federal University of Rio Grande do Norte, Natal, Brazil

³Queen's University, Kingston, Ontario, Canada

⁴University of Maryland School of Medicine, Baltimore, USA

Abstract

Objective: This study examines the relationship between economic adversity transitions from childhood to older adulthood and older adulthood physical performance among 1,998 community-dwelling older adults from five demographically diverse sites from middle and high-income countries.

Method: The principal exposure variable was economic adversity transition. No adversity encompassed not experiencing poverty in both childhood and older adulthood, improved described having only experienced poverty in childhood, worsened captured having experienced poverty in older adulthood, and severe is having experienced poverty in both childhood and older adulthood. The short physical performance battery (SPPB) was used for outcome measures. Analyses of the continuous SPPB score used linear regression, while analysis of a binary outcome (SPPB < 8 vs. 8) used Poisson regression models with robust error variance, both adjusting for sex, education, and site location.

Result: In sex-stratified models, the SPPB < 8 prevalence rate ratio (PRR) was higher for the severe (PRR: 2.80, 95% confidence interval [CI] = [1.70, 4.61]), worsened (PRR: 2.40, 95% CI = [1.41, 4.09]), and improved (PRR: 1.82, 95% CI = [1.11, 3.01]) groups, compared with those with no adversity in childhood or as adults, but only for females.

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Corresponding Author: Phoebe W. Hwang, University of Hawai'i at Mānoa, 1960 East West Road, Biomedical Sciences Bldg #D104T, Honolulu, HI 96822, USA. pwnhwang@hawaii.edu.

Author Contributions

P.W.H. planned the study, conducted the analysis, interpreted the data, and wrote the article. C.G., M.A., K.L.B., and J.M.G. contributed to the study plans and revising the article. C.M.P. helped plan the study and supervised the data analysis and interpretation.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Discussion: Findings from this study indicate that persistent economic adversity has a negative effect on older adult physical performance, especially among women.

Keywords

gerontology; global health; life course epidemiology; physical performance; life course adversity

Introduction

A robust body of literature documents that poverty is associated with poor health outcomes across the globe (Leon & Walt, 2001). Besides examining how current income status is associated with health status at one point in time, life course epidemiology approaches allow researchers to examine the temporal and/or cumulative effects of poverty on health outcomes (Ben-Shlomo & Kuh, 2002). Life course studies provide compelling evidence that sustained lifetime poverty is independently associated with poor physical, psychological, and cognitive health outcomes during adulthood (Lynch, Kaplan, & Shema, 1997).

Research on older adults shows that an individual's biological risk increases and years of life decrease as his or her poverty experiences accumulate over time. This may explain why certain demographic groups age less successfully than others (Crimmins, Kim, & Seeman, 2009). There is robust literature showing that women suffer from greater health disparities in older age compared with men (Câmara et al., 2015; de Albuquerque Sousa et al., 2014; Zunzunegui et al., 2015). For example, research examining mobility disability, an indicator of functional decline, in adults across 70 countries documented a persistent gender gap with women faring worse than men. The greatest differences between the sexes were observed in regions with largest gender inequalities, which include unequal access to economic resources (Mechakra-Tahiri, Freeman, Haddad, Samson, & Zunzunegui, 2012).

Of the many health outcomes examined in older adults, functional decline is an important indicator because such decline affects quality of life for both the affected individuals and their families by increasing the older adult's risk of falls, risk of subsequent overall health decline, need for assistance, and cost for both health care and daily living ("Functional Decline in Older Adults—American Family Physician," n.d.). Physical performance tests are commonly used in research to detect functional decline (Fukagawa, Brown, Sinacore, & Host, 1995). Although functional decline naturally occurs in older adults, the degree of decline depends on multiple risk factors, including social inequities, such as poverty across the life span. Having experienced childhood poverty is consistently associated with a greater likelihood of older adult physical performance decline (Grundy & Sloggett, 2003; Haas, 2008). As physical performance has been observed to vary by economic exposures in previous studies, physical performance is an ideal measure of older adult physical health for this study.

Current life course literature documents the significant impact of childhood poverty on adult and older adulthood health, separately (Evans, Chen, Miller, & Seeman, 2012; Lif, Brannstrom, Vinnerljung, & Hjern, 2016). However, no research, to our knowledge, examines how different poverty trajectories affect the level of physical performance at older age in high and middle-income countries. While poverty is well documented to have a

cumulative impact over a life course, to the authors' knowledge, it is unknown how improvement or worsening of an individual's economic situation later in life may affect physical performance measures. Furthermore, there is limited global health research that examines the effects of life-course poverty in diverse settings. Life course frameworks describe how health outcomes and behaviors come to be over an individual's life experiences or across generations. It emphasizes a social and temporal perspective, and highlights the impact of exposure timing, critical periods of early life, and temporal order of exposures (Mishra, Cooper, & Kuh, 2010). Utilizing the life course approach has implications on how health policies or interventions will be developed and aid in identifying chains of risk that can be broken, as well as the most effective types and times of intervention from gestation to old age (Kuh & Ben-Shlomo, 1997). Therefore, this study takes a life course approach to examine how economic adversity transitions are associated with later life physical performance. The purpose is to examine the relationship between economic adversity transitions from childhood to older adulthood and older adulthood physical performance among community-dwelling older adults in five sites—Kingston and St. Hyacinthe, Canada; Tirana, Albania; Manizales, Colombia; and Natal, Brazil. We hypothesize that physical performance scores will vary according to a gradient of high to low in the following order: individuals with neither childhood nor older adulthood economic adversity (no adversity), individuals with economic adversity in childhood but not in older adulthood (improved), individuals with economic adversity in older adulthood but not in childhood (worsened), and individuals with both childhood and older adulthood economic adversity (severe).

Method

Study Population

Data were collected as part of the longitudinal International Mobility in Aging Study (IMIAS) at the following study sites: Kingston ($N = 398$) and St. Hyacinthe ($N = 401$), Canada; Tirana, Albania ($N = 394$); Natal, Brazil ($N = 407$); and Manizales, Colombia ($N = 402$). Each site had near equal proportions of men and women, with the total sample containing 953 men and 1,045 women. These five sites were chosen because the varying demographic factors maximize the spectrum of exposures that participants face across the life course (Zunzunegui et al., 2015). Baseline data were obtained in 2012, with follow-up collections in 2014 and 2016. Only baseline data were used for these analyses. Four participants were missing data on physical performance. Therefore, of the 2,002 participants at baseline, 1,998 were used in the analysis.

Participants comprised community-dwelling older adults ages 65 to 74 at baseline. University ethics committees did not allow researchers to recruit or contact potential participants directly in Kingston and St. Hyacinthe. Thus, family physicians were engaged to send study invitation letters to potential participants that invited them to contact a field coordinator for further information regarding the study. In Tirana, Natal, and Manizales, participants were randomly sampled and recruited from health center registries. Potential participants were approached directly by interviewers to participate in the study (Zunzunegui et al., 2015). All interviewers were trained with a standardized protocol.

Response rates were 90% in Tirana, nearly 100% in Manizales and Natal, and 30% in Kingston and St. Hyacinthe. Samples of recruited participants are representative of their respective towns/cities. Individuals who had four or more errors on the Leganes Cognitive Test orientation scale (de Yébenes et al., 2003) were excluded from the study, as low scores indicated inability to complete study procedures. For a detailed description of study site, refer to Zunzunegui et al. (2015).

Exposures

The principal exposure variable, economic adversity transition, depended on the presence of any childhood and older adulthood economic adversity, and was categorized as no adversity, improved, worsened, or severe. To create this variable, we used measures of childhood and older adulthood adversity. Childhood economic adversity was measured using a series of retrospective questions on events that occurred within the first 15 years of the participants' lives. The events were low economic status, having been hungry, and parental unemployment (de Albuquerque Sousa et al., 2014). Individuals who experienced any of these events were considered to have had childhood economic adversity. Older adulthood current economic adversity was measured using actual income and income sufficiency. Actual income and income sufficiency were self-reported measures. For actual income, participants were asked about their current individual annual income (including work, pension, help from family, rental/investments, government assistance). Based on the annual minimum salary for each site, individuals were categorized as poor, middle, upper middle, and high income. For example, in Canada, the minimum salary is CAN\$19,680/year. Thus, we categorized Canadian participants as poor if they earned less than CAN\$20,000/year. Those who earned more than the minimum salary but less than twice it (CAN\$20,000-CAN\$39,999) were classified as middle income, while those that earned twice or greater the minimum salary, but less than 3 times it, were classified as upper-middle (CAN\$40,000-CAN\$59,999), and those that earned 3 times or more the minimum salary (CAN\$60,000) were classified as upper-income. This was done for each site based on the site-specific minimum salary. For income sufficiency, participants were asked "to what extent did your income meet your needs?" Responses were very well, suitably, and not/not very well. Participants categorized as either poor or middle actual income, or those who reported income insufficiency (not/not very well), were considered to have endured older adulthood economic adversity. Thus, based on the childhood and adulthood measures, the following four categories were delineated: The no-adversity group encompassed participants who had experienced neither childhood nor older adulthood economic adversity; the improved category included participants who reported experiencing economic adversity in childhood, but not in older adulthood; the worsened group included participants who reported experiencing economic adversity in older adulthood, but not in childhood; and the severe category included participants who reported experiencing both childhood and older adulthood economic adversity.

Covariates

Correlates of SPPB scores were identified previously through literature review. Education, age, and sex were selected as covariates based on research into the social determinants of health (Marmot, 2005). Education was previously coded into three categories: illiterate/

primary school only, secondary schooling, and postsecondary schooling. Analyses indicated insufficient variability within sites for direct comparison across sites. For example, in Kingston, 9.6% of participants were illiterate or only had primary school education, whereas in the Natal, 89.8% were illiterate or only had primary school education. To compare across sites, total years of education was split categorically into tertiles of high, medium, and low education by site to obtain a variable called “relative education.” Thus, it is possible for a participant to have high educational attainment relative to his or her community, but medium or low attainment compared with another site in IMIAS. Sex is an interviewer reported categorical variable (male/female). Age is a self-reported continuous variable recoded into a binary categorical variable (64–69/70–75). Site location is based on the location of data collection.

Outcomes

Physical performance was evaluated using the Short Physical Performance Battery test (SPPB; Guralnik et al., 1994). SPPB was measured using balance, gait speed, and chair stand scores. Each component has a maximum score of four. Total possible SPPB score is 12. Balance was measured by asking participants to stand for 10 s in three increasingly difficult positions: feet together, in semi-tandem position, and tandem position. The gait speed test measures the time of the participant walking, at his or her normal pace, 4 m. The chair stand tests the participant’s ability to stand up and sit down in a chair 5 times. Continuous SPPB measures (balance, gait speed, chair stand, and total scores) were used as dependent variables for analyses. A binary categorical response of low and high SPPB was also generated. SPPB scores of less than eight indicate low or limited physical performance, and SPPB scores of eight or more indicate higher physical performance (de Albuquerque Sousa et al., 2014). A categorical cut off for the outcome variable allows for easier clinical interpretation of data by using a risk estimate, compared with using only using a continuous outcome variable.

Statistical Analysis

STATA/SE (version 14.0; StataCorp LP, College Station, TX, USA) was used to conduct the analyses. Bivariate analyses were performed using Pearson’s chi-square test for categorical data and one-way ANOVA for continuous data. Poisson regression with robust variance and multilinear regression were used to examine the strength of associations between covariates and outcome measures. The data met linear regression assumptions; therefore, no transformations were required. For binary outcomes, Poisson regression with robust variance was selected over logistic regression because prevalence rate ratios (PRR) are more interpretable for the general public and provide more accurate estimates for cross-sectional studies (Barros & Hirakata, 2003). All regression models statistically adjusted for age, educational attainment, and sex. Previous research from IMIAS demonstrate significant differences in physical performances by site location and sex (Zunzunegui et al., 2015). Therefore, multivariate models were stratified by site location and sex. The sex stratifications are consistent with World Health Organization recommendations to sex-disaggregate data (World Health Organization, 2015). A test for trend in association was conducted to identify trends in economic adversity transitions by total SPPB score.

Results

The distribution of participant characteristics by economic transition category is shown in Table 1. Based on self-report, a greater proportion of men than women experienced improvements in their economic conditions over their life courses (30% vs. 21%). In contrast, a greater proportion of women (19%) reported deteriorating economic conditions over their life courses compared with men (12%). Differences between men and women were smaller (<5%) in the no and severe adversity categories. There was a similar distribution of participants according to age category for all economic transition categories. Regarding educational attainment, stark differences were observed in the no and severe adversity categories. For example, 30% of those in the low relative education category reported no economic adversities compared with 50% of those with relatively high educations. In comparison, only 10% of those with high relative educations reported both childhood and adulthood economic adversity versus 28% among those of low relative educations. There was a much higher proportion of individuals in the no adversity group in Kingston (65.9%) and St. Hyacinthe (61.1%) compared with the other study sites (23% in Tirana and Manizales and 19% in Natal). In contrast, approximately one third of participants from all three middle-income sites reported severe economic adversity across the life course compared with less than 5% of participants from the Canadian sites.

Notable differences were observed in poor physical performance measures according to economic transition category. Of those with high physical performance (SPPB = 8), there was a greater proportion of individuals in the no-adversity group (40.3%) compared with improved (25.9%), worsened (15.1%), and severe groups (18.7%). Of those with low physical performance, there was a higher proportion of individuals in the severe (38.1%) compared with no-adversity (20.8%), improved (22.3%), and worsened groups (18.9%).

Mean physical performance test scores by covariates in Table 2 corroborate the results of SPPB categories in Table 1. Males consistently scored higher than females in balance, gait, chair stand, and total score. The younger age group consistently scored on average higher in all three physical performance tests compared with the older group. A gradient of low to high physical performance scores was observed in those with low to high levels of education, respectively. In addition, for all physical performance tests, a gradient of high to low physical performance scores, by economic adversity transitional category, was observed from no-adversity, improved, worsened, to severe. It should be noted that although all three physical performance tests total to a score of 4, average chair stand tests scores per covariate were consistently lower (total $M = 2.5$), by about 1 point, compared with balance (total $M = 3.6$) and gait speed (total $M = 3.5$).

Multivariate models examined covariate-adjusted associations between economic adversity transitions with high/low physical performance (Table 3) and continuous physical performance scores (Table 4). In the overall sample, controlling for covariates, individuals from the severe group were almost twice as likely to have low physical performance (SBBP < 8) in older adulthood (PRR: 1.91, 95% confidence interval [CI] = [1.33, 2.75]) compared with the no-adversity group. For those in the worsened category, the CI barely crossed 1.0 (95% CI = [0.99, 2.20]); the PRR of those in the worsened category compared with no

adversity was 1.47. Similar to the overall model, in fact stronger, associations were observed in St. Hyacinthe. Interestingly, in Kingston, PRR for the worsened group was 4.86 (95% CI = [1.08, 21.91]) compared with 3.65 in the severe group (95% CI = [1.01, 13.26]). Although not statistically significant, similar trends were observed in Manizales. In Tirana, the PRR for those in the severe category compared with no-adversity was 2.14 (95% CI = [1.22, 3.76]), but there was no association for other categories of economic transition. In Natal, no association was observed between economic adversity transition and poor physical performance.

Large differences in economic adversity transition associations were observed when stratified by sex (Table 3). For women, a significant gradient in PRR was observed from severe (PRR: 2.80, 95% CI = [1.70, 4.61]), worsened (PRR: 2.40, 95% CI = [1.41, 4.09]), to improved (PRR: 1.82, 95% CI = [1.11, 3.01]), all compared with the no-adversity category. No significant associations were observed among men.

Table 4 presents the study-site-adjusted and sex-stratified results for the continuous total SPPB scores. With both sexes combined, participants in the severe group had lower total SPPB scores (β : -0.28, 95% CI = [-0.44, -0.12]) compared with those in the no-adversity group. In the test for trend, a gradient effect was observed in males, females, and both. Among females, the severe (β : -0.95, 95% CI = [-1.37, -0.55]) and worsened groups (β : -0.64, 95% CI = [-1.06, -0.22]) had significantly lower total SPPB scores compared with the no-adversity group.

Discussion

Using global health data from middle and high-income sites, we examined how economic adversity transitions over the life course affect older adult physical performance. Although not always statistically significant, overall results, when adjusted for sex, site location, education, and age, corresponded with our hypothesis. Physical performance in older age occurs on a gradient that appears linked to economic adversity transitions. Results from the total sample suggest that economic adversity transitions associated with highest to lowest physical performance outcomes in older adulthood were as follows: no adversity in childhood and older adulthood, improved (adversity only in childhood), worsened (adversity only in older adulthood), and severe (adversity in both childhood and older adulthood). This trend was observed in our bivariate and multivariate analyses using categorical and continuous physical performance measures. Findings support previous literature highlighting that the accumulation of poverty experiences over the life course is associated with poor health outcomes (Galobardes, Lynch, & Smith, 2004; Kuh, Hardy, Langenberg, Richards, & Wadsworth, 2002). It also provides evidence that the worsening of economic circumstances from childhood to adulthood is disadvantageous for one's physical health.

Although overall results aligned with our hypothesis, results differed greatly when stratified by site location and sex. For site location, Natal had the lowest proportion of older adults in the no adversity (19.2%) category and the highest proportion of older adults in the severe category (37.1%). In contrast, Kingston had the highest proportion of older adults in the no adversity category (65.9%), and the lowest proportion of older adults in the severe (2.2%)

and worsened (2.2%) categories. Similar patterns were observed in mean physical performance scores, with Kingston having the highest and Natal the lowest.

Perhaps due to differences in economic adversity distributions by site, findings from multivariate models by site location did not follow the same overall gradient observed with all sites combined. For example, there was no observed association or general trend between physical performance and economic adversity transitions in Natal. It may be that absolute poverty is so pervasive in Natal that relative improvements in one's economic situation do not translate into health gains, and that other socioeconomic factors may be better predictors of the poor physical performance scores we observed in Natal. Because this study focused only on individual-level income transition, we did not model possible community-level socioeconomic factors such as community area economic conditions and intergenerational poverty transmissions. An area's economic condition is a predictor of one's abilities to adapt to decreased income and employment loss (Yeung & Hofferth, 1998) as individuals living in poor area economic conditions have fewer resources, and thus less public assistance. Furthermore, poverty transmitted consecutively through multiple generations seems to be more difficult to overcome compared with poverty experienced in a single generation (Harper, Marcus, & Moore, 2003). Factors beyond individual-level economic adversity transition may play a role in poor physical performance in Natal. Future studies should examine community-level socioeconomic factors.

The most interesting finding from this study is the strong association, along a gradient, observed in women and the lack of such an association in men. Although site-specific differences were observed in the site stratified analyses, when adjusting for site location in the overall analyses, the difference in associations between males and females were notable. This highlights the global importance of sex disparities in health and echoes World Health Organization calls to sex-disaggregate data to identify sex and gender-based differences in health risks, as well as opportunities for appropriately designed interventions (World Health Organization, 2015). Parallel to previous literature, more women are living in poverty and have poorer physical performance compared with men (Cawthorne, 2008). In models stratified by sex, economic adversity transitions seem to have much stronger associations with physical performance in females compared with males, suggesting that the associations seen in the combined models were driven mainly by females. These findings corroborate existing literature on poverty-accumulation disparities between sexes. For example, Hernandez and Pressler found that lifetime poverty accumulation was detrimental to female physical health outcomes, yet protective for males (Hernandez & Pressler, 2014). This may suggest that males and females take different social paths when exposed to poverty. For example, poverty among young men is often associated with manual jobs, such as construction (Entwisle, Alexander, Olson, & Ross, 1999), and these jobs often require vigorous physical activity, which may protect these men from chronic conditions as they age, even if they do not maintain vigorous activity levels later in life. It is well documented in the literature that physical activity is associated with high physical performance and good health outcomes (LIFE Study Investigators et al., 2006). On the contrary, poverty among young females is associated with earlier ages at first childbirth and elevated lifetime parity (Glasier, Gülmezoglu, Schmid, Moreno, & Van Look, 2006). Women who give birth during their teens often have low socioeconomic status prior to the pregnancy (da Conceição

Chagas de Almeida & Aquino, 2009; Kiernan, 1997). The accumulated physiological demands of childbearing may directly and/or indirectly contribute to physical function decline among women, as previously observed in IMIAS and elsewhere (Câmara et al., 2015; Hardy, Lawlor, Black, Mishra, & Kuh, 2009). We should recognize that the negative effects of poverty may differ in strength between demographic groups across the globe.

As this and previous studies highlight the important role financial status plays on health outcomes, it may be worth further investigating the mechanisms behind and other possible mediators involved in differences in physical performance observed between high and middle-income sites and across the sexes. Understanding these mechanisms can better identify demographic specific approaches to improving health outcomes.

Strengths and Limitations

There are several strengths of this study. First is the uniqueness of the IMIAS data set, which allows researchers to observe how global geographical and socioeconomic differences affect study outcomes. Recall bias is often cited as a limitation in cross-sectional studies using self-reported retrospective events. Recall bias is a type of information bias that leads to misclassification and is concern when there is differential reporting in exposure groups according to the outcome measure (Szklo & Nieto, 2012). This is unlikely in our study because the outcome measure was the SPPB test, which is an objective measure of physical function, and any recall bias regarding retrospective events would have been nondifferential across the outcome measure. Thus, if recall bias did occur in the exposure variable, the effect estimate would have been biased toward the null and the associations observed in this study are most likely underestimates. Furthermore, participants with low cognitive functioning were excluded from this study, reducing the likelihood of recall bias in the exposure variable. Finally, the protocols used in this study were pretested, standardized, and validated (Zunzunegui et al., 2015).

Although this study has some notable strengths, limitations also exist. First, older adulthood economic adversity data were collected at the same time as the physical performance data, for example, during older adulthood. As physical performance and older adulthood economic adversity were collected simultaneously, it is possible that loss of physical performance contributed to impoverishment during older adulthood, rather than the other way around. Furthermore, economic adversity was only collected at two time points; future studies should examine the effects of economic adversity trajectory through childhood, adulthood, and older adulthood. Being that our participants were older adults, selective survival also is a possible limitation to this study. If the most at-risk individuals in each community died before cohort selection, then the effect sizes may be smaller than observed. The effects of selective survival can be seen as socioeconomic gradients tend to lessen in older aged groups (Guilley, Bopp, Faeh, & Paccaud, 2010). As high-income countries tend to have higher average life expectancies compared with middle and low-income countries, there may be differences in socioeconomic gradients between site locations for this study (World Bank, n.d.). Thus, the associations within our middle-income sites with lower life expectancy may not be as strong as the high-income sites. This may explain the lack of association that we observed in Natal.

Conclusion

Economic adversity is widely accepted to be directly related to poor health outcomes. Findings from this study indicate that persistent economic adversity has a negative effect on older adult physical performance, and that these negative effects were stronger among women than for men. Results suggest that physical performance in older age for females occurs on a gradient that is tightly linked to lifetime economic adversity experiences. Furthermore, results were significant when adjusted for demographically diverse site locations from middle and high-income countries, indicating that this association has implications in various social contexts. Should the observed association be causal, it highlights the importance of poverty alleviation across the life course, especially for women.

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Table 1.

Participant Characteristics by Economic Transition Category.

	Economic transition category ^{a,b}								<i>p</i> value
	No adversity (<i>N</i> = 739)		Improved (<i>N</i> = 497)		Worsened (<i>N</i> = 305)		Severe (<i>N</i> = 416)		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Sex									
Male	362	38.5	283	30.1	113	12.0	182	19.4	<.001
Female	377	37.1	214	21.0	192	18.9	234	23.0	
Age									
64–69	427	39.8	265	24.7	166	15.5	216	20.1	<.21
70–75	312	35.3	232	26.3	139	15.7	200	22.7	
Education ^c									
Low	229	30.6	190	25.4	117	15.6	213	28.4	<.001
Medium	235	36.0	146	22.4	122	18.7	149	22.9	
High	275	49.5	161	29.0	66	11.9	54	9.7	
Site location									
Kingston	243	65.9	110	29.8	8	2.2	8	2.2	<.001
St. Hyacinthe	236	61.1	123	31.9	12	3.1	15	3.9	
Tirana	90	22.8	103	26.1	78	19.8	123	31.2	
Manizales	93	22.9	49	12.1	143	35.2	121	29.8	
Natal	77	19.2	112	27.9	64	15.9	149	37.1	
SPPB ^d									
SPPB ≥ 8	681	40.3	438	25.9	255	15.1	315	18.7	<.001
SPPB < 8	55	20.8	59	22.3	50	18.9	101	38.1	

Note. Missing values: SPPB (*n* = 4).

^aNo adversity = not having experienced any childhood and older adulthood economic adversity, improved = having experienced any childhood economic adversity and not having experienced older adulthood economic adversity, worsened = not having experienced any childhood economic adversity and having experienced any older adulthood economic adversity, severe = having experienced both any childhood economic adversity and older adulthood economic adversity.

^bMissing values: Economic adversity transition (*n* = 44 or 2.2% of total sample).

^cEducation calculated from total years of education categorized by site-specific tertiles.

^dSPPB = Short Physical Performance Battery, SPPB test scores of less than 8 are considered low or limited physical performance.

Table 2.
Mean Levels and Standard Deviations of Physical Performance Tests by Covariates ($N = 2002$)

	Balance ($n = 1,998$)		Gait ($n = 1,998$)		Chair ($n = 1,998$)		Total score ^a ($n = 1,998$)		SPPB ^b < 8 ($n = 267$)		SPPB 8 ($n = 1,731$)	
	M	SD	M	SD	M	SD	M	SD	n	%	n	%
Sex												
Male	3.72	0.76	3.60	0.69	2.70	1.12	10.04	1.94	91	9.55	862	90.45
Female	3.54	0.90	3.39	0.86	2.38	1.16	9.32	2.29	176	16.40	869	83.16
Age												
64-69	3.68	0.80	3.57	0.73	2.64	1.13	9.90	2.05	117	10.61	986	89.39
70-75	3.56	0.88	3.39	0.85	2.41	1.17	9.38	2.26	150	16.76	745	83.24
Education ^c												
Low	3.53	0.93	3.40	0.82	2.39	1.16	9.34	2.23	120	16.54	646	83.46
Medium	3.62	0.85	3.45	0.84	2.55	1.15	9.65	2.23	90	13.55	574	86.45
High	3.76	0.68	3.66	0.64	2.71	1.11	10.14	1.89	49	8.75	511	91.25
Site location												
Kingston	3.80	0.67	3.80	0.56	2.72	1.11	10.32	1.80	27	6.82	369	93.18
St. Hyacinthe	3.74	0.68	3.81	0.50	2.66	1.05	10.20	1.61	25	6.23	376	93.77
Tirana	3.52	0.97	3.21	0.96	2.39	1.32	9.13	2.66	80	20.41	312	79.59
Manizales	3.69	0.64	3.43	0.75	2.39	1.00	9.59	1.85	45	11.06	362	88.94
Natal	3.38	1.09	3.20	0.85	2.51	1.22	9.09	2.41	90	22.39	312	77.61
Economic adversity transition ^d												
Severe	3.41	1.02	3.11	0.95	2.26	1.21	8.80	2.53	101	24.28	315	75.72
Worsened	3.59	0.86	3.32	0.86	2.41	1.17	9.34	2.28	50	16.39	255	83.61
Improved	3.66	0.81	3.57	0.72	2.59	1.17	9.83	1.95	59	11.87	438	88.13
No adversity	3.73	0.71	3.70	0.60	2.69	1.10	10.14	1.85	55	7.47	681	92.53

Note. Physical performance test is the SPPB which consists of balance, chair stand, and gait speed tests. Higher scores indicate better physical performance. Total possible score for balance, chair stand, and gait speed is 4 each. Missing values: economic adversity transition ($n = 44$ or 2.2% of total sample), SPPB = Short Physical Performance Battery.

^aTotal score is sum of balance, chair stand, and gait speed scores and the maximum score is 12.

^bSPPB test scores of less than 8 are considered low or limited physical performance.

^cEducation calculated from total years of education categorized by site-specific tertiles.

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No adversity = not having experienced any childhood and older adulthood economic adversity, improved = having experienced any childhood economic adversity and not having experienced older adulthood economic adversity, worsened = not having experienced any childhood economic adversity and having experienced any older adulthood economic adversity, severe = having experienced both any childhood economic adversity and older adulthood economic adversity.

Table 3.

Poisson Regression Models With Robust Error Variance for Poor Physical Performance According to Study Site, Sex, and Full Sample Combined.

SPPB < 8 ^d	Kingston (N = 396)			St. Hyacinthe (N = 401)			Tirana (N = 392)			Manizales (N = 407)			Natal (N = 402)			Male (N = 953)			Female (N = 1,045)			Combined (N = 1,998)		
	PRR	95% CI		PRR	95% CI		PRR	95% CI		PRR	95% CI		PRR	95% CI		PRR	95% CI		PRR	95% CI		PRR	95% CI	
Sex																								
Male	1.00			1.00			1.00			1.00			1.00			1.00			1.00			1.00		
Female	0.95	[0.46, 1.95]		1.56	[0.68, 3.57]		2.30 *	[1.48, 3.55]		1.64	[0.92, 2.93]		1.61 *	[1.10, 2.35]								1.66 *	[1.31, 2.10]	
Age																								
64-69	1.00			1.00			1.00			1.00			1.00			1.00			1.00			1.00		
70-75	2.04	[0.91, 4.59]		1.41	[0.65, 3.06]		1.33	[0.92, 1.94]		1.69	[0.98, 2.92]		1.44 *	[1.00, 2.08]		1.43	[0.95, 1.23]		1.48 *	[1.14, 1.92]		1.48 *	[1.19, 1.84]	
Education ^b																								
Low	1.04	[0.43, 2.56]		1.67	[0.58, 4.78]		2.06 *	[1.05, 4.06]		2.19	[0.95, 5.03]		1.11	[0.69, 1.79]		1.35	[0.82, 2.25]		1.61 *	[1.07, 2.42]		1.47 *	[1.08, 2.00]	
Medium	0.81	[0.28, 2.34]		1.20	[0.36, 3.95]		1.98 *	[1.02, 3.87]		1.75	[0.73, 4.19]		0.92	[0.56, 1.51]		1.23	[0.75, 2.01]		1.32	[0.86, 2.03]		1.25	[0.90, 1.72]	
High	1.00			1.00			1.00			1.00			1.00			1.00			1.00			1.00		
Economic adversity transition ^{a,c}																								
Severe	3.65 *	[1.01, 13.26]		6.06 *	[2.03, 18.10]		2.14 *	[1.22, 3.76]		1.49	[0.59, 3.73]		1.05	[0.62, 1.80]		1.20	[0.69, 2.09]		2.80 *	[1.70, 4.61]		1.91 *	[1.33, 2.75]	
Worsened	4.86 *	[1.08, 21.91]		4.29 *	[1.03, 17.78]		0.91	[0.44, 1.85]		1.72	[0.71, 4.19]		0.96	[0.51, 1.81]		0.57	[0.25, 1.32]		2.40 *	[1.41, 4.09]		1.47	[0.99, 2.20]	
Improved	1.34	[0.58, 3.09]		2.69 *	[1.10, 6.57]		1.06	[0.52, 1.13]		1.18	[0.34, 3.99]		0.92	[0.52, 1.65]		0.89	[0.53, 1.48]		1.82 *	[1.11, 3.01]		1.31	[0.91, 1.88]	
No adversity	1.00			1.00			1.00			1.00			1.00			1.00			1.00			1.00		
Site location																								
Kingston																1.00			1.00			1.00		
St. Hyacinthe																0.74	[0.32, 1.72]		1.12	[0.57, 2.18]		0.99	[0.58, 1.68]	
Tirana																1.72	[0.82, 1.58]		2.62 *	[1.46, 4.72]		2.30 *	[1.45, 3.66]	
Manizales																1.23	[0.57, 2.66]		1.31	[0.68, 2.52]		1.28	[0.77, 2.13]	

SPPB < 8 ^d	Kingston (N = 396)		St. Hyacinthe (N = 401)		Tirana (N = 392)		Manizales (N = 407)		Natal (N = 402)		Male (N = 953)		Female (N = 1,045)		Combined (N = 1,998)	
	PRR	95% CI	PRR	95% CI	PRR	95% CI	PRR	95% CI	PRR	95% CI	PRR	95% CI	PRR	95% CI	PRR	95% CI
Natal											2.45 *	[1.21, 4.92]	2.38 *	[1.32, 4.31]	2.46 *	[1.53, 3.93]

Note. CI = confidence interval.

^a Missing values: Economic adversity transition (n = 44), SPPB (n = 4).

^b Education calculated from total years of education categorized by site-specific tertiles.

^c No adversity = not having experienced any childhood and older adulthood economic adversity, improved = having experienced any childhood economic adversity and not having experienced older adulthood economic adversity, worsened = not having experienced any childhood economic adversity and having experienced any older adulthood economic adversity, severe = having experienced both any childhood economic adversity and older adulthood economic adversity.

^d SPPB = Short Physical Performance Battery, SPPB test scores of less than 8 is considered low or limited physical performance.

* p < .05.

Multiple Linear Regression Models for Physical Performance Test Total Score by Economic Adversity Transitions According to Sexes and Both Sexes Combined.

Table 4.

	Male (N = 953)		Female (N = 1,047)		Both sexes (N = 2,002)	
	b	95% CI	b	95% CI	b	95% CI
Economic adversity transition ^a						
Severe	-0.36	[-0.76, 0.03]	-0.95 [*]	[-1.37, -0.55]	-0.28 [*]	[-0.44, -0.12]
Worsened	0.15	[-0.30, 0.60]	-0.64 [*]	[-1.06, -0.22]	-0.12	[-0.29, 0.05]
Improved	-0.05	[-0.35, 0.26]	-0.22	[-0.58, 0.13]	-0.08	[-0.21, 0.05]
None	0.00		0.00		0.00	
p for trend	p < .05		p < .05		p < .05	

Note. All models adjusted for site location, age, sex, and education. Physical performance test is the Short Physical Performance Battery (SPPB) test which consists of balance, chair stand, and gait speed tests. Higher scores indicate better physical performance. Total score is sum of balance, chair stand, and gait speed score.

^aNone = not having experienced any childhood and older adulthood economic adversity, improved = having experienced any childhood economic adversity and not having experienced older adulthood economic adversity, worsened = not having experienced any childhood economic adversity and having experienced any older adulthood economic adversity, severe = having experienced both any childhood economic adversity and older adulthood economic adversity.

^{*} p < .05.