Feature Article

Factors that influence physical function and emotional well-being among Medicare-Medicaid enrollees

Kathy D. Wright, PhD, RN, CNS\(^a,\)^*, Ginette A. Pepper, PhD, RN, FAAN\(^b\), Michael Caserta, PhD\(^c,d\), Bob Wong, PhD\(^d\), Cherie P. Brunker, MD, CMD, FACP\(^e,f\), Diana L. Morris, PhD, RN, FAAN\(^g\), Christopher J. Burant, PhD, MACTM\(^a\), Susan Hazlett, MS, RN\(^h\), Denise Kropp, BS, CCRP\(^i\), Kyle R. Allen, DO, AGSF\(^i\)

\(^a\)Frances Payne Bolton School of Nursing, Case Western Reserve University, 2120 Cornell Road, Cleveland, OH 44106-4906, USA
\(^b\)Hartford Center of Geriatric Nursing Excellence, University of Utah College of Nursing, 10 S. 2000 East, Salt Lake City, UT 84112, USA
\(^c\)Department of Health Promotion and Education, University of Utah, USA
\(^d\)University of Utah, College of Nursing, 10 S. 2000 East, Salt Lake City, UT 84112, USA
\(^e\)Geriatrics Division, University of Utah School of Medicine, USA
\(^f\)Intermountain Healthcare, 8th Avenue & C Street, Salt Lake City, UT 84143, USA
\(^g\)Seniors Institute Research, Summa Health System, 525 East Market Street, Akron, OH 44304, USA
\(^h\)Department of Family and Community Medicine, Northeast Ohio Medical University, 4209 St. Rt. 44, PO. Box 95, Rootstown, OH 44272, USA
\(^i\)Riverside Health System, Lifelong Health & Aging Related Services Administration, 1020 Old Denbigh Blvd., Suite 1020A, Newport News, VA 23602, USA

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**A B S T R A C T**

Dually enrolled Medicare-Medicaid older adults are a vulnerable population. We tested House’s Conceptual Framework for Understanding Social Inequalities in Health and Aging in Medicare-Medicaid enrollees by examining the extent to which disparities indicators, which included race, age, gender, neighborhood poverty, education, income, exercise (e.g., walking), and physical activity (e.g., housework) influence physical function and emotional well-being. This secondary analysis included 337 Black (31%) and White (69%) older Medicare-Medicaid enrollees. Using path analysis, we determined that race, neighborhood poverty, education, and income did not influence physical function or emotional well-being. However, physical activity (e.g., housework) was associated with an increased self-report of physical function and emotional well-being of \(b = .23, p < .001\); \(b = .17, p < .01\), respectively. Future studies of factors that influence physical function and emotional well-being in this population should take into account health status indicators such as allostatic load, comorbidity, and perceived racia/discrimination.

**Introduction**

The average cost of care for older adults dually enrolled in Medicare-Medicaid in 2008 was nearly twice as much as Medicare-only recipients in 2008.\(^1\) In addition to significant monetary cost to society, there was considerable physical burden and diminished quality of life for the Medicare-Medicaid population. Further, data indicate that there were marked disparities between the two groups in terms of race, ethnicity, and gender. Forty-four percent of the dually enrolled patient population had physical function impairments compared to only 26% of the Medicare-only patients, and 58% of the dually enrolled reported mental health problems associated with emotional well-being compared to 25% of the Medicare enrollees.\(^1\) Lower income Medicare-Medicaid enrollees were also disproportionately more likely to be African American, Hispanic, female, and/or have less than a high school education.\(^2\)

Factors known to influence physical and mental health outcomes in older adults include race, gender, age, amount and type of physical activity, chronic disease, and adaptation to physical and emotional stressors.\(^3–8\) Additionally, but not always, environmental factors such as structural barriers and personal safety influence physical activity in older adults.\(^6–8\) Given the multiple biopsychosocial factors that impact health outcomes, we applied House’s Conceptual Framework for Understanding Social Inequalities in Health and Aging\(^9\) to a group of dually enrolled Medicare-Medicaid older adults to examine the relationship between physical function and emotional well-being.
Conceptual framework

Specifically, House’s conceptual framework posits that race, gender, age, environmental stressors (neighborhood poverty), and health behaviors result in poor health outcomes (e.g., functional limitations and diminished emotional well-being). This conceptual framework is grounded in theories of psychosocial stress, social inequalities, and personality theory (e.g., Type A) that contribute to disease and result in poor health outcomes (e.g., morbidity, disability, depression). In House’s conceptual framework, a person’s socioeconomic status (SES) mediates the effect of race/ethnicity on health outcomes (Fig. 1). As seen in the literature, persons with lower education and income levels smoke more and exercise less compared to those of a higher SES.10–12

Health behaviors (e.g., smoking, physical inactivity) are known as explanatory variables that are associated with health outcomes. Using factors from House’s conceptual framework, we examined the associations between race, gender, age, neighborhood poverty, education, and health behaviors (i.e., smoking, exercise, and physical activity) with physical function and emotional well-being in Medicare-Medicaid enrollees. The findings from this study can be used to guide interventions focused on optimizing function and mental health in low-income minority older adults.

Methods

Design

A secondary analysis was conducted using data from the After Discharge Care Management of Low-Income Frail Elderly (AD-LIFE) trial.13,14 AD-LIFE was a randomized control care management study that included adults 65 and older who were eligible for both Medicare and Medicaid, had 1 or more deficits in activities of daily living (e.g., bathing, dressing, preparation), 2 or more deficits in instrumental activities of daily living (e.g., medication administration, managing finances, transportation), and at least 1 chronic condition (e.g., arthritis, diabetes, hypertension). The secondary analysis study was approved by the Summa Health System’s Institutional Review Board (IRB) and The University of Utah’s IRB.

Sample

Data from individuals who had participated in the AD-LIFE trial, aged 65 and older and enrolled in both Medicare and Medicaid, were included. AD-LIFE participants were recruited during their acute hospital admission. The paper by Allen et al, describes further detail of the recruitment process.13

Measures

Demographic variables included Race, gender, age, education. Participant education level was categorized into a range of 1 (none) to 6 (graduate degree) as described in Table 1.

Health behaviors were obtained based on interview and included (a) the participant’s subjective report of the number of cigarettes smoked per day (range 0–100); (b) the amount of time spent in exercise, as defined by the participant (e.g., walking, swimming); and (c) overall physical activity (e.g., household chores, gardening). Participants were asked to describe what kinds of formal/structured exercise and physical activity do you participate in for how many minutes per week. Physical activity and exercise were both self-reported as minutes per week.

Neighborhood poverty and income data were obtained from the American Community Survey 2010 United States census data using Esri’s ArcGIS 10.0 desktop software to spatially link participant addresses to the corresponding census tract.Specifically, neighborhood poverty was defined as the percentage of households in ($10,830 or less per 1 person household in the year 2010) in each participant’s census tract whose income in the past 12 months was at or below the poverty guideline.15 The poverty guideline was adjusted for larger households ($22,050 or less for a family of 4 in 2010). Yearly income based on the participant’s self-reported occupation prior to retiring was included in the AD-LIFE data instead of yearly income. Therefore, we used the participant’s preretirement occupation as a proxy for income using ACS data on the median income per occupation based on the census tract. This was expressed in U.S. dollars received annually.

Physical function and emotional well-being

Physical function and emotional well-being were evaluated using the 12-Item Short Form Health Survey (SF-12).16 The SF-12 measures health-related quality of life and was composed of two component summary scores: the physical component score and the mental component score. The two scores included eight concepts: physical functioning, bodily pain, general mental health, role limitations due to physical health, social functioning, emotional well-being, and mental component summary score for aged 65–75 is 41.09 on a 0–100 scale. The mental component summary score for aged 65–75 is 53.99 and aged 75+ is 51.89 on a 0–100 scale (Ware, Kosinski, Turner-Bowker, & Gandek, 2007).

Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>M (SD)</th>
<th>n (%)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than high school education</td>
<td>Smoker</td>
<td>120 (9.24)</td>
<td>1–40</td>
</tr>
<tr>
<td>Cigarettes per day</td>
<td>22.33 (14.26)</td>
<td>1.4–65.3</td>
<td></td>
</tr>
<tr>
<td>Neighborhood poverty percentage</td>
<td>Income</td>
<td>37,157.32 (15,319.82)</td>
<td>9983–113,542</td>
</tr>
<tr>
<td>Physical activity minutes/week</td>
<td>50.30 (89.61)</td>
<td>0–840</td>
<td></td>
</tr>
<tr>
<td>Exercise minutes/week</td>
<td>72.23 (38.26)</td>
<td>0–210</td>
<td></td>
</tr>
<tr>
<td>SF-12 Physical components summary score</td>
<td>30.16 (8.72)</td>
<td>15.80–61.98</td>
<td></td>
</tr>
<tr>
<td>SF-12 Mental components summary score</td>
<td>38.15 (9.71)</td>
<td>12.45–59.40</td>
<td></td>
</tr>
</tbody>
</table>

Neighborhood poverty = percent of persons at or below poverty level in or near the subjects home. SF-12 median physical components summary score for aged 65–75 is 44.55 and aged 75+ is 41.09 on a 0–100 scale. The median mental components summary score for aged 65–75 is 53.99 and aged 75+ is 51.89 on a 0–100 scale (Ware, Kosinski, Turner-Bowker, & Gandek, 2007).
to emotional problems, vitality (energy and fatigue), and general health perception. Scoring of the SF-12 was done using an algorithm developed by Ware, Kosinski and Turner-Bowker. In older adults, the SF-12 had a Cronbach alpha coefficient of .89.

Analysis

Descriptive analyses in our study were conducted using SPSS Version 18 statistical software. A path analysis was used to test the direct and indirect relationships among variables through structural equation modeling. Model testing was done with the Amos structural equation modeling statistical program. The sample covariance matrix was used as input and a maximum likelihood solution was sought. Models were evaluated with the following fit indices: the Tucker–Lewis index (TLI > .95), comparative fit index (CFI > .95), and The Steiger–Lind root mean square error of approximation (RMSEA < .05). The best-fitting model in which all paths were significant was used as the final model.

The chi-square statistic, the normed fit index (NFI), and RMSEA were used to estimate model fit. The variables entered into the model were race, gender, age, neighborhood poverty, education, income, cigarette smoking, exercise, physical activity, and participants' physical function and emotional well-being scores. All the relationships between the variables were modeled, and statistically nonsignificant associations were removed and paths were added based upon modification indices. The process allowed for the identification of the most parsimonious model.

Results

Sample characteristics

Data from 337 older adults, 292 female (86.6%) and 45 male (13.4%), were included in this study. The racial distribution was 31% Black and 69% White. Participants had a mean of 9.3 chronic conditions (SD = 13.4), and 73% received in-home services for personal care and meals. The mean age of the subjects was 74.7 (SD = 7.3, age range: 65–94 years). The results of the descriptive statistics for education, neighborhood poverty, income, cigarettes, exercise, physical activity, and physical function and emotional well-being are listed in Table 1.

Path analysis

Fig. 2 is a diagram of the initial model of the initial poor fitting model ($\Delta \chi^2 = 127.30, df = 35.09, \chi^2/df = 3.62, TLI = .09, CFI = .42, \text{and RMSEA} = .09$). We retested the model and removed and added paths to improve the model fit. The final model as seen in Fig. 3 showed significant improvement in model fit ($\Delta \chi^2 = 45.04, df = 42, \chi^2/df = 1.12, TLI = .97, CFI = .98, \text{RMSEA} = .01$). Table 2 lists the standardized regression coefficients estimates for each path in the final model. A total of thirteen out of 20 hypothesized paths were significance (Table 2).

Discussion

This study examined factors in House's conceptual framework associated with physical function and emotional well-being in Medicare-Medicaid older adults. Age and health behaviors were positively correlated with physical function and emotional well-being. Contrary to House's conceptual framework, race, education, and income were not directly or indirectly associated with physical function and emotional well-being in this sample. Consistent with House's conceptual framework and other studies, Blacks were more likely to live in areas of greater poverty than Whites. Yet none of the racial, demographic, or gender variables had a direct or indirect effect on physical function and emotional well-being in the present study. Other disparities indicators reflected in House's conceptual framework among Medicare-Medicaid enrollees were associated.
with gender, income, and education. Men were more likely than women to have more years of education, which is consistent with other socioeconomic disparities literature.25

There was a direct positive relationship between participants’ age and self-report of health-related quality of life subscales of physical function and emotional well-being. This is in contrast to what would be commonly assumed. However, others have found older adults tend to report greater emotional well-being despite disability/disease severity as compared to younger adults.26–29 This is known as the paradox of well-being.30 The paradox of well-being suggests that regardless of age-related changes, physical impairments, and economic constraints, older adults maintain their subjective well-being. The negative association between physical function and emotional well-being may be associated with the paradox of well-being and has been found in other studies.31 The summary scales may inaccurately summarize subscales profiles scores.31 For example, the subscales for bodily pain and general conditions is known as the paradox of well-being.30 In addition, engaging in physical activity has been associated with lower mortality from all causes and fewer sick days from physical and mental symptoms.35,36 Even sedentary older adults benefit from basic physical activity such as chair sit-and-reach, arm curls, and chair stand repetitions.39,40

**Limitations**

This study was limited based on being a secondary analysis and not being initially developed to measure the variables in House’s conceptual framework. For example, the measurement of stressors related to environmental exposures was limited to neighborhood poverty. Neighborhood poverty was not a direct measure of stress-related environmental factors such as graffiti, abandoned houses and neighborhood safety which could influence health outcomes. Future research in this area should include subjective and biological measures of chronic stress and allostatic load (wear and tear on the body that results in disease) that might influence physical function and emotional well-being in low-income older adults. In addition, future work should consider comorbidities and examine other social factors (e.g., perceived racism/discrimination) and the impact that they have on health and longevity of Medicare-Medicaid older adults.

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**Table 2**

Standardized regression coefficients estimate for each path in final model.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient estimate</th>
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<tbody>
<tr>
<td>Neighborhood poverty → Race</td>
<td>.27**</td>
</tr>
<tr>
<td>Education → Race</td>
<td>.12**</td>
</tr>
<tr>
<td>Education → Gender</td>
<td>.13**</td>
</tr>
<tr>
<td>Income → Gender</td>
<td>.32**</td>
</tr>
<tr>
<td>Physical function → Age</td>
<td>.15</td>
</tr>
<tr>
<td>Emotional well-being → Age</td>
<td>.26**</td>
</tr>
<tr>
<td>Education → Neighborhood poverty</td>
<td>−.11</td>
</tr>
<tr>
<td>Income → Neighborhood poverty</td>
<td>−.21</td>
</tr>
<tr>
<td>Physical function → Exercise</td>
<td>−.12</td>
</tr>
<tr>
<td>Physical function → Physical activity</td>
<td>.13</td>
</tr>
<tr>
<td>Physical function → Emotional well-being</td>
<td>−.22**</td>
</tr>
</tbody>
</table>
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