HEART & LUNG

Care of the Patient with Coronary Heart Disease

The relationship of work, self-care, and quality of life in a sample of older working adults with cardiovascular disease

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ABSTRACT

Objective: The study objective was to describe the self-care behaviors of adherence to medication, diet, exercise, and symptom monitoring of older workers with cardiovascular disease (CVD) and explore the relationship among job characteristics (job demands, job control, and workplace support), self-care, and quality of life. More than 3.5 million workers have CVD with significant work limitations and increased disability. Workers must meet the challenges of today's work processes that include increased stress and intense production demands while managing the complexities of their CVD.

Methods: A total of 129 workers (aged $\geq$ 45 years) with CVD completed standardized instruments about self-care (Specific Adherence Scale $\alpha = .74$), job characteristics (Job Content Questionnaire $\alpha = .71$), and quality of life (MacNew health-related quality of life $\alpha = .84$). Regression analyses were used to examine relationships between variables.

Results: The sample had a mean age of 59.16 $\pm$ 8.83 years, 56.3% were female, and 36.5% were African-American. Self-care behaviors varied. Most workers (71.4%) reported medication adherence, and few adhered to diet (27%), exercise (18%), or symptom monitoring (31.3%). Psychologic job demands were negatively correlated to self-care ($r = -.217$, $P = .02$). Better adherence was reported by those with workplace support ($r = .313$, $P = .001$). Job characteristics explained 22% of variance in self-care adherence behaviors. Adherence was a significant determinant of general quality of life.

Conclusion: Because job characteristics may interfere with self-care, clinicians should assess job demands and discuss stress management with employed patients. Interventions that foster worksite programs and facilitate self-care among workers with CVD are needed.

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According to the Bureau of Labor Statistics, the American workforce is aging.[1] By 2015, the number of workers aged 55 years or more will reach 31.2 million, a 72% increase from 2000.[1] As a result, health problems associated with the aging process, such as cardiovascular disease (CVD), present new health and safety challenges for older workers. More than 3.5 million workers have CVD.[2,3] Thirty-one percent of the workforce have hyperlipidemia, and 15% have hypertension.[2] Advances in medical care have led to improved trends in morbidity and mortality,[4] allowing many workers with CVD to continue working. However, older workers (>50 years) with CVD are 3 times more likely to report work limitations than those without CVD.[2] For example, decreased physical capacity or noxious symptoms associated with a heart problem (eg, chest pain, shortness of breath, dizziness) can limit performance of job tasks requiring physical exertion. Older workers with CVD also report increased rates of absenteeism and longer periods of disability from work.[5,6] Furthermore, within 6 years after a recognized heart attack, approximately 22% of men and 46% of women report being disabled from work.[7]

Individuals with chronic illnesses such as CVD play a central role in managing their health through self-care,[8] which encompasses adherence to medication regimens, diet restrictions, and symptom monitoring for the purpose of maintaining physiologic stability, and symptom management in response to symptoms when they occur. Successful self-care is associated with improved health outcomes, including fewer hospitalizations, less emergency department use, and improved quality of life.[9-11] Self-care, conceptualized as a naturalistic decision-making process (Figure 1), is situation and context specific and influenced by the person's knowledge about and experience with decision-making in the particular context, the person's skill to act on the decision made, and the compatibility of the decision and action with the person's values.[12] Individuals with CVD make decisions on a daily basis about whether to take medication, adhere to diet restrictions, or act early on symptoms, and these decisions may vary depending on the situation faced by the individual (eg, whether at home or work). According to the extant literature, the adherence behaviors encompassed by self-care that include diet, medication, exercise, and symptom monitoring are influenced by numerous individual-level factors, such as mood and physical functioning,[13-15] and vary among demographic groups.[16] For workers with CVD, job-level factors (job demands, job control, and workplace support)[17] and work organization (eg, work practices and organizational policies)[18] may further complicate one's ability to engage in self-care (ie, adhere to medication regimens and diet restrictions, attend doctor's appointments) during work hours and while on business travel or attending work events. For the older worker with CVD, continuing employment while adhering to a complex treatment regimen may be difficult,[19] but the relationship between work and adherence is not known.

There is a general consensus that the new organization of work trends[20] (ie, the way jobs are designed and workplace policies) is associated with increased stress, longer work hours, and increased workloads. Experts contend that older workers may be particularly vulnerable to changes in work processes that include extended shifts, overtime, and increased work demands of productivity.[20] Increased stress from these changes may have deleterious health effects through increased physiologic demands, such as elevated blood pressure or coronary insufficiency, or on the worker's ability to practice self-care. Job strain, defined as work that combines high psychologic work demands with low job control, is the most frequently cited work stressor and CVD risk factor among workers.[17] There are several pathways by which work stress may adversely affect the health of workers with CVD. First, increased sympathoadrenal activity on cardiovascular function may result in increased myocardial demand and decreased myocardial oxygen supply leading to myocardial ischemia.[21] Work stress may further contribute to CVD through a psychologic pathway. For example, depression and difficulty coping are hypothesized as responses to job strain that contribute to stress and CVD risk.[22] Similar relationships between these psychologic variables and self-care, specifically adherence to treatment regimens, have also been demonstrated in other populations with CVD. However, little is known about how job characteristics (ie, job demands, job control, and workplace support) influence the ability of older workers with CVD to engage in self-care behaviors (eg, adhere to medication regimens, diet restrictions, attend doctor's appointments, and symptom management) and maintain quality of life.

The constituency of older workers is growing. According to the Age Discrimination of Employment Act, older workers are those aged more than 40 years,[23] whereas the American Association of Retired Persons recognizes the age of 50 years as a milestone for decision making about employment.[24] Much of the current interest in the older workforce health centers on the aging of the large birth cohort of 1946-1964, known as the "Baby Boomers," and an increasing trend toward postponed retirement.[25] In fact, the health and productivity of this fastest growing proportion of America's workforce has been identified as a research priority for several key organizations. The National Institute of Aging and the National Institute of Occupational Safety and Health have both cited the need to

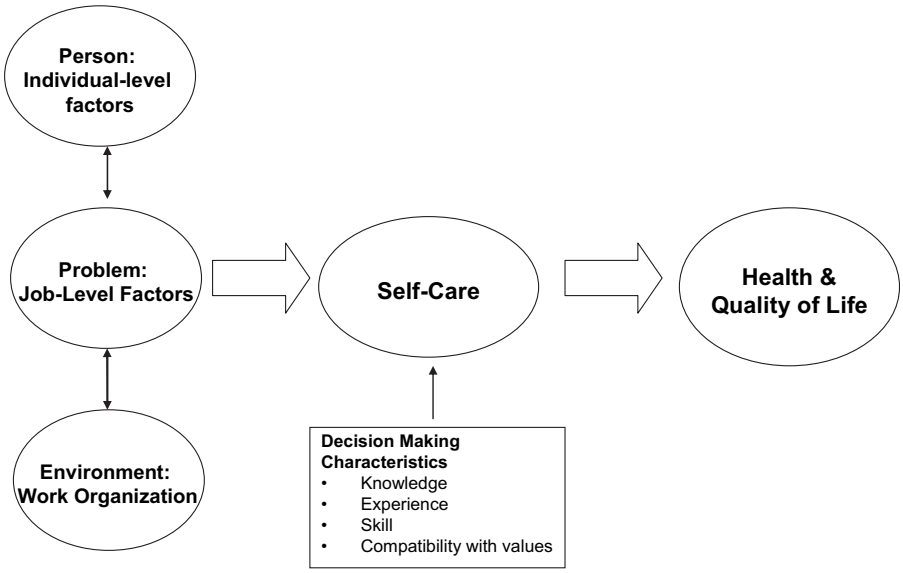

Figure 1 – Decision-making model of self-care and organization of work. According to the naturalistic decision-making framework of self-care, in real-world settings such as the workplace, people make decisions that are influenced by the interaction among the individual, the problem, and the current setting or environment. According to this model, workers with CVD must make decisions daily about engaging in self-care within the context of the workday. These decisions will be influenced by job-level factors, such as job demands, job control, workplace support, and work organization (eg, workplace policies).

understand how working conditions affect the health of the aging workforce, including the identification of risk factors that may disproportionately affect older workers to develop interventions to improve their health and safety.[26] For the large segment of the American workforce with CVD, self-care that entails adhering to treatment regimens while working and managing symptoms is critical to their quality of life. However, to date the literature has been limited to return to work as an outcome measure for patients after a cardiac event.[27,28] Few studies exist to guide clinicians in supporting ongoing employment among patients with CVD.

Therefore, the purpose of this study was to examine the self-care behaviors of adherence to medication, diet, exercise, and symptom monitoring of older workers with CVD, and explore the relationship among job characteristics (job demands, job control, and workplace support), self-care, and quality of life. The study had 2 specific aims: 1) to describe adherence to common self-care practices of older workers with CVD and 2) to examine how job-level factors explain variation in self-care adherence behaviors and quality of life taking into account common illness characteristics (depression and physical functioning).

Materials and Methods

A cross-sectional descriptive design was used to study a convenience sample of 129 adults (>age 45 years) with CVD enrolled from outpatient settings associated with a large urban medical center. To achieve the aims of this exploratory, descriptive study, individuals were eligible to participate if they met the following inclusion criteria: 1) diagnosis related to the cardiovascular system (hypertension, coronary heart disease, eg, myocardial infarction and angina, cardiac arrhythmia, valve disease, heart failure; stroke, peripheral vascular disease, or hyperlipidemia), 2) age 45 years or older, and 3) employed within the past year. Individuals were excluded from participating if they were unable or unwilling to provide informed consent, were unable to read or write in English, or had been unemployed for the prior year.

A sample size of 125 was calculated a priori to provide adequate power to achieve $\geq$ 80% power to detect a minimal linear correlation of .28 at a 2-sided alpha level of .05.[29] This sample size was also sufficient for the regression analysis of 4 to 5 variables[30] determined by the conceptual model guiding the study.

Procedures

After approval from the appropriate institutional review boards, participants were recruited from outpatient programs that serve employed populations through the delivery of medical care, employee health, and occupational health programs in a large urban population. Flyers promoting the study were available to individuals who visited the participating settings. A research assistant trained in the study recruitment and enrollment protocol was available during scheduled

clinic hours to facilitate enrollment, obtain written informed consent, and complete data collection. Individuals received a non-coercive incentive of $20 for survey completion.

Valid and reliable instruments were used to collect quantitative data about the dependent variables of self-care, specifically adherence to recommended medication, diet, exercise, symptom monitoring, smoking cessation and reduction of alcohol intake,[31,32] and quality of life;[33] and the independent variables of job-related factors (job demands, job control, and workplace support)[34] and individual-level factors (depression[35] and physical functioning[36]). Patient sociodemographic characteristics that include job category, employment status, and job satisfaction were assessed using an investigator-designed survey. The average number of hours per week worked over the past 8 weeks was also collected, and individuals were categorized into full time (≥35 hours/week), part time (<35 hours), or unemployed. A brief description of the instruments used in this study is provided below.

In this study, measurement of self-care focused on the adherence to commonly recommended behaviors, including medication, diet restrictions, exercise, and symptom monitoring, and was assessed using the Specific Adherence Survey from the Medical Outcomes study. The Specific Adherence Survey[31,32] is a valid and reliable instrument that has been widely used in medical outcomes research. The Specific Adherence Survey consists of 8 CVD-pertinent questions that assess adherence to medication, diet, exercise, symptom monitoring, and alcohol and cigarette use over the prior 4-week period. Responses to the 6-point Likert scale (0 = not at all to 5 = all of the time) are summed and transformed to a scale of 0 to 100[37] (Cronbach's alpha was .74 in this sample). In addition, individuals who reported a history of chronic angina or history of myocardial infarction also completed the Self-Care of Heart Disease Index (SCHDI), a new instrument[38] based on the established Self-Care of Heart Failure Index.[39] The SCHDI consists of 22 items measured on a 4-point Likert scale grouped to form 3 scales: maintenance, management, and confidence.[15] To calculate the management scale, individuals must have experienced symptoms in the prior month. Each subscale is standardized to a score of 100; higher scores reflect better self-care. In this study, only 16% reported symptoms. Therefore, only the SCHDI maintenance scale (Cronbach's alpha was .63) was used to describe the sample's adherence behaviors and augmented the findings of the Specific Adherence Survey.

Quality of life was measured in 2 ways. Health-related quality of life (HRQOL) was measured using the MacNew Heart Disease Heart-Related Quality of Life questionnaire. This valid and reliable instrument has been used extensively in CVD research to evaluate how quality of life is affected by one's heart disease and treatment.[33] The 27 items measured on a 7-point Likert scale include emotional, physical, and social quality of life subscales, and a global HRQOL score. In this study, the global score was used in the analysis and had a superb Cronbach's alpha of .93. A general measure of quality of life was also assessed using a single question "How do you rate your quality of life" rated on a 4-point Likert scale of "1 = poor" to "4 = very good."[40]

Independent Variables

The Job Content Questionnaire (JCQ) was used to assess job-related factors of job demands, job control, and workplace support. This instrument is widely used in organization of work research and has demonstrated adequate reliability across many work groups.[34] The JCQ consists of 27 items that constitute 5 scales: job control, psychologic demands, physical demands, support (supervisor and coworker support), and job insecurity. Each item has a 4-point response ranging from strongly disagree (1) to strongly agree (4). Cronbach's alpha in this sample was .71.

Depression was measured by the Patient Health Questionnaire (PHQ)-9, a brief measure that has been used as a provisional diagnostic tool for major or minor depression in addition to depressive symptoms. The PHQ-9 had a sensitivity of 95% and a specificity of 84% for detecting major depression when a score of 10 was compared with the professional interviews as the criterion standard.[35] In this sample, Cronbach's alpha was adequate at .82.

Physical functioning was assessed by the Duke Activity Status Index (DASI), which measures the individual's ability to perform a range of specific daily activities and has been used in studies of CVD and other chronic conditions. The DASI correlates significantly with the peak oxygen uptake ($P < .0001$), supporting its validity as a measure of physical functioning.[41,42] In this study, the DASI had adequate reliability as measured by Cronbach's alpha of .79.

Data Analysis

Standard descriptive statistics of central tendency and dispersion were used to describe the sample. Relationships among physical functioning, depression, job-level factors of job demands (psychologic and physical), job control, workplace support (supervisor and coworker) and job insecurity, adherence, and quality of life were analyzed using appropriate correlational methods. The Student *t* test and analysis of variance compared differences in the groups (eg, employment status, gender, and race) with respect to adherence and quality of life.

Hierarchic regression analysis was used to determine the amount of variance in adherence to self-care explained by job characteristics after controlling for the influence of depression and physical functioning, and significant demographic variables. The subscales of job characteristics from the JCQ that had the highest correlation with measure of adherence were chosen for inclusion in the model. For the evaluation of quality of

Table 1 – Demographic and illness characteristics

	Sample (n = 129)
	Mean ± SD
Age (y)	59.16 ± 8.8
Years with CVD	9.7 ± 7.86
Physical functioning (DASI)	36.21 ± 17.72
Depression (PHQ-9)	5.14 ± 4.9
	Frequency (%)
Female	56.3%
Race:	
White	38.9%
African American	37.3%
Hispanic	14.3%
Asian	9.5%
Marital status:	
Married/cohabitate	36.2%
Single	38.6%
Divorced or widowed	25.2%
Highest education:	
-Less than high school	3.9%
-High school	15.6%
-College	55.5%
-Graduate school	25%
CVD diagnosis:	
Hypertension only	42.6%
Coronary heart disease (MI, angina)	29.1%
Heart failure	5%
Prior CABG	9.1%
Other (eg, PVD, hyperlipidemia, stroke)	14.2%

MI, myocardial infarction; *PVD*, peripheral vascular disease; *SD*, standard deviation.

life, we tested the effects of adherence on the HRQOL and general quality of life while controlling for the influence of depression and physical functioning. Preliminary analysis was conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. The influence of each variable on adherence was assessed by evaluating the significance of the increase in model R^2 and direction and strength of slope coefficients and associated 95% confidence intervals. Post hoc effect sizes were calculated using Cohen's f^2 with effect sizes of .02, .15, and .35 considered small, medium, and large, respectively.[43]

Results

A sample of 129 adults with CVD (female 56%, African American 36.5%; mean age 59.2 ± 8.83 years) participated in the study (Table 1). Seventy-nine percent were actively employed at the time of the study (average hours worked per week 29.29 ± 19.07). Employment in a service job was the most common occupation reported. Hypertension was reported in 43% of the sample; 34% had coronary heart disease (prior myocardial infarction, angina, or heart failure).

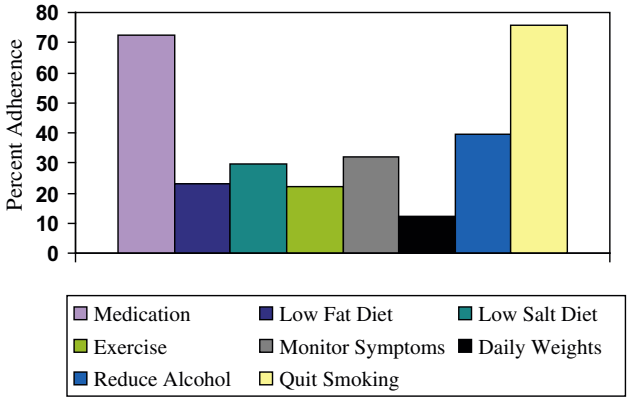

Figure 2 – Percent reporting adherence "all" or "most of the time" to commonly recommended health behaviors.

Self-Care

Overall adherence to treatment recommendations as measured by the Specific Adherence Survey was poor (Figure 2). Although most reported adhering to medication adherence "all" or "most of the time" (71%), few adhered "all" or "most of the time" to diet (18%), exercise (18%), or symptom monitoring (31%). The mean score of the SCHDI self-care maintenance scale was 71.3 ± 13.9. There was significant correlation of the SCHDI self-care maintenance scale and the Specific Adherence Survey ($r = .614$, $P < .001$).

There were no differences in Specific Adherence Survey scores among those who were working full- or part-time or in different occupations. Older individuals had better self-care adherence practices. An independent-sample t test comparing the Specific Adherence Survey score by age category found a significant difference (age 45-61 years: M = 57.5 ± 20.15 and ≥62 years: M = 64.84 ± 18.10; $P = .042$). Depression was associated with poorer adherence to treatment recommendations ($r = -.313$, $P = .001$). Individuals with higher levels of physical functioning reported better adherence ($r = .281$, $P = .002$).

Job-Level Factors

Most of the individuals (79.6%) in our sample were satisfied with their jobs. Increased psychologic job demands were negatively associated with adherence ($r = -.31$, $P = .002$), but the relationship between physical job demands and adherence was not significant, nor was job insecurity. Better adherence was reported by those with increased job control ($r = .244$, $P = .016$) and workplace support (coworker support $r = .267$, $P = .002$; supervisor support $r = .291$, $P = .001$). Hierarchic regression analysis was used to assess the relationship among job characteristics (psychologic job demands, job control, and workplace support by supervisors) and adherence, controlling for depression and physical functioning (Table 2). Depression and

Table 2 – Regression of psychologic job demands and workplace support on self-care adherence behaviors

	β	95% CI of β	*P* value	Total R^2	Cohen's f^2
Model controls					
Depression	−.870	(−1.687 to −.054)	.111	.119	.136*
Physical functioning	.219	(.011-.447)	.040		
+ Job characteristics					
Psychologic job Demands	−.525	(−1.049 to −.002)	.049	.214	.272†
Job control	.046	(−.321 to .412)	.803		
Workplace support	1.350	(−.095 to 2.605)	.035		

CI, confidence interval.
* Considered a medium effect size.
† Medium to large effect size.[32]

Table 3 – Regression of self-care adherence behaviors on general quality of life

	β	95% CI of β	*P* value	Total R^2	Cohen's f^2
Model controls					
Depression	−.050	(−.082 to −.017)	.010	.181	.221*
Physical functioning	.011	(.002-.020)	.072		
+Self-care					
Specific adherence survey	.011	(.004-.019)	.002	.246	.326*

* Considered medium to large effect size.[32]

physical functioning were entered at step 1, explaining 11.9% of the variance in adherence to treatment recommendations. After entry of the JCQ variables of psychologic job demands, job control, and workplace support by supervisors at step 2, the total variance explained by the model as a whole was 21.4% ($P < .0001$). The job characteristics explained an additional 9.6% of the variance in adherence ($P = .01$). In the final model, only 3 measures were statistically significant: physical functioning (beta = .205, $P = .04$), psychologic job demands (beta = −.184, $P = .049$), and workplace supervisor support (beta =.208, $P = .035$).

Quality of Life

Overall, quality of life in this sample was moderate[33] (MacNew HRQOL mean 5.41 ± .71; general quality of life mean 2.77 ± .81) and associated with better adherence (r =.275, $P = .004$). There was a strong correlation between general quality of life and HRQOL ($r = .426$, $P < .0001$). In regression analysis, we examined both HRQOL and general quality of life controlling for depression (PHQ-9) and physical functioning (DASI). First, PHQ-9 and DASI scores were entered at step 1, explaining 46.6% of the variance in HRQOL as measured by the MacNew HRQOL instrument. After entry of the adherence measure (Specific Adherence Survey) at step 2, the total variance explained by the model as a whole was 46.8% ($P < .0001$). Adherence to self-care only explained an additional .2% of the variance in HRQOL after controlling for depression and physical functioning (R^2 change =.002, $P = .540$).

By using this same approach in the analysis of general quality of life (Table 3), depression and physical functioning explained 18% of variance, whereas adherence explained an additional 7% ($P = .001$). Only depression and adherence were statistically significant in the final model; adherence had a slightly higher beta (beta = .270, $P = .002$) than PHQ-9 (beta = −.237, $P = .01$).

Discussion

To our knowledge, this is the first study to explore the complex relationship between job characteristics and adherence among older workers with CVD. We found that although most individuals reported taking medications, few consistently adhered to other self-care behaviors commonly recommended for patients with CVD. The association of job characteristics, specifically job demands, job control, and workplace support, with self-care adherence behaviors offers an explanation for the challenges facing older workers and suggests recommendations for potential interventions.

In a previous study, we found that individuals with heart failure who were actively employed had poorer self-care practices than those who were unemployed ($P < .05$).[44] We suspected that as individuals returned to work, meeting the demands of employment interfered with ability to engage in self-care. Likewise, among patients post-myocardial infarction, return to work has been negatively associated with physical activity and cardiac rehabilitation attendance.[45,46] Our results suggest that increased job demands and low job control may be reasons for the diminished adherence to routinely recommended self-care behaviors that has been found in older workers with CVD. Rose et al[47]

reported a similar finding among African American men with hypertension who cited fear of discrimination for having a medical condition and lack of job flexibility to attend doctor appointments. Our study extends those findings among a broader sample of older workers with CVD and provides insight into the importance of support by both supervisor and coworkers to self-care in the workplace.

Our finding that depression and physical functioning are related to adherence among older workers with CVD is also an important contribution. The current literature focusing on employed individuals with CVD is sparse. In other chronic health conditions (eg, diabetes), there is evidence to suggest that mood (ie, depression and anxiety) compromises the worker's ability to routinely practice self-care and remain productive.[19,48] In coronary heart disease, depression is recognized as a potent risk factor for poor adherence and predictor for adverse outcomes,[16] but this has not been examined in a working population. Patients with CVD generally are less likely to maintain healthy lifestyle behaviors, such as smoking cessation, alcohol avoidance, and exercise when depressed.[49] Failure to adhere to treatment regimens such as medications and symptom monitoring can lead to volume overload, elevated blood pressure, coronary strain, and subsequent decompensation. As a result, physical functioning that encompasses mobility, large muscle functioning, fine motor skills, gross motor skills, and ability to perform activities of daily living deteriorates.[50-52] Conversely, patients who engage in self-care have fewer symptoms, better physical functioning, and an overall feeling of well-being.[53] Our results provide preliminary support for this complex relationship and suggest that targeted interventions aimed at diagnosis and treatment of depression, and promotion of self-care to maintain physical functioning in older workers with CVD are needed.

In this study, adherence was not a significant determinant of HRQOL when controlling for depression and physical functioning, but it was significant for general quality of life. Research investigating the relationship between self-care and quality of life, a multidimensional concept that includes emotional and physical well-being,[27] has been mixed. Grady's[54] systematic integrated review of heart failure self-care and quality of life outcomes measured by both disease-specific and general instruments reported was inclusive. However, some groups experienced a greater improvement in quality of life after self-care interventions, presumably because of severity of illness or symptom burden.[54] The Women's Lifestyle Heart Trial evaluated the effects of an intervention to improve self-management focused on adherence to diet, exercise, and stress management among postmenopausal women with CHD. Although it was a small sample (n = 28), the intervention was effective in improving angina symptoms and quality of life.[55] Likewise, a meta-analysis of quality of life outcomes after self-management interventions in a large sample of patients with diabetes (n = 1892) reported improvement in quality of life (effect size .281).[56] Although only a few of the studies included in the meta-analysis reported hemoglobin A1C or symptom experience, one explanation for the significant results was improved adherence to diet and exercise behaviors. Consistent with this literature, our equivocal findings may be explained in part by our sample, who were predominately symptom-free.

In addition, employment status among chronically ill adults is strongly linked to quality of life.[57] Because 80% of our sample was actively employed with high levels of job satisfaction, this is another plausible explanation for our quality of life findings.

Given the high rates of disability among workers with CVD,[2,3] our finding that adherence was better in workers aged more than 62 years was particularly interesting. In our previous work in heart failure self-care, we have found that older patients reported better self-care.[12] We have hypothesized that skill gained by experience in practicing self-care over the course of a diagnosis of heart failure facilitates effective self-care. So we have focused interventions on improving self-care by developing skill in managing unique, challenging situations.[58] It may be that a similar effect is at play in this population. Perhaps older workers who are able to successfully practice self-care within the context of employment are more effective and therefore able to remain actively employed longer. Older adults generally report decreased family role responsibilities (eg, caregiving roles).[59] In our prior work, we found that work–life balance demands can interfere with self-care, leading an individual faced with a perceived conflict to be nonadherent to self-care recommendations.[44] To our knowledge, the relationship between adherence and age is a unique finding that requires further investigation because the proportion of America's workforce aged more than 55 years is growing rapidly.

Limitations

It is important to note that this was a cross-sectional study; thus, causal relationships cannot be made. A longitudinal, prospective study to examine the contribution of organizational and job-level factors to self-care and related health and productivity outcomes, including quality of life, is a logical next step. In addition, although we sought to measure self-care that included both adherence and symptom-management behaviors, our analysis was limited to examining only adherence to treatment recommendations. The new SCHDI used to describe self-care maintenance and management had marginal reliability and requires further psychometric validation. Few individuals in our sample reported symptoms, so we were unable to explore the relationship among job-level factors to

individual response to symptoms. This is an important area for future research because others have found that lack of job flexibility, long work hours, and fear of discrimination have been identified as reasons that individuals with acute coronary symptom delayed seeking treatment when experiencing chest pain symptoms during work hours.[60]

In this exploratory study, we used a convenience sample of working adults; therefore, we were unable to examine the influence of specific organizational policies and practices. Further testing of the model that includes the interaction of the work organization and job-level factors on self-care and health is warranted.

Our sample included a range of CVD diagnosis with varying levels of self-care requirements and treatment complexity. The sample size was not sufficient to examine differences across different diagnoses (eg, hypertension compared with stroke). Furthermore, CVD diagnosis was self-reported, which is a limitation. Focusing on specific diagnoses may yield different results. However, our findings are important in that they document the inadequacy of current efforts to promote self-care, specifically adherence among workers with CVD.

Conclusions

The results of this exploratory study are an important step to address the 2009 American Heart Association's policy statement on worksite wellness programs for CVD prevention that explicitly calls for research to improve the understanding of factors that impede worker engagement, especially vulnerable older workers, in worksite health programs.[61] Research to develop and test interventions to foster worksite programs that facilitate self-care behaviors among older workers with CVD is needed. Research efforts should include the objective measurement of adherence and self-care.

Programs that target general self-care such as diet and exercise, as well as more complex self-care (eg, after myocardial infarction or those with heart failure), are indicated to address the needs across the working population. Nurses with expertise in occupational health are well suited to champion these efforts.

In addition, because job characteristics may interfere with self-care and potentially influence quality of life, nurses should assess job demands and include stress reduction as part of patient counseling for workers with CVD during routine office visits. Nurses are encouraged to take advantage of employer programs, such as referrals to employee assistance resources and coaching in individual stress-management strategies. During a period of disability (ie, work absence), the individual's work goals should be assessed so that the plan of care can support a timely and successful return to work. This will likely necessitate interdisciplinary coordination among healthcare providers, occupational or employee health services, and disease management programs that extends beyond merely reentry to the work environment.

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