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Project:
Organization of Work and Self-Care Among Aging Workers with Coronary Heart Disease
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List of Terms & Abbreviations:
CHD – Coronary Heart Disease
ERI-Q - Effort-Reward Imbalance Questionnaire
GAS- General Adherence Survey
GLM- Generalized linear modeling
JCQ - Job Content Questionnaire   )
NORA - National Occupational Research Agenda
OEHN – Occupational and Environmental Health Nursing
OW – Organization of Work
SCCAI- Self-Care Chronic Angina/Heart Disease Index

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Final Report Abstract: The American workforce is aging. Over 3.5 million workers have CHD with significant work limitations and disability. Yet, little is known about how aging workers with CHD practice self-care, (i.e., adherence to medication and treatment, symptom monitoring and symptom management) on a daily basis within the context of employment or the consequences of poor self-care behaviors on aging worker health and safety. Furthermore, the effect of organization of work (OW), defined as work process (e.g., the way jobs are designed and performed) and organizational practices (e.g., human resource policies) on the health behavior of self-care and worker productivity in this population has not been explored. As a K01 award, a portion of the grant was focused on career development activities of the PI with the goal of preparing the candidate to transition to a successful independent investigator with expertise in OW research and a focus on optimizing self-care among aging workers with chronic illness. In the research component, a prospective mixed methods study was conducted to investigate the self-care practices of 125 working adults over age 50 (69% Male, 85% White; mean age 59.2±5.4 years) with CHD and the relationship of OW, job-level factors, self-care, and health and productivity outcomes (health status, quality of life, absenteeism and presenteeism). There were three specific aims: 1) to describe the self-care practices of aging workers with CHD, 2) to identify self-care types of aging workers with CHD and identify the characteristics and work-related determinants of self-care types and 3) to explore the relationship of OW and job-level characteristics to self-care, health status, quality of life and work-related outcomes. A subsample (n=40) participated in in-depth interviews about self-care, workplace factors, work-life balance, and attitudes and self-efficacy about self-care on the job. Overall, self-care was marginal in this sample, with 32% reporting poor adherence to treatment regimens. Self-care differed across job category, which was explained in part by the qualitative data. Job control and workplace support facilitated self-care for some; but job demands and work-life imbalance were associated with poorer self-care as individuals tried to balance competing work-life-health priorities. Quantitative and qualitative data were integrated to derive a typology of self-care, which we labeled as: novice (45.5%), expert (36.4%), and inconsistent (18.2%). The model predicting self-care cluster membership was significant (χ^2 17.622, p=.001); self-care confidence and length of time with CHD were the only significant individual factors. Qualitative data explained the influence of workplace and job-level factors across self-care types. Experts described positive attitudes, high self-efficacy and supportive work environments. Those labeled inconsistent reported job stress, negative work attitudes and struggled with balancing work-life-health. Importantly, the transition period from disability to return to work was identified as critical and may influence self-care in novices who lack confidence, and contribute to failed self-care within the context of work over time. These results suggest that targeted intervention should focus on the return to work transition period and help workers with CHD manage stress, negotiate job accommodations and navigate barriers to sustainable self-care in the workplace.

1.0 Final Progress Report

1.1   Significant Findings:
        There were several significant findings generated from this longitudinal mixed methods study. First, in this sample of working adults with CHD over age 50 (69% Male, 85% White; mean age 59.2±5.4 years) self-care was marginal. That is, 32% reported poor adherence to treatment regimens. Self-care differed by age, ethnicity, type of heart disease and job type, which was explained in part by the qualitative data. Clerical workers, transportation workers and household/service workers reported low job control and poorer self-care compared to those in professional and managerial positions. Similarly, there was a significant effect of work-life balance and job type (but not work sector) on self-care. The qualitative data provided insight into these results and why self-care is challenging for many. Specifically, job control and workplace support facilitated self-care for some; but job demands including job insecurity and work-life imbalance were associated with poorer self-care as individuals tried to balance competing work-life-health priorities.
        A second significant finding was in this population with CHD, work-life balance encompasses a third dimension of balancing health activities or self-care with job and daily life responsibilities. Although nearly half of the sample reported availability of worksite wellness programs, very few participated in programs citing challenges of time and energy that resulted from competing priorities of work versus life activities. In this older population, work-life balance issues were related to caregiving responsibilities for adult family members rather than children, and were described as additional stressors for which individuals were ill-equipped to manage.
        Third, older workers with CHD may be vulnerable to increased stress, and lapses in self-care when there is a lack of a clear return to work transition. Poor communication between healthcare providers and employer may result in difficulty identifying or negotiating job accommodations. For many, the challenges in navigating the return to work process contributed to increased perceived stress, and feelings of insecurity related to both one's health and one's career.
        The analysis of aim #2 resulted in the categorization of a typology of self-care in older workers with CHD: experts, novices and those inconsistent in self-care. Two quantitative determinants of the self-care types: confidence and length of CHD along with the qualitative themes of self-efficacy, workplace support and decision latitude (job control/job demands) suggest that interventions are needed that help individuals build self-efficacy and skill in self-care within the context of work. This finding also highlighted differences in stress management and work-life-health balance across the typology.
        Finally, preliminary analysis of aim #3 shows that self-care may not improve in this population over time and is predictive of absenteeism (sick hours) at 6-months. Therefore, it is paramount that all stakeholders – individuals, healthcare providers and employers address the multilevel challenges to self-care experienced by older workers with CHD.

1.2   Translation of Findings
        Based on the results, there is a need to develop return to work programs that facilitate a successful reentry into the workforce for older workers after a cardiac event or period of disability. In light of the gaps identified, communication and coordination perhaps through disability management or employer benefits is indicated and should routinely include a

discussion about job accommodations with the healthcare provider team. At a minimum, employers should be encouraged to consult the job accommodation network for recommendations. Increasing options including transitional work agreements, flexibility in hours for structured breaks or medical appointments should be discussed. Future research should focus on how operationalizing accommodations may improve health and productivity in this population.

The results of this study also found that workplace wellness programs and health promotion benefits should encompass targeted content on CHD self-care, support development of self-efficacy and overcoming perceived barriers. Increasing utilization of employee assistance (mental health promotion) programs is recommended for those, especially novices and inconsistent types, who are vulnerable to stress. Stress management programs should focus on working with CHD. A critical finding in this study was that although many employers offer generic wellness programs, a specific focus on the needs of workers with CHD is lacking. Therefore, current programs might be augmented with community or hospital partners who are experienced in working with individuals with CHD and their unique needs (e.g., exercise, weight management).

1.3 <u>Outcomes/ Impact</u>:

This study was significant in that it identified organization- and job-level factors that influence self-care behavior among aging workers with CHD. The impact of this study lies in its potential to serve as a basis for the development of targeted interventions, aimed at both work organization and job-level factors, to improve self-care among aging workers with CHD.

Potential outcome: One of the key significant findings of this study was the need for improved return to work coordination and transition programs that includes identifying job accommodations. The results suggest that this is a critical but missing step for many; job accommodations are underutilized. As a result, increased stress and job insecurity impedes work ability. Preliminary results suggest that future absenteeism may be a risk. Although we were not able to determine the long term health events of stress on CHD in this sample, older workers with increased stress may be vulnerable to adverse health consequences.

Intermediate outcomes: Based on the results that a targeted intervention is needed to focus on CHD self-care, a pilot intervention has been developed and a feasibility study is underway. Fifty adults with CHD are being recruited to participate in an 8-week intervention that uses community resources to promote sustainable self-care and health behaviors. A key component of this intervention is overcoming challenges to self-care within the context of work and life events. Stress management is a core component of the intervention. One of the outcomes of this pilot is development of a "toolkit" that may be used to disseminate the program in the future. If this pilot study is feasible, a larger RCT trial is warranted to examine the effects on biobehavioral outcomes and health and productivity. Since self-care is linked to future absenteeism/sick hours, such an intervention has important implications for workplace wellness programs.

As a K01 award, a portion of the grant was focused on career development activities of the PI with the goal of training the candidate in OW research and a focus on optimizing self-care among aging workers with chronic illness. To that end, course work in occupational health psychology and organization of work theory was completed and infused into the study design. This preparation has also contributed to the nursing faculty role by preparing the PI for mentorship of PhD students interested in OEH nursing research. An intermediate outcome, therefore, is the PhD in OEH Nursing training program that has been developed.

2.0 Scientific Report

2.1 Background:

According to the Bureau of Labor Statistics, the American workforce is aging. As a result, health problems associated with the aging process, like coronary heart disease (CHD) present new health and safety challenges. Over 3.5 million workers have CHD with significant work limitations and increased disability.[1,2] Further, the prevalence of risk factors for CHD is very high in this population. For example, thirty-one percent of the workforce have hyperlipidemia and 15% have hypertension.[1] Advances in medical care have led to improved trends in morbidity and mortality[3] allowing many workers with CHD to continue working. However, older workers with CHD are 3-times more likely to report work limitations than those without CHD.[1] To date, research on employment among patients with CHD has focused on return to work after an adverse event (e.g., heart attack). There is a dearth of research investigating the factors that affect day to day health and productivity among workers with CHD. Although it is widely accepted that individuals with chronic illnesses play a central role in managing their health,[4] little is known about how aging workers with CHD manage their conditions on a daily basis within the context of employment.

Self-care, defined as a naturalistic decision-making process in which persons engage for the purpose of maintaining health and managing their illness,[5] is the cornerstone of treatment of many chronic illnesses including CHD. Self-care is a health behavior that encompasses self-care maintenance, those behaviors performed by the patient that maintain physiological stability (e.g., adherence to medication, diet and symptom monitoring) and self-care management, which is the response by the patient with CHD to symptoms when they occur. Although self-care is associated with improved health outcomes,[6-8] self-care practices have not been examined in the working population with CHD. Further, little is known about how aging workers with CHD adhere to diet restrictions, medication regimens, and healthy behaviors (i.e., self-care maintenance) and monitor and manage symptoms of the disease (i.e. self-care management) when symptoms occur on the job. What are the consequences of poor self-care behaviors on aging worker health and productivity (e.g., health status, quality of life, absenteeism and presenteeism)? How does organization of work (i.e., underlying organizational characteristics and processes that affect job design characteristics, such as schedule, pay structure, family-friendliness, etc.[9] facilitate or impede self-care?

This study is the first step in a program of research that addresses the National Occupational Research Agenda (NORA) priority to investigate how organization of work affects the health of the growing aging workforce, to identify risk factors that may disproportionately affect aging workers and to develop recommendations for interventions to improve the health and safety of older workers.

2.2 Specific Aims

The primary goal of this prospective mixed methods study was to investigate the self-care practices of aging workers with CHD and the relationship of organization of work, resultant job-level risk factors, self-care, and health and productivity outcomes (health status, quality of life, absenteeism and presenteeism). This study had the following aims:

Aim #1: To describe the self-care practices of 125 aging workers (>age 50 years) with CHD
Aim #2: To identify self-care types of aging workers with CHD and identify the characteristics and work-related determinants of self-care types in this population.

Aim #3: To explore the relationship of work organization and job-level characteristics to self-care, health status, quality of life and work-related (absenteeism, presenteeism) outcomes.

We hypothesized that job-level factors would be significant determinants of self-care among aging workers with CHD. Work organization was hypothesized to be related to self-care and individuals with adequate self-care would report better health status, quality of life and less absenteeism.

2.3 Methodology

Overview of Study Design: This prospective study used mixed methods techniques to address the aims in a sample of 125 employed aging ($\geq$ age 50) individuals with CHD working full-time in a job within the most common workplace sectors served by recruitment sites. In the first step of the study both quantitative and qualitative data were collected to describe the self-care practices of aging workers with CHD (aim #1), identify self-care types and identify determinants of self-care (aim #2). The second step of the study examined the relationship between work organization and job-level characteristics, self-care, health and productivity outcomes over a period of 6 months (aim #3).

Sample: A convenience sample of 125 adults over age 50 with CHD were enrolled from clinical and community settings in New York City and using Research Match (ResearchMatch.org) a national electronic, web-based recruitment tool that was created through the Clinical & Translational Science Awards Consortium in 2009. Inclusion criteria were: 1) CHD diagnosis confirmed by healthcare provider, 2) age over 50 years; 3) working and employed at least 35 hours/week at the time of study enrollment, 4) ability to perform tests, 5) able to speak and read English), and 6) able and willing to provide informed consent. Exclusion criteria were: 1) history of a prior neurological event (e.g., stroke, head injury, encephalopathy); 2) serious other chronic illness or treatment that precludes participation in a longitudinal study; or 3) self-employment status. An evaluable sample size of 100 was calculated to achieve adequate ($\geq$ 80%) power for the aims of this study. We estimated attrition in this longitudinal study to be 20%. Therefore, 125 subjects were targeted for recruitment (125-(125*.20) = 100).

TABLE 1: Instrument and Data Collection Interval	α	0 mo	2 mo	4 mo	6 mo
Organization of Work: Organization- & Job-Level Factors					
Organization of Work Survey	.78	√			
Job Content Questionnaire	.85	√	√	√	√
Effort Reward Imbalance Questionnaire	.83	√	√	√	√
NIOSH Generic Job Stress Questionnaire	.78	√			√
Work -Life Balance Survey	.83	√			√
Self-Care					
Self-Care Heart Disease Index (SCCAI)	.79	√	√	√	√
General Adherence Survey (GAS)	.88	√	√	√	√
Personal Factors: Psychological, Physiological & Social Factors					
Self-efficacy & Attitudes: qualitative interview	----	√			
Mood: _Brief Symptom Inventory_	.94	√			√
Social support: _MPSS_	.92	√			√
Functional capacity: DASI	.85	√			
Health and Productivity Outcomes					
Work Ability Index	.83	√			√
_SF-12_	.94	√	√	√	√
Work Limitations Questionnaire	.76	√	√	√	√
WHO Work Performance Questionnaire	.78	√	√	√	√
Potentially Confounding Variables					
Sociodemographic Survey	----	√			
Charlson Co-morbidity Index	----	√			

For the qualitative data collection, a purposive sample (n=40) from the total sample (n=125) were recruited using maximum variation sampling to ensure that cases for the qualitative analysis emerged that provided the maximum heterogeneity on specific attributes (e.g., age, ethnicity, CHD diagnosis and occupation) that affect the variables of interest. Since this study investigated a broad CHD population and workplace factors, we targeted 40 individuals for qualitative data collection to ensure adequate representation of individuals with varied CHD diagnosis, age and occupation. Sampling variation for the qualitative data collection

was monitored by the PI to ensure range of CHD diagnoses (myocardial infarction, angina and heart failure), age, ethnicity and occupation as well as adequate representation (at least 30%) of women in the sample.

Data Collection: Based on our preliminary pilots and in training during this award, we used valid and reliable instruments to collect quantitative data (see Table 1) at baseline, 2-, 4- and 6-month intervals. Qualitative data about self-care, workplace factors, work-life balance, and attitudes and self-efficacy about self-care on the job were collected during tape-recorded interviews guided by a semi-structured interview guide.

Data Analysis: Analyses were performed using SPSS V.22. Statistical significance was set at $p < .05$. Standard descriptive statistics were used to describe baseline socio-demographic and clinical characteristics and other variables identified as confounders. Continuous variables were analyzed for normality and appropriately transformed if necessary. Mean scores and standard deviations as well as Cronbach's α were calculated on all questionnaires.

Aim #1: To explore the self-care practices of aging workers with CHD, mixed methods (using both qualitative and quantitative data) were used. (Specific qualitative analytic methods are described below). First, Pearson's *r* or eta were computed, multiple hierarchial and generalized linear modeling (GLM) was used to examine the strength and direction of the univariate and multivariate determinants of baseline self-care. Then, thematic content analysis methods were used to analyze the qualitative data (n=40) followed by integration of the qualitative and quantitative data. During data integration, qualitative evidence of self-care was compared to the scores on the self-care instrument. Emergent themes from the narratives of work organization characteristics elicited from the semi-structured interview were triangulated with the JCQ and ERI-Q survey results. Themes related to attitudes and self-efficacy were compared with the self-care and workplace data. These relationships were then explored in the content analysis and using multivariate linear regression analysis. Finally, the qualitative data was re-examined to identify potential differences in attitudes, self-efficacy and self-care between subjects categorized by individualistic factors including socio-demographic characteristics (e.g., gender, socioeconomic status, age, occupation, etc.) and illness factors.

Aim #2: Based upon the typology identified in our prior work,[10] this aim classified self-care types among aging workers with CHD and identified the determinants of self-care types in this population. Although it was hypothesized that three clusters would emerge from these data, two-step cluster analysis was used to identify two or more patterns of similarity among all self-care behaviors on the maintenance and scale of the SCCAI and the GAS. To mitigate bias in two-step clustering, cases were assigned a random number (from a Gaussian distribution with a 1:0.5 ratio of mean to standard deviation) and reordered in ascending order. Schwarz's Bayesian information criterion (BIC), BIC change, and ratio of BIC change were used to support a final cluster solution (e.g., the actual number of clusters), as these metrics indicate when more clusters will not improve model fit. Due to the ordinal nature of the instrument responses, log-likelihood (probability-based) distancing was selected over Euclidian distancing; autoclustering was set to a maximum of 15 clusters. Finally, the qualitative data themes derived from Aim #1 were reviewed for each type which provided gain additional insight into the determinants of self-care (i.e., attitudes, self-efficacy) in this population.

Aim #3: Analysis for this aim is still underway. We are using GLM to determine the strength and direction of the relationship between baseline measures of self-care and 2, 4 and 6 month measures of self-care, health status and QOL as well as the relative change in health status and QOL from baseline. To explore the relationship between self-care and productivity

outcomes, a one-way (within-subjects) repeated measures ANOVA and factorial (within-subjects and between-subjects) using the Geisser-Greenhouse corrected *F*-test are planned to describe variability in productivity outcomes and to determine if there are differences in variability in productivity outcomes by self-care type. GLM, GEE, and extensions thereof will be used to quantify the strength and direction of the relationship between baseline measures of self-care (as well as other factors) and mean and relative change in WLQ scale scores, and the total 6 month count of hours and days of absence (WHO HPQ), respectively, and to assess the influence of organization- and job-level factors and self-care on variance in absenteeism/ presenteeism.

*Qualitative Data Analysis***:** The processing and analysis of the qualitative interview data was completed using content analysis. Data management and analysis entailed the following major activities: 1) processing qualitative data, including careful review of interviews and transcriptions, 2) analyzing data to identify the self-care practices, workplace factors, attitudes and self-efficacy towards self-care, and 3) analyzing data to identify themes and patterns related to the factors of interest. The emergence of themes was analyzed within-cases then across cases to identify commonalities among subsets of individuals. All tape-recorded interviews were transcribed verbatim, with accuracy confirmed and coded using *ATLAS.ti* version 7.0.

*Data Integration***:** In the first step of data integration, quantitative self-care and organization of work data was compared with the qualitative data. Then using a matrix, codes derived from the qualitative analysis described above for each of the 40 cases, were analyzed given the quantitative scores on self-care, JCQ and ERI-Q. Using these data integration techniques, results from the quantitative data were enhanced through the findings from the qualitative data to yield a broader perspective of the self-care patterns and correlates in this population. Methodological rigor in the mixed methods portion of this study was ensured by using an audit trail, regular meetings with experts and member checking, the process by which findings are validated as representative of the experience of the participants.

2.4 <u>Results and Discussion</u>

2.4.1 Aim #1: Of the 125 individuals enrolled in this study, 108 provided evaluable data for aim #1. The sample was 69% Male, 85% White and the mean age was 59.2 ± 5.4 years (range 50 to 72 years). Seventy-eight percent worked in professional or managerial jobs; most (48%) worked in the services work sector. In this sample, nearly half (49%) reported that they had had a myocardial infarction (heart attack) in the prior 6 months. On average, participants reported 2 chronic conditions not including obesity (30%); 37% were overweight. Over a third of the sample (36%) reported moderate alcohol use; 60% had symptoms consistent with depression and 33% reported inadequate sleep.

At baseline, physical capacity, was associated with work ability (i.e, one's ability to work at present or in the near future with respect to work demands, health, and mental resources) *(r=. 428, p<.01).* After controlling for physical capacity, OW factors (organizational support and work-life balance) explained 11% of variance in work ability; job related factors (job control, and supervisor support) explained an additional 8% of variance in work ability. In this sample work-life balance was strongly associated with organizational justice (r = -.290, p<.01) and organizational support (r= -.376, p<.01).

Overall, 68% reported adequate self-care at baseline (SCCAI mean 76 ± 14; GAS mean 75 ± 17); 32% reported poor adherence. There were significant differences in self-care by age, ethnicity, type of heart disease and job type. Interestingly, there was also a significant difference among job types in levels of depression and anxiety, factors which are known to contribute to

poor self-care. A general linear model with main effects for job type, job control and job type*job control interaction were fitted to the data. There was a significant interaction effect of job control and job type on self-care (F 2.097, p=.038, eta .177). Clerical workers, transportation workers and household/service workers reported low job control and poorer self-care. Similarly, there was a significant interaction effect of work-life balance and job type (but not work sector). Work-life balance and the number of adults but not children being cared for at home were significantly associated with self-care (F 2.53, p=.024).

The qualitative data analysis provided insight into these findings. Narrative accounts of self-care revealed that medication adherence was perceived as critical; but most struggled with diet and engaging in regular exercise due to job demands. Workplace support by both coworkers and supervisors was essential to overcome barriers to self-care and manage job stress that was associated with symptoms. But workers were selective in whom they trusted about their CHD and daily symptoms, especially when they perceived workplace injustice, often articulated as job insecurity and fear of discrimination.

Interestingly, nearly half of the sample reported availability of worksite wellness programs, either through benefits or onsite facilities. However, very few participated in programs citing challenges of time and energy that resulted from competing priorities of work versus life activities. In this older population, work-life balance issues were related to caregiving responsibilities to adult family members rather than children, and were described as additional stressors for which individuals were ill-equipped to manage. The results suggest that in this population with CHD, work-life balance encompasses a third dimension of balancing health activities or self-care with job and daily life responsibilities; that is, work-life-health.

Another important theme that emerged from the qualitative data centered around the challenges of returning to work after a period of disability, (e.g., after a heart attack or surgery). The lack of clear return to work transition planning, difficulty identifying or negotiating job accommodations and poor communication between healthcare providers and employer contributed to increased perceived stress, and feelings of insecurity related to both one's health and one's career.

When qualitative and quantitative data were integrated, there was adequate (>80%) concordance of the self-care and job-related data. Among those with poor self-care, qualitative themes revealed lack of job control, job stress and work-life balance issues that interfered with the ability to engage in healthy eating, exercise and stress management. Individuals with poor self-care measured in the quantitative data reported feeling stressed out and fatigued which they attributed to their job. Few interpreted these feelings as potential symptoms related to their heart condition.

The preliminary findings of this first aim have been presented at several conferences and one publication to date [Dickson, V (2013)Workplace Health & Safety; 61(11);486-494]. Currently, a manuscript is in preparation that will fully describe aim #1 the mixed methods results of baseline individual-level, job-level and OW-level factors related to self-care.

2.4.2 Aim #2: Using 2-step cluster analysis , self-care behaviors among aging workers with CHD clustered best into three categories (two-cluster solution BIC = 116.1, BIC change -38.6 ratio of BIC change =1.0, three-cluster solution BIC 100.9, BIC change -15.1, ratio of BIC change .393; four-cluster solution 109.4, BIC change 8.5, ratio of BIC change -.221). The three clusters were differentiated in several ways. First the self-care maintenance and general adherence scores varied across the three clusters. Experts (n=34, 36.4%), reported the highest levels of self-care (89.2±6.3) and high self-care confidence(75.9±19.1). Novices (n=45, 45.5%),

reported adequate self-care (74.3±8.2) but inadequate self-care confidence (59.5±20.2). The third cluster, which was labeled inconsistent (n=18, 18.2%), had inadequate self-care (57.2±13.2) and low self-care confidence (64.6±18.7). A second difference in the three types was adherence to specific self-care behaviors. Although all three types reported medication adherence, experts were more likely to monitor symptoms, keep doctors' appointments and engage in healthy behaviors like exercising, limiting alcohol or avoiding cigarettes. Those inconsistent in self-care were more likely to be overweight, not follow dietary restrictions (i.e., low sodium, low cholesterol or low fat), limit alcohol or avoid cigarettes. A third difference was in the length of time with CHD. As expected novices reported having CHD on average for only 6.5 years compared to experts and inconsistent, who reported mean length of CHD diagnosis as 15 and 12 years, respectively.

The model predicting self-care type was significant ($\chi^2$17.622, p=.001, Nagelkerke pseudo-R^2=.22); self-care confidence and length of time with heart disease were the only significant factors. Higher levels of confidence were associated with an increase in odds that participants would be typed as expert (OR = 1.045) or inconsistent (OR =1.013). Length of diagnosis with HF was also predictive of self-care type (experts OR=1.479; inconsistent OR=1.800). These results support earlier work[10] that self-efficacy (confidence in one's ability to persist in a behavior despite obstacles) is gained over time and associated with better self-care.[11] In this population experts may have learned how to consistently engage in self-care and overcome obstacles posed in workplace. Similarly, novices may be more vigilant and engaged in self-care (higher self-care scores than inconsistent) as they are earlier in the illness trajectory.

Half of the 40 participants who also completed interviews were classified as novices (28% were experts; 22% were inconsistent). The qualitative data revealed three important themes. First, self-efficacy is important to successful self-care within the context of work and was lacking in novices who had difficulty negotiating accommodations that would support their health. Most of the novices had experienced a cardiac event within the prior six months. Secondly, workplace support for self-care (e.g., flexibility for doctors appointments, healthy food options) and job control facilitated self-care. Experts and novices were more likely to be in professional and managerial positions that afforded them increased job control (as found in aim #1); and this was supported in the qualitative accounts that job flexibility and decision latitude supported their daily self-care. Conversely, the inconsistent type was comprised mostly of clerical and service workers who discussed lack of support, excessive job stress and lack of flexibility. A third theme that emerged from the qualitative data was the role that attitudes about health and work played in self-care. Positive attitudes about healthy behaviors and prior successful engagement in healthy lifestyles, professional identity, and optimism were more common in experts. Negative attitudes towards work as having ill effects on health was more prevalent in the inconsistent type. Although mood and affect have been explored in patients recovering from MI, research is needed to explore how personality and affect may influence successful return to work in older workers with CHD. Use of workplace benefits like employee assistance programs, which was grossly underutilized in this sample, may support workers returning to work after a cardiac disability.

In this unique sample of older workers with CHD, the typology previously developed and validated in adults with heart failure is an important finding. Further, two determinants of the self-care types: confidence and length of CHD along with the qualitative themes of self-efficacy, workplace support and decision latitude (job control/job demands) suggest that interventions are needed that help to build self-efficacy and skill in self-care within the context of work.

Participation in workplace programs was very limited. Novices commonly cited fear of injury or adverse event along with conflicting family responsibilities. The inconsistent type reported that lack of time and energy along with fear of retribution from employer interfered with participation in workplace programs. Interestingly, experts discussed lifelong healthy habits like exercise and healthy eating as most influential to self-care not workplace initiatives.

Currently, a manuscript is in preparation that will fully describe aim #2, the validation of a typology of self-care in aging workers with CHD. The mixed methods results are also being submitted to the 2015 American Heart Association Scientific Sessions (November 2015).

*2.4.3 Aim #3:*The third aim of this study examines the relationship between self-care and productivity outcomes. Analysis is currently underway but has been slowed due to delayed six month data completion as reported in the prior narratives.   Overall, physical quality of life in this sample was below US norm at baseline (47.3±8.3), but improved significantly over time (49.6±9.7; *P*=.02); mental quality of life was consistent with US norms at baseline (52.2±10.2) and 6 months (52.4±7.8; *P*=NS). Preliminary data analysis suggests that self-care is an important predictor of absenteeism but not presenteeism at 6-months in this sample. This analysis will be completed as soon as possible and a manuscript prepared to describe the findings of this project related to health and productivity outcomes.

2.5 Conclusion

This study focused on an understudied, yet vulnerable population, aging workers who have CHD and their self-care practices at work. To date, research has focused on each of the studied domains (OW, job-related factors, self-care, etc) in isolation. This work builds hypotheses for future testing and identifies opportunities for targeted interventions. Importantly, the level of poor self-care adherence (32%) in this sample is significant because, adherence is generally over stated. The results suggest a typology of self-care among aging workers with CHD and provide preliminary data about the work-related determinants of self-care types. The typology suggests that given the trajectory of CHD, there is a need for healthcare providers to consistently reinforce education about CHD and self-care to older workers. As this patient population ages, healthcare providers should also routinely review occupational demands, both physical and psychological. Interventions that address the identified gap in the transition from disability to return to work, or anytime the worker's capabilities change, are needed. Improving communication among healthcare providers, employees and employers may help older workers with CHD work safely and confidently. Importantly, the results of this study highlight that stress management and work-life-health balance should be a central focus of future intervention research.

Research is also needed to develop and test workplace accommodations like flexible work schedules and remote work options that can be operationalized in older workers with CHD. Although there is a list of potential accommodations through the Job Accomodation Network, the results of this study suggest that many older workers with CHD may not be engaged in the interactive job accommodation process. Utilizing existing employee assistance programs for older workers returning to work after a cardiac event should be explored as a way to support transition and manage stress in vulnerable workers. Analyzing the effectiveness of job accommodations suggested by experts in this study would benefit employees and employers.

This study also uncovers an unmet workplace wellness need for older workers with CHD. Despite recommendations for worksite health promotion programming aimed at cardiovascular risk reduction, older workers with CHD may not be currently engaged with employer programs. Reasons uncovered in this study included work demands, health concerns, personal preferences

and job insecurity. Therefore, the current workplace wellness models may not be effective especially for employers with an older workforce.

In sum, the results of this study provide important insight into the challenges that older workers with CHD face as they strive to maintain health, continue to work and be productive. A multi-level intervention is needed that focuses on promoting sustainable self-care among older workers with CHD within the context of work, enhancing communication among employee and employer to mitigate barriers to self-care and when indicated, facilitating successful transition back to work.

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3.0 Inclusion Enrollment Table
Attached

4.0 Publications

Journal Articles**:**
Dickson, VV: [2013] How older workers with coronary heart disease perceive the health effects of work. Workplace Health & Safety; 61(11);486-494.
Dickson, VV: [2013] Presenteeism Among Older Workers with Coronary Heart Disease: An Integrative Literature Review. The Open Public Health Journal.6(31-41).
Dickson VV, Nocella J, Yoon H-W,Hammer, M, Melkus, GD, Chyun, D: [2013] Cardiovascular Disease Self-Care Interventions. Nursing Research and Practice. Article ID 407608.

Published Abstracts:
Dickson, VV, Warren, N, Melkus, GD: [2012] A Qualitative Study of Barriers to Self-Care and Worksite Wellness Participation among Workers with CHD. Circulation. 2012;126:A12683.
Dickson, VV**,** Lee, CS, Yehle, K, Mola, A, Ackerman, S, Levine-Wong, A, Yoon, HW, Riegel, B: [2013] Psychometric testing of the Self-Care of Chronic Angina Index (SCCAI). European Journal of Cardiovascular Nursing 12:1(S3)

Proceedings:
Dickson, VV, Warren, N, Melkus, GD: [2014] Organization of work and work ability among older workers with CHD. Proc of American Association of Occupational Health Nurses, Dallas, TX, May 6-8, 2014.
Dickson, VV, Warren, N, Melkus, GD: [2014] A Mixed Methods Study Exploring Self-Care Practices and Worksite Wellness Participation Among Older Workers with CHD, Proc of 1st International Symposium to Advance Total Worker Health, Washington, DC, October 6-8, 2014.
Dickson, VV: [2012] A Qualitative Study of Barriers to Self-Care among Workers with CHD. Proc of NIOSH Workshop on Research Translation with Vulnerable Worker Populations, Fort Collins, CO, June 7-8 2012.

5.0 Inclusion of Children
Not Applicable

6.0 Materials available for other investigators
De-identified data sociodemographic, occupational (organization of work) and behavioral data may be made available to researchers under a data sharing agreement. Inquiries should be directed to the PI: Dr Victoria Vaughan Dickson, NYU College of Nursing, 433 First Ave, #742, New York, NY 10010.