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ORIGINAL RESEARCH ARTICLE

Work-Health Conflict among Breast Cancer Survivors: Associations with Cancer Self-Management, Quality of Life, and Anticipated Turnover

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Abstract

Breast cancer and its treatment can affect a survivor's work role, potentially resulting in job loss or work withdrawal. Survivors are encouraged to adopt self-management behaviors as part of their health role to minimize treatment after-effects, prevent cancer recurrence, and improve health-related quality of life. We examined work-health conflict, an under-recognized form of inter-role conflict that occurs when work role demands make it difficult to engage in the health role. We hypothesized that work-health conflict is directly associated with poorer quality of life and anticipated turnover, and indirectly associated with both outcomes through self-management behaviors. An online cross-sectional survey was administered to working breast cancer survivors. We conducted ordinary least square regressions path analysis to test hypothesized associations of work-health conflict, quality of life, anticipated turnover, and cancer self-management. Respondents ($n = 157$) had a mean age of 51 and were primarily female (98%), White and non-Hispanic (85%), married or partnered (74%), and college-educated (94%). Hypothesis-testing showed that work-health conflict had direct effects on health-related quality of life and anticipated turnover, as well as indirect effects through self-management. We provide evidence for the adverse health and work impacts of work-health conflict, a potentially modifiable variable that is of growing interest within the literature on work-life interface. Employers should focus on supporting survivors' long-term health-related quality of life and opportunities for health-supporting activities, which may promote work retention. Upstream interventions may be needed to address sources of work-health conflict, and may include minimizing spillover of work stress and reducing drains on time and energy resources.

Keywords Cancer survivorship · Chronic health conditions · Work-health conflict · Work-life conflict · Quality of life · Turnover

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There are approximately 3.8 million people living with a history of breast cancer in the United States (Breast Cancer Facts and Stats, 2024). Over recent decades, the prognosis of breast cancer has improved due to advancements in early detection, more precise diagnoses, and targeted treatment. The overall relative 5-year survival rate for breast cancer patients now stands at 91%, with early-stage diagnoses showing more favorable outcomes (Giaquinto et al., 2022). Thus, breast cancer survivors (people living after a cancer diagnosis) comprise an increasing percentage of the workforce, especially as the workforce is aging (Park & Hanna, 2022).

Extant literature indicates that while there are employed survivors who continue to work during treatment (Blinder et al., 2017), others need to take time off from work during treatment and recovery, and some even leave their employer or the workforce permanently (Rosenberg et al., 2019). Disability, unemployment, early retirement, and associated losses of income and health insurance are commonly experienced by survivors resulting from their cancer diagnosis and treatment (Mehnert, 2011). Factors enabling survivors' work continuance are poorly understood and pose a challenge to occupational health practice. They appear to be related in part to survivors being able to fulfill their *health role*, receiving treatment for and recovering from cancer, as well as engaging in regular health behaviors needed to manage physical and psychosocial aftereffects of treatment, which can be challenging for people with full-time employment (Dugan et al., 2023; Richardson et al., 2011). In this study, we contribute new knowledge to the literature on the work-life interface by focusing on the adverse effects of an infrequently-examined form of inter-role conflict – conflict between the work and health roles – as well as its impact on a previously unexamined health behavior in this literature, cancer self-management.

Expanding Research on Inter-role Conflict

A concept rooted in social role theory, inter-role conflict occurs when two or more life roles (e.g., work, family) compete for finite resources, making it difficult to fulfill both roles (Greenhaus & Beutell, 1985; Kahn et al., 1964). Per conservation of resources theory, resources allocated to one role necessarily drain resources available for other life roles (e.g., work time may detract from personal time), contributing to stress (Hobfoll, 1989; Rothbard & Edwards, 2003). The most commonly-researched form of inter-role conflict, work-family conflict, is associated with poor work outcomes, including job performance decrements, as well as work withdrawal and turnover intentions (Allen et al., 2000; Eby et al., 2005; Kossek et al., 1998). Work-family conflict is also linked to poor health and well-being, and a major pathway by which it adversely affects well-being (in addition to stress) is via reduced health behaviors (e.g., diet, exercise, sleep; Allen & Armstrong, 2006; Hammer & Sauter, 2013).

The extensive body of research on work-family conflict has led experts to point out that narrowly focusing on work's impact on the family role has resulted in a limited understanding of work's effect on other important non-work roles, such as the leisure role (Eby et al., 2005; Wilson & Baumann, 2015). Experts have also called for more diverse samples in research on the work-life interface, as studies on

work-family conflict are typically limited to workers who are married with children and are generally in good health (Agars & French, 2016). In this paper, we respond to the call for an expansion of the work-life literature by focusing on a vulnerable population of workers, those managing health conditions, and provide new knowledge about a form of inter-role conflict that is relevant to them.

For employees with poor health or facing a life-threatening illness like cancer, the rarely acknowledged health role is especially salient and likely to interfere with the work role, because medically-recommended health behaviors related to receiving treatment and maintaining function may require time and effort resources akin to a full-time job (Boyle, 2003; Perry & Hammer, 2017). A term from medical sociology, the *health role* obliges people (even healthy ones) to engage in behaviors that promote health and functioning, and reduce risk for injury and illness (Frank, 1991; Frank, 2013; McCluskey, 1992; Williams, 2005). The existence of the health role is evidenced by fact that cancer clinicians act as *role senders* by regularly emphasizing the importance of self-care to their patients (Kahn et al., 1964; Lev et al., 2001). Employers, too, may function as health role senders, often putting the onus on the individual worker to take responsibility for their health and work-life balance (while frequently disregarding their own influence on worker health; see Chari et al., 2018; Perreault et al., 2023).

Work-Health Conflict

When participating in the health role is made difficult by competing demands from the work role, people experience *work-health conflict*, a form of inter-role conflict that is of increasing interest to occupational health researchers (Stoddart, 2014). Different versions of this construct have been conceptualized and measured, with findings generally showing adverse impacts on well-being and work outcomes, particularly work withdrawal. This is unsurprising given that inter-role stress is coped with by reprioritizing life roles, and critically-ill people often need to prioritize health over work (Porro et al., 2022).

The Keeney et al. (2013) study of work interference with life sought to expand knowledge about work's interference with other non-work life domains beyond family, including health. They found that the health domain, operationalized as including all activities undertaken for the maintenance of physical and mental health or personal self-care (e.g., manicures), was one of the top three (out of eight) life domains affected by work. They further found that work interference with health was associated with higher turnover intentions as well as poorer job satisfaction, life satisfaction, and mental health (Keeney et al., 2013). In a study that examined the combined impact of work and personal demands on health, Gignac et al. (2014) found that work/personal life conflict with arthritis management was positively associated with fatigue, work activity limitations, and job disruptions. In a mixed sample of healthy and ill workers, Gragnano et al. (2017) found that work-health incompatibility (when work activities hamper the management of health needs) was associated with higher presenteeism, emotional exhaustion, and psychological distress, as well as poorer job satisfaction and work engagement.

In Stoddart's (2014) research on full-time workers with various chronic health conditions, she found similar associations with outcomes (i.e., burnout, work withdrawal), but used a work-health conflict construct that differed from those in the studies above. Specifically, she only examined the interaction between the work and health roles (not inclusive of personal life or other non-work domains) and adopted a multidimensional measurement approach analogous to Greenhaus and Beutell's (1985) seminal taxonomy of work-family conflict with three types (strain-based, time-based, and behavior-based). Stoddart operationalized work-health conflict as having a strain- and time-based type, but rather than a behavior-based type, the third type of conflict she included in her measure was energy-based, a new type of conflict relevant to the health role that was revealed in her formative research. Other research on inter-role conflict has also demonstrated the importance of energy resources for enabling engagement in the health role (Dugan & Barnes-Farrell, 2020).

Cancer Self-Management

Due to the paucity of research on the work-health conflict construct, little is known about the mechanisms by which this form of inter-role conflict affects health and work outcomes, and we seek to fill the gap by exploring whether health behavior is an explanatory mechanism, in the same way that it explains the association of work-family conflict with work and health outcomes (Allen & Armstrong, 2006; Hammer & Sauter, 2013). This is plausible given employed cancer survivors' risk for work-health conflict resulting from stress and drained time and energy resources, which may impede engagement in important health behaviors, particularly during the early years of survivorship (within five years of diagnosis).

Chronic diseases lasting more than one year – such as heart disease and diabetes – require ongoing *self-management* to facilitate daily life activities (Centers for Disease Control and Prevention, 2023). Due to the potential for recurrence and treatment related side-effects over the long term, cancer is also now considered a chronic illness that requires continued self-management (Henshall et al., 2017). Cancer self-management is a type of health behavior recommended by oncology clinicians that includes activities such as adopting healthier lifestyles, reducing risky behavior, complying with taking medication and having recommended medical follow-up, monitoring symptoms and using symptom-reduction techniques, and engaging in activities to overcome distress and improve coping (Osborne et al., 2007). Self-management activities enable survivors to maintain a sense of normality by improving health-related quality of life, a multi-dimensional construct from oncology practice that refers to health's impact on physical and emotional functioning and participation in a full life, including employment (Henshall et al., 2017; Yin et al., 2016). By strengthening functional capacity, reducing symptoms, and diminishing risk of cancer recurrence and comorbid conditions, self-management can also facilitate work sustainment among survivors (Chen et al., 2021; Tamminga et al., 2016).

The Current Study

The current study fills research gaps related to work disability prevention, cancer survivorship, and within occupational health psychology, it responds to the call for expanding research on inter-role conflict beyond work-family conflict. We built upon on Stoddart's (2014) research that conceptualizes work-health conflict as occurring when job stress worsens or prevents the ability to cope with health problems (strain-based conflict), or when work depletes the time and energy required to take care of health-related needs (time- and energy-based conflict). Another contribution of this paper is our examination of whether work-health conflict's associations with adverse health and work outcomes found in other chronically-ill populations extends to a novel population of employed cancer survivors. A final contribution is our examination of whether findings about health behavior being an intervening factor that explains associations of work-family conflict with adverse outcomes also apply to work-health conflict, a lesser-known form of inter-role conflict, and cancer self-management, a health behavior never examined in work-life literature.

In a sample of employed breast cancer survivors, we assessed the direct effects of work-health conflict on a health-related outcome (health-related quality of life) and a work-related outcome (anticipated turnover for health reasons), as well as the indirect effect through self-management behaviors. Our hypotheses (see Fig. 1) are as follows:

> Hypothesis 1: (a) Work-health conflict is negatively associated with health-related quality of life, and (b) work-health conflict is indirectly associated with health-related quality of life through self-management behaviors. Specifically, work-health conflict is negatively associated with self-management behaviors, and self-management behaviors are positively associated with health-related quality of life.
> Hypothesis 2: (a) Work-health conflict is positively associated with anticipated turnover for health reasons, and (b) work-health conflict is indirectly associated with anticipated turnover through self-management behaviors. Specifically, work-health conflict is negatively associated with self-management behaviors, and self-management behaviors are negatively associated with anticipated turnover.

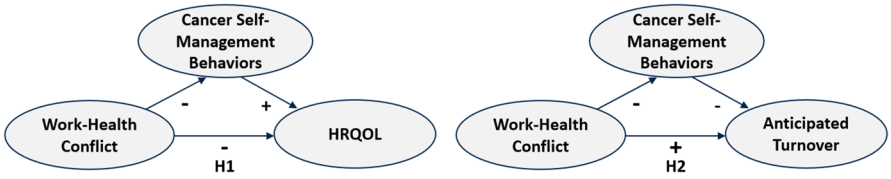

Fig. 1 Conceptual model of hypothesized relationships

Method

This study is part of a larger community-based participatory research project carried out in the northeast United States (U.S.) with cancer survivors about their lived experiences of health and work. The aim of the larger study was to assess survivor concerns about maintaining health and employment, identify points of intervention for employer and clinician support, and design interventions with and for employed cancer survivors.

Recruitment

Breast cancer survivors were recruited to participate in an online survey with flyers that directed interested survivors to contact researchers by phone for eligibility screening. Eligibility criteria were as follows: at least 18 years of age, able to speak and read in English, ceased active primary treatment for breast cancer within the past 36 months, and employed ($\geq$20 h/week) both at the time of breast cancer diagnosis and at the time of screening. We used a multi-faceted recruitment strategy, distributing flyers to patients at cancer centers, survivorship programs and support groups, breast cancer events in the community, and to workers at a public university in the northeastern U.S. Participants were screened by three doctoral-level graduate students. Data collection occurred over 17 months (May 2017 to October 2018).

Measures

We used a participatory survey design method in which subject matter experts (i.e., breast cancer survivors, cancer clinicians, and researchers) participated as part of an advisory group called a "design team" that identified and developed relevant survey items to assess survivors' needs related to health, well-being, and work (method described in detail elsewhere; Dugan et al., 2021). The final survey contained generic workforce health needs assessment items (e.g., related to health status and behaviors, physical and psychosocial work environment) and measures relevant to employed breast cancer survivors (e.g., experiences with healthcare system, quality of life, organizational support). Measures were mainly quantitative with several qualitative items, and the final online survey had a one-hour completion time. The survey measures we used are described below.

Work-Health Conflict The 9-item Work-health Conflict Scale (Stoddart, 2014) was used to assess the extent to which work interfered with survivors' health. The scale is comprised of three components pertaining to time, energy, and strain. Sample items include, "Spending time at work prevents me from taking time to recuperate from my illness symptom flare-ups" (time-based), "I have a difficult time following an illness treatment plan because I am tired from work" (energy-based), and "Stress at work makes it more difficult for me to cope with living with a chronic health condition" (strain-based). Response options ranged from 1 (*strongly disagree*) to 5

(*strongly agree*). The items were averaged, such that higher scores indicated greater work-health conflict. Cronbach's α for this scale is 0.89.

Cancer Self-Management Behaviors The Health Education Impact Questionnaire (heiQ) developed by Osborne et al. (2007) was used to assess cancer self-management behaviors. The questionnaire is comprised of 42 items related to health-directed behavior, skill and technique acquisition, self-monitoring and insight, health services navigation, positive and active engagement in life, constructive attitudes and approaches, social integration and support, and emotional well-being. Sample items include, "On most days of the week I do at least one activity to improve my health (e.g. walking, relaxation, exercise)" (health-directed behavior), "When I have symptoms, I have the skills that help me cope" (skill and technique acquisition),"As well as seeing my doctor, I regularly monitor changes in my health" (self-monitoring and insight), "I communicate very confidently with my doctor about my healthcare needs" (health services navigation),"I am doing interesting things in my life" (positive and active engagement in life), "If others can cope with problems like mine, I can too" (constructive attitudes and approaches), "If I need help, I have plenty of people I can rely on" (social integration and support), and, "If I think about my health, I get depressed" (reverse scored; emotional well-being). Response options ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). All emotional well-being items are negatively worded and thus were reverse scored. All items were averaged, such that higher scores indicated more engagement in self-management behaviors.

Health-Related Quality of Life To assess health-related quality of life, we used the physical health subscale from the Quality of Life – Cancer Survivor Instrument developed by Ferrell et al. (1995). Participants were asked "To what extent are the following currently a problem for you?" and presented with 8 items related to physical symptomology and functional limitations including "fatigue," "nausea," and "aches or pain." Respondents rated each item from 0 (*no problem*) to 10 (*severe problem*). Items were averaged, such that higher scores indicated higher health-related quality of life. Cronbach's α for this scale is 0.81.

Anticipated Turnover for Health Reasons To assess anticipated turnover for health reasons, we used an item from the Organizational Assessment Survey (OAS) developed by the U.S. Office of Personnel Management (Gowing & Lancaster, 1996). Participants were asked the extent to which they agreed with the item "I am likely to leave this job in the next 2 years because of my health." Response options ranged from 1 (*strongly disagree*) to 5 (*strongly agree*).

Potential Confounding Variables Age, comorbidities, and weekly work hours were adjusted for in our analyses. Age was assessed with the question "What is your current age (in years)?" Comorbidities were assessed using a scale developed by investigators from the Center for the Promotion of Health in the New England Workplace (CPH-NEW) with some additions made by the survey design team. Participants

were asked, "Has a doctor or other healthcare provider told you that you have the following conditions?" and presented with ten medical conditions: heart disease, high blood pressure, lung disease, diabetes, stomach disease or ulcer, kidney or liver disease, depression or anxiety, back or neck pain, rheumatoid arthritis, and a second cancer (not the cancer for which they were recruited to take the survey). The presence of a diagnosed condition was coded as 1, and the absence of the condition was coded as 0. Comorbidities were summed, such that a higher score indicated the presence of more comorbid conditions in addition to cancer. Work hours were assessed with the open-ended question "How many hours do you typically work each week? (Includes working at job, from home, overtime, second job, commute time, work travel, and career development activities.)"

Data Analysis

We used Hayes' (2017) PROCESS macro, version 4.2 in SPSS 28.0. PROCESS is an analytic modeling tool based on path analysis and uses ordinary least squares (OLS) regression with bootstrapping for continuous outcomes. This analytic approach is often used to estimate direct and indirect effects as well as their confidence intervals. To test Hypotheses 1 and 2 (see Fig. 1), we used a simple mediation model (i.e., PROCESS Model 4). To test the indirect effects, we utilized a percentile bootstrap estimation approach with 10,000 samples. The effects of age, comorbidities, and work hours were included as covariates in each regression model.

Results

One hundred and fifty-seven breast cancer survivors completed the online survey. Participant demographics are summarized in Table 1. The sample was predominately female (97.5%) and White/Non-Hispanic (84.7%). The mean age of participants was 50.9 (SD = 9.4) with most falling between the ages of 40 and 60 (70.7%). The majority were married or lived with a committed partner (73.9%). Many participants had a college degree (31.2%) or graduate degree (47.1%). Participants were mostly diagnosed at Stage 0 or 1 (49.7%) or Stage 2 and 3 (47.8%), and the most common treatment was surgery with radiation (71.3%) and/or chemotherapy (59.2%). Most were employed full-time (84.7%) with an average job tenure of 12.2 years (SD = 9.4). Over half reported no supervisory responsibility (59.2%). Most participants worked for large employers, organizations with more than 500 employees (57.3%) and only 22% worked for businesses with 50 or fewer employees. The most frequently reported occupational group was office and administrator support (15.3%). Over half of the participants stopped working during treatment and recovery and returned to work (56%), while the rest of the participants continued working during treatment (44%).

Table 1 Demographics and work information of respondents in sample ($n = 157$)

	N (%)
Sex	
Female	153 (97.5%)
Male	2 (1.3%)
Race/Ethnicity	
Hispanic / Person of Color	22 (14.0%)
Non-Hispanic / White	133 (84.7%)
Age by Group	
Under 40 years old	19 (12.1%)
40 to 60 years old	111 (70.7%)
Over 61 years old	25 (15.9%)
Dependent Care	
No Care Demands	81 (51.6%)
Only Child Care Demands	40 (25.5%)
Only Adult Care Demands	24 (15.3%)
Both Child and Adult Care Demands	10 (6.4%)
Marital Status	
Married or partnered	116 (73.9%)
Divorced/separated, widowed or single	39 (24.8%)
Annual Family Income	
< $75,000	38 (24.2%)
$75,000–99,999	22 (14.0%)
> $100,000 and over	94 (59.9%)
Education	
Graduate degree	74 (47.1%)
College degree (2 or 4 year)	49 (31.2%)
Some college	25 (15.9%)
High school graduate or GED	6 (3.8%)
Stage Diagnosed	
Early Stage Cancer (Stages 0 or 1)	78 (49.7%)
Later Stage Cancer (Stages 2 or 3)	75 (47.8%)
Treatment (check all that apply)	
Surgery Only	43 (27.4%)
Surgery & Radiation	112 (71.3%)
Chemotherapy	93 (59.2%)
Endocrine Therapy	80 (51.0%)
Reconstruction	67 (42.7%)
Employment Status	
Full-time	133 (84.7%)
Part-time	22 (14.0%)
Employer Size	
1 to 50 employees	34 (21.7%)
51 to 100 employees	31 (19.7%)
Greater than 500 employees	90 (57.3%)

Table 1 (continued)

	N (%)
Supervisory Responsibility	
No supervisory responsibility	93 (59.2%)
Some supervisory responsibility	61 (38.9%)
Occupations (largest groups)	
Office and Administrator Support	24 (15.3%)
Business and Financial Operations	20 (12.7%)
Healthcare Practitioners and Technical	16 (10.2%)
Healthcare Support	12 (7.6%)
Management	13 (8.3%)
Education, Training & Library	15 (9.6%)
Life, Physical & Social Science	10 (6.4%)
Other	45 (28.7%)
Job Tenure by Group	
Less than 5 years	39 (24.8%)
5–15 years	63 (40.1%)
16–25 years	32 (20.4%)
Over 25 years	18 (11.5%)

Sample sizes vary due to missing data; Percentages do not all add up to 100% due to missing cases

Descriptive Statistics

Descriptive statistics and bivariate correlations for all study variables are reported in Table 2. Work-health conflict was negatively related to self-management behavior (r = -0.52, $p < 0.001$) and health-related quality of life (r = -0.52, $p < 0.001$), and positively related to anticipated turnover ($r = 0.56$, $p < 0.001$). Self-management behavior was positively related to health-related quality of life ($r = 0.43$, $p < 0.001$) and negatively related to anticipated turnover (r = -0.45, $p < 0.001$). Health-related

Table 2 Means, standard deviations and correlations among study variables

Variable	*M*	*SD*	1	2	3	4	5	6	7
1. Age	50.9	9.4	–						
2. Comorbidities	1.88	1.77	.29***	–					
3. Work Hours	40.9	11.1	−.15†	.08	–				
4. Work-Health Conflict	2.37	1.02	−.20*	.11	.20*	(.94)			
5. Self-Management Behavior	3.99	.52	−.01	−.12	.01	−.52***	(.95)		
6. Health-Related Quality Of Life	7.28	1.52	.14†	−.26**	−.03	−.52***	.43***	(.75)	
7. Anticipated Turnover Due to Health	1.82	1.03	.06	.22**	−.04	.56***	−.45***	−.36***	–

$N = 157$. Reliabilities (Cronbach's α) are on the diagonal in parentheses

† $p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$

quality of life was negatively related to anticipated turnover (r = -0.36, $p < 0.001$). Of the demographic variables, age was positively related to the number of comorbidities ($r = 0.29$, $p < 0.001$) and negatively related to work-health conflict (r = -0.20, $p < 0.05$). Number of comorbidities was negatively correlated with health-related quality of life (r = -0.26, $p < 0.01$) and positively related to anticipated turnover ($r = 0.22$, $p < 0.01$). Work hours were positively associated with work-health conflict ($r = 0.20$, $p < 0.05$).

Indirect Effects

We used Model 4 of Hayes' (2017) PROCESS macro to investigate Hypothesis 1, that: (a) work-health conflict is negatively associated with health-related quality of life, and (b) work-health conflict is indirectly associated with health-related quality of life through self-management behaviors. Results supported Hypotheses H1a and H1b. Work-health conflict negatively predicted health-related quality of life, b = -0.5824, $SE = 0.1233$, $p < 0.001$. Work-health conflict negatively predicted self-management behaviors, b = -0.2783, $SE = 0.0381$, $p < 0.001$, and self-management behaviors positively predicted health-related quality of life, $b = 0.6544$, $SE = 0.2297$, $p < 0.01$, with results indicating a statistically significant indirect effect, *indirect effect* = -0.1821, *BootSE* = 0.0665, *BootCI* (-0.3262, -0.0646).

We also used Model 4 of the PROCESS macro to investigate Hypothesis 2, that: (a) work-health conflict is positively associated with anticipated turnover for health reasons, and (b) work-health conflict is indirectly associated with anticipated turnover through self-management behaviors. Results supported Hypotheses H2a and H2b. Work-health conflict positively predicted anticipated turnover, $b = 0.4833$, $SE = 0.0811$, $p < 0.001$. Work-health conflict negatively predicted self-management behaviors, b = -0.2783, $SE = 0.0381$, $p < 0.001$, and self-management behaviors negatively predicted anticipated turnover, b = -0.3378, $SE = 0.1511$, $p < 0.05$, with results indicating a statistically significant indirect effect, *indirect effect* = 0.0940, *BootSE* = 0.0503, *BootCI* (0.0057, 0.2036).

Discussion

Our study expands research on inter-role conflict by focusing on the health role, in an effort to understand how work affects other worker populations and life roles beyond those related to family. Very little prior research exists on work-health conflict, which we use as a central construct for understanding the work-related challenges and experiences of cancer survivors. Our preliminary findings regarding associations between work-health conflict, health-related quality of life, anticipated turnover, and cancer self-management provide a basis for further study, and have theoretical and practical implications that may apply to workers with other chronic diseases in addition to cancer.

Key Findings and Future Research

Our results suggest that work-health conflict can adversely affect survivors' health-related quality of life and work continuance, which may be indirectly due to survivors' inability to engage in self-management behaviors that decrease treatment after-effects and prevent cancer recurrence. These findings were present even after adjusting for the effects of age, work hours, and comorbidities, indicating that effects of both work-health conflict and self-management behaviors were above and beyond demographic factors or health characteristics commonly associated with health-related quality of life and turnover.

Our finding that work-health conflict has direct effects on key health and work outcomes for cancer survivors is not unlike findings from studies that used somewhat different conceptualizations and measures of the work-health conflict construct (see Gignac et al., 2014; Gragnano et al., 2017; Keeney et al., 2013). Taken together, these studies have shown work-health conflict to have unfavorable associations with psychological health (i.e., psychological distress, mental health problems, emotional exhaustion, and reduced life satisfaction) and work outcomes (i.e., presenteeism, turnover intentions, work activity limitations, job disruptions, and reduced job satisfaction and work engagement). Unlike these studies that assessed work-health conflict's association with psychological health outcomes, in our study of cancer survivors, we focus on work-health conflict's relation to physical health, examining constructs such as health-related quality of life and anticipated turnover due to health (criterion variables), as well as self-management behavior (intervening variable).

Due to the scarcity of research on work-health conflict in general, no intervening factors have been identified that may explain the relationship of work-health conflict to health or work outcomes. Taking what is known about the extensively-researched work-family conflict construct, we assessed whether health behavior is an intervening factor that also explains the associations of work-health conflict with health-related outcomes, and found evidence that cancer self-management behaviors may indirectly explain this relation, a novel finding. Future research should confirm these relationships with longitudinal data, and consider other intervening or moderating variables that may explain these associations, such as work ability.

Given that inter-role conflict is a stressor that is often coped with by reprioritizing life roles, research that provides a better understanding of people's motivations for prioritizing one life role over another is needed (Bagger & Li, 2012; Frear et al., 2019). For some workers, on-the-job pressures, the need for income to meet basic security needs, or the need to maintain employment to meet esteem and self-actualization needs, may cause them to prioritize the work role over their health role, even if it puts their well-being at risk (Dugan et al., 2022; Rasskazova et al., 2016). With critically-ill workers, the need to seek and comply with medical treatment to meet survival needs usually means that the health role takes precedence over all other roles, including work, which is perhaps why work withdrawal is not uncommon (Porro et al., 2022). Moreover, reprioritization may be temporary, permanent, or intermittent. Understanding how the enactment of life roles is affected by individual needs and situational stressors that can change over time is important for the

development of employer initiatives that are responsive to workers' lived experiences. Supportive interventions can benefit cancer survivors and workers with other chronic illness by enabling them to successfully participate in both the work and health roles, and can also benefit employers by building and maintaining a healthy and sustainable workforce.

Other Notable Findings

We found that age was associated with a higher number of comorbidities, but less work-health conflict. This finding may be explained by the fact that expectations regarding the health role are different for older people, and that it is socially acceptable for older people to prioritize their health over work, because health conditions are more commonplace as people age and the work role becomes less salient as people move toward retirement. Younger workers may have greater work-health conflict because they have other life roles that can contribute to additional forms of inter-role conflict, including work-family conflict. In our sample, 14% of the women were under the age of 40, and about a third of the sample had child care responsibilities. Employed breast cancer survivors with young children may experience higher work-health conflict than older survivors due to a more highly demanding family role, which simultaneously competes for resources along with the work role and the health role, creating additional inter-role stress.

Research such as that conducted by Gignac et al. (2014) and Keeney et al. (2013) that considers other life roles that a person has in addition to health and work, should further examine the cumulative effects of peoples' life roles, as well as the nature of role interactions, whether may be conflictual or enriching (e.g., work-health balance; Gragnano et al., 2017). Also of interest would be an exploration of the degree to which development of coping strategies and life management tactics may either transfer from one role to the other or interfere with one another.

Theoretical Implications

The findings of our study offer several theoretical implications. Our study is responsive to scholars in the medical sociology field who have pointed to the need to expand social role theory to include a more thorough understanding of the health role, in which people engage in normative behaviors that promote good health and reduce the risk of injury/illness (Frank, 1991; Frank, 2013; McCluskey, 1992; Williams, 2005). Further, we address gaps in the literature on work-life interface, which historically has emphasized the family role as the singular non-work life role that paid work conflicts with, to the neglect other life roles (Keeney et al., 2013). This empirical deficiency fails to adequately account for the lived experiences of many workers with chronic illness for whom maintaining health requires daily time and effort, and health is not taken for granted (Fisher & Golaszewski, 2008). The development of the work-health conflict construct and situating it within the larger work-life interface literature has promise for worker health generally, in addition to chronically-ill workers such as our novel population of cancer survivors. Further research

may lead to a variety of organizational solutions for overcoming work-health conflict as a modifiable barrier to the health and continued employment of all workers and best practices for achieving work-health balance. This is an area of growing interest in occupational health and related disciplines.

Further research on work-health conflict should be conducted to reach greater consensus on conceptualizing and measuring the construct. Since the idea for this paper was first conceived, McGonagle et al. (2020) proposed another version of the construct in the form of *work-health management interference* (WHMI), defined as interference of work responsibilities with the management of a health condition. The WHMI measure is similar to the work-health conflict measure developed by Stoddart (2014) that was used in this study, but it is different in two ways: items exclusively pertain to health management (rather than also pertaining to health itself) and the measure only includes time- and energy-based forms of conflict (rather than also including a strain-based form). As with comparable previously-cited studies, McGonagle et al. (2020) found that WHMI was associated with poorer outcomes including work burnout, work withdrawal, and decreased work ability among workers with chronic disease.

Given our focus on cancer self-management among survivors, if it had been available, the WHMI would have been a more fitting measure to use in our study because of its specificity to workers managing health conditions, and it would be especially useful in future research of cancer survivors with competing or interacting health conditions (i.e., multi-morbidity). However, we do appreciate the utility of also having a general measure of work-health conflict for use with workers who do not have diagnosed health conditions, to assess whether work is a barrier to them engaging in preventative behaviors that stave off chronic illness or injury, especially as they age.

Practical Implications

Supporting the health and function of workers with chronic conditions requires employers to be open to the perspective that organizational solutions can be effective in addressing what is conventionally seen as an individual medical problem (e.g., cancer treatment and survival). Understanding how to retain workers with cancer (and other chronic diseases) who want to remain in the workforce has a clear benefit for employers, and continued employment is also important for chronically-ill workers in meeting their income and health insurance needs, as well as maintaining their sense of psychological well-being and engagement in a productive work life, consistent with the concept of salutogenesis (Antonovsky, 1996; Schulte et al., 2015).

Findings from our study may be utilized by agents of the employer who are assisting workers managing chronic health conditions, especially organizational leaders who implement policies, programs, practices and benefits that can enable employees with conflicting work and health roles to have more comprehensive resources including accommodations and support. This may include various actions such as instituting policies and programs that support health and work-life balance, offering more flexibility or autonomy at work, training supervisors on how to provide needed social support, ensuring Human Resources staff assist with navigation and

coordination of paperwork needed to access work leave or benefits, arranging replacement coverage, allowing job protected/paid time off for treatment and recovery, and offering job modifications such as reduced workloads or rest breaks (Dugan et al., 2023; Stoddart, 2014). Moreover, employers could work to enhance the climates and cultures of their organizations to explicitly support health, given that an increasing portion of the working population is now managing a chronic health condition (Gragnano et al., 2017).

To inform the development of targeted interventions that support survivor health and job retention, examining the separate components of work-health conflict (time-, energy-, and strain-based) could further help employers identity the forms of work-health conflict that are most problematic for their workers. For example, we found a positive bivariate correlation between work-health conflict and number of weekly work hours, suggesting that time-based interventions that reduce work hours, offer paid leave, or provide job leeway could be perceived as supportive (Dugan et al., 2023; Shaw et al., 2023). However, the source of the conflict could be more directly identified by examining effects of the time-based form of work-health conflict.

Remote work is another work modification that has potential to alleviate work-health conflict. Although our data were collected before the it occurred, the COVID-19 pandemic gave rise to remote work as a commonplace working arrangement that may now impact cancer survivors dealing with treatment aftereffects while trying to remain engaged with work. However, working remotely may be a double-edged sword where survivors benefit by alleviating the time burden of travel to/from work and avoiding potentially contagious infection, but may also have fewer opportunities to receive support by infrequently going into a physical work environment with other people. This is an area for future research.

Strengths and Limitations

A strength of this study is that it is embedded within a larger community-based participatory research study of employed breast cancer survivors, and its exploration of important factors relevant to the lived experiences of employed survivors by assessing direct and indirect effects, as well as key covariates. Findings may also be relevant to workers with other chronic health conditions, and may inform interventions to improve their work situations and support their health as well.

The study has limitations. We cannot draw causal relations among study variables due to the cross-sectional study design, and relationships between key study variables could be reciprocal. Findings should be verified using longitudinal data. Also, our study variables were assessed using reliable and validated measures of work-health conflict, self-management behaviors, health-related quality of life, and anticipated turnover. However, the self-report, single-source format may have created biased responses and ideally would have been directly observed or verified through another reporting source.

Further, our heterogeneous sample was atypical, consisting mainly of highly-educated, higher-income, married or partnered, non-Hispanic white females with full-time employment living in a Northeast state in the U.S. This is attributable to

convenience-based sampling and results should be interpreted cautiously. Findings may not be generalizable to other employed survivors who have lower socioeconomic status, are unmarried, are members of underrepresented racial or ethnic minority groups, have insecure and unbenefited employment, live in rural areas, or face greater health, work, and financial challenges (Yabroff et al., 2020). A representative population-based sample with participants from multiple occupations and work-arrangements is needed to assess the applicability of our results to the broader survivor population and examine these associations in different subpopulations of workers. Moreover, healthy worker bias may have influenced results if workers who withdrew from the workforce were not represented as survey participants; if they had been included, associations between work-health conflict and outcomes may be stronger than we observed in this study.

It is possible that work-health conflict is higher in our U.S.-based sample due to governmental and organizational policies related to healthcare and employment, such that findings may not as generalize to workers in other countries. For example, some survivors in the U.S. may view work withdrawal as undesirable but inevitable because taking job-protected time off for medical reasons is not universally available and may be limited to time periods that are too brief for managing severe health problems (Yabroff et al., 2020). Conversely, some survivors who wish to withdraw from work to prioritize their health may find it unfeasible because health insurance in the U.S. is typically provided through one's employer; this leaves many cancer survivors struggling to remain employed to maintain their health insurance coverage which may further diminish their health (Mehnert, 2011).

For survivors in the U.S., government and organizational policies may make the decision to keep working or leave work a constrained choice, exacerbating work-health conflict. Survivors in countries with a stronger social safety net are unlikely to experience the same level of work-health conflict. For example, employers in the Netherlands have great legal responsibility for workers on sick leave (for any reason), requiring them to be actively involved in the workers' return-to-work process from the beginning of their job-protected work leave for up to 2 years, including paying 70% of their wages and ensuring access to an occupational physician for health care (Greidanus et al., 2020). For this reason, it is important to consider determinants of occupational health – and solutions – at all levels of the social-ecological environment (Jason et al., 2017; Baron et al., 2014).

Conclusion

In this study of breast cancer survivors, we explored the health role, a currently understudied social role that deserves future empirical attention to clarify its relationship to the work role, and we also examined the impact of work-health conflict on workers with chronic health conditions. We tested novel relationships, observing direct work and health effects from the work-health conflict construct, as well as indirect effects through self-management behaviors. The workplace is an important determinant of work and health outcomes for employed breast

cancer survivors, and employers should focus on improving survivors' long-term health-related quality of life and work sustainability, perhaps instituting interventions that improve work-health balance, by focusing on supporting the health role, fostering self-management behaviors, and reducing work role demands.

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Data Availability The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Code Availability The code that supports the findings of this study are available on request from the corresponding author.

Declarations

Relevance to special issue Improving health outcomes and work retention for workers living with chronic health conditions such as cancer requires an understanding of barriers to maintaining employment and managing health. We examined a novel variable within the work-life interface literature – *work-health conflict* – which has been linked to poor work outcomes, but has not been examined in relation to health behavior or outcomes. In our study of breast cancer survivors, work-health conflict had direct effects on health-related quality of life and anticipated turnover, as well as indirect effects through cancer self-management. Work-health conflict is unlike other constructs used to assess cancer survivors who want to maintain employment because it provides a platform for informing and evaluating employer-based interventions. Evidence from our study suggests that directly reducing work-health conflict (e.g., decreasing work's drain on time and energy resources), may be promising approach for employers who want to help cancer survivors to better manage work and health.

Ethics Approval All procedures were reviewed and approved by the Institutional Review Board of the University of Connecticut Health Center All study participants provided written consent.

Consent to Participate Written informed consent was obtained by all study participants.

Consent for Publication Obtained.

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