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Job Burnout, Work Health Management Interference, and Organizational Health Climate Among Employees with Varied Levels of Work Ability

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Abstract

Purpose The presence of chronic health conditions (CHCs), without sufficient personal and job resources, can impede one's ability to effectively perform work tasks and manage job demands. The aim of this study was to evaluate the level of job burnout and perceptions of work health management interference (WHMI) and organizational health climate (OHC) among employees with varied levels of work ability (WA). We also examined relationships among these variables and with sociodemographic and job-related variables (e.g., age, number of physician-diagnosed conditions).

Methods A convenience sample of 878 adults living and working in the United States who responded to a recruitment message via professional listservs/email lists and social media participated in a non-experimental, cross-sectional online survey. Participants reported sociodemographic and job-related items, as well as measures to evaluate WA, burnout, WHMI, and OHC.

Results Statistically significant differences in burnout, WHMI, and OHC were observed across WA groups. Workers with poor WA reported the highest levels of overall burnout, WMHI, and the least supportive OHC. A more supportive OHC was associated with lower burnout. A strong inverse relationship between WA and the number of physician-diagnosed conditions was observed; weak relationships between WA and age, as well as WA and managerial status, were found.

Conclusion Employees with lower levels of WA tended to report higher levels of burnout and WHMI and lower levels of OHC. Findings provide a foundation for future research to examine causal relationships among these variables and to inform actions to both preserve WA and support worker well-being.

Keywords Work ability · Burnout · Work health management interference · Organizational health climate · Chronic health

Introduction

Work ability describes how well a worker perceives they can perform work tasks and responsibilities now and, in the future, as well as how able the worker is to perform work tasks given job demands and available health and mental resources, while also considering their current and future health status [1–3]. Individuals with lower levels of WA are more likely to perceive greater job demands and fewer job resources and therefore may be more prone to developing burnout and other negative health and well-being outcomes [4]. Essentially, WA is the product of an individual's personal capacities/abilities to perform and the demands of their job.

Health-related problems have been one of the most common hindrances reported in relation to perceived WA [5], and research supports an association between the presence [6] and level of severity [7] of chronic disease and lowered WA. The effects of employees' health and disability status on work performance, therefore, can be evaluated through measuring WA. An estimated 60% of United States (U.S.) adults have at least one chronic health condition (CHC), and 40% have two or more [8]. In addition, 27% of U.S. adults have a disability [9], which may be the result of a CHC. CHCs are long-lasting (1+ years) health conditions that require ongoing medical care and/or restrict daily living activities [8]. Examples of CHCs include Alzheimer's

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disease, diabetes, heart disease, cancer, arthritis, anxiety, depression, endometriosis, headache disorders, chronic kidney disease, and obesity. Longitudinal studies examining consequences of WA among U.S. workers have found that WA predicts absenteeism, future disability status, and retirement [7]. Other work-related outcomes associated with lower WA include sickness-related absences, sick leave, turnover, productivity loss, and job satisfaction [4].

According to the American Psychological Association's 2021 *Work and Well-being Survey*, three in five employees report experiencing negative impacts of work-related stress (e.g., physical fatigue, emotional exhaustion, difficulty focusing) [10], many of which are recognized symptoms of job burnout. In addition, research suggests that employees with CHCs and disabilities are at a greater risk of experiencing job burnout than those not affected by impaired health or disability [6, 11]. Job-related burnout appears in the most recent version of the International Classification of Diseases (ICD-11) [12]. Notably, the World Health Organization (WHO) recognizes burnout as an occupational phenomenon rather than a medical condition, linking the development of burnout to job-related factors in the work environment. While the burden to manage burnout has previously been placed on employees, the responsibility to manage and address employee burnout, as an occupational phenomenon, shifts from the individual to the organization. Researchers have proposed varied conceptualizations and dimensions of burnout [13–15], a significant limitation of the state of the science on burnout [16]. That said, burnout is recognized as a work-related condition that develops from prolonged, chronic exposure to work-related stressors without sufficient personal or job resources to manage or respond effectively to said stressors.

Burnout not only impacts employees but it also affects the organizations in which they work. In their systematic review, Salvagioni et al. [17] identified several psychological, physical, and occupational/professional consequences of burnout including insomnia, depressive symptoms, headaches, coronary heart disease, chronic fatigue, musculoskeletal pain, job dissatisfaction, and absenteeism. While research exists to support an association between WA and burnout [18, 19], only one study has examined causality between WA and burnout. Viotti et al. [20] found that, in the short-term (i.e., one year), WA predicts increased burnout via increased exhaustion and decreased enthusiasm toward the job. These findings suggest that early detection of employees with lower WA may be critical in preventing burnout among those with CHCs and disability to avert long-term consequences, such as disability leave and early retirement [4, 11].

Employees with CHCs and disabilities face unique personal demands in contrast to those not impacted by health or disability-related issues. Recently, McGonagle et al. [21] proposed the concept of work-health management interference (WHMI) to refer to the competing, simultaneous demands of managing one's work and health responsibilities. More specifically, WHMI reflects the extent to which work interferes with health/illness management. McGonagle and colleagues identified and defined two types of WHMI: energy-based and time-based. Energy-based WHMI refers to when most of one's energy is being used to manage work-related demands, leaving the individual with less energy available to spend on managing their health. Time-based WHMI refers to when completing work responsibilities absorbs most of one's time, leaving the individual with less time to spend on managing their health. Both energy- and time-based WHMI were positively related to health condition severity and negatively correlated to perceived WA; energy-based WHMI was a robust predictor of burnout [21].

Given WHMI's novelty within the occupational health science literature, more research is needed to better understand its relationship with WA and burnout, as well as its job and person-related predictors and outcomes. Interestingly, the severity or impact versus the number of CHCs may be a better predictor of perceived WA, depending on how well one is able to manage their health condition or disability [7]. Thus, to best support a workforce in which the prevalence of CHCs and disabilities is increasing, it is imperative that organizations can identify and support workers with lower WA who are struggling to manage health-related needs due to interference from work demands to reduce the probability of experiencing burnout and other negative well-being and performance outcomes.

The work environment's influence on employee health and well-being has been widely studied, and organizational-level versus individual-focused interventions to support worker health and well-being are likely to have more positive and sustained effects [22]. Employees' shared perceptions of fundamental aspects of an organization's culture are reflected by assessing an organization's climate [23], and a supportive organizational climate may serve as a valuable job resource associated with positive employee outcomes. In a 10-year study, managers with consistently excellent WA gave organizational climate the highest rating [24]. In addition, Tuomi et al. [25] found that increases in organizational practices, such as the promotion of employee well-being and supervisory support, resulted in higher WA. Especially relevant to workers with CHCs and disabilities is whether the work environment is perceived to support their current and future employability. Gragnano et al. [26] proposed that an organization's health climate (OHC) reflects how employees perceive management's attention to or interest in employees' health and contributes to sustained employment. OHC, then, is a facet-specific component of the larger organizational climate that may impact the likelihood that employees will use health-supporting job resources provided by their employer [27]. OHC has been negatively associated with presenteeism, burnout, fatigue, stress, overwork, and psychological distress; it was positively associated with job satisfaction, work engagement, and work ability [26–29]. Therefore, examining OHC across various levels of WA has implications for identifying whether an organization may need to provide additional job resources (e.g., organizational and supervisor support) and to whom in order to reduce the interference between work and health demands and positively impact health and well-being outcomes.

Though research has examined how WA relates to burnout, WHMI, and OHC, no research to our knowledge has simultaneously examined the relationships among these variables or how they compare across different levels of WA. The current research also examined individuals from a range of occupations and included newer constructs that contributes insights to the WA and burnout literatures, as well as our understanding of the issues workers face while trying to manage their health issues. Therefore, the aims of this study were to: (a) identify the levels of burnout, WHMI, and OHC among those with varied levels of WA; (b) identify correlations between WA and the dimensions of burnout, WHMI, and OHC; and (c) identify selected sociodemographic variables and occupational factors connected with WA, burnout, WHMI, and OHC. In line with previous research and drawing on both conservation of resources (COR) theory [30] and the job demands-resources (JD-R) model [31], we expected that individuals with lower levels of WA would report higher levels of burnout and WHMI, as well as a less supportive OHC. We also expected that a more supportive OHC, as an organizational resource, would be associated with lower burnout.

Method

Participants and Procedure

Participants were a convenience sample of adults (i.e., aged 18 or older) who lived in the U.S. and were employed at the time of data collection. Data were collected following approval from the University's Institutional Review Board as part of a larger study on worker well-being. Potential participants self-identified via recruitment messages shared through professional listservs/email lists (e.g., university email lists; Chronic Disease Coalition Ambassadors) and posted on social media (i.e., researchers' professional Instagram, Facebook, Twitter, and LinkedIn accounts). Recruitment messages included a description of the study, inclusion criteria, requirements, and a link to a web-based survey hosted on Qualtrics. Participants provided electronic agreement and responded to screening items to confirm eligibility before completing survey measures. To encourage participation, individuals who completed the survey were able to provide an email address via a link to a form unassociated with their survey responses to be entered into a prize drawing for one of 50 $10 Amazon eGift Cards.

Measures

Participants reported on a range of different variables related to worker well-being. The online survey included a total of 100 survey items, including the agreement to participate and screening items, and the predicted survey duration was $M = 19$ min. In the article, the subset of variables central to the hypotheses of this study are reported and analyzed (i.e., sociodemographic and job-related characteristics, WA, burnout, WHMI, and OHC).

Sociodemographic and Job-Related Characteristics

The survey included eight items to collect sociodemographic and job-related information: age, gender, race, employment status, years employed at current workplace, industry, managerial status, and number of physician-diagnosed conditions (obtained via the Work Ability Index).

Work Ability (WA)

The Work Ability Index (WAI) [3] was used to assess WA. The WAI is a seven-part self-assessment consisting of objective and perceived measures of WA to evaluate: current WA; WA in relation to physical and mental job demands; the number of physician-diagnosed diseases, illnesses, and injuries; estimated work impairment due to health conditions; number of days of sick leave during the last year; predicted WA in the next year; and mental resources. The WAI uses and combines multiple response formats and different weightings. Sample items included, "How do you rate your current work ability with respect to the physical demands of your work?" and "Do you believe, according to your present state of health, that you will be able to do your current job two years from now?" A total WA score, with a possible range from 7 to 49 points, was calculated, and scores were categorized into one of four levels of WA: *poor/restore* (7–27); *moderate/improve* (28–36); *good/support* (37–43); and *excellent/maintain* (44–49). The WAI has been shown to have acceptable test–retest reliability [32], adequate internal reliability (e.g., $\alpha = 0.74$ [33]), and valid [34].

Burnout

The 12-item version of the Burnout Assessment Tool (BAT-12) [35] was used to measure four core dimensions of burnout: exhaustion, mental distance, cognitive impairment, and emotional impairment. The BAT addresses conceptual, technical, and practical limitations of other common burnout measures (see Schaufeli et al. [15] for a detailed overview). Respondents rated items on a 5-point Likert-type scale that ranged from 1 (*never*) to 5 (*always*). Sample items included, "At work, I feel mentally exhausted" and "I make mistakes in my work because I have my mind on other things." Subscale scores were found by summing and averaging the three items associated with each of the four subscales, and an overall burnout score was found by summing and averaging all 12 items. Higher scores represented higher levels of burnout. The BAT-12 demonstrated robust psychometric properties, including acceptable omega reliability values at the subscale level ($0.71 \leq \omega \leq 0.88$) and overall ($\omega = 0.89$) [35].

Work Health Management Interference (WHMI)

The eight-item work-health management interference scale [21] was used to measure time-based and energy-based WHMI. Items were rated on a 5-point Likert-type scale that ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). Sample items included, "My work schedule makes it difficult to schedule necessary medical visits, treatments, or procedures" and "Work depletes the *mental* energy I need to take care of my health." Subscale scores were found by summing and averaging the four items relevant to each subscale. Higher scores represented higher levels of time- and energy-based WHMI. The internal consistency values for each of the WHMI dimensions across three samples were originally found to be $0.82 \leq \alpha \leq 0.92$ for time-based and $0.85 \leq \alpha \leq 0.93$ for energy-based [21].

Organizational Health Climate (OHC)

The five-item health climate subscale of the work-health balance questionnaire [26] was used to measure employees' perception of their organizations' attitudes toward health issues. A sample item was, "Senior management acts decisively when concerns about health emerge between employees." Items were rated on a 5-point Likert-type scale that ranged from 1 (*strongly disagree)* to 5 (*strongly agree*). The OHC score was calculated by summing and averaging individual item scores. Higher scores reflected a more supportive OHC. The health climate subscale demonstrated good psychometric properties, and theoretically consistent relationships with other relevant variables, and adequate internal reliability, $\alpha = 0.90$ [26].

Commitment Request and Attention Check

Two items, a commitment request and a textual attention check, were included in the survey to improve data quality; research suggests commitment requests may be more effective than standard attention check items [36]. The commitment request was placed at the beginning of the survey and stated, "We care about the quality of our survey data. For us to get the most accurate measures of your responses, it is important that you provide thoughtful answers to each question in this survey. Do you commit to providing thoughtful answers to the questions in this survey?" Participants were asked to select one of three responses options: "I can't promise either way", "Yes, I will," or "No, I will not." The textual attention check was placed about mid-way through the survey and stated, "Please type "Hello" to show you are paying attention to this question." Data for participants who selected "Yes, I will" and who typed "Hello" (disregarding the inclusion/exclusion of quotes and letter case) remained in the data set during data cleaning.

Study Design and Statistical Analyses

This study used a non-experimental, cross-sectional research design. Descriptive statistics were produced for all variables. The Kruskal–Wallis test was used to compare variables across four levels of WA. Relationships between quantitative variables were analyzed with the Spearman rank and point-biserial correlation coefficients. The Mann Whitney and Kruskal–Wallis tests were used to determine differences in study variables across sociodemographic and job-related variables. Analyses were conducted using IBM SPSS Statistics Software, version 29.

Results

Data Cleaning and Response Quality Assessment

Survey responses were downloaded from Qualtrics to SPSS, and a response quality assessment was performed before conducting analyses. A total of 3,240 responses were analyzed using the Expert Review feature in Qualtrics [37]; 2,362 responses were removed from the dataset because they were flagged as fraudulent responses (i.e., spam, bots, duplicates), failed to agree or confirm agreement to participate, were ineligible (i.e., failed screening items, reported age < 18, or failed to report age), failed or did not respond to the commitment request or attention check item, did not finish/complete the survey, or failed to respond to all items necessary to calculate a WA score. Data for 878 respondents were included in the analyses.

Participant Characteristics and WA

Participants were 878 individuals aged 18–81 ($M = 32.01$, $SD = 8.19$). Participants' levels of WA ranged from poor to excellent. The average WA ($M = 37.65$, $SD = 6.27$, *range* 16–49) score of the whole sample reflected a borderline moderate/good level of WA. Mean values with each

WA category were: poor, $n=64$, $M=25.02$, $SD=1.98$; moderate, $n=307$, $M=32.89$, $SD=2.39$; good, $n=326$, $M=40.18$, $SD=1.98$; excellent, $n=181$, $M=45.62$, $SD=1.50$. Table 1 provides an overview of all sociodemographic and job characteristics.

Level of Burnout

The average overall burnout score was $M=2.39$, $SD=0.67$. At the time of publication, statistical norms and clinical cut-off scores for the BAT-12 are not yet available for U.S. samples; therefore, levels of burnout were defined based on scores above or below 1 SD of the mean ($\leq 1.71=$ low, 1.72–3.06 = moderate, $\geq 3.07=$ high). The majority of the sample reported moderate ($n=604$, 68.8%), followed by high ($n=148$, 16.9%) and low ($n=126$, 14.4%) overall burnout. Of the four burnout dimensions, the highest level was observed in the exhaustion domain ($M=2.60$, $SD=0.77$), and the lowest level in the emotional impairment domain ($M=2.26$, $SD=0.78$).

Across the four levels of WA, Kruskal–Wallis tests showed statistically significant differences in overall burnout, $\chi^2(3)=260.10$, $p<0.001$; exhaustion, $\chi^2(3)=131.13$, $p<0.001$; mental distance, $\chi^2(3)=197.61$, $p<0.001$; cognitive impairment, $\chi^2(3)=192.20$, $p<0.001$, and emotional impairment, $\chi^2(3)=231.50$, $p<0.001$. All pairwise comparisons were significant, except for exhaustion and mental distance mean ranks between those with poor and moderate WA. Mean scores increased as levels of WA decreased for overall burnout, mental distance, cognitive impairment, and emotional impairment (Table 2). For exhaustion, the mean for those with good versus moderate WA was slightly higher, though this difference was not significant.

Level of WHMI

Between the two WHMI dimensions, higher average scores for the whole sample were reported for energy-based ($M=3.03$, $SD=0.95$) than time-based ($M=2.86$, $SD=1.00$) WHMI; the same pattern was observed within each WA category. Across the four levels of WA, Kruskal–Wallis tests showed a statistically significant difference in energy-based WHMI, $\chi^2(3)=133.41$, $p<0.001$ and time-based WHMI, $\chi^2(3)=127.74$, $p<0.001$. All pairwise comparisons were significant except for energy- and time-based WHMI mean ranks between those with poor and moderate WA. Mean scores for both energy- and time-based WHMI increased as levels of WA decreased (Table 2).

Level of OHC

The average OHC score ($M=3.59$, $SD=0.80$) for the whole sample indicated that respondents' perceptions of their organizations' attitudes toward health issues were slightly above "neutral." Across the four levels of WA, a Kruskal–Wallis test showed a statistically significant difference in OHC, $\chi^2(3)=133.05$, $p<0.001$. All pairwise comparisons were significant except for mean ranks between those with poor and moderate WA. Mean scores for OHC decreased as levels of WA decreased (Table 2).

Correlations Among the Study Variables

Spearman's rank-order correlation was used to assess the relationships among WA, burnout, WHMI, and OHC. Uncategorized (continuous) WA scores were used in the analyses. All relationships were statistically significant and in the expected direction (Table 3). Moderate and strong negative correlations were observed between WA and each dimension of burnout; a strong negative correlation was observed between WA and overall burnout ($r_s=-0.56$; $p<0.001$). Moderate negative correlations were observed between WA and energy-based ($r_s=-0.37$; $p<0.001$) and time-based ($r_s=-0.38$; $p<0.001$) WHMI. Moderate positive correlations were observed between overall burnout and energy-based ($r_s=0.44$; $p<0.001$) and time-based ($r_s=0.37$; $p<0.001$) WHMI. OHC had a moderate positive relationship with WA ($r_s=0.38$; $p<0.001$) and moderate negative relationships with overall burnout ($r_s=-0.35$; $p<0.001$), energy-based WHMI ($r_s=-0.32$; $p<0.001$), and time-based WHMI ($r_s=-0.31$; $p<0.001$).

Sociodemographic Variables and Job-Related Characteristics

Spearman's rank-order correlation was used to assess the relationships of each the study's variables with age, years employed at current workplace, and number of physician-diagnosed conditions (Table 3). Age had a weak, positive relationship with WA ($r_s=0.11$; $p=0.002$) and OHC ($r_s=0.07$; $p=0.029$). Age had a weak negative relationship with cognitive impairment ($r_s=-0.08$; $p=0.016$) and emotional impairment ($r_s=-0.11$; $p=0.002$), overall burnout ($r_s=-0.09$; $p=0.012$), and time-based WHMI ($r_s=-0.12$; $p<0.001$). Years employed at current place of employment had a weak negative relationship with cognitive impairment ($r_s=-0.08$; $p=0.017$) and time-based WHMI ($r_s=-0.12$; $p<0.001$), as well as a weak positive relationship with OHC ($r_s=0.17$; $p<0.001$). Number of physician-diagnosed conditions had a strong negative relationship with WA ($r_s=-0.67$; $p<0.001$), a weak negative relationship with OHC ($r_s=-0.21$; $p<0.001$), and

Table 1 Sociodemographic and job-related characteristics of the sample across levels of WA

Sample characteristics	Total	Poor WA	Moderate WA	Good WA	Excellent WA
Age (years)					
M	32.01	30.23	31.37	31.93	33.84
SD	8.19	8.83	6.99	7.81	10.06
Min	18.00	18.00	18.00	20.00	18.00
Max	81.00	81.00	65.00	65.00	71.00
Years at current place of work					
M	5.54	5.10	5.25	5.72	5.86
SD	4.83	4.55	4.53	4.96	5.18
Min	0.45	1.00	0.50	0.50	0.45
Max	42.50	30.00	42.50	31.50	38.00
Physician-diagnosed conditions					
M	2.00	6.27	3.22	1.03	0.15
SD	2.85	2.92	3.27	1.38	0.47
Min	0.00	1.00	0.00	0.00	0.00
Max	14.00	14.00	14.00	8.00	3.00
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Age category					
18–24	120 (13.7)	16 (25.0)	37 (12.1)	44 (13.5)	23 (12.7)
25–34	504 (57.4)	38 (59.4)	186 (60.6)	184 (56.4)	96 (53.0)
35–44	187 (21.3)	7 (10.9)	68 (22.1)	78 (23.9)	34 (18.8)
45–54	44 (5.0)	2 (3.1)	14 (4.6)	10 (3.1)	18 (9.9)
55–64	18 (2.1)	0 (0.0)	1 (0.3)	9 (2.8)	8 (4.4)
65+	5 (0.6)	1 (1.6)	1 (0.3)	1 (0.3)	2 (1.1)
Gender					
Male	528 (60.1)	44 (68.8)	196 (63.8)	193 (59.2)	95 (52.5)
Female	340 (38.7)	20 (31.3)	106 (34.5)	128 (39.3)	86 (47.5)
Transgender	4 (0.5)	0 (0.0)	3 (1.0)	1 (0.3)	0 (0.0)
Prefer not to answer	6 (0.7)	0 (0.0)	2 (0.7)	4 (1.2)	0 (0.0)
Race					
African American/Black	83 (9.5)	7 (10.9)	40 (13.0)	22 (6.7)	14 (7.7)
American Indian/Alaskan Native	111 (12.6)	10 (15.6)	33 (10.7)	46 (14.1)	22 (12.2)
Asian/Pacific Islander	35 (4.0)	3 (4.7)	21 (6.8)	7 (2.1)	4 (2.2)
Caucasian/White	581 (66.2)	42 (65.6)	190 (61.9)	221 (67.8)	128 (70.7)
Hispanic/Latinx	57 (6.5)	2 (3.1)	21 (6.8)	23 (7.1)	11 (6.1)
Other	8 (0.9)	0 (0.0)	2 (0.7)	5 (1.5)	1 (0.6)
Prefer not to answer	3 (0.3)	0 (0.0)	0 (0.0)	2 (0.6)	1 (0.6)
Employment status					
Employed full-time	764 (87.2)	54 (84.4)	246 (80.1)	295 (90.8)	169 (93.9)
Employed part-time	71 (8.1)	5 (7.8)	43 (14.0)	15 (4.6)	8 (4.4)
Self-employed full-time	33 (3.8)	4 (6.3)	15 (4.9)	11 (3.4)	3 (1.7)
Self-employed part-time	8 (0.9)	1 (1.6)	3 (1.0)	4 (1.2)	0 (0.0)
Industry					
Agriculture, forestry, fishing, and hunting	30 (3.4)	4 (6.3)	13 (4.2)	11 (3.4)	2 (1.1)
Mining, quarrying, and oil and gas extraction	28 (3.2)	3 (4.7)	14 (4.6)	10 (3.1)	1 (0.6)
Utilities	54 (6.2)	7 (10.9)	20 (6.5)	14 (4.3)	13 (7.2)
Construction	90 (10.3)	7 (10.9)	37 (12.1)	31 (9.5)	15 (8.3)
Manufacturing	178 (20.3)	14 (21.9)	68 (22.2)	69 (21.2)	27 (14.9)
Wholesale trade	58 (6.6)	8 (12.5)	21 (6.9)	21 (6.4)	8 (4.4)

Table 1 (continued)

	n (%)	n (%)	n (%)	n (%)	n (%)
Retail trade	55 (6.3)	1 (1.6)	29 (9.5)	17 (5.2)	8 (4.4)
Transportation and warehousing	35 (4.0)	3 (4.7)	17 (5.6)	10 (3.1)	5 (2.8)
Information	42 (4.8)	3 (4.7)	14 (4.6)	11 (3.4)	14 (7.7)
Finance and insurance	42 (4.8)	2 (3.1)	14 (4.6)	14 (4.3)	12 (6.6)
Real estate and rental and leasing	27 (3.1)	4 (6.3)	8 (2.6)	9 (2.8)	6 (3.3)
Professional, scientific, and technical services	38 (4.3)	0 (0.0)	10 (3.3)	18 (5.5)	10 (5.5)
Management of companies and enterprises	37 (4.2)	0 (0.0)	9 (2.9)	18 (5.5)	10 (5.5)
Administrative and support and waste management and remediation services	10 (1.1)	4 (6.3)	5 (1.6)	0 (0.0)	1 (0.6)
Educational services	74 (8.4)	1 (1.6)	9 (2.9)	33 (10.1)	31 (17.1)
Health care and social assistance	27 (3.1)	3 (4.7)	7 (2.3)	9 (28)	8 (4.4)
Arts, entertainment, and recreation	30 (3.4)	0 (0.0)	6 (2.0)	21 (6.4)	3 (1.7)
Other services (except public admin)	5 (0.6)	0 (0.0)	1 (0.3)	2 (0.6)	2 (1.1)
Public administration	5 (0.6)	0 (0.0)	2 (0.7)	2 (0.6)	1 (0.6)
Other	12 (1.4)	0 (0.0)	2 (0.7)	6 (1.8)	4 (2.2)
Managerial or supervisory role					
No	266 (30.3)	9 (14.1)	82 (26.8)	121 (37.1)	54 (29.8)
Yes	611 (69.7)	55 (85.9)	224 (73.2)	205 (62.9)	127 (70.2)

weak positive relationships with overall burnout ($r_s = 0.21$; $p < 0.001$), energy-based WHMI ($r_s = 0.18$; $p < 0.001$), and time-based WHMI ($r_s = 0.18$; $p < 0.001$).

Mann–Whitney U tests revealed significant differences in WA, time-based WHMI, and OHC between those in a managerial versus a non-managerial role. Values are mean ranks unless otherwise stated. WA scores for those in a managerial role (424.59) were statistically lower than for those in a non-managerial role (472.09), ($U = 72{,}461$, $z = -2.56$, $p = 0.011$); time-based WHMI scores for those in a managerial role (450.64) were statistically higher than for those in a non-managerial role (410.67), ($U = 88{,}534$, $z = 2.16$, $p = 0.031$); and OHC scores for those in a managerial role (460.64) were statistically higher than for those in a non-managerial role (389.30), ($U = 94{,}484$, $z = 3.86$, $p < 0.001$).

Kruskal–Wallis tests revealed significant differences across four gender categories for WA [$\chi^2(3) = 9.86$, $p = 0.020$], overall burnout [$\chi^2(3) = 18.08$, $p < 0.001$], and time-based WHMI [$\chi^2(3) = 14.43$, $p = 0.002$]. Values are mean ranks unless otherwise stated, and pairwise comparisons were performed using a Bonferroni correction for multiple comparisons. Females (469.75) had significantly higher WA than males (421.88) ($p = 0.039$). Transgender workers (810.50) had significantly higher overall burnout than females (416.79) ($p = 0.012$), males (453.96) ($p = 0.030$), and those who preferred not to answer (207.00) ($p = 0.001$). Males (464.55) had significantly higher time-based WHMI than females (398.71) ($p = 0.001$).

Kruskal–Wallis tests revealed significant differences across seven race/ethnicity categories for WA [$\chi^2(6) = 19.65$, $p = 0.003$], time-based WHMI [$\chi^2(6) = 13.40$, $p = 0.037$], and OHC [$\chi^2(6) = 23.79$, $p < 0.001$]. Asian/Pacific Islander (309.23) had significantly lower WA than Caucasian/White (451.41) ($p = 0.026$) workers. Caucasian/White workers (455.59) reported significantly higher OHC than African American/Black workers, (364.66) ($p = 0.044$). None of the pairwise comparisons for time-based WHMI were statistically significant.

Kruskal–Wallis tests revealed significant differences across four employment status categories for WA [$\chi^2(3) = 26.07$, $p < 0.001$], overall burnout [$\chi^2(3) = 9.22$, $p = 0.026$], and OHC [$\chi^2(3) = 33.36$, $p < 0.001$]. Employed full-time workers (455.18) had significantly higher WA than employed part-time (322.45) ($p < 0.001$) and self-employed full-time (325.33) ($p = 0.023$) workers. Employed part-time workers (522.67) had significantly higher overall burnout than employed full-time (430.60) ($p = 0.020$) workers. Employed full-time workers (455.32) had significantly higher overall OHC than employed part-time (282.49) ($p < 0.001$) workers.

Kruskal–Wallis tests revealed significant differences across 20 industry categories for WA [$\chi^2(19) = 89.80$, $p < 0.001$], overall burnout [$\chi^2(19) = 31.18$, $p = 0.039$], time-based WHMI [$\chi^2(19) = 38.56$, $p = 0.005$], and OHC [$\chi^2(19) = 40.03$, $p = 0.003$]. Those in Administrative and Support and Waste Management and Remediation

Table 2 Mean Levels of WA, burnout, WHMI, and OHC

Study variable	Poor WA	Moderate WA	Good WA	Excellent WA	Total
Work ability					
M	25.02	32.89	40.18	45.62	37.65
SD	1.97	2.39	1.98	1.50	6.27
Min	16.00	28.00	37.00	44.00	16.00
Max	27.00	36.00	43.00	49.00	49.00
Overall burnout					
M	3.07	2.67	2.30	1.84	2.39
SD	0.61	0.60	0.57	0.45	0.67
Min	1.83	1.00	1.00	1.00	1.00
Max	4.33	4.50	4.33	3.25	4.50
Exhaustion					
M	3.03	2.79	2.61	2.10	2.60
SD	0.81	0.70	0.72	0.68	0.77
Min	1.33	1.00	1.00	1.00	1.00
Max	5.00	4.67	5.00	5.00	5.00
Mental distance					
M	2.98	2.65	2.13	1.75	2.29
SD	0.83	0.75	0.75	0.63	0.83
Min	1.33	1.00	1.00	1.00	1.00
Max	5.00	4.67	4.67	4.00	5.00
Cognitive impairment					
M	3.14	2.69	2.30	1.83	2.40
SD	0.81	0.75	0.73	0.57	0.81
Min	1.00	1.00	1.00	1.00	1.00
Max	4.67	4.67	4.67	4.00	4.67
Emotional impairment					
M	3.11	2.56	2.15	1.67	2.26
SD	0.72	0.74	0.67	0.52	0.78
Min	2.00	1.00	1.00	1.00	1.00
Max	4.67	4.67	5.00	3.33	5.00
Energy-based WHMI					
M	3.50	3.33	3.05	2.34	3.03
SD	0.77	0.80	0.94	0.88	0.95
Min	1.75	1.00	1.00	1.00	1.00
Max	5.00	5.00	5.00	4.50	5.00
Time-based WHMI					
M	3.27	3.22	2.78	2.27	2.86
SD	0.83	0.84	0.93	0.91	0.96
Min	1.00	1.00	1.00	1.00	1.00
Max	4.75	5.00	5.00	5.00	5.00
Organizational health climate					
M	3.10	3.34	3.70	3.98	3.59
SD	0.81	0.81	0.74	0.66	0.80
Min	1.60	1.00	1.00	1.40	1.00
Max	4.75	5.00	5.00	5.00	5.00

Services (196.95) had significantly lower WA than those in Professional, Scientific, and Technical Services (530.32) ($p < 0.001$), Management of Companies and Enterprises (530.34) ($p < 0.001$), Arts, Entertainment, and Recreation (535.72) ($p < 0.001$), and Educational Services (597.18) ($p < 0.001$). Those in Mining, Quarrying, and Oil and Gas

Table 3 Cronbach's Alpha and Intercorrelations for WA, burnout, WHMI, OHC, age, years employed at current workplace, number of physician-diagnosed conditions, and managerial status

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Work ability	**0.68**											
2. Burnout (overall)	−0.56**	**0.91**										
3. Exhaustion	−0.37**	0.77**	**0.79**									
4. Mental distance	−0.49**	0.88**	0.62**	**0.79**								
5. Cognitive impairment	−0.48**	0.85**	0.51**	0.69**	**0.82**							
6. Emotional impairment	−0.53**	0.80**	0.47**	0.61**	0.64**	**0.81**						
7. Energy-based WHMI	−0.37**	0.44**	0.40**	0.36**	0.31**	0.37**	**0.87**					
8. Time-based WHMI	−0.38**	0.37**	0.27**	0.32**	0.27**	0.38**	0.067**	**0.87**				
9. Health climate	0.38**	−0.35**	−0.24**	−0.37**	−0.28**	−0.24**	−0.32**	−0.31**	**0.86**			
10. Age	0.11**	−0.09*	−0.04	−0.04	−0.08*	−0.11**	−0.06	−0.12**	0.07*	–		
11. Years employed	0.06	−0.06	−0.04	−0.06	−0.08*	−0.02	−0.06	−0.12**	0.17**	0.59**	–	
12. Diagnosed conditions	−0.66**	0.21**	0.13**	0.20**	0.21**	0.19**	0.18**	0.18**	−0.21**	0.06	0.06	–
13. Managerial status	−0.10**	0.02	0.02	−0.03	0.01	0.05	0.01	0.07*	0.08	0.06	0.11**	0.21**

Cronbach's alpha coefficients are presented in bold along the diagonal

NN = 876. All values are based on listwise exclusion

** $p < 0.01$ (2-tailed)

* $p < 0.05$ (2-tailed)

Extraction (299.93) had significantly lower WA than those in Professional, Scientific, and Technical Services (530.32) ($p<0.001$). Those in Educational Services (597.18) had significantly higher WA than those in Agriculture, Forestry, Fishing, and Hunting (307.18) ($p<0.001$), Wholesale Trade (355.90) ($p<0.001$), Transportation and Warehousing (369.66) ($p<0.001$), Retail Trade (406.45) ($p=0.004$), Utilities (413.44) ($p=0.009$), Construction (404.07) ($p<0.001$), and Manufacturing (416.16) ($p<0.001$). None of the pairwise comparisons for overall burnout, time-based WHMI, or OHC were statistically significant.

Discussion

Workers with poor WA reported the highest levels of overall burnout, WMHI, and the least supportive OHC. This finding may be impacted by the high number of physician-diagnosed conditions ($M=6.27$) among those with poor WA in comparison to workers with moderate ($M=3.22$), good ($M=1.03$), and excellent ($M=0.15$) WA; research supports an inverse relationship between WA and multimorbidity, or the presence of two or more CHCs [38, 39]. A closer look at the results, however, revealed that those with poor and moderate WA reported comparable levels of energy- and time-based WHMI and OHC; thus, it is possible that differences in overall burnout may be attributed to the type or severity of their health-related condition [6, 7], in addition to other job-related characteristics (e.g., industry, employment status, managerial status).

Lower energy- and time-based WHMI were associated with higher WA. This finding, coupled with the moderate-to-strong negative relationships observed between WA and burnout (overall and each dimension of burnout), and the positive relationships between WHMI and burnout, suggests that individuals with higher levels of WA may find it is easier to manage health demands because fewer competing work-related demands exist. Alternatively, those with lower WHMI may have access to and more frequently use supportive job resources (e.g., flexible work arrangements [40]) that make it easier to simultaneously manage work and health demands. This could lead to both higher WA and lower burnout. Our findings are consistent with previous research that suggests individuals with impaired health and disabilities report lower levels of WA and higher levels of burnout [6, 11] and that decreased energy- and time-based WHMI are associated with lower levels of burnout [21]. Given the known impact of health status on WA, these findings suggest that WA, as a personal health resource, may play a role in explaining the positive relationship between WHMI and burnout [41].

Higher OHC was associated with higher WA and lower levels of energy- and time-based WHMI and overall burnout. While these results were aligned with our expectations, the average OHC score overall and within each WA group indicated that the study sample neither agreed nor disagreed that their organization's management was interested in employee health-related issues. Thus, more research is needed to determine why and the extent to which a supportive OHC influences health and well-being outcomes for workers with CHCs and disabilities. Interestingly, 70% of the sample reported holding a managerial or supervisory position at work, and both lower WA and higher time-based WHMI were associated with managerial roles. It seems probable that those in managerial roles may have access to job resources (e.g., more autonomy and flexibility) that would make a greater impact than OHC on their ability to simultaneously manage work and health demands, though confirmation of access to *and* use of available resources is needed. High time-based WHMI suggests that mangers may not have time to use available resources due to work demands associated with their role. In addition, 85% of workers with poor work ability reported holding a managerial or supervisory position. Given that these workers also reported the highest burnout, WHMI, and number of diagnosed conditions, our findings suggest that individuals with poor WA in managerial positions may require additional and/or different resources than those with higher WA.

When considering the sociodemographic and job-related characteristics of the sample, several notable observations emerged. First, our findings that age had a weak positive relationship with WA, and females had higher WA than males, add to the inconsistent findings in the larger WA literature [4] and is likely influenced by the observed skewed age and gender distributions wherein 92.4% of participants were between the ages of 18–44, and 60.1% of the sample was male. Second, we found no significant association between age and number of physician-diagnosed conditions, highlighting the need for more research on the impact of condition characteristics (e.g., type and severity) on WA. Third, across the sample, the majority (20.3%) were employed in manufacturing jobs. Though likely influenced by the high number of manufacturing workers in the sample, we observed that most workers with excellent WA worked in education services, while the majority with poor, moderate, and good WA worked in manufacturing. In addition, WA for education services workers was significantly higher than those in several of the more physically-demanding industries (e.g., construction, manufacturing, utilities). These findings provide some support for previous research that has found a negative relationship between WA and physical job demands, which are more common in manufacturing versus education professions [4]. Fourth, past research has found that full and part-time employees report similar levels of burnout [42]; thus, the finding that those employed part-time versus full-time reported higher burnout may be an artifact of a skewed distribution in favor of full-time employees. Finally, the finding that Caucasian/White workers reported significantly higher OHC than African American/Black workers, though possibly skewed by a predominantly Caucasian/White sample, is aligned with recent research that found Black employees perceived lower levels of organizational support [43].

Practical Implications

Findings from this research provide organizations, managers/supervisors, and employees with a better understanding of the issues workers face while trying to manage health- and disability-related issues. Individuals with lower WA—influenced by one's perception of job demands, available job resources, and health status—may be at a higher risk of experiencing job-related burnout. Though organizations cannot directly impact an employee's health, the way in which they support employees' management of job demands and access to job resources contributes to employees' perceived WA and may indirectly impact employees' performance, health, and well-being outcomes. Like previous research [24], employees in this study with excellent WA tended to report the higher OHC ratings; therefore, we encourage employers to establish an organizational climate that is supportive of employee health and well-being. One such way to do this may be through purposely increasing organizational practices that promote employee health alongside health-promoting leadership behaviors [29, 44, 45]. Recent research suggests that health-oriented leadership facilitates employees' disclosure intentions [46]. By creating a work environment in which employees feel comfortable enough to disclose their CHC/disability, employers are better-positioned to identify and provide access to job resources or implement interventions that may reduce WHMI. Doing so may lead to improved WA and sustained employment. In sum, a supportive health-related organizational climate may serve as a beneficial job resource that could buffer the negative relationship between work ability and WHMI. Employees who are able to manage job demands more effectively may experience interference between work and health-related demands and be at a lower risk for burnout. Future research is needed, however, to evaluate causal relationships among the study variables and the differential effects of interventions on those with higher versus lower WA.

Limitations and Future Directions

This study has limitations that should be noted because they suggest directions for future research. First, though we recruited a large sample of employees from a variety of industries via convenience sampling, individuals with very low WA (WAI scores between 7 and 15) were not represented. It seems plausible that individuals with very low WA may not have qualified for the study, due to no longer being employed because health issues hindered their ability to maintain employment and/or return to work due to illness or injury [47]. Relatedly, we did not include assessments of CHC/disability severity or the nature of one's condition (e.g., invisible, visible, episodic, progressive). Future research in this area should include adequate samples of those with diverse levels of WA, especially those with very poor WA, as well as those with different types and levels of CHC/disability severity so that tailored recommendations can be made.

Second, the cross-sectional nature of this study prevents conclusions regarding causal relationships among study variables. Future research would benefit from longitudinal studies that use a three-wave design to investigate the temporal sequence of the variables and allow for inferences about causality. For example, given past research and the observed relationships in this study, researchers might investigate whether lower WHMI leads to increased WA and, in turn, leads to lower burnout. Researchers might also further investigate the relationship between WA and burnout to add to the extremely limited research on the direction of causality [20]. For example, chronic burnout may lead to negative health consequences that, in turn, lead to increased WMHI and reduced WA. Relatedly, researchers should consider the role of other relevant variables, such as work engagement [48], in the relationship between organizational job resources, such as OHC, and WA.

Third, the reliance on self-report data, which can be influenced by response bias, also limits conclusions that can be made. Future research may consider the inclusion of objective and behavioral measures supplement self-report measures, such as documented number of missed days of work due to managing one's health condition, behavioral symptoms of burnout (e.g., complaints about work-related stress and impaired mental health), and requests for work-related accommodations. An assessment of the types and use of health-related job resources, along with documented examples wherein organizational support was offered to workers with lower WA, may also provide clearer insight into the ways in which organizations facilitate sustained employment.

Finally, the use of an anonymous survey link, coupled with online recruitment methods and a long survey, was associated with data loss risks related to fraudulent responders and poor completion rate. In the current study, only 878 of over 3,200 respondents were kept. We enabled all available response quality and fraud detection settings within Qualtrics, and we applied strict criteria when reviewing and cleaning the dataset. As a result, responses that were flagged as duplicates or bots may not have been. For example, Qualtrics flags responses using embedded data fields and provides criteria against which to interpret values. Responses flagged as “likely fraudulent and a bot” or “likely a duplicate” were removed from the analyses. Future research should consider shortening survey length to improve completion rates. In addition, for health-related research studies conducted in the U.S., researchers might consider using secure participant recruitment platforms (e.g., ResearchMatch [49]).

Conclusion

Examining factors associated with sustained and prolonged employment of workers warrants attention, particularly given the growing percentage of U.S. adults who have one or more CHCs and disabilities. WA provides insight into the effects of employees’ health and disability status on work performance. The current study examined levels of job burnout, WHMI, and OHC among employees from diverse occupational industries with varied levels of WA. Employees with lower levels of WA tended to report higher levels of burnout and WHMI and lower levels of OHC, suggesting these variables might relate to one another similarly across different work environments. Findings contribute to the limited research on WHMI and OHC in relation to both WA and burnout and provide a foundation upon which future research can examine causal relationships among these variables. Given individuals with decreased WA are more likely to report increased job demands and fewer resources, pinpointing possible mitigators, as well as promotors, of reduced WA is critical to reduce workers’ risk for burnout and other negative individual and organizational outcomes.

Author Contributions Both authors contributed to the study conception, design, material preparation, data collection, and funding acquisition. JMS conducted data cleaning and data analysis. The first draft of the manuscript was written by JMS and both authors commented on previous versions of the manuscript. Both authors read and approved the final manuscript.

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Data Availability The dataset generated during and analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Competing Interests Julie M. Slowiak and Mariah McDonough declare that they have no relevant financial or non-financial interests to disclose.

Ethical Approval All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and/or national) and with the Helsinki Declaration of 1975, as revised in 2000. Approval was obtained from the Institutional Review Board of the University of Minnesota, who determined this study met the requirements for exemption (Date: November 7, 2022; No: STUDY00017535).

Consent to Participate Agreement to participate was obtained electronically from all individuals for whom data are included in this study.

Consent for Publication Not applicable.

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