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# Associations between workplace social capital, well-being, and work engagement in medical residents: a multicenter cross-sectional study

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## Abstract

**Background** Workplace social capital (WSC), a social resource available within work or occupational environments, has been identified as an important factor for employees' health in fields other than medical education. However, little is known about whether WSC is associated with well-being and work engagement among medical residents. The aim of this study was to examine the relationships between WSC, well-being, and work engagement specifically among medical residents.

**Methods** This cross-sectional study was conducted at 32 hospitals in Japan, assessing WSC with the Japanese medical resident version of the Workplace Social Capital (JMR-WSC) scale. Well-being and work engagement were measured as the primary and secondary outcomes using the Subjective Well-Being Scale and the Japanese version of the Utrecht Work Engagement Scale.

**Results** We analyzed data from 276 residents. Adjusting for possible confounders, the JMR-WSC Scale scores were associated with well-being in a dose-dependent manner (adjusted mean difference 6.55, 95% CI 4.96–8.15 for the WSC highest score quartile, compared with the lowest score quartile). The WSC Scale scores demonstrated a dose-dependent association with work engagement (adjusted mean difference 15.12, 95% CI 11.66–18.57 for the WSC highest score quartile, compared with the lowest score quartile).

**Conclusions** This study showed that WSC was linked to enhanced well-being and work engagement among residents. Our findings offer insights for developing interventions to prevent resident burnout and create an environment conducive to residents' well-being and engagement.

**Keywords** Workplace social capital, Well-being, Work engagement, Burnout, Medical residents

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## Background

Physicians face a greater risk of burnout, depressive disorder, and death due to suicide compared with the general population [1]. The COVID-19 pandemic has exacerbated physicians' emotional and mental well-being [2]. Among physicians, medical residents are particularly vulnerable. There is an inverse relationship between the prevalence of burnout and the age of practicing physicians, suggesting that residents in the early stages of their medical careers are particularly susceptible to burnout [3]. Existing studies indicate that approximately half of the residents experience burnout [4–7]. Residents are exposed to high-stress levels, including heavy workloads, time constraints for practical tasks, and psychological and physical pressure from supervisors and patients [8]. Residents also face challenges regarding wellness, such as social isolation, alternating sleep cycles, and limited exercise opportunities [9]. Resident burnout and decreased well-being can lead to medical errors, poor care quality, and reduced patient safety. Improving resident well-being benefits residents and positively impacts patient outcomes [10]. Therefore, well-being is a major issue that must be addressed worldwide.

Work engagement has gained attention in occupational health psychology. As burnout has become a significant problem for various workers, including healthcare professionals, the search for preventative factors has gained momentum, eventually leading to the concept of engagement, considered an antithesis to burnout [11]. Work engagement is a positive, emotionally motivated, and fulfilling state of work-related well-being [12]. It represents a positive, active, and work-related state of mind described by dedication, vigor, and absorption [12, 13]. According to prior research, work engagement is linked to several positive outcomes: fewer mental health problems [14], fewer health-related absences from work [15], higher life satisfaction [16], lower turnover intentions, increased job performance, and greater job involvement [17]. Work engagement has been studied in numerous occupations and is crucial to boosting health and job outcomes. However, the literature on work engagement among medical residents is limited [18]. Few studies show that greater work engagement among medical residents is linked to markers of higher quality of care [19], greater satisfaction with residency, and decreased positive depression screening [20]. Therefore, nurturing work engagement is vital among residents.

Social capital refers to the resources individuals and groups obtain through their social networks [21, 22]. The workplace is a critical setting that has been the focus of social capital research, as it serves the primary social context for working-age adults spending the majority of their waking hours [23]. Workplace social capital (WSC)

is a social resource accessible within work or occupational environments [22]. Extensive evidence supports the benefits of WSC for employees, such as good self-rated health and mental health [23–25]. Accordingly, examining the WSC of medical residents is crucial, given its significant impact.

Several studies have verified the relationship between WSC and well-being or between WSC and employee work engagement. For example, a study on Danish daily workers found that social capital at work is positively associated with psychological well-being and work engagement [26]. In healthcare settings, a Swedish study found that higher social capital was linked to higher job satisfaction and work engagement among healthcare professionals [27]. Another study conducted in Japan reported a positive correlation between WSC and work engagement [28]. However, applying these findings to residents is problematic. First, the Danish study did not involve healthcare workers. Second, the Swedish study employed a scale for overall social capital; the authors did not use a scale for workplace-specific social capital. Third, the Japanese study included only seven doctors out of 440 participants. The postgraduate years of these participating physicians were not specified; thus, it is unclear whether any of the study participants were residents. Thus, to the best of our knowledge, no studies have examined the associations between WSC and well-being and between WSC and work engagement, focusing on medical residents as research subjects. As medical residents are highly vulnerable physicians, it is essential to examine the relationship between WSC and their well-being and work engagement.

Thus, our research questions are: (1) Is there a significant relationship between WSC and well-being among medical residents? (2) Is WSC significantly associated with work engagement as a secondary outcome among medical residents? The findings of this study will contribute to the development of effective interventions involving WSC to enhance the well-being and work engagement of medical trainees.

## Methods

### Design, setting, and participants

We conducted a multicenter cross-sectional survey concurrently from July to August 2022, alongside a validation study of the Japanese medical resident version of the Workplace Social Capital (JMR-WSC) Scale [29]. We contacted the training directors of 78 postgraduate clinical training hospitals in Japan. We selected the 78 hospitals nationwide by referring to the list of clinical training hospitals listed on the website of the Regional Bureau of Health and Welfare in each region. 32 hospitals out of 78 agreed to take part in our study (Table 1). We emailed

**Table 1** Participating hospital characteristics

Characteristics	N (%)
Hospital type	
Community hospital	30 (94)
University hospital	2 (6)
Hospital size	
≤ 500 beds	19 (59)
501–800 beds	8 (25)
801–1000 beds	3 (9)
≥ 1001 beds	2 (6)
Hospital location	
Hokkaido and Tohoku	5 (16)
Kanto	6 (19)
Chubu	6 (19)
Kinki	4 (13)
Chugoku and Shikoku	5 (16)
Kyushu	6 (19)

the residents of these 32 hospitals through their training directors and invited them to complete an online survey using SurveyMonkey ([www.surveymonkey.com](http://www.surveymonkey.com)). The email invitation emphasized that participation in the survey was entirely voluntary, with no penalties for non-participation. To encourage survey completion, three follow-up email reminders were sent to those who initially did not respond to the invitation.

## Measures

### Primary outcome: subjective well-being

The primary outcome measure in our study was the Subjective Well-Being Scale (SWBS) [30]. The SWBS is a Japanese-validated psychological scale developed by modifying the original Subjective Well-Being Inventory [30, 31] that consists 12 items. Each of the items is scored on a four-point Likert scale ranging from 1 (not at all, never, etc.) to 4 (very much, always, etc.). A total SWBS score was calculated for each participant, ranging from 12 to 48, with higher scores indicating higher well-being.

### Secondary outcome: work engagement

The secondary outcome measure was the Japanese version of the Utrecht Work Engagement Scale (UWES) scores [32]. The UWES is the world's most extensively used metric to assess work engagement [33]. A Japanese version of the UWES has been developed, and its reliability and validity have been well-tested [32]. It has nine items rated from 0 (never) to 6 (always). We used total UWES scores. The total scale score is an equally weighted sum of the scores for the nine items. The scores range from 0–54, with higher scores suggesting greater work engagement.

### Explanatory variable: workplace social capital

The JMR-WSC Scale was used to assess WSC [29]. The WSC Scale was initially developed in Finland and has since been translated into several languages, being the most widely used tool for measuring WSC [34]. The JMR-WSC Scale can be used for Japanese medical residents, having good reliability and validity [29]. The scale comprises eight items rated on a five-point Likert scale varying from 1 (strongly disagree) to 5 (strongly agree). The average scores on the eight items were used as explanatory variables, with higher scores representing better WSC.

### Covariates

We selected covariates based on their established associations with WSC, well-being, and work engagement [26, 28]. We included gender, postgraduate years, hospital type (community vs. university hospital), hospital size (≤ 500, 501–800, 801–1000, or ≥ 1001 beds), and clinical department (internal medicine, surgical medicine, or other).

### Statistical analysis

We reported continuous data as means and standard deviations for descriptive statistics, whereas categorical data were reported as frequencies and percentages.

To assess whether multilevel analysis was required, we checked for a clustering effect by obtaining the intraclass correlation coefficient (ICC) [35]. In our dataset, the ICC was less than 0.1 for the outcome variables (SWBS and UWES). Thus, institutional settings were not responsible for the variation in these outcome variables, and we chose to conduct a conventional analysis method. We performed multivariable linear regression analyses with adjustments for possible confounders (i.e., gender, postgraduate years, type of hospital, hospital size, and department). The WSC Scale scores were categorized into quartiles because the assumption of linearity may not be met in the association between the independent and dependent variables in our regression model. We used a 2-sided significance level of  $P < 0.05$  for each analysis. Owing to the small percentage of missing data, we chose a complete case analysis.

According to previous research on the sample size formula, sample size per independent variable values of ≥ 20 were required for linear regression analysis [36]. Therefore, since the number of independent variables was 12, we estimated a minimum sample size of 240. We performed all statistical analyses employing SPSS Statistics 29.0 (IBM Japan; Tokyo, Japan).

### Ethical considerations

Participants were provided with a study description at the beginning of the online questionnaire and indicated their informed consent by checking a participation agreement box. As an incentive, participants entered a drawing for one of ten ¥5,000 gift cards. This study received approval from the Institutional Review Board of the University of Tokyo (approval number: 2022062NI).

### Results

Out of 1,290 medical residents, 289 (22.4%) responded to the survey. After excluding 13 participants with missing data, data from the remaining 276 residents were analyzed (Fig. 1). Table 2 lists the characteristics of the participants and the instruments. The majority of the participants were male (63.8%), were junior medical residents (64.1%), worked in community hospitals (59.4%), and were affiliated with internal medicine (58.0%). Note that the median response rate per hospital was 21.9% (interquartile range 10.4%–35.9%).

Table 3 shows the associations between WSC and well-being and between WSC and work engagement. After adjusting for possible confounders, the WSC Scale scores exhibited a dose-dependent relationship to well-being (i.e., increasing levels of WSC were associated with increasing levels of well-being) (adjusted mean difference 6.55, 95% confidence interval (CI) 4.96–8.15 for the WSC highest score quartile, compared with the lowest score quartile). The WSC Scale scores were associated in a dose-dependent manner with work engagement after adjustment for possible confounders (i.e., increasing levels of WSC were associated with increasing levels of work engagement) (adjusted mean difference 15.12, 95% CI 11.66–18.57 for the WSC highest score quartile, compared with the lowest score quartile).

**Table 2** Characteristics of the participants and the instruments (N = 276)

	Value
Gender, n (%)	
Female	99 (35.9)
Male	176 (63.8)
Non-binary	1 (0.4)
PGYs, n (%)	
PGY 1–2 (junior medical residents)	177 (64.1)
PGY 3–6 (senior medical residents)	99 (35.9)
Hospital type, n (%)	
Community hospital	164 (59.4)
University hospital	112 (40.6)
Hospital size, n (%)	
≤ 500 beds	87 (31.5)
501–800 beds	56 (20.3)
801–1000 beds	17 (6.2)
≥ 1001 beds	116 (42.0)
Clinical department, n (%)	
Internal medicine <sup>a</sup>	160 (58.0)
Surgical medicine <sup>b</sup>	73 (26.4)
Other departments <sup>c</sup>	43 (15.6)
WSC Scale, mean (SD)	4.05 (0.74)
SWBS, mean (SD)	34.39 (5.16)
UWES, mean (SD)	30.07 (11.22)

**Abbreviations:** PGY Postgraduate year, SD Standard deviation, SWBS Subjective Well-Being Scale, UWES Utrecht Work Engagement Scale, WSC Workplace Social Capital

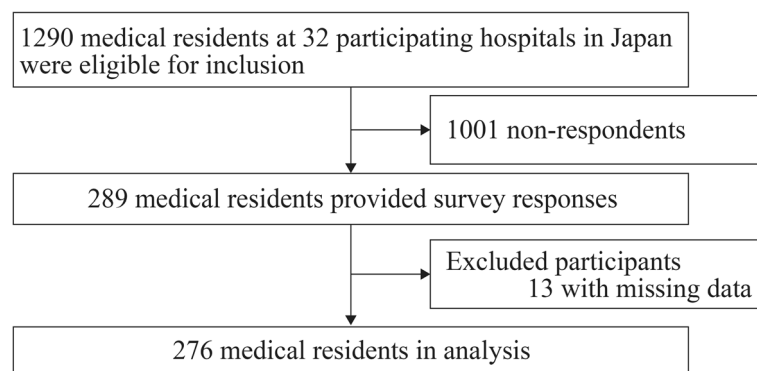
<sup>a</sup> Internal medicine, pediatrics, and general medicine

<sup>b</sup> General surgery, neurosurgery, obstetrics and gynecology, ophthalmology, orthopedics, otorhinolaryngology, plastic surgery, and urology

<sup>c</sup> Anesthesiology, dermatology, emergency medicine, psychiatry, and radiology

### Discussion

Our multicenter study in Japan investigated the associations between WSC and subjective well-being as well as between WSC and work engagement among medical



**Fig. 1** Participant flowchart

**Table 3** Associations of WSC Scale scores with SWBS and UWES scores among medical residents ( $N=276$ )

	Unadjusted mean difference	95% CI	Adjusted <sup>a</sup> mean difference	95% CI
<b>SWBS<sup>b</sup></b>				
WSC Q1 <sup>d</sup>	Ref	Ref	Ref	Ref
WSC Q2 <sup>e</sup>	4.07	2.44–5.69*	3.83	2.16–5.49*
WSC Q3 <sup>f</sup>	4.45	2.88–6.03*	4.54	2.96–6.13*
WSC Q4 <sup>g</sup>	6.64	5.06–8.22*	6.55	4.96–8.15*
<b>UWES<sup>c</sup></b>				
WSC Q1 <sup>d</sup>	Ref	Ref	Ref	Ref
WSC Q2 <sup>e</sup>	8.46	4.93–11.99*	8.63	5.03–12.23*
WSC Q3 <sup>f</sup>	8.48	5.06–11.90*	8.94	5.51–12.37*
WSC Q4 <sup>g</sup>	14.66	11.22–18.10*	15.12	11.66–18.57*

Abbreviations: CI Confidence interval, Q Quartile, SWBS Subjective Well-Being Scale, UWES Utrecht Work Engagement Scale, WSC Workplace Social Capital

<sup>a</sup> Adjusted for postgraduate years, gender, hospital type (community hospital vs. university hospital), hospital size ( $\leq 500$  beds; 501–800 beds; 801–1000 beds; or  $\geq 1001$  beds), and clinical department (internal medicine; surgical medicine; or others)

<sup>b</sup> Scores range from 12 to 48

<sup>c</sup> Scores range from 0 to 54

<sup>d</sup> 0.000–3.750

<sup>e</sup> 3.750–4.125

<sup>f</sup> 4.125–4.625

<sup>g</sup> 4.625–5.000

\*  $p < 0.01$

residents. Our multivariable linear regression analyses revealed positive associations between WSC and well-being or work engagement. Our findings have implications for postgraduate clinical training programs, aiding in the development of interventions to prevent resident burnout and create a work environment that fosters resident flourishing.

Our study indicated that WSC might be crucial for increasing medical residents' well-being and work engagement. Several mechanisms can explain how WSC improves well-being and work engagement. First, WSC helps medical residents communicate, collaborate, and coordinate with their peers and supervisors [37], thereby contributing to the effective functioning of the workplace [38] and leading to improved resident self-efficacy. This, in turn, can result in higher levels of engagement and well-being [39, 40]. Second, greater WSC may promote informal social control (e.g., supervisors and peers becoming more attentive to residents' work attitudes). These characteristics can contribute to workplace fairness and a positive work atmosphere, increasing work engagement and well-being [41]. Third, the WSC can promote medical trainees' learning and professional development. As part of the supportive network, medical

residents can access valuable knowledge, skills, and mentoring opportunities. Continuous learning and feeling supported in professional growth can contribute to higher well-being and work engagement [42–44]. Future studies should investigate the causality between WSC and well-being and between WSC and work engagement.

To improve well-being and work engagement, postgraduate education programs should conduct interventions to foster WSC. These interventions should promote reciprocity and trust within the workplace among workers and between hierarchies [45]. Action plans can include tasks aimed at communication, improving social cohesion and cooperation, and actively involving workers in decision-making processes [46]. While concrete methods for effectively enhancing WSC are yet to be developed, one proposed approach in postgraduate medical education is the use of medical escape rooms, which offer immersive simulation game-based learning activities [47]. However, further evidence is needed to establish effective strategies for improving WSC.

To the best of our knowledge, this study is the first to demonstrate a positive correlation between WSC and well-being and between WSC and work engagement in medical residents. The participating institutions varied in location, size, and type. The WSC Scale is an internationally established instrument for measuring social capital at work. Thus, our findings exhibit high external validity. In addition, the critical value of the findings is underscored by the fact that as noted in the Background, resident physicians are vulnerable. The findings from this study, which could lead to improving burnout and work engagement among vulnerable residents, would be valuable.

This study has some limitations. First, although it indicated associations between WSC and well-being and between WSC and work engagement, our cross-sectional study design did not allow for determining causal relationships. Therefore, further longitudinal studies are required. Second, the response rate was relatively low. Short response times could also have a potential impact on the participants. Residents of low-WSC settings and those with low well-being or work engagement might have been less inclined to participate in the questionnaire. Such a response trend could cause an underestimation of the associations between these variables. Third, although we included covariates in our regression model referring to previous studies, unadjusted confounding factors can exist. Fourth, both exposure and outcome were based on self-report data, which could lead to overestimation (common method bias). Fifth, participating hospitals may have been interested in occupational health. There also may be a concern that it was unclear whether the target hospitals were representative of Japanese postgraduate clinical training hospitals. However, we selected



the hospitals with reference to the list of clinical training hospitals listed on the website of the Regional Bureau of Health and Welfare in each region, which varied in type and size. Caution should be exercised when interpreting our study's results.

## Conclusions

Our nationwide study of medical residents showed that WSC was positively related to subjective well-being and work engagement. Improving social capital in the workplace may enhance residents' well-being and work engagement. Our findings will assist postgraduate clinical training programs in developing interventions to prevent resident burnout and create an environment conducive to residents' well-being and engagement.

## Abbreviations

ICC	Intraclass correlation coefficient
JR-WSC Scale	Japanese resident version of the workplace social capital scale
SWBS	Subjective Well-Being Scale
UWES	Utrecht Work Engagement Scale
WSC	Workplace social capital

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## Authors' contributions

HF and ME designed the study. HF and TA analyzed the data. HF drafted the manuscript. All authors critically reviewed the manuscript. The final version of the manuscript was then approved by the authors.

## Authors' information

Not applicable.

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## Availability of data and materials

Upon reasonable request, the corresponding author can provide the data sets generated and analyzed in this study.

## Declarations

### Ethics approval and consent to participate

This study was conducted in accordance with the Declaration of Helsinki. All methods were performed in accordance with relevant guidelines. All participants checked the consent box at the beginning of the questionnaire to reveal their informed consent to participate in this study. The Institutional Review Board of the University of Tokyo granted ethical approval (2022062NI).

### Consent for publication

Not applicable.

### Competing interests

The authors declare no competing interests.

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