













## Association between grit and wellness outcomes among Japanese medical residents: A nationwide cross-sectional study

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### ABSTRACT

**Purpose:** The well-being of resident physicians is a globally recognized concern, with high rates of burnout, stress, and attrition. Studies proposed grit—a personality trait defined as perseverance and passion for long-term goals—as a protective factor against poor psychological outcomes. Although studies in Western countries have linked grit with lower burnout and depression among residents, evidence from collectivist cultures, such as Japan, remains limited.

**Method:** This nationwide cross-sectional study included data from 2,876 postgraduate year (PGY) 1–2 resident physicians across 553 hospitals in Japan. Participants completed self-administered surveys following the 2024 General Medicine In-Training Examination. Grit was measured using the validated Japanese version of the Short Grit Scale (Grit-S); wellness outcomes—including burnout, job satisfaction, stress, and depressive symptoms—were assessed using the single Mini-Z 2.0 item and the two-item Patient Health Questionnaire. Multilevel logistic regression models with a random intercept for hospital were used to evaluate the associations between grit and wellness outcomes, adjusting for demographic and institutional covariates.

**Results:** Higher Grit-S scores were significantly associated with lower odds of burnout (adjusted odds ratio [AOR], 0.54; 95% CI, 0.45–0.64), high stress (AOR, 0.63; 95% CI, 0.55–0.71), and depressive symptoms (AOR, 0.54; 95% CI, 0.48–0.62). Grit was also associated with greater job satisfaction (AOR, 2.09; 95% CI, 1.80–2.43).

**Conclusions:** In this national sample of Japanese resident physicians, higher grit was consistently associated with improved psychological well-being, including lower burnout, reduced stress, fewer depressive symptoms, and increased job satisfaction. These findings suggest that grit is a critical protective trait for residents, even within a collectivist culture. Future research should explore whether the identification of residents with lower grit, especially those with reduced perseverance or inconsistent interests, can help inform customized support programs such as mentoring or structured stress management to enhance well-being.

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## Introduction

The well-being of resident physicians is a significant issue worldwide. Physician well-being has been described as the presence of positive emotions and moods, the absence of negative emotions, satisfaction with life, fulfillment, and positive functioning [1]. In residency training, this broad construct spans both psychological health and occupational functioning, with key domains including *distress* (burnout/

high stress and depressive symptoms), *professional fulfillment* (job satisfaction), and *training sustainability* (thoughts of attrition). Residents are at particularly high risk of burnout due to their transition from students to clinicians and limited clinical experience [2]. Burnout can result from night shifts and heavy workloads, potentially leading to attrition [2]. Therefore, it is crucial to identify risks early and provide appropriate support.

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**Practice points**

- This nationwide study surveyed 2,876 residents in Japan.
- Higher grit scores were associated with lower burnout and depressive symptoms.
- Residents with greater grit reported lower stress and higher job satisfaction.
- The association between grit and thoughts of attrition did not meet the Bonferroni-corrected threshold ( $p < 0.05/15$ ).
- Assessing grit may help residency programs identify trainees who are at risk and guide them toward tailored wellness support.

Grit, proposed by Angela Duckworth, is defined as ‘passion and perseverance for long-term goals’ and has emerged as a particularly notable trait [3]. Research in the medical field has reported positive associations between grit and academic performance, career success, and psychological well-being, and negative associations with depression, burnout, and training attrition [4]. For example, a study of surgical resident physicians in the United States indicated that higher grit scores were associated with lower risks of burnout, attrition, and suicidal ideation [5]. Other studies targeting American resident physicians generally found that higher grit is associated with lower susceptibility to burnout. However, the association varies by specialty and training stage, with some studies showing inconsistent results [5–9].

Research on grit has primarily been conducted in North American and European contexts, which have individualistic values. In contrast, East Asian cultures, including Japan, emphasize collectivist values [10,11]. Although grit is defined as passion and perseverance for self-selected, long-term personal goals [3], this definition is rooted in individualistic cultural assumptions that prioritize autonomy, personal achievement, and self-direction [12]. However, in collectivist societies, individuals are more likely to pursue socially endorsed goals, prioritize group harmony, and adjust their behaviors based on familial or societal expectations. Thus, grit in such contexts may reflect social obligation rather than personal passion [13]. These culturally shaped motivations can alter not only how grit manifests but also how it relates to well-being.

Although evidence from collectivist settings remains limited, several small studies in East Asia, including Japan, have suggested associations between grit and resident well-being [14–16]. However, these studies have been small and limited to single centers; additionally, there is a lack of nationally representative data regarding resident

physicians in this region. Research also suggests that the meaning and measurement of grit may differ across cultural contexts. For example, one international study found that grit scales have a lesser ability to assess overall grit in collectivistic countries, including those in Asia and Latin America [13]. In these cultures, people are more likely to prioritize harmony and collective goals, which may affect how they demonstrate perseverance [17]. Research targeting Japanese individuals also shows that grit, originally developed in an individualistic context, may be more closely related to the pursuit of socially meaningful goals, but not personal goal achievement or individual engagement [18]. This difference can be attributed to the Japanese mentality, which tends to prioritize contributions to and strengthening of the organization or society over individual involvement; simultaneously, the reverse seems to hold true in the United States [19,20]. Because grit was developed in an individualistic context, it may not fully reflect culturally specific forms of perseverance in Japan (e.g. striving for socially endorsed goals).

Furthermore, in Japan, diligence has traditionally been considered a virtue, and long working hours among resident physicians have been highlighted as a societal concern. Recent work-style reforms have sought to reduce excessive duty hours, yet workloads still vary substantially across hospitals and training programs [21,22]. Additionally, prior research in Japan has also suggested that individuals with higher grit may report greater work engagement [18]. In this context, the relationship between grit, engagement, workload, and well-being may be complex, underscoring the need for a national-level examination within Japan’s training environment.

This nationwide study investigates the association between grit and various wellness outcomes, such as burnout, job satisfaction, stress, depression, and attrition intent, among PGY1–2 resident physicians. Importantly, in the present study, grit was assessed using the Short Grit Scale (Grit-S), which operationalizes grit as two components—perseverance of effort and consistency of interests—for long-term goals. Therefore, our primary goal was to examine whether grit, originally developed in predominantly individualistic contexts, shows comparable associations with resident well-being outcomes in Japan. The findings will help determine whether grit plays a universally protective role or whether its impact on physician well-being varies across sociocultural settings.

**Methods****Study setting**

From January to March 2025, we performed a nationwide cross-sectional study using an

anonymous, web-based, self-administered questionnaire (see questionnaire, **Supplemental Digital Appendix 1**). The survey link was distributed to candidates for the General Medicine In-Training Examination (GM-ITE), a national assessment of clinical knowledge taken annually by more than half of all Japanese resident physicians.

Before accessing the survey, each resident reviewed an information sheet describing the study and provided electronic informed consent. The information sheet emphasized that participation was entirely voluntary and all responses would remain anonymous. We obtained ethical approval from the Ethical Review Committee of the Japan Institute for Advancement of Medical Education Program (December 10, 2024, approval no. 24–17). This study adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines and was conducted in accordance with the Declaration of Helsinki.

### Study population

The study participants were postgraduate-year (PGY)-1 and PGY-2 residents, who consented to participate and answer the questionnaire after finishing the GM-ITE. Resident physicians were excluded if they had any missing responses in the grit survey, wellness outcome measures, or covariates.

In Japan, medical education includes a six-year undergraduate curriculum followed by a mandatory two-year postgraduate clinical training program [23,24]. PGY1–2 residents complete core rotations in internal medicine and emergency medicine, and in additional required rotations across major specialties and community medicine [25].

### Grit

Grit was assessed using the Japanese version of the Short Grit Scale (Grit-S), which consisted of eight items rated on a 5-point Likert scale (1 = *not at all* to 5 = *very much*) [26]. The ratings were summed and averaged to produce total scores, which range from 1 (*not at all gritty*) to 5 (*extremely gritty*). Scores were also calculated for the subscales: perseverance of effort and consistency of interests (range 1–5).

The Grit-S was designed as a modified version of the original Grit Scale [3] and had demonstrated internal consistency, test–retest stability, and predictive validity in prior research [27]. This scale has been validated in a study involving 1,043 Japanese university students, establishing good reliability and validity [26]. In this study, the Cronbach's  $\alpha$  values were 0.78 for the overall scale, 0.80 for perseverance of effort, and 0.73 for consistency of interests. All three

scores were treated as continuous variables in the subsequent analyses.

### Wellness outcomes

We selected psychological well-being outcomes to capture complementary domains relevant to residents: distress (burnout/high stress and depressive symptoms), professional fulfillment (job satisfaction), and training sustainability (thoughts of attrition). These outcomes are commonly used in the resident well-being literature [4–9]. We collected these five well-being outcomes (burnout, high stress condition, high job satisfaction, depressive symptoms, and thoughts of attrition) through a self-reported questionnaire.

#### 1) Burnout, high-stress condition, and job satisfaction

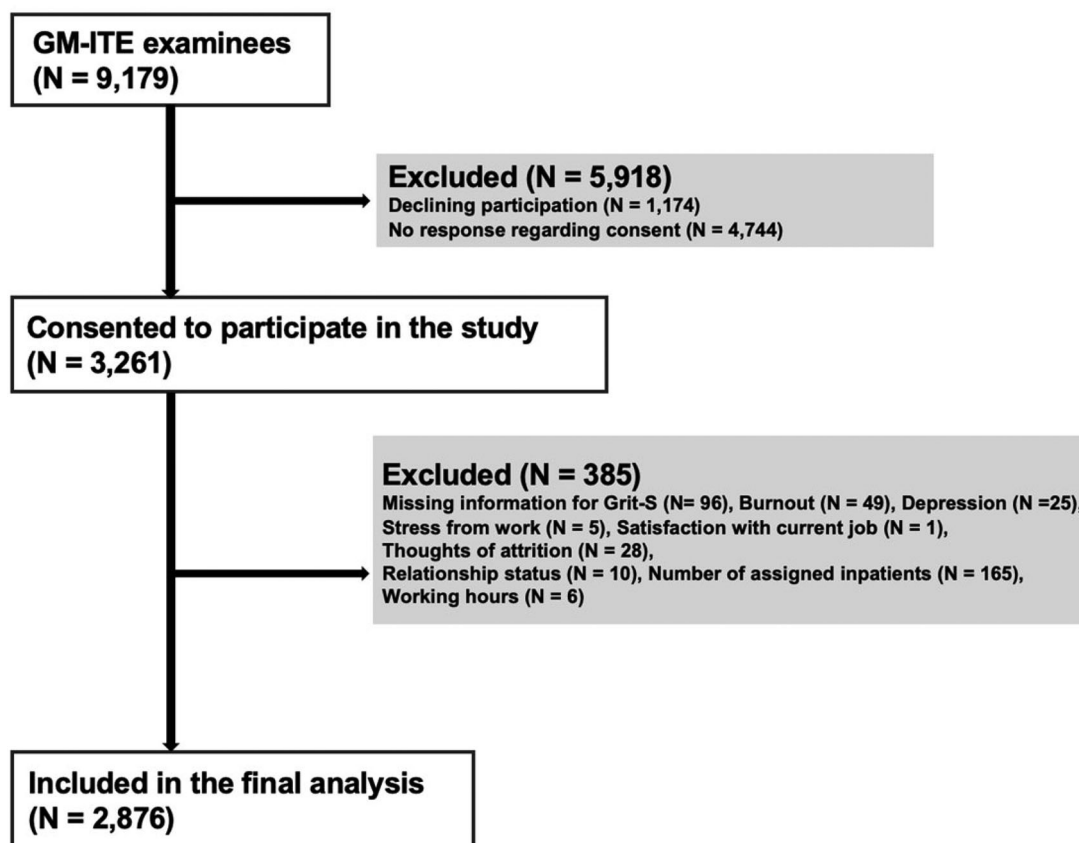
Burnout, high-stress condition, and job satisfaction were each assessed with a single Mini-Z 2.0 item rated on a 5-point Likert scale [28]. Using the validated Japanese version of the survey [29], responses were categorized as either positive or negative according to predetermined scoring. A previous study confirmed that a single-item measure of burnout correlates strongly with emotional exhaustion [30]. The diagnostic properties of this single-item measure of burnout have been assessed in both the original and Japanese versions; in Japanese, sensitivity is 54% and specificity is 88%, which are comparable to those of the original version [31].

#### 2) Depressive symptoms

Depressive symptoms were assessed with the Patient Health Questionnaire 2-item (PHQ-2) [32]. Participants indicated whether, during the preceding month, they had (1) experienced little interest or pleasure in activities and (2) felt down, depressed, or hopeless. Each item was answered 'yes' or 'no', and endorsement of either item qualified as a positive depression screening, with a sensitivity of 0.76 and a specificity of 0.87 [32,33]. We used the fully validated Japanese version of the PHQ-2 [34].

#### 3) Thoughts of attrition

To measure thoughts of attrition, we asked the question based on a prior study: 'During the past 12 months, have you considered leaving your residency program?' [5]. Responses were collected on a 5-point Likert scale ranging from '*strongly disagree*' to '*strongly agree*' and were categorized for analysis as yes (*strongly agree*, *agree*, or *neutral*) versus no (*disagree* or *strongly disagree*), consistent with the categorization used in the prior study [5].



**Figure 1.** Participants flow. *Note:* Abbreviation: GM-ITE, General Medicine In-Training Examination

### Covariates

We collected residents' demographic data, including gender and postgraduate year, as well as institutional characteristics, such as hospital type, bed count, program location, and program size, through a questionnaire completed by the hospital administrator or a designated staff member. Resident physicians also completed a self-administered survey that included their relationship status and information about their specific workplace environment, including the average number of assigned inpatients at any given time, and average resident duty hours worked per week.

### Statistical analysis

Resident and program characteristics were summarized using univariate statistics and frequency distributions. Bivariate associations were examined with the Student's *t* test for comparisons between two groups and the one-way analysis of variance for comparisons across three or more groups. In a hospital-level analysis, we calculated the mean Grit-S score for each hospital program, consistent with a prior study [5].

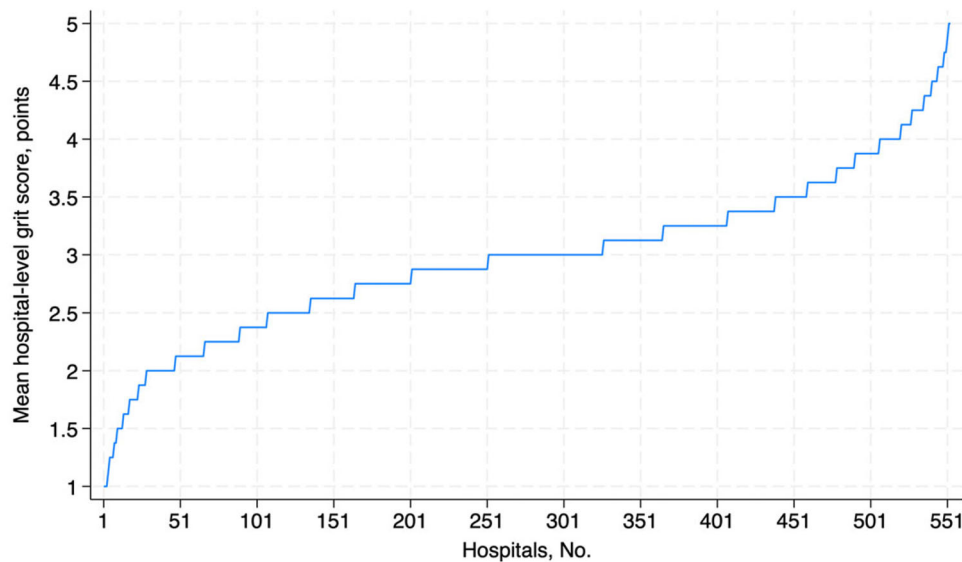
In the primary analysis, we used multilevel logistic regression models with a random intercept for residency hospitals to account for clustering in the

association between individual-level grit and the five outcomes. Multivariable models were adjusted for sex, PGY, relationship status, and program size, according to the previous study [5]. The Grit-S score was included in the models as a continuous predictor, implying that the reported odds ratios (ORs) represent the change in odds for each one-unit increase in the Grit-S score. Additionally, we evaluated the association between the Grit-S subscales—perseverance of effort and consistency of interest—and the outcomes in the secondary analysis. For univariable comparisons, statistical significance was defined as  $p < 0.05$  (two-sided). For multivariable mixed-effects logistic regression models, we applied a Bonferroni correction ( $p < 0.05/15$ ). All analyses were conducted using Stata version 17.0 (Stata Corp LLC, College Station, TX, USA).

### Results

Of the 9,179 residents from 640 hospitals who initially enrolled in the GM-ITE in the 2024 academic year, 5,918 were excluded due to nonresponse or lack of consent, and 385 were excluded due to missing data. The final sample comprised 2,876 residents from 553 hospitals (Figure 1).

Among these residents, 65.7% were male, and the Grit-S score (mean [SD]) was 3.02 [0.64]. Hospital-level analysis demonstrated wide variability, with



**Figure 2.** Variation in mean hospital-level grit-S scores for 552 hospitals in Japan. Note: Hospital-level Grit-S scores range: 1.0 to 5.0.

mean program-level Grit-S scores ranging from 1.00 to 5.00 (2.98 [0.67]) across the 553 hospitals (Figure 2).

Table 1 summarizes participant characteristics and Grit-S scores. The Grit-S scores did not differ significantly by gender, postgraduate year, inpatient case-load, hospital type, hospital bed count, or weekly working hours. In contrast, Grit-S scores differed across categories of relationship status, hospital region (urban vs rural), and program size. The highest mean Grit-S scores were observed among married residents and residents training in urban programs. Grit-S scores also tended to be slightly higher in larger programs.

Regarding wellness outcomes, Grit-S scores were significantly lower among residents who reported burnout (2.80 [0.70] vs. 3.05 [0.63];  $p < 0.001$ ), job dissatisfaction (2.81 [0.65] vs. 3.09 [0.62];  $p < 0.001$ ), high stress (2.90 [0.66] vs. 3.08 [0.63];  $p < 0.001$ ), depressive symptoms (2.85 [0.65] vs 3.09 [0.62];  $p < 0.001$ ), and thoughts of attrition (2.95 [0.54] vs 3.03 [0.66];  $p = 0.004$ ).

In multilevel logistic regression models with a random intercept for hospital, adjusting for sex, PGY, relationship status, and program size, higher Grit-S scores were significantly associated with lower odds of burnout (adjusted OR (AOR) 0.54; 95% CI, 0.45–0.64;  $p < 0.001$ ), high stress (AOR 0.63; 95% CI, 0.55–0.71;  $p < 0.001$ ), depressive symptoms (AOR 0.54; 95% CI, 0.48–0.62;  $p < 0.001$ ), and higher odds of job satisfaction (AOR 2.09; 95% CI, 1.80–2.43;  $p < 0.001$ ). The association with thoughts of attrition (AOR 0.81; 95% CI, 0.69–0.94;  $p = 0.006$ ) did not meet the Bonferroni-corrected threshold for significance ( $p < 0.05/15$ ) (Table 2).

Subscale analyses (Table 3) revealed that perseverance of effort was significantly associated with

lower burnout (AOR 0.62; 95% CI, 0.55–0.71;  $p < 0.001$ ), depressive symptoms (AOR 0.64; 95% CI, 0.58–0.71;  $p < 0.001$ ), and higher odds of job satisfaction (AOR 1.97; 95% CI, 1.76–2.21;  $p < 0.001$ ). The associations of perseverance of effort with high stress (AOR, 0.87; 95% CI, 0.79–0.96;  $p = 0.005$ ) and thoughts of attrition (AOR, 0.84; 95% CI, 0.75–0.95;  $p = 0.004$ ) did not reach Bonferroni-corrected significance ( $p < 0.05/15$ ). Consistency of interests was significantly associated with reduced burnout (AOR 0.76; 95% CI, 0.66–0.87;  $p < 0.001$ ), high stress (AOR 0.62; 95% CI, 0.56–0.69;  $p < 0.001$ ), and depressive symptoms (AOR 0.74; 95% CI, 0.67–0.83;  $p < 0.001$ ), and higher odds of job satisfaction (AOR 1.23; 95% CI, 1.10–1.38;  $p < 0.001$ ).

## Discussion

In this nationwide study of 2,876 PGY 1–2 Japanese residents from 553 hospitals, we found that higher Grit-S scores were significantly associated with lower odds of burnout, high stress, and depressive symptoms, as well as with higher job satisfaction. Most of our findings align with prior research that demonstrated similar relationships between grit and resident well-being. For example, a national cross-sectional study of 7,464 surgical residents in the United States indicated that higher grit scores were associated with lower risks of burnout and higher job satisfaction [5]. Other cross-sectional studies in emergency medicine, internal medicine, and orthopedic surgery have similarly reported inverse associations between grit and emotional exhaustion or overall burnout [7,35,36]. Although effect sizes and outcomes vary across specialties and methodologies, the general trend across studies supports grit as a protective psychological trait in residency training.

**Table 1.** Characteristics of study participants.

Characteristic	n (%)	Grit-S, mean (SD)	p-value
Overall	2,876	3.02 (0.64)	
Gender			0.15
Male	1,889 (65.7)	3.01 (0.65)	
Female	987 (34.3)	3.04 (0.63)	
Postgraduate year			0.06
1	1,467 (51.0)	3.04 (0.63)	
2	1,409 (49.0)	2.99 (0.65)	
Relationship status			0.02
Married	420 (14.6)	3.07 (0.66)	
Relationship	1,246 (43.3)	3.03 (0.61)	
No relationship	1,200 (41.7)	2.99 (0.67)	
Divorced or widowed	10 (0.4)	2.78 (0.55)	
Number of assigned inpatients			0.39
0–4	1,159 (40.3)	2.94 (0.65)	
5–9	1,394 (48.5)	3.05 (0.62)	
10–14	232 (8.1)	3.10 (0.63)	
≥15	91 (3.2)	3.26 (0.65)	
Type of hospital			0.42
Community hospital	2,310 (80.3)	3.01 (0.65)	
University hospital	373 (13.0)	3.04 (0.62)	
University branch hospital	193 (6.7)	3.05 (0.63)	
Size of hospital			0.53
< 400 beds	715 (24.9)	2.94 (0.66)	
400–499 beds	660 (23.0)	3.00 (0.64)	
500–699 beds	870 (30.3)	3.08 (0.63)	
≥700 beds	631 (21.9)	3.04 (0.64)	
Hospital region			< 0.001
Rural city	1,975 (68.7)	2.98 (0.65)	
Urban city	901 (31.3)	3.10 (0.63)	
Program size (total No. of residents)			0.006
Quartile 1 (1–14)	719 (25.0)	2.92 (0.68)	
Quartile 2 (15–23)	779 (27.1)	3.02 (0.64)	
Quartile 3 (24–35)	679 (23.6)	3.06 (0.59)	
Quartile 4 (36–104)	699 (24.3)	3.07 (0.63)	
Working hours per week			0.86
< 45 h	674 (23.4)	2.90 (0.63)	
≥45 to < 50 h	598 (20.8)	2.98 (0.65)	
≥50 to < 55 h	620 (21.6)	3.06 (0.64)	
≥55 to < 60 h	429 (14.9)	3.08 (0.63)	
≥60 to < 65 h	320 (11.1)	3.12 (0.64)	
≥65 to < 70 h	106 (3.7)	3.05 (0.58)	
≥70 to < 80 h	77 (2.7)	3.24 (0.61)	
≥80 h	52 (1.8)	2.93 (0.68)	
Burnout			< 0.001
Yes	386 (13.4)	2.80 (0.70)	
No	2,490 (86.6)	3.05 (0.63)	
Satisfaction			< 0.001
Yes	2,165 (75.3)	3.09 (0.62)	
No	711 (24.7)	2.81 (0.65)	
High stress			< 0.001
Yes	970 (33.7)	2.90 (0.66)	
No	1,906 (66.3)	3.08 (0.63)	
Depressive symptoms			< 0.001
Yes	841 (29.2)	2.85 (0.65)	
No	2,035 (70.8)	3.09 (0.62)	
Thoughts of attrition			0.004
Yes	534 (18.6)	2.95 (0.54)	
No	2,342 (81.4)	3.03 (0.66)	

**Table 2.** Association between grit-S score changes and wellness outcome estimated by mixed-effects logistic regression analysis.

Outcome	AOR (95% CI)	P value
Model 1: Burnout	0.54 (0.45–0.64)	< 0.001
Model 2: Satisfaction	2.09 (1.80–2.43)	< 0.001
Model 3: High stress	0.63 (0.55–0.71)	< 0.001
Model 4: Depressive symptoms	0.54 (0.48–0.62)	< 0.001
Model 5: Thoughts of attrition	0.81 (0.69–0.94)	0.006

Abbreviations: AOR, adjusted odds ratio. The AORs presented in the table correspond to each one-unit increase in the Grit-S score. Models included a random intercept for residency hospital. Models 1–5 adjust for gender, postgraduate year, relationship status, and program size.

However, the association between grit and thoughts of attrition did not remain statistically significant after the Bonferroni correction, different from the prior findings in the United States [5,37]. In Japan, the lack of a significant association between grit and thoughts of leaving residency may be influenced by cultural, systemic, and measurement differences in how residents perceive and express their desire to quit. Research on Japanese resident physicians' intention to leave their positions is limited; however, it appears that PGY5 physicians report a

**Table 3.** Association between grit-S subscale score changes and wellness outcome estimated by mixed-effects logistic regression analysis.

Outcome	Perseverance of effort		Consistency of interest	
	AOR (95% CI)	P value	AOR (95% CI)	P value
Model 1: Burnout	0.62 (0.55–0.71)	< 0.001	0.76 (0.66–0.87)	< 0.001
Model 2: Satisfaction	1.97 (1.76–2.21)	< 0.001	1.23 (1.10–1.38)	< 0.001
Model 3: High stress	0.87 (0.79–0.96)	0.005	0.62 (0.56–0.69)	< 0.001
Model 4: Depressive symptoms	0.64 (0.58–0.71)	< 0.001	0.74 (0.67–0.83)	< 0.001
Model 5: Thoughts of attrition	0.84 (0.75–0.95)	0.004	0.91 (0.81–1.03)	0.157

Abbreviations: AOR, adjusted odds ratio. The AORs presented in the table correspond to each one-unit increase in the Grit-S subscale score. Models included a random intercept for residency hospital. Models 1–5 adjust for gender, post-graduate year, relationship status, and program size.

higher prevalence of wanting to leave compared to PGY1 physicians [38]. Since the content of Japanese PGY3–5 training is broadly comparable to residency training in the United States, it is possible that PGY1–2 physicians in Japan have a lower baseline intention to leave than resident physicians in the United States [24]. This difference may partly reduce the observed association between grit and thoughts of attrition in our cohort.

Most existing studies on grit and burnout among medical residents have been conducted in individualistic cultures, particularly in the United States. In contrast, research from collectivist settings in East Asia remains limited. This gap limits our understanding of whether grit universally contributes to the well-being of resident physicians across various cultural contexts. Previous cross-cultural research indicates that the expression and outcomes of grit may be influenced by cultural values, such as individualism and collectivism [13]. In collectivist societies like Japan and Korea, perseverance may be driven not only by personal goals but also by social expectations and obligations. In contrast, in individualistic cultures, grit is often understood as a result of self-directed passion and persistence for personal objectives [39]. These cultural differences may affect both the structure of grit and its relationship with well-being outcomes [40].

Nevertheless, several smaller-scale studies in East Asia have reported similar protective effects of grit, which is consistent with the findings of our study. A cross-sectional study of 77 psychiatry resident physicians in Korea indicated that psychiatry residents with higher grit scores reported less burnout and better psychological well-being [14]. Additionally, a cross-sectional study of 221 PGY-1 resident physicians at a single institution in Japan indicated that residents with higher grit scores reported lower levels of depression [15]. Our study expands upon this work by demonstrating consistent associations between grit and well-being outcomes across a large, nationally representative sample of Japanese residents.

We also examined the role of grit subscales. Both perseverance of effort and consistency of interests

were positively associated with most wellness outcomes, including lower burnout and depressive symptoms and higher job satisfaction. Although the association between perseverance of effort and high stress did not remain statistically significant after the Bonferroni correction, the association between consistency of interest and high stress remained significant. Residents who can sustain their interest in clinical work may experience greater motivation and a sense of meaning, making daily demands more manageable and reducing perceived stress.

### Strength and limitations

Our study has an important strength: it is the largest nationwide cross-sectional study to evaluate the impact of grit on wellness outcomes among resident physicians in East Asia. However, several limitations should be acknowledged. First, we could not specify the direction of the association between grit and resident wellness due to the cross-sectional design. Second, only half of Japanese resident physicians participated in GM-ITE, and only one-third of those participated in this study, potentially causing selection bias. Participation in GM-ITE is optional in training hospitals, and resident physicians with mood disorders or anxiety disorders may choose hospitals that prioritize work-life balance over educational programs. Third, the timing of the survey administration, which occurred immediately after the GM-ITE, might affect how residents report their wellness. Fourth, mental health outcomes were assessed using brief scales that did not provide formal diagnoses of burnout or depression, and we did not use more comprehensive scales, such as the Maslach Burnout Inventory or the 9-item Patient Health Questionnaire [41,42]. These simplified measures were selected to reduce the burden on resident physicians, as the study was conducted after their examinations. However, the lower sensitivity and specificity of these short forms might not fully capture the actual prevalence of burnout or depression. Fifth, although we used validated instruments for grit and depressive symptoms, several survey items (e.g. single-item well-being measures and thoughts of attrition) were

not developed through a structured survey design process and formally validated. Therefore, we could not confirm the comprehensibility, which may have introduced measurement error. Sixth, we could not evaluate the association between grit and actual attrition. Seventh, the survey asked several questions about the past 12 months, which may have led to recall bias. Lastly, we measured grit using the Japanese version of the Grit-S, a scale originally developed in an individualistic cultural context. Although culturally grounded grit measures have also been developed in collectivist settings (e.g. the Philippines) [43], we used the Japanese Grit-S to facilitate comparability with prior studies. We did not examine whether the Grit-S adequately captures culturally specific (collectivist) forms of grit in Japan.

### **Implications**

Our findings suggest that grit is independently associated with better psychological well-being among medical residents in Japan. This raises the possibility that assessing grit, alongside other indicators, could help residency programs identify residents who benefit from additional support. However, these findings should not be interpreted as placing the responsibility for well-being on individual residents; system-level factors remain central drivers of distress and burnout. Accordingly, grit may be best viewed as an indicator to help programs tailor supportive resources (e.g. mentoring, coaching, and workload adjustments), rather than as a basis of selection or blame.

Although grit-enhancement efforts, such as goal-setting workshops, exist [44–46], they remain limited and show modest results. A recent systematic review showed that interventions designed to improve resilience, grit, and growth-mindset among professional medical students produced moderate gains in resilience but only small improvements in grit [47]. This observation aligns with theories suggesting that grit tends to remain relatively stable in adulthood [45], making it challenging to change through brief programs.

Therefore, we propose a complementary strategy: delivering evidence-based wellness interventions—such as longitudinal mentorship, opt-out confidential counseling, and mindfulness-based stress reduction—to residents with low grit. Mentorship programs during residency training were associated with lower burnout and higher job satisfaction [48,49]. Opt-out mental health appointments increased help-seeking and high levels of satisfaction among resident physicians [50]. Mindfulness-based cognitive training appeared to mitigate stress and enhance executive function in surgery residents [51].

These interventions may help mitigate the effects of low grit. Future studies should evaluate the effectiveness of these interventions for low-grit resident physicians.

### **Conclusion**

In conclusion, higher Grit-S scores were significantly associated with lower odds of burnout, high-stress conditions, job dissatisfaction, and depressive symptoms among 2,876 PGY 1–2 residents across Japan. These findings indicate that grit serves as a protective factor for the well-being of resident physicians from collectivist cultural settings, particularly in East Asia.

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### **Ethical approval**

We obtained ethical approval from the Ethical Review Committee of the Japan Institute for Advancement of Medical Education Program (December 10, 2024, approval no. 24 – 17). This study was conducted in accordance with the Declaration of Helsinki.

### **Author contributions**

Nishizawa had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. Nishizawa, Nagasaki, and Nishizaki: study concept and design. Nishizawa and Nagasaki: manuscript drafting. Nishizawa: statistical analysis. Nishizaki, Shimizu, Yamamoto, and Shikino: critical revision of the manuscript for important intellectual content. Kobayashi and Tokuda: administrative, technical, or material support. Nawa, Akaishi, Fujiwara, Yamawaki, Kobayashi, and Tokuda: supervision.

### **Disclaimers**

None.

### **Previous presentations**

None.

### **Access to data and data sharing**

All authors had full access to all study data. Dr. Nishizawa performed all the analyses. Due to the nature of this research, participants in this study did not agree for their data to be shared publicly, so supporting data is not available.

## Disclosure statement

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## References

1. Eskander J, Rajaguru PP, Greenberg PB. Evaluating wellness interventions for resident physicians: a systematic review. *J Grad Med Educ.* 2021;13(1):58–69. doi: [10.4300/JGME-D-20-00359.1](https://doi.org/10.4300/JGME-D-20-00359.1)
2. Ishak WW, Lederer S, Mandili C, et al. Burnout during residency training: a literature review. *J Grad Med Educ.* 2009;1(2):236–242. doi: [10.4300/JGME-D-09-00054.1](https://doi.org/10.4300/JGME-D-09-00054.1)
3. Duckworth AL, Peterson C, Matthews MD, et al. Grit: perseverance and passion for long-term goals. *J Pers Soc Psychol.* 2007;92(6):1087–1101. doi: [10.1037/0022-3514.92.6.1087](https://doi.org/10.1037/0022-3514.92.6.1087)
4. Lee DH, Reasoner K, Lee D. Grit: what is it and why does it matter in medicine? *Postgrad Med J.* 2023; 99(1172):535–541. doi: [10.1136/postgradmedj-2021-140806](https://doi.org/10.1136/postgradmedj-2021-140806)
5. Hewitt DB, Chung JW, Ellis RJ, et al. National evaluation of surgical resident grit and the association with wellness outcomes. *JAMA Surg.* 2021;156(9): 856–863. doi: [10.1001/jamasurg.2021.2378](https://doi.org/10.1001/jamasurg.2021.2378)
6. Cortez AR, Winer LK, Kassam A-F, et al. Exploring the relationship between burnout and grit during general surgery residency: a longitudinal, single-institution analysis. *Am J Surg.* 2020;219(2):322–327. doi: [10.1016/j.amjsurg.2019.09.041](https://doi.org/10.1016/j.amjsurg.2019.09.041)
7. Dam A, Perera T, Jones M, et al. The relationship between grit, burnout, and well-being in emergency medicine residents. *AEM Educ Train.* 2019;3(1):14–19. doi: [10.1002/aet2.10311](https://doi.org/10.1002/aet2.10311)
8. Shakir HJ, Cappuzzo JM, Shallwani H, et al. Relationship of grit and resilience to burnout among U.S. neurosurgery residents. *World Neurosurg.* 2020; 134: E224–E236. doi: [10.1016/j.wneu.2019.10.043](https://doi.org/10.1016/j.wneu.2019.10.043)
9. Klein AJ, Grau T, Spagnoletti CL, et al. Grit does not predict burnout among first-year internal medicine residents. *South Med J.* 2021;114(5):272–276. doi: [10.14423/SMJ.0000000000001246](https://doi.org/10.14423/SMJ.0000000000001246)
10. Takano Y. *Origins of "Japanese Collectivism".* Cambridge, United Kingdom; New York, NY: Cambridge University Press; 2024. p. 135–179.
11. Kawabata M. Is collectivism good for health promotion? Experiences of day labourers in Japan.

- Glob Health Promot. 2013;20(4):44–51. doi: [10.1177/1757975913503384](https://doi.org/10.1177/1757975913503384)
12. Morell M, Yang JS, Gladstone JR, et al. Grit: the long and short of it. *J Educ Psychol*. 2021;113(5):1038–1058. doi: [10.1037/edu0000594](https://doi.org/10.1037/edu0000594)
  13. Disabato DJ, Goodman FR, Kashdan TB. Is grit relevant to well-being and strengths? Evidence across the globe for separating perseverance of effort and consistency of interests. *J Pers*. 2019;87(2):194–211. doi: [10.1111/jopy.12382](https://doi.org/10.1111/jopy.12382)
  14. Kim D, Jang S-H, Park S-Y. An analysis of the relationship between grit and the psychological well-being of psychiatry residents. *Mood Emot*. 2020;18(3):110–118. doi: [10.35986/me.2020.18.3.110](https://doi.org/10.35986/me.2020.18.3.110)
  15. Akaishi Y, Nawa N, Kashimada A, et al. Association between Grit and depressive symptoms at the timing of job start among medical residents during the COVID-19 pandemic in Japan: a cross-sectional study. *Med Educ Online*. 2023;28(1):2225886. doi: [10.1080/10872981.2023.2225886](https://doi.org/10.1080/10872981.2023.2225886)
  16. Nishizawa T, Nawa N, Akaishi Y, et al. Association between grit at the start of residency and depressive symptoms at the end of residency among post-graduate year 1 medical residents in Japan: a longitudinal study. *BMC Med Educ*. 2025;25(1):1086. doi: [10.1186/s12909-025-07651-4](https://doi.org/10.1186/s12909-025-07651-4)
  17. Littlewood W. Defining and developing autonomy in East Asian contexts. *Appl Linguist*. 1999;20(1):71–94. doi: [10.1093/applin/20.1.71](https://doi.org/10.1093/applin/20.1.71)
  18. Suzuki Y, Tamesue D, Asahi K, et al. Grit and work engagement: a cross-sectional study. *PLoS One*. 2015;10(9): E 0137501. doi: [10.1371/journal.pone.0137501](https://doi.org/10.1371/journal.pone.0137501)
  19. Oyserman D, Coon HM, Kimmelmeier M. Rethinking individualism and collectivism: evaluation of theoretical assumptions and meta-analyses. *Psychol Bull*. 2002;128(1):3–72. doi: [10.1037/0033-2909.128.1.3](https://doi.org/10.1037/0033-2909.128.1.3)
  20. Sugimura K, Mizokami S. Personal identity in Japan. *New Dir Child Adolesc Dev*. 2012;2012(138):123–143. doi: [10.1002/cad.20025](https://doi.org/10.1002/cad.20025)
  21. Nishizawa T, Ishizuka K, Miyagami T, et al. Five strategies for efficient and effective training of Japanese resident physicians under the Japanese work style reform. *Adv Med Educ Pract*. 2025;16:577–581. doi: [10.2147/AMEP.S511015](https://doi.org/10.2147/AMEP.S511015)
  22. Nagasaki K, Nishizaki Y, Shimizu T, et al. Educational environment changes toward resident duty hour restrictions in Japan. *Sci Rep*. 2025;15(1):16925. doi: [10.1038/s41598-025-00347-1](https://doi.org/10.1038/s41598-025-00347-1)
  23. Nishigori H. Medical education in Japan. *Med Teach*. 2024;46(sup1):S4–S10. doi: [10.1080/0142159X.2024.2372108](https://doi.org/10.1080/0142159X.2024.2372108)
  24. Heist BS, Torok HM. Contrasting residency training in Japan and the United States from perspectives of Japanese physicians trained in both systems. *J Grad Med Educ*. 2019;11(4 Suppl):125–133. doi: [10.4300/JGME-D-18-01046](https://doi.org/10.4300/JGME-D-18-01046)
  25. Shikino K, Sekine M, Nishizaki Y, et al. Distribution of internal medicine rotations among resident physicians in Japan: a nationwide, multicenter, cross-sectional study. *BMC Med Educ*. 2024;24(1):316. doi: [10.1186/s12909-024-05314-4](https://doi.org/10.1186/s12909-024-05314-4)
  26. Nishikawa K, Okugami S, Amemiya T. Development of the Japanese short grit scale (Grit-S). *Jpn J Pers*. 2015;24(2):167–169. doi: [10.2132/personality.24.167](https://doi.org/10.2132/personality.24.167)
  27. Duckworth AL, Quinn PD. Development and validation of the short grit scale (Grit-S). *J Pers Assess*. 2009;91(2):166–174. doi: [10.1080/00223890802634290](https://doi.org/10.1080/00223890802634290)
  28. Kroenke K, Spitzer RL, Williams JBW. The patient health questionnaire-2. *Med Care*. 2003;41(11):1284–1292. doi: [10.1097/01.MLR.0000093487.78664.3C](https://doi.org/10.1097/01.MLR.0000093487.78664.3C)
  29. Nagasaki K, Shikino K, Nishimura Y, et al. Translation, cultural adaptation, and validation of the mini-Z 2.0 survey among Japanese physicians and residents. *Intern Med*. 2021;60(15):2405–2411. doi: [10.2169/internalmedicine.6749-20](https://doi.org/10.2169/internalmedicine.6749-20)
  30. Rohland BM, Kruse GR, Rohrer JE. Validation of a single-item measure of burnout against the Maslach Burnout Inventory among physicians. *Stress and Health*. 2004;20(2):75–79. doi: [10.1002/smi.1002](https://doi.org/10.1002/smi.1002)
  31. Knox M, Willard-Grace R, Huang B, et al. Maslach Burnout inventory and a self-defined, single-item burnout measure produce different clinician and staff burnout estimates. *J Gen Intern Med*. 2018;33(8):1344–1351. doi: [10.1007/s11606-018-4507-6](https://doi.org/10.1007/s11606-018-4507-6)
  32. Whooley MA, Avins AL, Miranda J, et al. Case-finding instruments for depression. *J Gen Intern Med*. 1997;12(7):439–445. doi: [10.1046/j.1525-1497.1997.00076.x](https://doi.org/10.1046/j.1525-1497.1997.00076.x)
  33. Manea L, Gilbody S, Hewitt C, et al. Identifying depression with the PHQ-2: a diagnostic meta-analysis. *J Affect Disord*. 2016;203:382–395. doi: [10.1016/j.jad.2016.06.003](https://doi.org/10.1016/j.jad.2016.06.003)
  34. Muramatsu K, Kamijima K, Yoshida M, et al. The patient health questionnaire, japanese version: validity according to the mini-international neuropsychiatric interview-plus. *Psychol Rep*. 2007;101(3 Pt 1):952–960. doi: [10.2466/pr0.101.3.952-960](https://doi.org/10.2466/pr0.101.3.952-960)
  35. Lee DH, Reasoner K, Lee D, et al. Is grit associated with burnout and well-being in orthopaedic resident and faculty physicians? a multi-institution longitudinal study across training levels. *Clin Orthop Relat Res*. 2021;479(12):2576–2586. doi: [10.1097/CORR.0000000000001987](https://doi.org/10.1097/CORR.0000000000001987)
  36. Brateanu A, Switzer B, Scott SC, et al. Higher grit scores associated with less burnout in a cohort of internal medicine residents. *Am J Med Sci*. 2020;360(4):357–362. doi: [10.1016/j.amjms.2020.05.045](https://doi.org/10.1016/j.amjms.2020.05.045)
  37. Salles A, Lin D, Liebert C, et al. Grit as a predictor of risk of attrition in surgical residency. *Am J Surg*. 2017;213(2):288–291. doi: [10.1016/j.amjsurg.2016.10.012](https://doi.org/10.1016/j.amjsurg.2016.10.012)
  38. Morita T, Muroya S, Takahashi O, et al. Factors associated with intention to resign among medical residents during the COVID-19 pandemic in Japan: a cross-sectional study. *JMA J*. 2023;6(3):292–299. doi: [10.31662/jmaj.2023-0004](https://doi.org/10.31662/jmaj.2023-0004)
  39. Datu JAD, Yuen M, Chen G. Grit and determination: a review of literature with implications for theory and research. *J Psychol Couns Sch*. 2017;27(2):168–176. doi: [10.1017/jgc.2016.2](https://doi.org/10.1017/jgc.2016.2)
  40. Datu JAD, Valdez JPM, King RB. Perseverance counts but consistency does not! Validating the short grit scale in a collectivist setting. *Curr Psychol*. 2016;35(1):121–130. doi: [10.1007/s12144-015-9374-2](https://doi.org/10.1007/s12144-015-9374-2)
  41. Maslach C, Jackson SE. The measurement of experienced burnout. *J Organ Behavior*. 1981;2(2):99–113. doi: [10.1002/job.4030020205](https://doi.org/10.1002/job.4030020205)
  42. Kroenke K, Spitzer RL, Williams JBW. The PHQ-9. *J Gen Intern Med*. 2001;16(9):606–613. doi: [10.1046/j.1525-1497.2001.016009606.x](https://doi.org/10.1046/j.1525-1497.2001.016009606.x)
  43. Datu JAD, Yuen M, Chen G. Development and validation of the Triarchic Model of Grit Scale (TMGS):

- evidence from Filipino undergraduate students. *Pers Individ Dif*. 2017;114:198–205. doi: [10.1016/j.paid.2017.04.012](https://doi.org/10.1016/j.paid.2017.04.012)
44. Park D, Tsukayama E, Yu A, et al. The development of grit and growth mindset during adolescence. *J Exp Child Psychol*. 2020;198:104889. doi: [10.1016/j.jecp.2020.104889](https://doi.org/10.1016/j.jecp.2020.104889)
  45. Tang X, Wang M-T, Parada F, et al. Putting the goal back into grit: academic goal commitment, grit, and academic achievement. *J Youth Adolesc*. 2021;50(3):470–484. doi: [10.1007/s10964-020-01348-1](https://doi.org/10.1007/s10964-020-01348-1)
  46. Mirza TI, Yasmeen R, Mahboob U. Nurturing grit among medical students. *Pak J Med Sci*. 2021;37(2):531–535. doi: [10.12669/pjms.37.2.2999](https://doi.org/10.12669/pjms.37.2.2999)
  47. Calo M, Judd B, Peiris C. Grit, resilience and growth-mindset interventions in health professional students: a systematic review and meta-analysis. *Med Educ*. 2024;58(8):902–919. doi: [10.1111/medu.15391](https://doi.org/10.1111/medu.15391)
  48. Joe MB, Cusano A, Leckie J, et al. Mentorship programs in residency: a scoping review. *J Grad Med Educ*. 2023;15(2):190–200. doi: [10.4300/JGME-D-22-00415.1](https://doi.org/10.4300/JGME-D-22-00415.1)
  49. Gaeta ED, Gilbert M, Johns A, et al. Effects of mentorship on surgery residents' burnout and well-being: a scoping review. *J Surg Educ*. 2024;81(11):1592–1601. doi: [10.1016/j.jsurg.2024.08.001](https://doi.org/10.1016/j.jsurg.2024.08.001)
  50. Kevern T, Davies DR, Stiel K, et al. Impact of opt-out therapy appointments on resident physicians' mental health, well-being, stigma, and willingness to engage. *J Grad Med Educ*. 2023;15(6):734–737. doi: [10.4300/JGME-D-22-00898.1](https://doi.org/10.4300/JGME-D-22-00898.1)
  51. Lebares CC, Guvva EV, Olaru M, et al. Efficacy of mindfulness-based cognitive training in surgery. *JAMA Netw Open*. 2019;2(5):E194108. doi: [10.1001/jamanetworkopen.2019.4108](https://doi.org/10.1001/jamanetworkopen.2019.4108)