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Work-life conflict, gender-based discrimination, and their associations among professionals in a medical university and affiliated hospitals in Japan : A cross-sectional study

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Abstract

Objectives : To clarify (1) the prevalence and associating factors of work-life conflict (WLC) ; (2) the details of gender-based discrimination ; and (3) the association between WLC and gender-based discrimination among various professionals in a medical university organization.

Methods : This cross-sectional study, conducted in 2017, included all employees working at a public medical university and two affiliated hospitals that lie in provincial cities in Japan. The outcome of interest was time-based WLC in the work-to-family or family-to-work direction, measured with a shortened version of an existing scale. Gender-based discrimination was measured according to a three-point scale.

Results : Among the 3,347 employees, complete data sets were available for 2,285 (complete response rate, 68.3%). Of these, approximately 30% of respondents had perceived WLC. Multivariable logistic regression analysis showed that faculty members, nurses, and employees between 30 and 39 years old had a greater risk of WLC regardless of gender. Men were more likely to perceive gender-based discrimination in the contents of their work and the number of incidental tasks, while women were more likely to perceive discrimination with promotions and evaluation of academic achievements. Both men and women respondents who perceived gender-based discrimination had an increased risk of WLC.

Conclusions : When promoting organizational well-being in a medical university, increased attention should be paid to faculty members, nurses and employees between 30 and 39 years old, as they have a greater risk of WLC. Our results also suggest that promoting gender equality is important to help achieve appropriate work-life balance.

Key words : academic faculty, gender equality, work-life balance, nurses, organizational effort

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Introduction

With the continuous increase of women, dual-earner couples, and single parents in the workforce, an imbalance in work responsibilities and family roles (work-life conflict [WLC]) has become a growing challenge for modern society[1]. WLC is known to be associated with a number of negative consequences including burnout[2,3], depression[4], and career dissatisfaction[2]. The European Agency for Safety and Health at Work Research has recently classified WLC as one of the most emerging psychosocial risk factors in the workplace[5].

WLC may even be a more relevant issue for healthcare professionals, because they tend to work for substantially longer hours than most workers in other fields[6]. According to health data from the Organization for Economic Cooperation and Development (OECD), Japan has had fewer physicians per capita (2.4 practicing physicians per 1,000 inhabitants in 2017) than most other OECD countries (an average of 3.4 practicing physicians per 1,000 inhabitants in 2017)[7]. Consequently, many healthcare professionals are chronically exposed to a heavy workload. Excessive working hours by physicians and nurses have shown to be associated with an increased risk of medical errors[8-10], emotional exhaustion[6], and reason for a higher employment turnover rate[11,12], all of which adversely affects the quality of healthcare delivery. Therefore, we need to advance our understanding of WLC among medical professionals, especially in the context of Japan.

Although previous studies have focused on WLC in faculty members[2], physicians[3,6] and nurses[12], there is a paucity of studies that intercompare the prevalence of WLC among all professionals working in medical institutions. In medical universities and affiliated hospitals, a variety of workers, including members of the academic faculty, practicing physicians, nurses, technicians, therapists and clerks, are working together on a regular basis. Such interdisciplinary collaboration of healthcare workers is an indispensable part of modern medical practice[13]. Since work-life patterns are known to affect teamwork and safety climates in the workplace[14], the enhancement of organizational well-being is extremely important to improve the effectiveness and quality of healthcare delivery[15]. In order to promote organizational work and life integration, we need to understand which type of professionals have a greater risk of WLC.

Over recent years, there has also been increasing discussion of gender bias and discrimination in the medical field. Studies from Japan[15-17] and other countries[18-20] have demonstrated that gender-based discrimination is commonly prevalent, especially among female physicians. However, little is known regarding the associations between gender-based discrimination and WLC. We also need to clarify the contents of gender-based discrimination to promote gender equality in a medical university organization.

In this study, we therefore aimed to clarify (1) the prevalence and associating factors of WLC ; (2) the details of gender-based discrimination ; and (3) the association between WLC and gender-based discrimination among various professionals in medical universities and affiliated hospitals.

Methods

Study design, setting, subjects, and data source

This was a cross-sectional study conducted at Fukushima Medical University and two university hospitals, one with 778 hospital beds, and the other with 226. The university is one of 50 public medical universities in Japan that lies in a provincial city. The study participants were all employees of the university and affiliated hospitals, including faculty members, practicing physicians, nurses, and other healthcare professionals and clerks. As in most Japanese medical universities, many faculty members in our study population were not only involved in research and education, but also in clinical activities. Practicing physicians were doctors without faculty positions, including senior and junior residents and clinical fellows. Most of their time was spent on clinical activities. Other healthcare professionals included laboratory and radiological technicians, pharmacists, clinical technologists, physical therapists, and occupational therapists.

To promote the equality of career development and to help achieve appropriate work-life balance (WLB), the Office for Gender Equality Support at our university has launched a couple of activities, including support for researchers with important life events, such as child birth and child rearing, and initiation of nursery and consulting services in 2014. As part of this project, surveys regarding perceived WLC and gender-based discrimination among all employees in university organizations have been conducted. After approval by the institutional review board of Fukushima Medical University (application no. 3007), we analyzed data from the latest survey that was conducted in August 2017. The

aims of the survey were explained as a note on the first part of the questionnaire. By responding to the survey, participants were considered to have consented to participation.

Questionnaire development

When developing the questionnaire, we referred to relevant articles for the measurement of WLC[21-24]. We also referred to online reports from the National Women's Education Center of Japan[25] and another Japanese university[26] that similarly assessed gender equality or WLB. We then circulated drafts among the survey team members consisting of practicing physicians, physician scientists, a clerk, and a nurse. After minor modification, the questionnaire was finalized in July 2017.

Survey protocol and items

First, to have an accurate number of employees working at the university and affiliated hospitals, we officially contacted the human resources department and the general affairs department of each facility by letter. Self-administered anonymous questionnaires were then sent to all directors of each department on August 3, 2017. Directors were asked to distribute and collect the surveys from their colleagues before August 15, 2017. Opaque envelopes were used when collecting the completed questionnaires. Because the response rate was quite satisfactory (see Results section), no non-response follow-up techniques such as repeat mailing, phone calls, or reminder letters were used.

The survey requested participants' demographic data, including sex, age, work place, and job type. The study participants were also asked about perceived WLC and gender-based discrimination. We were aware that several previous research articles distinguished between three forms of WLC (time-based, strain-based, and behavior-based)[21,22] in two causal directions (work-to-family and family-to-work)[21,23,24]. However, because healthcare professionals are busy and likely to have limited time to complete lengthy questionnaires[27], we decided to focus on time-based WLC. Most recent studies[28-31] also employed a similar survey strategy and measurement. WLC was assessed by a single question : "How difficult do you find it to achieve your ideal WLB?" Response choices included : "I find it very difficult because I have to miss work activities due to the amount of time I must spend on family responsibilities" ; "I find it somewhat difficult because the time I spend on family responsibilities often interferes with my work responsibilities" ; "I achieve an almost ideal WLB" ; "I find it somewhat difficult because my work often keeps me from my family activities" ; and "I find it very difficult because I have to miss family activities due to the amount of time I must spend on work responsibilities". These response choices were adopted based on the items of the Work Family Conflict Scale[21]. We translated the items into Japanese and used them with minor modifications. The study participants were also queried regarding what is needed to realize an ideal WLB. Response options included : decrease workload ; decrease worktime ; improve the mood or environment of the workplace ; ease of taking childcare or nursing leave ; and facilitating consultation services.

To measure whether the responders have felt gender-based discrimination at their current workplace, three-point scales were employed (1 = none, 2 = somewhat, 3 = strongly). We further asked respondents who had chosen "strongly" or "somewhat" in what area they had felt gender-based discrimination. Response choices included : contents of the work, the number of incidental tasks, promotions, training opportunities, transfer or assigned destination, and evaluation of academic achievement.

Outcome measures and statistical analysis

The outcomes of interest in this study were time-based WLC in the work-to-family or family-to-work direction. The two responses "I find it very difficult because I have to miss family activities due to the amount of time I must spend on work responsibilities (work-to-family conflict[21])" or "I find it very difficult because I have to miss work activities due to the amount of time I must spend on family responsibilities (family-to-work conflict[21])" were considered to indicate WLC. As conflict in both directions can adversely affect work-life integration, job satisfaction, and physical and mental well-being[2-6], we decided to combine these two responses.

WLB was defined in terms of agreement with the remaining three responses : "I find it somewhat difficult because the time I spend on family responsibilities often interferes with my work responsibilities" ; "I achieve an almost ideal WLB" ; and "I find it somewhat difficult because my work often keeps me from my family activities." This definition was adopted because we wanted to clarify the characteristics of respondents who found work-life integration "very difficult." To help improve work-life integration at our organization, we first needed to focus on those employees at very high risk of

WLC. All survey items were initially evaluated with descriptive statistics. To determine the factors associated with WLC, characteristic differences between those who had WLC (the WLC group) and those who had achieved WLB (the WLB group) were compared. Differences in categorical variables were assessed by a chi-squared test followed by residual analysis. Univariable and multivariable logistic regression models were established to produce a crude and adjusted odds ratio (AOR) for WLC. After stratification by gender, imbalanced characteristics between the WLB and WLC groups (variables with $P < 0.05$ in Table 1, see the Results section), such as age and job were included as independent variables in the logistic regressions. Responders' workplace was also considered as a potential confounder because flexibility and atmosphere of the workplace was known to be associated with WLC[32].

Finally, we explored the association between the experience of WLC and gender-based discrimination using univariable and multivariable logistic regression analyses. The answers "strongly" and "somewhat" were assumed to indicate feelings of gender-based discrimination. Association between the experience of gender-based discrimination and WLC was controlled for responders' workplace, age and job.

In all multivariable analyses, a variance inflation factor was used to detect multicollinearity. The models' goodness of fit and discrimination ability were confirmed with the Hosmer-Lemeshow test and the *c* statistic, respectively. Because less than 6% of data points were missing for all analyses, missing observations were excluded and complete data sets were used for all relevant analyses. All statistical analyses were performed with SPSS Statistics for Windows, version 22.0 (IBM Corp., Armonk, NY, USA). A P value < 0.05 was considered statistically significant.

Results

Response rate

Of the 3,347 employees working at the university and affiliated hospitals, 2,464 returned a completed questionnaire (response rate, 73.6%). Of those respondents, complete data were available for 2,285 (complete response rate, 68.3%) and were included in all relevant analyses.

Proportion of work-life conflict

Figure 1 shows the proportion of WLC among the 2,285 (736 men and 1,549 women) respondents. According to our operational definition, approximately 30% of respondents had WLC. The percentage of WLC in the family-to-work direction was low. The distribution of WLC was not significantly different between men and women.

Most of the respondents regarded "decrease workload" (male : 75.9% ; female : 78.6%), "improve the mood or environment of the workplace" (male : 59.3% ; female : 64.6%) and "decrease work time" (male : 43.7% ; female : 48.4%) as important measures to achieve an ideal WLB.

Characteristic differences among respondents by work-life conflict

Table 1 compares the demographic characteristics of respondents according to their perceived WLC. Respondents aged ≤ 29 or ≥ 60 were less likely to feel WLC regardless of sex. We also found that clerks (a non-medical profession) were also less likely to feel WLC. In contrast, both men and women aged 30 to 39 were most likely to have perceived WLC. WLC was also positively related with being a part of the academic faculty and being a nurse, whether male or female. Practicing physicians, especially females, had a relatively lower risk of WLC than other professionals. We also noted that female respondents who were working in a main university hospital were more likely to have felt WLC.

Associating factors of work-life conflict

Table 2 shows the associating factors of WLC. After adjusting for potential confounders, factors independently associated with the perception of WLC were : being an academic faculty member [male : AOR, 3.58 ; 95% confidence interval (CI), 1.82-7.03 ; female : AOR, 6.04 ; 95% CI, 3.28-11.15], and being a nurse (male : AOR, 2.45 ; 95% CI, 1.26-4.79 ; female : AOR, 3.92 95% CI, 2.62-5.88). Negative association between WLC and being aged ≤ 29 years (male : AOR, 0.50 ; 95% CI, 0.30-0.82 ; female : AOR, 0.55 ; 95% CI, 0.40-0.76) also persisted in the multivariable analysis. Associations between WLC and being aged ≥ 60 years (AOR, 0.24 ; 95% CI, 0.11-0.51) in men, and the relation between WLC and being a healthcare professional other than a nurse or physician (AOR, 2.08 ; 95% CI, 1.22-3.55) in women also remained to be significant. Working at two university-affiliated hospitals was independently associated with WLC in females (main hospital with 778 hospital beds : AOR, 2.18 ; 95% CI, 1.35-3.50 ; branch

Table 1. Characteristic differences among employees in a medical university and affiliated hospitals according to work–life conflict.

	Male				Female			
	All (n = 736)	WLB (n = 496)	WLC† (n = 240)	P	All (n = 1,549)	WLB (n = 1,101)	WLC† (n = 448)	P
Age				< 0.001				< 0.001
≤ 29	144	110 (76.4)**	34 (23.6)*		413	315 (76.3)**	98 (23.7)*	
30–39	215	122 (56.7)*	93 (43.3)**		400	264 (66.0)*	136 (34.0)**	
40–49	165	103 (62.4)	62 (37.6)		429	298 (69.5)	131 (30.5)	
50–59	139	98 (70.5)	41 (29.5)		260	177 (68.1)	83 (31.9)	
≥ 60	73	63 (86.3)**	10 (13.7)*		47	47 (100)**	0 (0)*	
Job				< 0.001				< 0.001
Academic faculty‡	334	200 (59.9)*	134 (40.1)**		118	74 (62.7)*	44 (37.3)**	
Practicing physician§	83	62 (74.7)	21 (25.3)		217	194 (89.4)**	23 (10.6)*	
Nurse	63	35 (55.6)*	28 (44.4)**		805	492 (61.1)*	313 (38.9)**	
Other health care professionals¶	114	86 (75.4)**	28 (24.6)*		158	123 (77.8)**	35 (22.2)*	
Clerk	142	113 (79.6)**	29 (20.4)*		251	218 (86.9)**	33 (13.1)*	
Workplace				0.193				< 0.001
Medical University	358	232 (64.8)	126 (35.2)		315	262 (83.2)**	53 (16.8)*	
University hospital with 778 hospital beds	314	223 (71.0)	91 (29.0)		1,030	700 (68.0)*	330 (32.0)**	
University hospital with 226 hospital beds	64	41 (64.1)	23 (35.9)		204	139 (68.1)	65 (31.9)	

†WLC was surveyed with a question : "How difficult do you find it to achieve your ideal work–life balance (WLB)?" The answers "I find it very difficult because I have to miss family activities due to the amount of time I must spend on work responsibilities (work-to-family direction)" or "I find it very difficult because I have to miss work activities due to the amount of time I must spend on family responsibilities (family-to-work direction)" were defined as having perceived WLC.

‡As in most Japanese medical universities, many academic faculty members in this study population were not only involved in research and education, but also in clinical activities.

§Practicing physicians were doctors who did not have faculty positions, including senior and junior residents, and clinical fellows.

¶Other health care professionals included laboratory and radiological technicians, pharmacists, clinical technologists, physical therapists, and occupational therapists.

** Adjusted standardized residual > 1.96, *adjusted standardized residual < −1.96.

WLB, work-life balance ; WLC, work-life conflict.

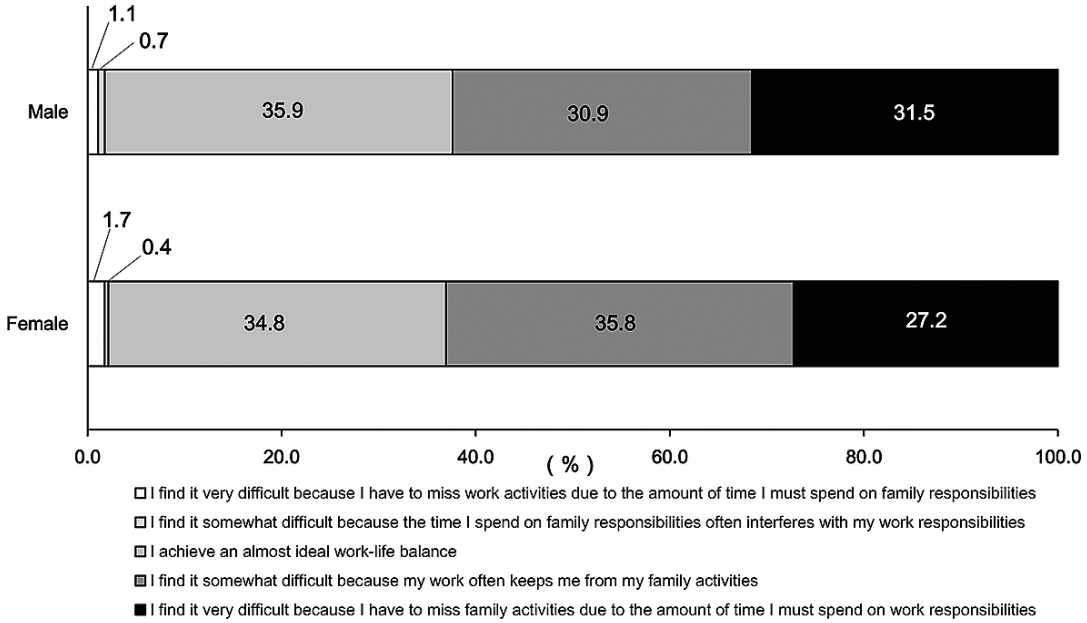

Fig. 1. Work-life balance and work-life conflict among employees in a medical university and affiliated hospitals
Based on the replies of 2,285 (male 736 and female 1,549) of the 3,347 employees queried.

hospital with 226 beds : AOR, 1.74 ; 95% CI, 1.01-2.97), and working at a branch hospital with 226 beds was independently associated with WLC in males (AOR, 2.04 ; 95% CI, 1.02-4.06).

Association between the work-life conflict and gender-based discrimination

Among the 2,285 respondents, 573 (25.1%) had felt gender-based discrimination at their current workplace. Male respondents were more likely to have perceived gender-based discrimination compared with female respondents (males 29.8% vs. females 22.8%, chi-squared, 12.65 ; OR 1.43, 95% CI, 1.17-1.74).

As shown in Figure 2, of the 573 respondents who had perceived gender-based discrimination, men were more likely to have perceived this in the contents of their work (males 58.0% vs. females 45.5% ; chi-squared, 8.47 ; OR, 1.66 ; 95% CI, 1.18-2.33) and the number of incidental tasks (males 46.1% vs. females 36.2% ; chi-squared, 5.60 ; OR, 1.51 ; 95% CI, 1.07-2.13) than women, but less likely to have perceived it in promotions (males 13.2% vs. females 20.9% ; chi-squared, 5.39 ; OR, 0.58 ; 95% CI, 0.36-0.92) and evaluation of academic achievement (males 7.8% vs. females 16.9% ; chi-squared, 9.82 ; OR, 0.41 ; 95% CI, 0.23-0.73) than women.

As shown in Table 3, there was a significant association between the experience of WLC and gender-based discrimination regardless of sex in multivariable analyses (males : AOR, 2.00 ; 95% CI, 1.42-2.82 ; females : AOR, 1.45 ; 95% CI, 1.11-1.91).

Discussion

This cross-sectional study revealed that WLC was a pervasive problem among employees in a Japanese public medical university and affiliated hospitals. Of those, faculty members, nurses, and respondents aged between 30 and 39 were at greater risk of WLC. The perception of gender-based discrimination was also common among our study population, and was associated with the perception of WLC. Men were more likely to have felt gender-based discrimination, especially in the contents of their work and the number of incidental tasks than women, while women were more likely to have felt it in promotions and evaluation of academic achievement.

In this study, approximately 30% of professionals in a medical university and affiliated hospitals reported WLC. Most of this WLC was in the work-to-family direction ; family-to-work conflict was rare. The reported prevalence of WLC among our study participants was consistent with several previous studies. For example, in a national study including a large sample of US physicians, Shanafelt *et al.*[6] reported that 36.9% of physicians had WLC. Similarly, in a survey of 330 academic faculty members at a Japanese medical university, Chatani *et al.*[2]

Table 2. Factors associated with work-life conflict among employees in a medical university and affiliated hospitals.

Characteristics	Male				Female			
	Univariable analysis		Multivariable analysis[†]		Univariable analysis		Multivariable analysis[‡]	
	OR (95% CI)	*P*	AOR (95% CI)	*P*	OR (95% CI)	*P*	AOR (95% CI)	*P*
Age								
≤ 29	0.41 (0.25-0.65)	< 0.001	0.50 (0.30-0.82)	0.006	0.60 (0.44-0.82)	0.001	0.55 (0.40-0.76)	< 0.001
30-39	1 (Reference)		1 (Reference)		1 (Reference)		1 (Reference)	
40-49	0.79 (0.52-1.20)	0.264	0.77 (0.50-1.19)	0.059	0.85 (0.64-1.14)	0.286	0.95 (0.70-1.29)	0.736
50-59	0.55 (0.35-0.86)	0.010	0.64 (0.40-1.02)	0.247	0.91 (0.65-1.27)	0.580	1.12 (0.79-1.59)	0.535
≥ 60[§]	0.21 (0.10-0.43)	< 0.001	0.24 (0.11-0.51)	< 0.001	-	-	-	-
Job								
Academic faculty[¶]	2.61 (1.64-4.15)	< 0.001	3.58 (1.82-7.03)	< 0.001	3.93 (2.33-6.63)	< 0.001	6.04 (3.28-11.15)	< 0.001
Practicing physician[††]	1.32 (0.70-2.51)	0.396	1.75 (0.87-3.51)	0.117	0.78 (0.44-1.38)	0.398	0.99 (0.55-1.77)	0.966
Nurse	3.12 (1.64-5.93)	0.001	2.45 (1.26-4.79)	0.009	4.20 (2.84-6.22)	< 0.001	3.92 (2.62-5.88)	< 0.001
Other health care professionals[‡‡]	1.27 (0.70-2.29)	0.429	1.30 (0.71-2.38)	0.403	1.88 (1.11-3.18)	0.018	2.08 (1.22-3.55)	0.007
Clerk	1 (Reference)		1 (Reference)		1 (Reference)		1 (Reference)	
Workplace								
Medical University	1 (Reference)		1 (Reference)		1 (Reference)		1 (Reference)	
University hospital with 778 hospital beds	0.75 (0.54-1.04)	0.086	1.74 (0.99-3.06)	0.055	2.33 (1.69-3.22)	< 0.001	2.18 (1.35-3.50)	0.001
University hospital with 226 hospital beds	1.03 (0.59-1.80)	0.91	2.04 (1.02-4.06)	0.043	2.31 (1.52-3.51)	< 0.001	1.74 (1.01-2.97)	0.045

The definition of WLC is the same as Table 1.

[†]Adjustment for all variables are included in the table. Good fit was verified by the Hosmer-Lemeshow test ($P = 0.256$). The *c* statistic for the model was 0.65 (95% CI, 0.61-0.69).

[‡]Adjustment for all variables are included in the table. Good fit was verified by the Hosmer-Lemeshow test ($P = 0.710$). The *c* statistic for the model was 0.70 (95% CI, 0.67-0.73).

[§]There were no female respondents aged 60 or above that had WLC.

[¶]As in most Japanese medical universities, many academic faculty members in this study population were not only involved in research and education, but also in clinical activities.

[††]Practicing physicians were doctors who did not have faculty positions, including senior and junior residents, and clinical fellows.

[‡‡]Other health care professionals included laboratory and radiological technicians, pharmacists, clinical technologists, physical therapists, and occupational therapists.

AOR, adjusted odds ratio ; CI, confidence interval, OR, odds ratio ; Work-life conflict, WLC.

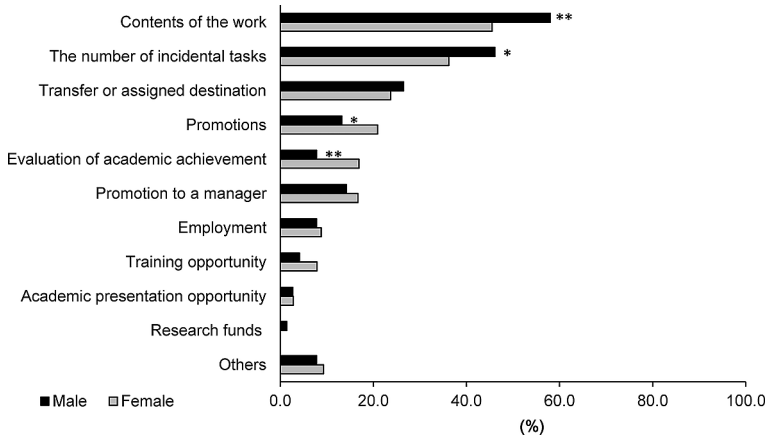

Fig. 2. The contents of perceived gender-based discrimination was different between male and female respondents. Three-point scales were used (1 = strongly, 2 = somewhat, 3 = none) to measure whether the respondents had perceived gender-based discrimination. The answers "strongly" and "somewhat" were defined as perceived gender-based discrimination. The proportion (%) among respondents that had felt gender-based discrimination (573 of 2,285 ; 219 men and 354 women) in their current workplace were shown. Respondents were allowed to choose a maximum of three items. $^{**}p < 0.01$, $^{*}p < 0.05$ by a chi-squared test.

reported that priority gaps between work and individual life were common and associated with burnout. Among nurses, the prevalence of WLC ranged from one-third to over 50%[28-34]. Taken together, these data suggest WLC is a relevant issue in medical institutions. WLC among healthcare professionals is also known to be associated with negative consequences such as an increased risk of medical errors[8-10] and burnout[9]. To improve the quality of healthcare delivery, organizational efforts to reduce WLC are necessary, along with a political commitment. Recently, the Japanese Ministry of Health, Labour and Welfare drafted a plan for work-style reform for physicians that includes limiting overtime hours, promoting task shifting and team medical care, and support for female physicians[35]. Similarly, the Japanese Nursing Association has recently published a guideline for promoting WLB among nurses[36].

At our study sites, faculty members and nurses were more likely to feel WLC than other employees in the medical university and affiliated hospitals. There are several plausible reasons for these observed findings. In Japan, obtaining academic positions related to medicine is known to be highly competitive and the work required to retain such a position is known to be demanding[2]. Obtaining a tenure position is getting even more difficult for young Japanese researchers[37]. Furthermore, many faculty members in medical universities are expected to have multifaceted roles encompassing scientific research, teaching, and clinical service. Academic faculty members of our study population may therefore tend to have difficulty balancing work and private life. A high prevalence of perceived WLC among academic faculty members was consistent with a report by Chatani *et al.*[2] As for nurses, they are representative of shift workers. Shift work, especially rotating shifts, can disrupt workers' circadian rhythms, resulting in sleep disturbances and private life interference[38]. Previous studies have shown that increased proportion of evening shifts[28,33], weekend work[29], and quick returns[39] were associated with an increased risk of WLC. Therefore, nurses may be at greater risk of WLC than other healthcare workers. In this study, we also observed that practicing physicians had a relatively lower risk of WLC than other professionals. Physicians have high skill discretion and decision authority, which are known to reduce job demands and emotional exhaustion, and positively affect job satisfaction[40,41]. Physicians may therefore have a reduced risk of WLC compared with other professionals. We believe that by recognizing such occupation-specific issues, concerted organizational efforts concerning all professionals are needed to find collaborative ways for better WLB.

Turning to workers' age, those aged between 30 and 39 were at greater risk of WLC. Responsibility in the workplace can increase in one's thirties both for hospital workers and faculty members. For example, physicians, nurses, and other healthcare professionals are more likely to be assigned to difficult tasks or complicated patients. They are also likely to educate and supervise many trainees and students at this age. Men and women in their thir-

Table 3. The binary logistic regression model for associations between perceived gender-based discrimination and work-life conflict.

	Male (n = 736)					Female (n = 1549)				
		Univariable analysis		Multivariable analysis†			Univariable analysis		Multivariable analysis†	
Perception of Gender-Based Discrimination	N (%)	OR (95% CI)	P	AOR (95% CI)	P	N (%)	OR (95% CI)	P	AOR (95% CI)	P
"strongly" and "somewhat"	219 (29.8)	2.14 (1.54–2.97)	< 0.001	2.00 (1.42–2.82)‡	< 0.001	354 (22.9)	1.36 (1.05–1.75)	0.019	1.45 (1.11–1.91)§	0.008
"none"	517 (70.2)	1 (Reference)		1 (Reference)		1,195 (77.1)	1 (Reference)		1 (Reference)	

The definition of WLC is the same as Table 1.
To measure whether the respondents have felt gender-based discrimination, three-point scales were employed (1 = none, 2 = somewhat, 3 = strongly). In the primary analysis, the answers "strongly" and "somewhat" were assumed to indicate felt gender-based discrimination. In the subanalysis, the "somewhat" responses were excluded and the "strongly" responses were retained as an indicator of perceived gender-based discrimination.
†Logistic regression analysis was used. The association between perception of gender-based discrimination and WLC was controlled for workplace, and responders' age and job.
‡the Hosmer–Lemeshow test, P = 0.456. The c statistic, 0.68 (95% CI, 0.64–0.72).
§the Hosmer–Lemeshow test, P = 0.955. The c statistic, 0.71 (95% CI, 0.68–0.73).
AOR, adjusted odds ratio ; CI, confidence interval, OR, odds ratio ; Work-life conflict, WLC.

ties are also more likely to have increased family responsibility, such as child birth and child rearing. In Japan, mean age of women giving birth to a first child is around 30 years old. Professionals aged between 30 and 39 may therefore have greater struggles with work-life integration.

Consistent with prior studies[15–20], a significant proportion of healthcare professionals included in this study experienced gender-based discrimination. Together with our data and previous findings, gender inequality should be recognized as a major problem in the medical field. To reduce gender-based discrimination in a medical university organization, clarifying the contents of the discrimination is important. In this study, we found that female professionals were more likely to feel gender-based discrimination in promotions and evaluation of academic achievement. Gender-based career obstacles in female physicians has been well documented in previous literature. For example, Tesch *et al.*[19] reported in 1995 that female physicians in the US are less likely to be promoted or to be in leadership positions than their male counterparts even after controlling for work schedule, specialty, and academic productivity. Jena *et al.*[20] found that a similar trend persisted in the US in 2014. Yasukawa *et al.*[16] reported that the experience of gender-based obstacles related to professional advancement is also common among Japanese female physicians. Our data builds on these observations by demonstrating that gender-based discrimination in promotions were also pervasive among healthcare professionals other than physicians.

This study also found that men were more likely to feel gender-based discrimination than women, although previous studies reported the opposite results[16,18]. Male professionals felt gender-based discrimination especially in the contents of their work and number of incidental tasks. The reasons for these discrepancies are likely multifactorial : differences in study population, employment structures, social norms, data measurement or some combination of these factors may have resulted in a relatively higher rate of men who felt gender-based discrimination, compared with previous studies[16,18]. Generally, our data suggests that gender-based discrimination in medicine is a relevant issue not only for women but for men as well.

Finally, this study found that both male and female respondents who have felt gender-based discrimination were more likely to perceive WLC. Gender-based discrimination is known to adversely affect job satisfaction, motivation, and professional

career development[18]. It may have thereby thwarted employees' work and private life integration. Our results suggest that gender-based discrimination should be considered as an important hindrance for achieving appropriate WLB.

Limitations and strengths

This study had three major limitations. The first limitation is the use of a single survey item to define WLC. Although three forms of WLC (time-based, strain-based, and behavior-based)[21,22] in two causal directions (work-to-family and family-to-work)[21,23,24] were detected in previous studies, we only focused on time-based WLC. However, many previous studies have also used either a single survey item or a shortened version of existing scales[28-31]. We adopted a similar strategy because our study population was very busy and likely to have limited time to complete lengthy survey items[27]. Second, our survey did not record personal information, such as marital status (single, married, divorced, or widowed), number and age of children, or number of close relatives who need nursing-care. These and other unmeasured variables may have affected our results for WLC, gender-based discrimination, and their association. For example, while we observed both male and female respondents aged between 30 and 39 that were at greatest risk of WLC, this result may actually arise from being likely to be rearing young children. We will take this information into account in the next survey. Finally, while our facilities are typical of a Japanese public medical university, as with any single-center study, it may not be possible to extrapolate our findings to other medical institutions, especially those in other countries. A multicenter survey is required for further investigation of the WLC, gender-based discrimination, and their associations among professionals in medical university organizations.

In spite of these limitations, this study also had several strengths. First, the complete response rate was quite high (2,285 of 3,347 surveyed employees, 68.3%), reducing the concerns of non-response bias. Second, the survey assessed various types of professionals working in a medical university, including academic faculty members, hospital physicians, nurses, technicians, and other types of professionals, and detected a population at high risk of having WLC. Such interdisciplinary assessments were scarcely conducted before our study. Third, to the best of our knowledge, our findings are the first to demonstrate the association between the perceived gender-based discrimination and WLC. This result implies that interventions to reduce WLC should address gender-based discrimination. Our results can be used to help improve work-life integration and promote gender equality at an organizational level. We believe that the implications of our results would be beneficial not only for our study population but also other settings.

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Disclosure

Conflict of interests

The authors have no competing interests to declare.

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Authors' contributions

YO and HK conceived the study design. All authors contributed to the construction of the questionnaire. YS and HK supervised the undertaking of the survey and data collection. YO managed the data and performed the statistical analysis. AG provided critical advice on the study design and statistical analysis. All authors interpreted the survey

results and participated in related discussions. YO drafted the initial manuscript and all authors contributed substantially to its revision. YO takes primary responsibility for the paper as a whole. All authors read and approved the final version of the manuscript.

References

1. Kossek EE, Lewis S, Hammer LB. Work-life initiatives and organizational change : overcoming mixed messages to move from the margin to the mainstream. Hum Relat, **63** : 3-19, 2010.
2. Chatani Y, Nomura K, Horie S, *et al.* Effects of gaps in priorities between ideal and real lives on psychological burnout among academic faculty members at a medical university in Japan : a cross-sectional study. Environ Health Prev Med, **22** : 32, 2017.
3. Starmer AJ, Frintner MP, Freed GL. Work-Life Balance, Burnout, and Satisfaction of Early Career Pediatricians. Pediatrics, **137** : e20153183, 2016.
4. Goodman WB, Crouter AC. The Family Life Project Key Investigators. Longitudinal associations between maternal work stress, negative work-family spillover, and depressive symptoms. Fam Relat, **58** : 245-258, 2009.
5. Brun E, Milczarek M, Roskams N, *et al.* Expert forecast on emerging psychosocial risks related to occupational safety and health [Internet]. Office for Official Publications of the European Communities, Luxembourg, 2007 [cited 22 Jan 2019]. Available from : https://osha.europa.eu/en/tools-and-publications/publications/reports/7807118.
6. Shanafelt TD, Boone S, Tan L, *et al.* Burnout and satisfaction with work-life balance among US physicians relative to the general US population. Arch Intern Med, **172** : 1377-1385, 2012.
7. OECD. Health at a Glance 2017 : OECD Indicators [Internet]. OECD Publishing. 2017 [cited 22 Jan 2019]. Available from : http://dx.doi.org/10.1787/health_glance-2017-en.
8. West CP, Huschka MM, Novotny PJ, *et al.* Association of perceived medical errors with resident distress and empathy : a prospective longitudinal study. JAMA, **296** : 1071-1078, 2006.
9. Shanafelt TD, Balch CM, Bechamps G, *et al.* Burnout and medical errors among American surgeons. Ann Surg, **251** : 995-1000, 2010.
10. Fahrenkopf AM, Sectish TC, Barger LK, *et al.* Rates of medication errors among depressed and burnt out residents : prospective cohort study. BMJ, **336** : 488-491, 2008.
11. Lu Y, Hu XM, Huang XL, *et al.* The relationship between job satisfaction, work stress, work-family conflict, and turnover intention among physicians in Guangdong, China : a cross-sectional study. BMJ Open, **7** : e014894, 2017.
12. Yamaguchi Y, Inoue T, Harada H, Oike M. Job control, work-family balance and nurses' intention to leave their profession and organization : A comparative cross-sectional survey. Int J Nurs Stud, **64** : 52-62, 2016.
13. Marqués-Sánchez P, Muñoz-Doyague MF, Martínez YV, *et al.* The Importance of External Contacts in Job Performance : A Study in Healthcare Organizations Using Social Network Analysis. Int J Environ Res Public Health, **15** : E1345, 2018.
14. Sexton JB, Schwartz SP, Chadwick WA, *et al.* The associations between work-life balance behaviours, teamwork climate and safety climate : cross-sectional survey introducing the work-life climate scale, psychometric properties, benchmarking data and future directions. BMJ Qual Saf, **26** : 632-640, 2017.
15. Nomura K, Gohchi K. Impact of gender-based career obstacles on the working status of women physicians in Japan. Soc Sci Med, **75** : 1612-1616, 2012.
16. Yasukawa K, Nomura K. The perception and experience of gender-based discrimination related to professional advancement among Japanese physicians. Tohoku J Exp Med, **232** : 35-42, 2014.
17. Okoshi K, Nomura K, Taka F, *et al.* Suturing the gender gap : Income, marriage, and parenthood among Japanese Surgeons. Surgery, **159** : 1249-1259, 2016.
18. Carr PL, Ash AS, Friedman RH, *et al.* Faculty perceptions of gender discrimination and sexual harassment in academic medicine. Ann Intern Med, **132** : 889-896, 2000.
19. Tesch BJ, Wood HM, Helwig AL, Nattinger AB. Promotion of women physicians in academic medicine. Glass ceiling or sticky floor? JAMA, **273** : 1022-1025, 1995.
20. Jena AB, Khullar D, Ho O, Olenski AR, Blumenthal DM. Sex Differences in Academic Rank in US Medical Schools in 2014. JAMA, **314** : 1149-1158, 2015.
21. Carlson DS, Kacmar KM, Williams LJ. Construction and initial validation of a multidimensional measure of work-family conflict. J Vocat Behav, **56** : 249-276, 2000.
22. Greenhaus JH, Beutell NJ. Sources of conflict between work and family roles. Academy Manage Rev, **10** : 76-88, 1985.
23. Carlson DS, Frone MR. Relation of Behavioral and Psychological Involvement to a New Four-Factor Conceptualization of Work-Family Interference. J Bus Psychol, **17** : 515-535, 2003.
24. Netemeyer RG, Boles JS, McMurrian R. Devel-

opment and validation of work-family conflict and family-work conflict scales. J Appl Psychol, **81** : 400-410, 1996.
25. The online reports from National Women's Education Center of Japan (in Japanese) [Internet]. 2013 [cited 5 Sep 2018] Available from : https://nwec.repo.nii.ac.jp/?action=pages_view_main&active_action=repository_view_main_item_detail&item_id=18727&item_no=1&page_id=4&block_id=58+.
26. The online reports from Shimane University (in Japanese) [Internet]. [cited 5 Sep 2018] Available from : http://www.ipc.shimane-u.ac.jp/gender/article/001/report.pdf.
27. Bragard I, Fleet R, Etienne AM, *et al.* Quality of work life of rural emergency department nurses and physicians : a pilot study. BMC Res Notes, **8** : 116, 2015.
28. Karhula K, Koskinen A, Ojajarvi A, *et al.* Are changes in objective working hour characteristics associated with changes in work-life conflict among hospital employees working shifts? A 7-year follow-up. Occup Environ Med, **75** : 407-411, 2018.
29. Greubel J, Arlinghaus A, Nachreiner F, Lombardi DA. Higher risks when working unusual times? A cross-validation of the effects on safety, health, and work-life balance. Int Arch Occup Environ Health, **89** : 1205-1214, 2016.
30. Albertsen K, Garde AH, Nabe-Nielsen K, Hansen AM, Lund H, Hvid H. Work-life balance among shift workers : results from an intervention study about self-rostering. Int Arch Occup Environ Health, **87** : 265-274, 2014.
31. van Amelsvoort LG, Jansen NW, Swaen GM, van den Brandt PA, Kant I. Direction of shift rotation among three-shift workers in relation to psychological health and work-family conflict. Scand J Work Environ Health, **30** : 149-156, 2004.
32. Hill EJ, Erickson JJ, Holmes EK, Ferris M. Workplace flexibility, work hours, and work-life conflict : finding an extra day or two. J Fam Psychol, **24** : 349-358, 2010.
33. Karhula K, Puttonen S, Ropponen A, *et al.* Objective working hour characteristics and work-life conflict among hospital employees in the Finnish public sector study. Chronobiol Int, **34** : 876-885, 2017.
34. Mauno S, Ruokolainen M, Kinnunen U. Work-family conflict and enrichment from the perspective of psychosocial resources : comparing Finnish healthcare workers by working schedules. Appl Ergon, **48** : 86-94, 2015.
35. The online reports from the Ministry of Health, Labor and Welfare in Japan (in Japanese) [Internet]. [cited 29 Mar 2019] Available from : https://www.mhlw.go.jp/content/10800000/000496522.pdf
36. The online reports from Japanese Nursing Association (in Japanese) [Internet]. [cited 1 Mar 2016] Available from : https://www.nurse.or.jp/home/publication/pdf/kakuho/2016/wlb_guidebook.pdf
37. Fuyuno I. Numbers of young scientists declining in Japan — Government policies are hampering the country's next generation of research leaders, advisory body says [Internet]. 2012 [cited 1 Oct 2018]. Available from : http://www.nature.com/news/numbers-of-youngscientists-declining-in-japan-1.10254.
38. Simmons S. Striving for work-life balance. Am J Nurs, **112 (1 Suppl)** : 25-26, 2012.
39. Dahlgren A, Tucker P, Gustavsson P, Rudman A. Quick returns and night work as predictors of sleep quality, fatigue, work-family balance and satisfaction with work hours. Chronobiol Int, **33** : 759-767, 2016.
40. Viotti S, Converso D. Relationship between job demands and psychological outcomes among nurses : Does skill discretion matter? Int J Occup Med Environ Health, **29** : 439-460, 2016.
41. Rafferty Y, Friend R, Landsbergis P. The association between job skill discretion, decision authority and burnout. Work & Stress, **15** : 73-85, 2001.