Research

Challenges and implications of dual employment among physicians in Japan

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Abstract

Background Physicians in Japan have traditionally worked long hours, but the 2024 revision of the Labor Standards Law introduced limits on physician working hours, including time spent in side jobs. This study examines how side jobs affect physicians' professional lives and well-being.

Methods In August 2023, we surveyed 333 physicians (252 men, 81 women) who graduated from Sapporo Medical University between 1993 and 2016. The survey gathered data on primary and side jobs, including earnings, weekly hours, commuting time, and subjective well-being. This study was approved by the SAPMED Ethics Committee (Approval No. 4-1-77).

Results Physicians with side jobs worked similar hours in their primary jobs to those without side jobs but earned less. They devoted an average of 11.5 h weekly to side jobs, reported shorter sleep, and lower satisfaction with compensation from their primary job. They also noted insufficient time for primary job tasks. Among physicians in Hokkaido, men were more likely to hold side jobs in remote areas requiring longer commutes, whereas women typically worked in Sapporo City.

Conclusions In light of the new overtime regulations, this study emphasizes the need for healthcare system reforms to ensure sustainable healthcare delivery. Proposed measures include hybrid models integrating telemedicine with visits to reduce commuting and further address pay disparities between physicians with and without side jobs. Additionally, it is crucial to address imbalances in working conditions for side jobs, as these disparities place greater burdens on male physicians and may impact workplace equity and sustainability.

Keywords Work-style reform · Physician dual employment · Physician well-being

Abbreviation

SAPMED Sapporo Medical University

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1 Background

Physicians in Japan have traditionally worked long hours, owing to the duty of attendance stipulated in the 1948 Medical Practitioners Law, which states that "a physician engaged in medical treatment shall not refuse a request for examination and treatment without a justifiable reason." Nevertheless, starting April 2024, hospitalists will also be subject to new statutory limits on physicians' working hours under Article 32 of the Labor Standards Law, as revised in 2024 [1]. This change is part of the workforce reform aimed at protecting physicians' health [2] and ensuring the sustainability of a high-quality medical care system. One problem introduced by this change is that reducing physicians' working hours could exacerbate physician shortages in local hospitals. According to a survey by the Japanese Ministry of Health, Labour and Welfare, 58.8% of full-time general hospital physicians and 91.4% of full-time university hospital physicians were engaged in dual employment [3]. One reason is that local hospitals facing physicians is deemed sufficient, dispatch some of their physicians to understaffed hospitals. To support a more equitable distribution of regional medical care in large areas such as Hokkaido, these physicians must devote a significant amount of their time to travel to their side jobs, even though current rules limiting working hours do not include travel time for side jobs. Therefore, although physicians who engage in dual employment gain the benefit of earning additional income by working in a second job, doing so often involves long uncompensated travel times.

To investigate the nature of dual employment among physicians, we surveyed physicians who had graduated from Sapporo Medical University, located in Sapporo, the largest city in Hokkaido, Japan, and a major urban center with a relatively large population. Although Hokkaido is Japan's northernmost and second-largest prefecture, it accounts for only 4.1% of the country's population. Hokkaido's landscape features vast plains, mountains, and extensive coastlines. Due to its size, travel between major cities often involves long journeys. For example, Sapporo is approximately 200 km from Haboro, a northern Hokkaido town served by the Hokkaido Prefectural Hospital; travel between Sapporo and Haboro requires three or four hours by driving. Similarly, reaching eastern cities like Kushiro or Abashiri takes four to five hours by train, while traveling to Hakodate in the south takes around four hours by train, car, or air. The region is experiencing a rapidly declining birthrate and an aging population, with the demographic shift occurring 10 years ahead of the national average [4, 5]. Of the three medical schools in Hokkaido (Hokkaido University, Sapporo Medical University, and Asahikawa Medical University), Sapporo Medical University is publicly funded and managed by the Hokkaido Prefectural Government, whereas the other two are nationally funded universities. Therefore, Sapporo Medical University was selected for this study because it is a public institution with the mission of serving all regions of Hokkaido. We also used data from the alumni of this medical school to minimize sample heterogeneity by reducing variations in academic ability, training program experience, postgraduate ties with the school, and other individual factors that might influence the incidence of physicians' dual employment. Although caution should be exercised regarding the generalizability of the findings, this dataset has unique strengths.

2 Methods

The data for this study were obtained from a survey of physicians who graduated from Sapporo Medical University (SAPMED) between 1993 and 2016. The data have also been used to analyze the motherhood penalty among female physicians [6]. The survey was conducted online and on paper. On August 1, 2023, the questionnaire was mailed to 1,452 alumni with work addresses listed in SAPMED's alumni directory. The survey period was set until September 30, 2023. Participants provided informed consent, either electronically or in written form, before completing the questionnaires. Each participant was asked to provide consent, which allowed the data to be used in the publication of this study. The response rate was 24.7% (N = 359). We excluded participants who did not provide information on key variables such as their primary job location and whether they held side jobs. This resulted in a final sample of 333 participants (252 male, 81 female). This study was approved by the SAPMED Ethics Committee (Approval No. 4-1-77).

We defined the job with the longest hours as the "primary job" and any supplemental or secondary job as the "side job." The questionnaire collected information on the physicians' primary jobs, including annual income, weekly working hours, job title, commuting time, overtime frequency and type (on duty, day duty, or on-call), specialty, practice type (hospitalist or private practitioner), and practice location (Sapporo, Central Hokkaido outside Sapporo,

Southern Hokkaido, Eastern Hokkaido, Northern Hokkaido, or outside Hokkaido). Additionally, we asked about their side jobs at other hospitals or clinics, including annual income, weekly working hours, travel frequency and time, and practice locations. To assess physicians' subjective well-being related to their primary and secondary jobs, we utilized eight questions from the Household, Income, and Labour Dynamics in Australia (HILDA) survey [7]. While parts of the HILDA questionnaire have been administered to Japanese participants in the National Survey on Family, Births and Work in the Low Fertility Aging Society [8] (https://www.eco.nihon-u.ac.jp/research/nupri/en/whocc.html), the specific questions from the HILDA survey used in our study are new, to the best of our knowledge, so that direct comparisons are currently unavailable. Respondents provided their answers on a seven-point Likert scale, where 7 indicated complete agreement and 1 indicated complete disagreement. Responses were collected separately for primary and side jobs (if any). We also gathered personal information on board certifications, certified physician qualifications, marital status, parenthood, and work interruptions due to childbirth, childcare, or other caregiving (such as eldercare).

All analyses were performed using Stata (version 18.0; StataCorp, College Station, Texas 77845, USA). We conducted t-tests for the equality of means and proportions between the two groups. Differences were considered statistically significant at p < 0.05.

3 Results

Table 1 summarizes the key characteristics of respondents. Of these, 292 (87.7%) were hospitalists, and 37 (11.1%) were private practitioners. Regarding the primary working locations of the respondents, 168 (50.5%) worked in Sapporo, 90 (27.0%) in Hokkaido outside Sapporo, and 75 (22.5%) outside Hokkaido.

3.1 Employment status and location of primary jobs

The upper panel of Table 2 compares the characteristics of physicians with and without side jobs. Among the physicians with side jobs, 84.5% were full-time hospitalists, 9.5% were part-time hospitalists, and 6.0% were private practitioners. Among those without side jobs, 80.6% were full-time hospitalists, 3.0% part-time hospitalists, and 16.4% private practitioners. Among the physicians with side jobs, 62.5% had primary jobs in Sapporo, 14.3% in Hokkaido outside Sapporo, and 23.2% outside Hokkaido. Among those without side jobs, 38.2% had primary jobs in Sapporo, 40.0% in Hokkaido outside Sapporo, and 21.8% outside Hokkaido. Therefore, physicians with side jobs are more likely to have primary jobs in Sapporo than in other areas of Hokkaido. Physicians with side jobs were more likely to hold a PhD, possess specialty certifications, or have studied abroad (data not shown in Table 2).

Side jobs are most common among physicians in their 40 s, with 55.6% of that age group engaged in side jobs, compared to 51.9% in their 30 s and 41.8% in their 50 s, as shown in Fig. 1. This trend suggests that side jobs are most prevalent among mid-career physicians. Mid-career physicians may take on side jobs to expand their expertise, build professional networks, or supplement their income to support their families. The decline in side-job participation for physicians in their 50 s may be attributed to career stability, higher income, administrative roles, or a preference for a reduced workload.

3.2 Hours worked, income, and sleep duration

A significant proportion of hospitalists with side jobs exceed 60 h per week compared to those without side jobs, as shown in Fig. 2. Physicians with side jobs work an average of 60.8 h per week (including hours from both their primary and side jobs), compared to 48.4 h for those without side jobs. Additionally, 17.3% of hospitalists with side jobs work 80 or more hours per week, compared to only 3.0% of hospitalists without side jobs. This indicates that excessive overwork is far more common among hospitalists with side jobs, with a predictably negative effect on their well-being. If the new work-hour regulations establish a cap of 59 working hours, then the average total weekly hours will decrease to 51.2 for physicians with side jobs and 46.6 for those without. As a result, the new working hour regulations are expected to lead to a greater reduction in working hours for physicians with side jobs, since they had exceeded the new work limits before the reform.

The middle panel of Table 2 shows the weekly working hours and annual income levels of all physicians based on whether they held side jobs. There were no significant differences between the two groups in the weekly working hours at their primary jobs, with both averaging approximately 49 h. However, annual income from the primary job was



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Table 1Characteristics ofrespondents

	n=333(%)
Age	
Thirties	81 (24.3)
Forties	153 (45.9)
Fifties	98 (29.4)
Sixties and above	1 (0.3)
Gender	
Male	252 (75.7)
Female	81 (24.3)
Employment status of primary job	
Private practitioner	37 (11.1)
Hospitalist, full-time	275 (82.6)
Hospitalist, part-time	17 (5.1)
Unknown	4 (1.2)
Work location of primary job	
Sapporo City	168 (50.5)
In Hokkaido outside Sapporo	90 (27.0)
Outside Hokkaido	75 (22.5)
Specialty	
Internal medicine	96 (28.8)
Urology	35 (10.5)
Surgery	32 (9.6)
Orthopedic surgery	24 (7.2)
Pediatrics	21 (6.3)
Gynecology	15 (4.5)
Psychiatry	16 (4.8)
Otolaryngology	15 (4.5)
Anesthesiology	13 (3.9)
Ophthalmology	11 (3.3)
Neurosurgery	9 (2.7)
Dermatology	8 (2.4)
Plastic Surgery	7 (2.1)
Radiology	5 (1.5)
Others	23 (6.9)
Unknown	3 (0.9)

significantly lower for physicians with side jobs, at 12.69 million JPY (approximately USD 85,000), compared to 17.43 million JPY (approximately USD 117,000) for those without side jobs (p < 0.001). Physicians with side jobs worked an additional 11.5 h per week and earned 4.77 million JPY (approximately USD 32,000) annually from their side jobs.

Physicians with side jobs had significantly shorter sleep duration, averaging 364 min nightly, compared to 382 min for those without side jobs (p < 0.05). There were no significant differences between the two groups in terms of overtime hours, number of night shifts, or number of on-call shifts for primary jobs (data not shown in Table 2).

3.3 Subjective well-being score for primary job

The subjective well-being scores for primary jobs differed significantly between physicians with and without side jobs (bottom panel of Table 2). Specifically, physicians without side jobs reported higher satisfaction with their compensation for their primary job, scoring 4.774 points, compared to 3.753 points for those with side jobs (p < 0.001). Conversely, physicians with side jobs did not have enough time to do all the work required for their primary job, scoring 4.667 points compared to 3.868 points for those without side jobs (p < 0.01). (Recall that the answers were chosen from a seven-point Likert scale, where 7 indicated complete agreement and 1 indicated complete disagreement with the statement under



Table 2 Characteristics of respondents based on holding of side jobs

	Has side jobs	No side job	Difference	
	n=168(%)	n=165(%)		
Employment status of primary job				
Private practitioners	10 (6.0%)	27 (16.4%)	(- 10.4%)	***
Hospitalist, full-time	142 (84.5%)	133 (80.6%)	(3.9%)	
Hospitalist, part-time	16 (9.5%)	5 (3.0%)	(6.5%)	**
Work location of primary job				
Sapporo City	105 (62.5%)	63 (38.2%)	(24.3%)	***
In Hokkaido outside Sapporo	24 (14.3%)	66 (40.0%)	(- 25.7%)	***
Outside Hokkaido, Japan	39 (23.2%)	36 (21.8%)	(1.4%)	
Hours worked per week, primary job (mean, hours)	49.20	48.40	0.80	
Annual earnings from primary job (mean, 1,000,000 JPY)	12.69	17.43	- 4.74	***
Hours worked per week, side job (mean, hours)	11.56	None		
Annual earnings from side job (mean, 1,000,000 JPY)	4.77	None		
Sleep duration (mean, minutes per day)	364.88	382.70	17.83	*
Subjective well-being score about primary job				
Your job has many interesting things to do. (mean)	5.651	5.592	- 0.059	
Your job often causes mental stress (mean)	5.018	4.951	- 0.067	
Your job compensates you well for your work. (mean)	3.753	4.774	1.021	***
Your job requires learning new skills (mean)	5.542	5.412	- 0.130	
Your job allows you to fully use your skills and abilities. (mean)	5.711	5.768	0.047	
You can decide when you want to do the job. (mean)	3.621	3.455	- 0.16	
You can decide how you want to do the job. (mean)	4.133	4.102	- 0.030	
Not enough time to do all the work (mean)	4.677	3.868	- 0.799	**

^{*} p < 0.05

** p<0.01

***^{*} p < 0.001





Fig. 1 Proportion of respondents with and without side jobs by age group





Fig. 2 Distribution of total weekly working hours

consideration; not all higher scores represent subjective reports of greater well-being, as can be seen from the statements listed in the bottom panel of Table 2.)

3.4 Travel frequency, travel time, and subjective well-being scores for side jobs

We examined travel frequency, travel time, and subjective well-being scores for side jobs based on whether the physicians' primary job was located inside or outside Hokkaido (Table 3). Among physicians with primary jobs inside Hokkaido, 80% took at least one 1-day business trip per week to their side jobs, compared to 92% of those with primary jobs outside Hokkaido. (The difference was not statistically significant, with p < 0.1.) Conversely, 50% of physicians with primary jobs outside Hokkaido took at least one overnight trip per month for a side job compared to 22% of those with primary jobs outside Hokkaido (p < 0.01). Additionally, 35% of physicians with primary jobs in Hokkaido had side jobs involving overnight stays of two or more days per month, compared to only 8% of those with primary jobs outside Hokkaido (p < 0.01).

We also examined travel time for side jobs. On average, one-way travel time for side jobs was 78.19 min for physicians with primary jobs in Hokkaido, compared to 49.72 min for those with primary jobs outside Hokkaido (p < 0.01). The maximum one-way travel time for side jobs was 173.29 min for physicians with primary jobs in Hokkaido and 84.62 min for those outside Hokkaido (p < 0.001). Thus, both the average and maximum travel times for side jobs were significantly longer for physicians with primary jobs in Hokkaido.

Regarding the subjective well-being scores for side jobs, physicians with primary jobs in Hokkaido found their side jobs more interesting than those with primary jobs outside Hokkaido, with mean scores of 4.617 and 4.026, respectively (although the difference was not statistically significant; p < 0.1). There were much smaller differences between the two groups in terms of mental stress, compensation suitability, skill utilization, decision-making autonomy, and time sufficiency associated with side jobs.

3.5 Differences in location, travel frequency, and travel time of side jobs between male and female physicians whose primary jobs are in Hokkaido

We examined the gender differences in the locations of side jobs for physicians with primary jobs in Hokkaido (Table 4). A significantly higher percentage of female physicians with primary jobs in Hokkaido had side jobs in Sapporo City than male physicians (78% versus 51%, respectively; p < 0.05). In contrast, the percentage of female physicians with side jobs in Northern Hokkaido was significantly lower than that of male physicians (7% vs. 27%, respectively; p < 0.05). There were no significant gender differences in the side jobs in Central Hokkaido outside Sapporo City, in Southern Hokkaido, in Eastern Hokkaido, or outside Hokkaido.



Table 3 Travel frequency, travel time, and subjective well-being scores for side jobs by primary job location

	Primary job location		Difference		
	Outside Hokkaido	Outside Hokkaido Inside Hokkaido			
	n=39	n=129			
Travel frequency for side jobs (%)					
Weekly 1-day trip	92%	80%	- 12%		
Trips of 2 days and 1 night, per month	22%	50%	28%	**	
Trips longer than 2 days, per month	8%	35%	27%	**	
Travel time for side jobs					
Average one-way travel time for side job (mean, minutes)	49.72	78.19	28.47	**	
Maximum one-way travel time for side job (mean, minutes)	84.62	173.29	88.67	***	
Hours worked per week, side job (mean, hours)	11.64	11.53	- 0.11		
Annual earnings from side job (mean, 10,000 JPY)	483.40	475.82	- 7.58		
Commuting time for primary job (mean, minutes)	30.67	22.27	- 8.40	**	
Hours worked per week, primary job (mean, hours)	48.87	49.30	0.43		
Annual earnings from primary job (mean, 10,000 JPY)	1148.84	1309.19	160.35		
Subjective well-being score about side job					
Your job has many interesting things to do. (mean)	4.026	4.617	0.591		
Your job often causes mental stress. (mean)	4.237	4.102	- 0.135		
Your job compensates you well for your work. (mean)	5.263	5.087	- 0.177		
Your job requires learning new skills. (mean)	4.211	4.339	0.128		
Your job allows you to fully use your skills and abilities. (mean)	4.842	4.772	- 0.071		
You can decide when you want to do the job. (mean)	3.790	4.039	0.250		
You can decide how you want to do the job. (mean)	4.297	4.016	- 0.282		
Not enough time to do all the work. (mean)	4.342	4.236	- 0.106		

* p < 0.05

^{**} p < 0.01

^{***} p < 0.001

Regarding travel frequency to side jobs, all female physicians took 1-day trips weekly for their side jobs, whereas 74% of male physicians did so (p < 0.01). Conversely, 26% of female physicians took 2-day trips (involving one overnight stay) per month compared to 57% of male physicians (p < 0.01). Additionally, 19% of female physicians took trips of more than 2 days per month, whereas 39% of male physicians did so (p < 0.05).

Regarding travel time for side jobs, female physicians had a significantly shorter average one-way travel time of 50.7 min, compared to 85.6 min for male physicians (p < 0.01). Female physicians also had a significantly shorter maximum one-way commute time for their side jobs, averaging 119 min, compared to 187 min for male physicians (p < 0.01).

4 Discussion

Perspectives on physicians holding more than one job (i.e., "dual employment" or "dual practice") vary by country [9]. In Europe, negative views can be observed regarding the dual practice of hospital staff physicians [10], based on the concern that physicians holding side jobs can negatively impact the quality of medical care provided in the public sector. In Japan, the number of physicians per capita is below average compared to other developed countries [11], and there is a significant shortage of physicians in rural areas. Therefore, hospitalists in urban areas were dispatched to support rural



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Table 4	Differences between
male an	d female physicians
with sid	e jobs whose primary
job is in	Hokkaido

	Men (n=102)	n Women 102) (n=27)	Difference	
Work location of side jobs (%)				
Sapporo City	51%	78%	27%	*
Central Hokkaido outside Sapporo	58%	44%	- 13%	
Southern Hokkaido	39%	22%	- 17%	
Eastern Hokkaido	42%	26%	- 16%	
Northern Hokkaido	27%	7%	- 20%	*
Outside Hokkaido	2%	0%	- 2%	
Travel frequency for side job (%)				
Physicians taking weekly 1-day trips	74%	100%	26%	**
Physicians taking monthly trips of 2 days and 1 night	57%	26%	31%	**
Physicians taking monthly trips of more than 2 days	39%	19%	20%	*
Travel time for side job				
Average one-way travel time for side job (mean, minutes)	85.60	50.74	- 34.86	**
Maximum one-way travel time for side job (mean, minutes)	187.65	119.09	- 68.56	**
Hours worked weekly at side job (mean, hours)	11.91	10.15	- 1.76	
Annual earnings from side job (mean, 10,000 JPY)	496.84	413.70	- 83.14	
*p<0.05				
n<001				

^{****}p<0.001

medical services, a practice facilitated by the national universal health insurance system. However, some governmentbased hospitals prohibit such assignments, since public officials in Japan are not allowed to hold side jobs. A survey by the Ministry of Health, Labour and Welfare (MHLW) conducted in December 2024 found that 5.3% of hospitals (300 facilities) reported a decline in physicians dispatched from universities or other institutions to rural areas due to the new physician work-hour regulations [12]. This decline will inevitably impact healthcare availability in rural and underserved regions, exacerbating staffing shortages, because these areas heavily rely on dispatched physicians to maintain medical services. For physicians engaged in side jobs, stricter work-hour monitoring may help reduce physician burnout but is likely to also lower their income. Continuous policy adjustments will be necessary to balance healthcare accessibility and physician well-being.

The survey revealed the backgrounds of the physicians who held side jobs earned significantly less in their primary jobs compared to those without side jobs. The survey did not ask for details about the hospitals where they worked, but it is plausible that physicians working at institutions such as university hospitals, which are typically low-paying, take side jobs to supplement their primary income and/or use their skills to support the broader community.

The current situation highlights the fact that physicians from metropolitan areas such as Sapporo support medical care in less urban regions with chronic physician shortages when they take on side jobs. Physicians with side jobs worked an extra 12.4 h per week and were asleep 18 min less per night than those without side jobs. This finding aligns with independent research that supports the hypothesis that working longer hours reduces sleep duration [13–15]. The survey found no significant differences between groups with and without side jobs in terms of hours worked, number of night shifts, or on-call shifts for the primary job. Although the nature of each specific physician's on-duty work needs to be considered, extended working hours due to holding dual jobs are likely to contribute to reduced sleep. This is important because sleep deprivation is a known cause of burnout and turnover among young physicians [16].

When our comparison was based on the physicians' primary job location (inside or outside Hokkaido; Table 3), both the average and maximum travel times for side jobs were significantly longer for physicians in Hokkaido than for those outside Hokkaido. On average, one-way travel time was 28.4 min longer, and the maximum travel time was 88.7 min longer, often involving overnight stays. Consequently, these physicians have less time to perform other life activities, including sleeping.



Table 4 shows the gender disparity in side-job locations of physicians whose primary workplace is in Hokkaido. Female physicians were significantly more likely than male physicians to hold side jobs in Sapporo City. Conversely, male physicians more frequently take side jobs in Northern Hokkaido, which involve overnight stays. Female physicians, who often have more family responsibilities [17, 18], may avoid side jobs with long commutes and overnight stays to prevent workfamily conflicts [19]. However, male physicians often endure long commutes, which can affect their ability to carry out family responsibilities.

Long commutes to side jobs, especially in large regions such as Hokkaido, pose a challenge to work-life balance, as travel time is unpaid and not included in the calculation of maximum working hours. Since commuting time will not be counted as part of their official working hours, physicians' actual work burden will remain higher despite the new work-hour regulations. To alleviate the burden on physicians, telemedicine can be strategically integrated into healthcare systems. It is particularly effective for follow-up consultations, chronic disease management, mental health care, and minor illness evaluations, reducing unnecessary travel for both physicians and patients. Hybrid models that combine the advantages of telemedicine with the advantages of periodic in-person visits can help maintain comprehensive care while optimizing physician workload. Additionally, regional telemedicine networks can improve healthcare accessibility in underserved areas. To fully realize its unique benefits, investments in infrastructure, regulatory support, and provider training must be prioritized.

Side jobs play a crucial role in sustaining medical services, particularly in rural areas such as Hokkaido, where hospitals rely on physicians dispatched from far-away urban centers. These physicians provide medical support to underserved regions, and a reduction in side jobs could exacerbate regional health disparities. However, our data indicate that physicians with side jobs work longer hours and experience reduced sleep, increasing the risk of burnout and attrition. To balance regional healthcare sustainability with physician well-being, policy measures such as expanding telemedicine, implementing appropriate work-hour regulations, and introducing incentives to reward physicians who practice rural healthcare should be considered.

This study has several limitations. First, the generalizability of our findings may be limited because of the relatively small sample size and the fact that the data were collected from graduates of a single medical school. Based on previous studies that examined preferences and career choices in the medical profession [20–22], such as the decision to work in a hospital versus private practice, it is possible that graduates from SAMPED, a public medical university, may be more inclined toward hospital-based careers rather than private practice. The low proportion of private practitioners in our sample may have led to an overestimation of the incidence of dual employment among physicians. Second, the survey did not consider commuting methods such as driving versus taking the train, which can affect fatigue levels differently. Long drives may impose greater physical and mental strain, whereas train commutes may provide opportunities for rest. However, physicians in Hokkaido often face extended travel times, regardless of the transportation mode. Given the potential impact of these factors on well-being, caution is required when interpreting the results. Third, we assessed the physicians' subjective well-being using a Likert scale adapted from the HILDA survey, a longitudinal study involving multidisciplinary researchers. However, individual differences in question interpretation may introduce variability, potentially limiting the accuracy of the results in capturing actual well-being. Therefore, caution should be exercised when interpreting these findings.

Despite these limitations, this study provides valuable insights into dual employment of physicians. Hokkaido, with its vast geographical dispersion, began experiencing a population decline 10 years earlier than the national average. The challenges faced by Hokkaido are a preview of what the rest of Japan will soon encounter. Thus, developing strategies to support the wellbeing of physicians and ensure sustainable healthcare in Hokkaido will ultimately benefit the entire country.

5 Conclusions

This study elucidated the impact of dual employment on physicians in Japan. We found that urban physicians frequently occupied side jobs, often leading to overwork and sleep deprivation. In geographically extensive regions such as Hokkaido, long travels to side jobs further exacerbate this burden. Gender differences were observed, with female physicians tending to avoid long travels to side jobs to protect time for family responsibilities, whereas male physicians often face long-distance travel. To improve public access to healthcare and reduce the burden on physicians with side jobs, a community-based integrated care system incorporating hybrid models that combine telemedicine with periodic



in-person visits should be developed. The findings offer valuable insights into shaping future healthcare policies and reforms in this domain.

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Author contributions S.N. and E.U contributed to the planning of the questionnaire survey. E.A., R. K. and M.O. contributed equally to the preparation of the questionnaire. S.N. contributed to the preparation of the manuscript, and E.U. participated in the revision and final approval of the manuscript. K.T. and N. M. supervised the manuscript. All authors reviewed the manuscript.

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Data availability The datasets generated and analyzed during this study are not publicly available because they were licensed to the authors for use restricted to this study; however, they are available from the corresponding author upon reasonable request. STATA statistical software (version 18.0) was used for all analyses.

Declarations

Ethics approval and consent to participate This study was conducted in accordance with the Declaration of Helsinki and was approved by the SAPMED Ethics Committee (Approval No. 4-1-77). Participants provided informed consent, either electronically or in written form, before completing the questionnaire.

Consent for publication Each participant was asked to provide a consent agreement allowing their data to be used in this study's publication.

Competing interests The authors declare no competing interests.

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