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How gender affects the mental health of healthcare workers across regions in Thailand

Nattanicha Chairassamee[1] and Kanokwan Chancharoenchai[1*]

Abstract

Background A shortage of healthcare professionals in Thailand can cause mental health impairment, low quality of life, high resignation rates, and low-quality services to patients due to heavy responsibilities. With the increasing rate of females entering medical careers, gender has become a significant factor in assessing healthcare workers' mental health. This study explores the relationship between the mental health and gender of healthcare workers across geographic regions in Thailand.

Methods The present study uses individual data of Thai healthcare workers from 2009 to 2015 and 2018—prior to the COVID-19 pandemic. We include overall mental health and work/job-related mental health. A linear regression with fixed effects is used to estimate the differentials of healthcare workers' gender on mental health issues.

Results Female healthcare workers feel more depressed and less satisfied with their health management than males do, particularly in rural areas. Young female healthcare professionals have lower levels of happiness and life satisfaction than male workers do. Predictions of mental health levels from our regressions show that nurses in rural areas experience higher levels of mental health impairment than doctors do.

Conclusions Female workers are more likely to feel depressed than males are, particularly in rural areas. We also find that nurses are less likely to be happy and satisfied with life than doctors are.

Keywords Gender, Urban–rural, Mental health, Healthcare workers, Thailand

Introduction

Thailand's healthcare system is recognized as one of the most successful in Southeast Asia, largely due to its commitment to universal health coverage and accessibility to all Thai nationals. Thailand has rapidly established itself as a leading medical hub in Asia, attracting foreign patients seeking high-quality and affordable healthcare. The country's advanced medical facilities, skilled healthcare professionals, and competitive pricing make it a top destination for medical tourism.

Thailand's healthcare system includes both private and public healthcare settings. The public hospital system in Thailand is a comprehensive network of healthcare institutions that provide affordable medical services to the population. It is primarily funded by the government and operates under the Ministry of Public Health (MoPH). Private hospitals in Thailand are mostly located in urban areas and cities, particularly in Bangkok. With the aim of being a medical hub of Asia, the Thai government has implemented policies to encourage foreign patients

*Correspondence:
Kanokwan Chancharoenchai
fecokwc@ku.ac.th; kanok1_c@hotmail.com
[1]Department of Economics, Kasetsart University, 50 Ngamwongwan Rd., Ladyao, Chatuchak, Bangkok 10900, Thailand

to boost medical tourism in the private sector. Consequently, several private hospitals have Joint Commission Internation (JCI) Standard for international medical treatments and charge significantly more expensive than public hospitals.

Despite its achievements, the Thai healthcare system faces ongoing challenges. Changes in economic and social dynamics—such as an aging society—as well as those healthcare policies from the government are pushing the demand for healthcare for local and foreign patients in Thailand. As in other countries, the Thai public health system is currently experiencing a shortage of healthcare professionals, especially in rural areas [18].

For the past 10 years, the Ministry of Public Health has implemented policies to generate new doctors and locate them outside big cities; however, high resignation rates remain a problem for the healthcare system. During 2013–2022, a total of 19,355 doctors registered to work in public sectors. On average, 23 physicians (or approximately 1.2 percent per year of the total doctors) resigned in their first year as an intern. Due to a requirement to finish the first year of the internship, only a small proportion of physicians decided to resign. On the contrary, around 10 and 4.4 percent per year of the second- and third-year interns, respectively, resigned from the public sector. Within the first three years of working as an intern, approximately 15.3 percent of the total number of new graduates—1,935 doctors per year, resigned, while some doctors decided to resign after three years, which accounted for 23.5 percent of new recruitments per year. The main reason for the resignation was enrolling in a residency program [2].[1]

The high mobility of healthcare professionals from rural to urban areas has exacerbated a disparity in healthcare services. The Medical Council of Thailand [43] recently reported that almost half of the doctors in Thailand reside in Bangkok, while the other half work across 76 provinces.

The high resignation rate and mobility of professionals in the public healthcare sector have created a vicious cycle. Due to the shortage, the doctor-to-population ratio in Thailand is 1:2,000, twice that recommended by the World Health Organization (WHO), which is 1:1,000. Current professionals in the system are overloaded with work. On average, they work more than 40 to 64 h per week, exceeding the WHO standard, which suggests limiting schedules to 40 h per week. However, the compensation for professionals in public hospitals is approximately 10 times less than that for professionals in the private sector. This situation causes not only the resignation of highly experienced doctors, but also a massive turnover of newly graduated doctors (interns). This situation could widen the gaps in healthcare services across hospital locations [17, 44, 47, 54].

These heavy responsibilities for professionals at public hospitals can cause mental health impairment—i.e., job burnout, depression, exhaustion, and low life and job satisfaction—leading to a low quality of life [12, 15, 32, 33, 44]. The poor mental health of healthcare workers can lead to high resignation rates [48, 56], migration to more developed areas [35], and low-quality services to patients [22, 33, 45, 50, 51].

With the increasing rate of females entering medical careers, gender has become a significant factor in assessing healthcare workers' mental health. Many studies in developed countries show that female healthcare professionals have low levels of job satisfaction [38, 40], which is another measure of mental health or well-being because of family responsibilities and commitments or possible work-family conflicts. Additionally, healthcare professionals in rural areas feel pressured by their work, causing them stress and anxiety [30, 54]. Generally speaking, female healthcare workers and those working in rural areas are at risk of substantial mental health impairment.

In Thailand, studies related to issues of healthcare workers are limited and mainly conducted in Bangkok and big cities. Therefore, the purpose of this paper is to examine how gender affects the mental health of healthcare workers. We exploit the large dataset by investigating mental-health-related issues across genders and locations-urban and rural. Additionally, we explore the heterogeneity in mental health statuses across different healthcare professionals.

WHO provides policy recommendations to increase and retain healthcare workers in rural areas, including education, regulatory, financial incentives, and personal and professional support [37]. Our results suggest policy implementation to improve mental health, one of the personal and professional supports, for healthcare workers. Better mental health may alleviate rural-to-urban migration of healthcare workers, particularly for female doctors and nurses in rural areas.

Literature review

In the literature, subjective well-being (SWB) has commonly been used as a measure of mental health status. According to the Diener [9], subjective well-being (SWB) is a complex concept that includes both cognitive and emotional aspects. Cognitive well-being pertains to how individuals assess their overall lives (life satisfaction) as well as particular areas of life (e.g., job satisfaction and marital satisfaction). Life satisfaction is usually evaluated using multi-item self-report measures such as the

[1] Doctor resignation rate in Thailand was higher than other countries—e.g., 9 percent in Ireland in 2018 and 11 percent in the US. in 2019 (see [36]). However, with different contexts across countries and time periods, the comparison should be carefully considered.

Satisfaction With Life Scale [10] or through single items that gauge overall contentment with one's life [11].

Affective well-being, introduced by Daniels [7], is a multidimensional measure for mental health issues. Affective well-being refers to the frequency and intensity with which people experience positive affect (PA) and negative affect (NA). PA and NA include particular both specific emotions and general mood states. Affective well-being is typically measured by asking people to rate the extent to which they experienced different affective states over a specified time frame. It includes job satisfaction, occupational stress, burnout, and work engagement as important measures of the work-related well-being of employees [6, 34].

The factors that can affect medical workers' well-being can be categorized into two groups: the work environment and other work-related factors, and individual characteristics.

Many previous studies have revealed that unhealthy working conditions-work-related demands, overwork, working hours, and complicated collaboration with colleagues-have significantly increased the risk of psychological distress [46]. Highly demanding jobs require more time and energy [8, 32], potentially causing sleep deprivation and depression [26]. Overwork, however, can be compensated for by a high pay scale to increase job satisfaction [40].

Personal characteristics are another main factor affecting mental health status, particularly gender and age. Medical personnel who are young females can be vulnerable to experiencing low subjective well-being [38, 40, 42]. In some studies, however, individual characteristics may not have had a significant effect on overall well-being [33, 54]. Age can be highly correlated with work experience. The life satisfaction of healthcare professionals remains stable for only 4–15 years after graduating from medical school and could decline afterward [16, 21, 25, 26].

Furthermore, previous studies have revealed heterogeneity in the mental health statuses of healthcare workers at workplaces across geographic locations. A few studies (e.g., [27]) have shown a positive satisfaction level in small cities/rural areas because of supportive working conditions [53], attitudes toward compensation, and job stability [49]. In contrast, most studies (e.g., [1, 42]) have suggested the opposite, namely that healthcare professionals in rural areas are likely to have low well-being, while some studies indicate an insignificant difference in satisfaction between rural and urban working locations [30, 54]. Low satisfaction in rural areas is caused by more on-call demand, heavier workloads, inadequate remuneration, and restricted working conditions and environments compared to those in urban areas.

The mental health of healthcare workers is linked to job performance [51] and patients' satisfaction with their services [22, 33]. Stress and job burnout negatively affect satisfaction with the services [45, 50]. Furthermore, poor mental health significantly leads to resignations [48, 56] and migration to other urban areas [35].

Data and descriptive statistics

The present study uses individual data from the National Statistical Organization (NSO), collected annually from Thai populations under the Mental Health Survey (MHS). According to the three-digit ISCO 88 occupation code, the data is limited to healthcare professionals under the minor group codes as follows:

221 medical doctors,
222 nursing and midwifery professionals,
223 traditional and complementary medicine professionals,
224 paramedical practitioners, and
226 other health professionals, such as dentists, and pharmacists.

The study covers the period from 2009 to 2015 and 2018[2] and uses pooled cross-sectional data on 4,263 respondents. In the study, we apply six questions to measure the mental health of healthcare workers, as reported in Table 1.

Table 2 reports descriptive statistics for the sample. The happiness level is slightly high, with an average score of 8.179. Consistently, most of those sampled are highly satisfied with their life and health management, with averages of 2.234 and 1.898, respectively.

For negative mental health issues, samples slightly feel depressed, exhausted, and burned out from work, with an average below one.

Approximately 50 percent of the total samples work as nurses, and 10 percent are categorized as doctors-including general and specialist doctors. Another 40 percent are categorized as other occupations in the healthcare sector, such as dentists and pharmacists. Most of the samples are female, ages 35 and above. Less than 15 percent are young staff aged less than 30 years old. Of the total samples, 30 percent are single and more than 80 percent live in urban/municipal areas.

On average, samples work approximately 44 h per week, with a standard deviation of 11 h per week. Almost 45 percent of the samples work more than 40 h per week, exceeding the maximum hours suggested by the WHO.

[2] The latest NSO mental health data in Thailand is for 2020, the first year of the COVID-19 pandemic. To avoid using noisy data, we omit the period of the pandemic. No data was collected in 2016 and 2017.

Table 1 Mental health variables, description, and measurement

	Description	Measurement scale
Mental health variable		
Current happiness level	How happy a respondent felt at the time of the interview	From 1 (least happy) to 10 (most happy)
General mental health		
Life satisfaction	How satisfied a respondent was with their life	Zero indicates "not at all," one indicates "a little," and two and three indicate "much" and "very much
Feeling depressed[#]	Whether a respondent felt they were suffering and depressed about their life	Zero indicates "not at all," one indicates "a little," and two and three indicate "much" and "very much
Health management satisfaction	Whether a respondent had sufficient time to rest and take care of their health	Zero indicates "not at all," one indicates "a little," and two and three indicate "much" and "very much
Mental health from work/job		
Job burnout[#]	How happy a respondent felt in their current job	Zero indicates "not at all," one indicates "a little," and two and three indicate "much" and "very much
Feeling exhausted from work[#]	Whether a respondent felt too exhausted from work to do housework and other family activities	Zero indicates "not at all," one indicates "a little," and two and three indicate "much" and "very much

[#]The lower scale reflects better mental health status

In addition, around 85 percent of those sampled mainly work in government hospitals.

Empirical methodology

Using a rating scale to assess mental health as dependent variables, most previous studies have applied an ordered logistic regression (e.g., [23, 24]). However, Ferrer-i-Carbonell & Frijters [14] compare the results from a linear fixed-effects (FE) model, which treats mental health rating as a cardinal measure, to those from an FE-ordered logistic specification. The results of both models are similar.

Therefore, we estimate the differentials of healthcare workers' gender on mental health issues with the following linear regression specification:

$$mental\_health_i = \alpha + \beta sex_i + \gamma sex_i * X_i\prime + \delta X_i\prime + \theta_{occ} + \mu_t + \rho_r + \varepsilon_i. \quad (1)$$

In the present study, $mental\_health_i$ covers issues mentioned in Table 1. sex_i represents the gender of respondent i. It is a dummy variable, which equals 1 if a respondent is female, otherwise zero. $X_i\prime$ is a set of socioeconomic variables of respondent i, including age and marital status.

We also examine the interaction terms between a respondent's sex and other characteristics-age and marital status. According to the previous studies, we hypothesize that female healthcare workers should have lower mental health than that of male workers. In this framework, the coefficients of the interactions (i.e., γ) estimate the differential mental health issues of individuals by sex and other characteristics.

θ_{occ} is a set of dummies indicating different occupations. We also add regional (ρ_r) and year (μ_t) fixed effects to control for unobservables across regions and years.

Robustness checks

Due to a concern about omitted variables, we do robustness checks by adding total working hours and the working status of whether a sample currently works for a government hospital. Most results are robust and do not show significant effects when those variables are added to

Table 2 Descriptive statistics

	Observations	Mean	Std. dev.
Mental health			
Happiness score[#]	2,173	8.179	1.033
Life satisfaction	4,263	2.234	0.487
Feeling depressed	4,263	0.859	1.248
Health management satisfaction[#]	2,173	1.898	0.536
Job burnout[#]	2,173	0.809	0.477
Feeling exhausted from work[#]	2,173	0.468	0.688
Occupations			
Doctors (ISCO code = 221)	4,263	0.080	0.271
Nurses (ISCO code = 222)	4,263	0.506	0.500
Other (under ISCO code = 22 except 221 and 222)	4,263	0.414	0.493
Characteristics			
Female	4,263	0.802	0.399
Aged less than 25	4,263	0.028	0.164
Ages 25–29	4,263	0.103	0.304
Ages 30–34	4,263	0.143	0.350
Ages 35–39	4,263	0.186	0.389
Ages 40–44	4,263	0.179	0.383
Ages 45–49	4,263	0.156	0.363
Ages 50 and above	4,263	0.205	0.404
Single	4,263	0.302	0.459
Living in urban area	4,263	0.824	0.381
Working hours[#]	2,173	43.764	11.780
Working for the government[#]	2,173	0.848	0.359

Std. dev. stands for standard deviations

[#]Observations included only in 2014 and 2015

the specification. Additional results are reported in Table A1 of Appendix A.

Results

To explore the preliminary relationship among mental health issues, the pairwise correlation matrix is simply conducted and reported in Table 3. In sum, happiness level and life satisfaction are used to measure the overall mental health of those sampled. A high happiness level reflects high life satisfaction.

Feeling depressed and health management are measured as mental health issues related to the samples' daily life. From the correlations reported, samples feeling depressed are more likely to have a low happiness level and life satisfaction. By contrast, high satisfaction with health management leads to a high happiness level and life satisfaction.

Job burnout and feeling exhausted from work are specifically used for an assessment of mental health related to their work/job. High-scale job burnout and feeling exhausted from work are negatively correlated with happiness level and life satisfaction. Samples who feel exhausted from work are more likely to feel burned out and depressed, as well as dissatisfied with their health management.

These simple correlation tests suggest an interesting conclusion about the link between general satisfaction in life and work-related health issues. Unfortunately, with the limited data available, the present study cannot further correlate the health issues of healthcare workers with their job performance and resignations.

For the linear regression estimates, only the coefficients of the interaction terms are reported in Table 4, while the full results of the regression are reported in Table B1 of Appendix B.

The results show that the level of life satisfaction for new female graduates (aged less than 25 years) in rural areas is significantly higher than that of males. Satisfaction in health management could be one of the causes of this greater sense of well-being. Our results show that those female workers in rural areas have responses approximately 0.5 points higher in health management than males do. On the contrary, young female graduates in urban areas are more likely to feel burned out than those males are. These results contradict what most people expect. Since there has been a high resignation rate and great rural-to-urban mobility for new graduates, early career workers in rural areas of Thailand are expected to have low life satisfaction and happiness levels. Our results, however, are similar to those of other previous studies in Asian countries, such as China [28].

Conversely, young female staff, regardless of location, who have a few years of work experience (ages 25–29) are more likely to be unhappy and dissatisfied with their life than males are. Our results, however, indicate that those young female professionals are likely to be satisfied with the time spent resting and taking care of their health. They are also less depressed in daily activities than are male professionals of the same age. In addition, our results do not show significant differences in job burnout and feeling exhausted from work from those of male professionals. Therefore, we cannot firmly conclude why female healthcare workers ages 25–29 have low well-being, compared to males. At this age, the harassment of female healthcare workers in residency programs, for instance, could be a factor correlated with low happiness and life satisfaction levels [4]. The causes of this low level of well-being should be further investigated when data are available.

Middle-aged female workers (ages 30–44), particularly in rural areas, are more likely to feel burned out and exhausted from work than males are. Female professionals aged 40–44 years in rural areas have scores 0.50 and 0.7 points higher for job burnout and exhaustion, respectively, than males do. A higher score regarding job burnout could occur in younger female professionals (ages 30–34) in urban areas. The results, however, do not clearly reveal that those negative feelings could cause low levels of well-being for middle-aged female workers (i.e., low happiness and life satisfaction levels). It may be somehow correlated with a low level of depression in those ages.

Depression of rural female healthcare workers improved by age. According to Yehya et al. [55], role and

Table 3 Correlations among mental health variables

	Happiness level	Life satisfaction	Feeling depressed	Health management satisfaction	Job burnout	Feeling exhausted
Happiness level	1.000					
Life satisfaction	0.474	1.000				
Feeling depressed	−0.162	−0.104	1.000			
Health management satisfaction	0.189	0.222	−0.034	1.000		
Job burnout	−0.345	−0.424	0.105	−0.343	1.000	
Feeling exhausted	−0.091	−0.034	0.228	−0.197	0.096	1.000

Table 4 Regression estimates by area

	Happiness score		Life satisfaction		Feeling depressed		Health management		Job burnout		Feeling exhausted	
	Urban	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**
Female	0.058	-0.117	0.001	-0.028	0.001	0.169**	-0.054	-0.096	-0.002	0.188*	-0.032	-0.058
	(0.138)	(0.250)	(0.046)	(0.102)	(0.042)	(0.071)	(0.059)	(0.122)	(0.058)	(0.112)	(0.083)	(0.173)
Interaction terms												
Female *aged less than 25	-0.059	-0.804	-0.027	0.404**	0.020	0.009	0.182	0.478*	0.189*	0.008	-0.227	-0.031
	(0.374)	(0.571)	(0.120)	(0.188)	(0.127)	(0.186)	(0.190)	(0.261)	(0.103)	(0.352)	(0.308)	(0.776)
Female *ages 25–29	-0.230	-1.078**	-0.170**	0.125	-0.022	-0.322**	0.106	0.536**	0.129	0.123	-0.358	-0.419
	(0.285)	(0.503)	(0.084)	(0.208)	(0.079)	(0.152)	(0.135)	(0.225)	(0.116)	(0.214)	(0.263)	(0.405)
Female *ages 30–34	-0.413	-0.510	0.007	0.179	-0.006	-0.072	0.094	-0.015	0.286***	0.071	-0.157	-0.023
	(0.279)	(0.452)	(0.084)	(0.149)	(0.072)	(0.129)	(0.103)	(0.159)	(0.111)	(0.197)	(0.179)	(0.303)
Female *ages 35–39	0.012	0.028	-0.077	0.022	0.056	-0.224*	0.007	0.355**	0.017	-0.441***	-0.128	-0.295
	(0.239)	(0.428)	(0.068)	(0.140)	(0.057)	(0.125)	(0.091)	(0.174)	(0.088)	(0.166)	(0.129)	(0.278)
Female *ages 40–44	0.084	-0.045	-0.017	0.045	0.071	-0.587***	-0.024	0.308**	0.013	0.527***	0.022	0.628***
	(0.207)	(0.316)	(0.073)	(0.178)	(0.064)	(0.218)	(0.091)	(0.150)	(0.093)	(0.130)	(0.119)	(0.199)
Female *ages 45–49	-0.572***	0.139	-0.002	0.002	0.029	-0.246	0.039	0.190	0.155	-0.043	0.012	0.269
	(0.216)	(0.380)	(0.069)	(0.134)	(0.055)	(0.151)	(0.119)	(0.176)	(0.099)	(0.207)	(0.115)	(0.244)
Female *single	0.221	0.558	0.102*	-0.028	-0.010	0.164	-0.050	-0.309**	-0.178**	-0.089	0.188*	0.271
	(0.186)	(0.401)	(0.054)	(0.124)	(0.046)	(0.100)	(0.071)	(0.144)	(0.068)	(0.154)	(0.110)	(0.253)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,750	423	3,512	751	3,512	751	1,750	423	1,750	423	1,750	423
R^2	0.0326	0.0744	0.0413	0.0582	0.8797	0.8429	0.0462	0.1043	0.0615	0.0998	0.0648	0.1204

Not all participants answered the questions; the total number of respondents in each question is reported in Table 2. Base groups are male, ages 50 and above, and married. Robust standard errors are in parentheses. The full results of the regression are reported in Table B1 of Appendix B

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

job future unambiguity significantly reduce depression. Physicians working with public hospitals in rural areas of Thailand for an extended period of time can be promoted to the equivalent of a provincial medical chief or deputy director of a central department in the Ministry of Public Health (MoPH). This is one of the strategies the MoPH employs to address the internal exodus of rural physicians [41]. Clear career paths for healthcare workers in rural areas may lower depression.

Single female professionals are more satisfied with their life than males are. However, we find ambiguous results, since they are less satisfied with their health management and more exhausted from work than males are. A higher level of life satisfaction may be due to low job burnout.

Predicted estimates across occupations and areas

We use the regression estimates in Table 4 to predict mental health issues by occupation and geographical area. For happiness levels, female workers, whether doctors or nurses, have lower happiness levels than males do. The differentials are significant for workers in rural areas (Fig. 1). Conversely, life satisfaction is not significantly different across genders. However, whether in urban or rural areas, doctors have higher life satisfaction than nurses do (Fig. 2).

Regardless of gender, nurses in rural areas have the lowest average satisfaction with health management. Female doctors have the highest level of satisfaction with health management. In urban areas, male healthcare workers have slightly higher satisfaction levels than those of females (Fig. 3).

Regarding negative feelings (i.e., depression), female medical workers in urban areas, regardless of occupation, feel more depressed than males do. By contrast, female workers in rural areas are less likely to feel depressed than males are. Regarding areas, workers in urban areas highly feel depressed compared to those in rural areas (Fig. 4).

The differences in job burnout are significant between female and male workers in rural areas. The predictions show that male workers feel less burned out (a high score indicates low burnout) than females do. Doctors are less likely than nurses to have job burnout (Fig. 5).

Overall, predictions of feeling exhausted from work are not high; however, there is a differential between female and male doctors in rural areas. Female doctors are more likely to be too exhausted by work to get involved in other household and family activities (Fig. 6).

Conclusions and discussions

Our study shows that female workers are more likely to feel depressed than males are, particularly in rural areas. We also find that nurses are less likely to be happy and satisfied with life than doctors are. Similar to other studies (e.g., [38, 40, 42]), our results show that young female staff, particularly ages 25–29, are vulnerable to experiencing low well-being. We do not find, however, that older female healthcare workers have low happiness and life satisfaction, contradictory to previous studies of Grotmol et al. [16], Joules et al. [21], Mahmood et al. [25], and Mata et al. [26]. It is possible that they can adjust to the workplace environment or have higher positions, which could improve job satisfaction and well-being.

Mental health disparities across areas have been found in several studies (e.g., [1, 42]). Our study's predictions regarding mental health issues show significant differences in the overall well-being of healthcare workers between urban and rural areas, as well as between

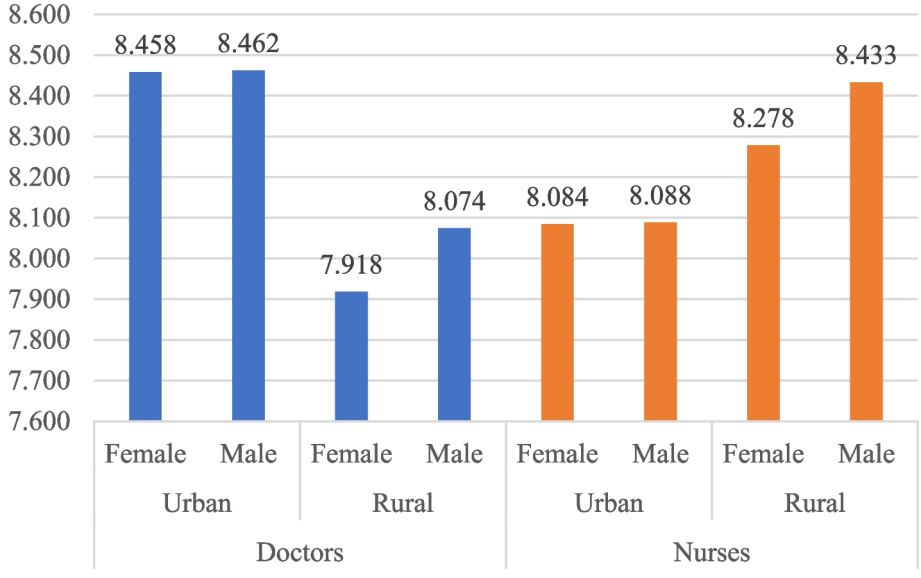

Fig. 1 Prediction of happiness level by occupation and area

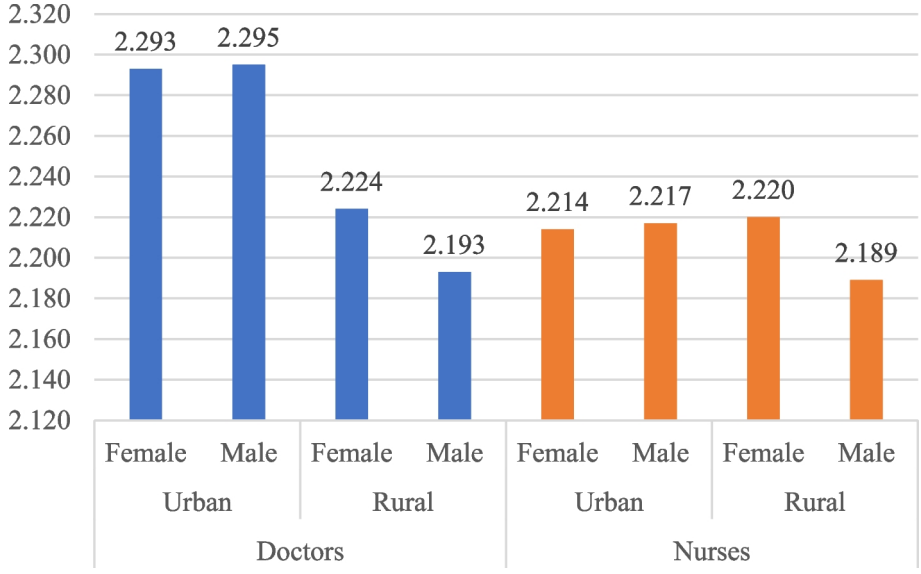

Fig. 2 Prediction of life satisfaction by occupation and area

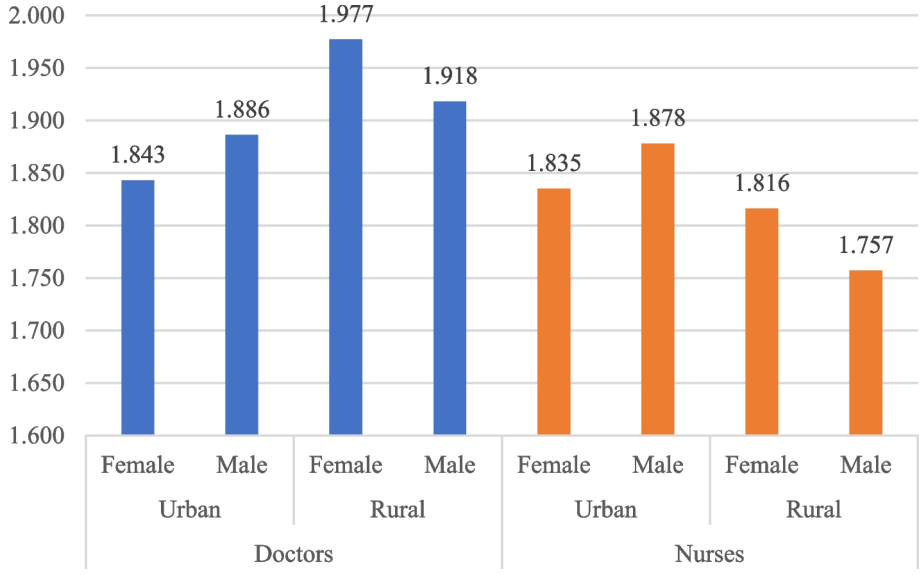

Fig. 3 Prediction of health management satisfaction by occupation and area

doctors and nurses. Healthcare workers in rural areas are less happy and satisfied with their life than those workers in urban areas. Poor health management and feeling burned out could be causes for concern. Regarding occupations, nurses experience a lower level of life satisfaction than doctors do. This could be from high levels of depression and low levels of satisfaction with health management. These results also indicate different factors at the workplace affecting the mental health of doctors and nurses. It is important to adopt different preventive measures to improve the quality of life among the two populations according to the different factors [52].

Job burnout level is higher for rural female healthcare professionals than for males. As burnout increases, the negative effect of career satisfaction and the intention to leave becomes stronger [29]. This factor may link to a high resignation rate of healthcare workers in rural areas of Thailand. Unfortunately, increased job burnout among healthcare professionals, particularly in the public sector, could be worsened by the COVID-19 pandemic.

Our predictions additionally show that rural female healthcare workers have higher exhaustion feeling from work to do housework or other family activities, indicating a possible link between job burnout and their personal life, as well as interpersonal relationships [31]. This issue should be further investigated.

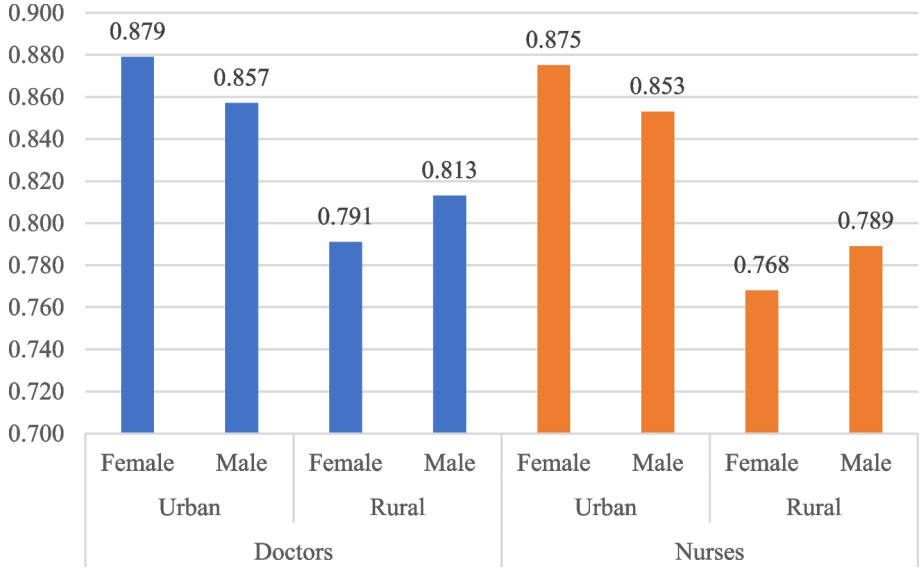

Fig. 4 Prediction of depression feeling by occupation and area

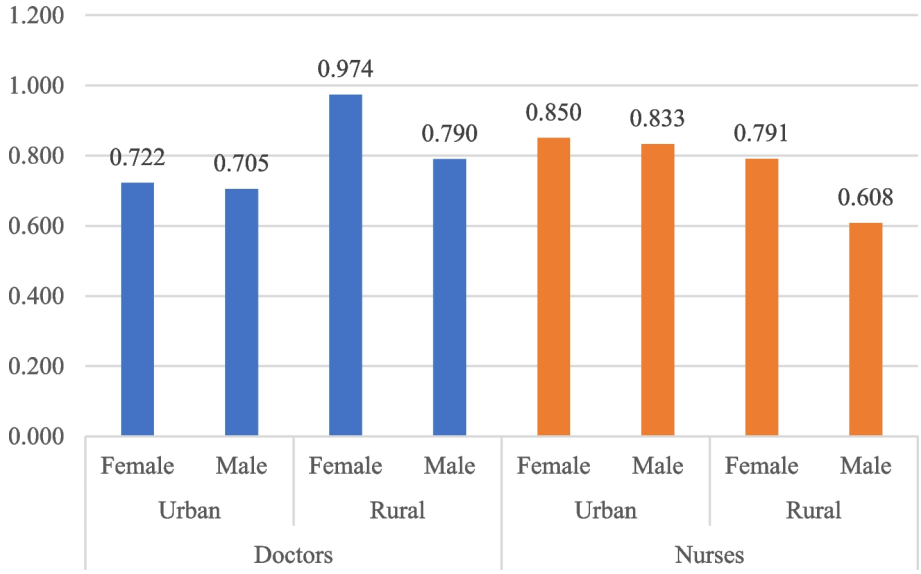

Fig. 5 Prediction of feeling job burnout by occupation and area

Recommendations

At this early stage of the research in Thailand, our results suggest that female healthcare workers are still a vulnerable group, experiencing mental health impairment. Young female workers may have a higher chance of experiencing mental health issues than older staff do. Moreover, for young to middle-aged staff, hospitals should provide an appropriate work environment, to decrease job burnout. Having a career and financial counselor, for example, could increase the overall well-being of newly graduated healthcare workers. These measures taken to improve the mental health status of healthcare professionals could help with staff retention and alleviate the shortage of healthcare workers in Thailand.

Culture may affect Thai people's misunderstanding, misperception, and misbehaving about selfcare and their daily activities—particularly people living in rural areas, such as eating raw and half-cooked food [20], low prevention of sexually transmitted infections [5], and misbelief of disease causes [39]. These could increase the unnecessary workload of healthcare workers and be barriers to medical treatment and counseling. Educating people on correct health behaviors should indirectly reduce workload, which leads to improving healthcare workers' mental health.

Even though our results do not show a significant effect of working hours on mental health impairment, this factor should be further investigated. LGBTQ + healthcare

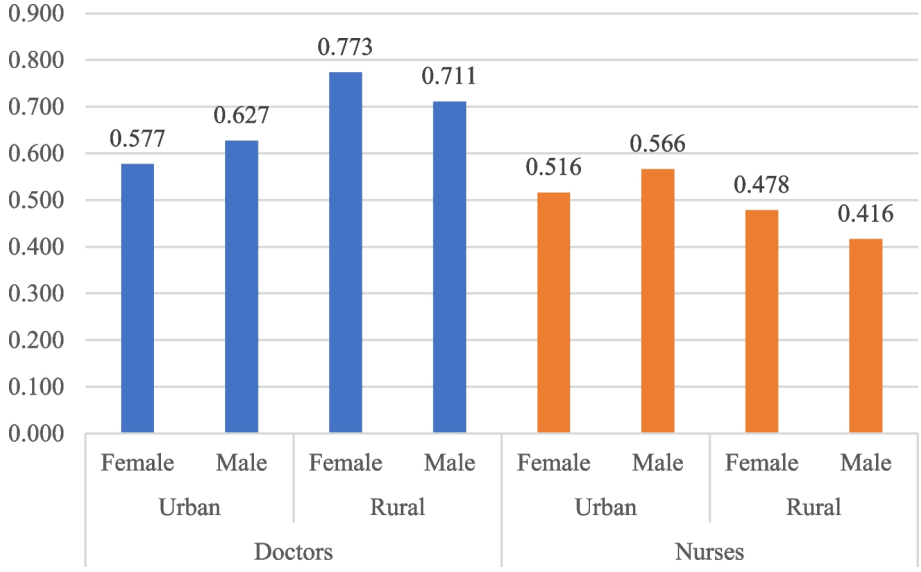

Fig. 6 Prediction of exhausted feeling by occupation and area

workers should be considered since they can experience higher work-related burnout scores than those of non-LGBTQ + healthcare workers, including emotional exhaustion from hiding their sexual orientations and gender identities, as well as workplace discrimination (e.g., [3, 19]).

With the data limitation of this present study, a self-assessment may reflect specific conditions on the day of the interview and cannot be considered a steady state. Long-term data or longitudinal data should be collected. In addition, the study of Siripanumas et al. [37] points out that most physicians are least satisfied with their salary levels. Adequate remuneration may be correlated with mental health status and can be a tool for alleviating retention rates and migration to urban areas. The urbanization effect may be one of the factors influencing the mental health impairment of healthcare workers [13]. This issue should be investigated in Thailand when data is available.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12913-025-12518-x.

Supplementary Material 1.

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Authors' contributions
Conception and research design: NC and KC. Data analysis: NC. Data interpretation: NC and KC. Draft manuscript: NC and KC. Revised manuscript: NC and KC.

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Data availability
The data that support the findings of this study are available from the National Statistical Office (NSO), Thailand. Restrictions apply to the availability of these data, which were used under license for this study. Data are available with the permission of the NSO.

Declarations

Ethics approval and consent to participate
Not applicable.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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