

[Original]

Work-Family Spillover, Job Demand, Job Control, and Workplace Social Support Affect the Mental Health of Home-Visit Nursing Staff

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Abstract : The primary purpose of this study was to clarify the path by which high job demands on home-visit nursing staff affect their mental health through work-family negative spillover (WFNS, FWNS). The secondary purpose was to clarify the path by which high job control and high social support in the workplace positively affect the mental health of nursing home-visit staff through work-family positive spillover (WFPS, FWPS). A cross-sectional survey using a self-administered questionnaire was conducted on 1,022 visiting nursing staff working at 108 visiting nursing stations in Fukuoka Prefecture in February, 2019. The measurement tools comprised sociodemographic factors, the Japanese version of the Survey Work-Home Interaction – NijmeGen (SWING-J), Job Content Questionnaire (JCQ-22), the Work-Family Culture Scale, and the K6 scale. Six models were determined in an analysis of the model: (1) working time load→WFNS→FWNS→psychological distress, (2) job demands→WFNS→FWNS→psychological distress, (3) job demands→psychological distress, (4) workplace support→job control→WFPS→psychological distress, (5) workplace support→WFPS→psychological distress, and (6) workplace support→psychological distress. This study clarified that job demands and working time load may adversely affect the mental health of home-visit nursing staff through the mediation of WFNS. It was also clarified that high job control and workplace support may have a positive effect on mental health through the mediation of WFPS.

Keywords : job control, job demand, work-family spillover, workplace social support, home-visit nursing.

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Introduction

Japan is constructing a community-based comprehensive-care system to help address the country's de-

clining birthrate and aging population [1]. A primary aim of this system is to increase the number of home-visiting nurses to approximately 150,000 by 2025 [2]. As of 2017, there were just 45,845 visiting nurses in

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Japan [3], meaning there is currently a serious shortage of such nurses. The turnover of visiting nurses is associated with their job satisfaction [4], which is, in turn, associated with negative stress reactions, such as poor mental health [5]. Notably, visiting nurses also have a high level of burnout [5]. “Overtime working” and “childcare” are also reasons for the high turnover rate [6]. This issue requires urgent action, as, currently, mental-health problems among home-visit nursing staff can only be treated through care from managers or through self-care.

Many studies of the mental health of home-visit nursing staff have applied the Demands-Control-Social Support (DCS) model [7]. Some studies have reported that, for visiting nurses, work-related stressors exacerbate the difficulty of caring for clients [8, 9], working time load at work [10, 11], and emotional labor [5, 12]; these issues are associated with high job demands (a form of occupational stress) [8, 12, 13], which are, in turn, associated with a risk of serious incidents [7]. Low job control may also increase the risk of mental-health disorders [8]. Meanwhile, poor social support from coworkers and managers can also be a predictive factor for poor mental health [9, 10, 13]. In contrast, good relationships with managers may relieve working time load and prevent mental-health disorders [10, 12, 14]. Notably, for home-visit nursing staffs, active information-sharing with coworkers can reduce incidents and accidents [7], as well as the risk of mental-health disorders and burnout [8, 12, 15]. In Japan, visiting nurses represent 4.2% of the total nurses [16]. Most home-visit nursing staff are female and in their 40s [15]; consequently, it is likely that many of them have many household responsibilities, such as childcare and parental care. Therefore, home-visit nursing staff must be able to flexibly meet both work and family demands [17], and those who successfully fulfill their household responsibilities show high retention rates [18]. These findings suggest that visiting nurses require greater work-life-balance support than hospital nurses. One means of promoting work-life balance among nursing staff is to foster a work-family culture [19], which may be a primary factor influencing employees’ judgment concerning whether or not to remain in their workplaces/careers [20].

Studies regarding the concept of home-visit nursing

staff’s work-life balance remain rare. It is possible that their mental health is influenced not only by occupational stress, but also by family factors such as childcare and parental care. Thus, it is necessary to search for a causal relationship model featuring occupational stress, work-life balance, and mental health. A notable concept relating to work-life balance is “spillover.” Spillover represents a situation in which a job or family role affects the performance of other roles; a negative effect is called “negative spillover,” while a positive effect is called “positive spillover” [21]. However, no previous study has considered the concept of spillover among home-visit nursing staff.

The hypothesis of this study was based on the DCS model [22], in which a state in which job demand (psychological job demands) is high and job control (job decision latitude) is low is defined as a high strain job. This model also suggests that high strain jobs with low workplace social support may be the highest risk for workers to develop health problems. The hypothetical model in this study regarded job demand and job control as independent relationships. We also verified two independent models, with negative factors derived from work as “job demand” and positive factors as “job control” and workplace social support. Job demand, job control, and workplace support are mediated by spillover and affect mental health.

The primary purpose of this study was to clarify the path by which high job demands on home-visit nursing staff (nurse, associate nurse, public-health nurse, nursing-care specialist, physiotherapist, occupational therapist, speech therapist, clerical staff, nursing assistant, and mental health worker) affect their mental health through work-family negative spillover. The secondary purpose was to clarify the path by which high job control and high social support in the workplace positively affect home-visit nursing staff’s mental health through work-family positive spillover. The tertiary purpose was to verify a model that can explain the primary and secondary purposes.

Methods

1. Participants

This was a cross-sectional study. Of the 181 home-visit nursing stations in Fukuoka Prefecture, we tar-

ged 1,022 home-visit nursing staff at 108 facilities with the approval of the administrator. Data collection was performed through an anonymous self-administered questionnaire that was distributed, with a request-to-participate form, by mail to the nursing stations in February 2019. The respective administrators then distributed it to the subjects. Subjects were asked to use an enclosed reply envelope to return the questionnaire directly to the researcher rather than via the administrator.

2. Measurement tools

1) Work and family spillover effects

Work to family negative spillover (WFNS; eight items), family-work negative spillover (FWNS; four items), Work to family positive spillover (WFPS; five items), and family-work positive spillover (FWPS; five items) were measured using the Japanese version of the Survey Work-Home Interaction – NijmeGen (SWING-J) [23], in which items are scored on a four-point Likert scale (0 = “never”; 3 = “always”). The item scores are summed to calculate the total score, with higher scores indicating greater WFPS, FWPS, WFNS, and FWNS, respectively. The J-SWING’s reliability and validity have been verified previously [23]. The Cronbach’s α for the present sample were 0.907 for WFNS, 0.744 for FWNS, 0.772 for WFPS, and 0.833 for FWPS, respectively.

2) Job demands, job control, supervisor support, and coworker support

The Japanese version of the Job Content Questionnaire (JCQ-22) was used to measure job demands (five items), job control (nine items), supervisor support (four items), and coworker support (four items), respectively [24]. All items are rated on a four-point scale (1 = “strongly disagree,” 4 = “strongly agree”). The JCQ-22 includes a 5-item job demand scale with items such as “My job requires working very fast” and “My job requires working very hard,” and a 9-item job control scale with items such as “I get to do a variety of different things on my job” and “I have an opportunity to develop my own special abilities.” The reliability and validity of the Japanese version of the JCQ-22 have been verified previously [24]. For the present sample, Cronbach’s α were 0.579, 0.579, 0.892, and

0.847 for the job demands, job control, supervisor support, and coworker support scales, respectively.

3) Work-Family Culture

The Japanese version of the nurse’s Work-Family Culture Scale (12 items) was used to measure work-family culture [25]. Items are scored on a scale ranging from one to five (1 = “none of the time,” 5 = “all of the time”), and scores are summed to acquire an overall total score. Higher scores indicate a higher likelihood that the respondent’s workplace possesses an organizational culture that supports a work-life balance. For the present sample, Cronbach’s α was 0.906.

4) Psychological distress

The six-item K6 scale was used to measure psychological distress [26]. All responses are given on a five-point scale (0 = “none of the time”; 4 = “all of the time”). Item scores are summed to calculate the total score; higher scores indicate greater psychological distress. The reliability and validity of the Japanese version of the K6 scale have been verified [27]. For the current study, Cronbach’s α was 0.898.

5) Sociodemographic factors

The sociodemographic factors included sex, age, occupation (nurse, associate nurse, public-health nurse, nursing-care specialist, physiotherapist, occupational therapist, speech therapist, clerical staff, nursing assistant, or mental health worker), general nursing experience (years and months), highest level of education (high-school major, graduate school, junior college graduate, university/graduate school graduate), marital status (married, unmarried), number of people in the household, number of dependents, experience as a home-visit nursing staff (years and months), length of service at present workplace (years and months), employment status (full-time, other), average working hours per day (hours and minutes), and member of a 24-hour on-call system (“yes” or “no”).

3. Statistical analysis

The following statistical analyses were performed to build a model to form the basis of the covariance structure analysis.

(1) Psychological-distress scores were compared be-

tween individual groups. Sex, occupation, highest level of education, marital status, employment status, and member status of an on-call system were tested for differences (using t-tests and one-way analyses of variance). The correlation coefficient (Pearson's product moment correlation coefficient) was calculated for age, general nursing experience, number of people in the household, number of dependents, experience as a home-visit nursing staff, length of service at present workplace, and average working hours per day.

(2) The correlation coefficient between the following variables (Pearson's product-moment correlation coefficient) was then calculated:

a. psychological-distress scores; b. work-family culture scores; c. SWING-J subscale scores; d. JCQ-22 subscale scores.

Covariance structure analysis was then performed as follows:

Based on the analysis of the results, we created two basic hypothetical models.

In the first model, working time load (constituent factors: working hours and member status of an on-call system) and job demands were mediated by WFNS and FWNS to influence psychological distress (Model 1-1). In the second model, job control and workplace social support (components: work-life culture, supervisor support, and coworkers' support) influenced psychological distress through WFPS and FWPS (Model 2-1). After this, a covariance structure analysis was performed, and the model with the best goodness of fit was used to construct the final model (Model 1-2 is shown in Figure 1; Model 2-2 is shown in Figure 2). The maximum likelihood method was used for the parameter estimation value. For the parameter constraints, all paths from the error variable to each observation variable were fixed at 1, while one of the paths from the latent variables to the observed variables was fixed at 1. To evaluate the model, the χ^2 test, goodness of fit index (GFI), adjusted goodness of fit index (AGFI), comparative fit index (CFI), root mean square error of approximation (RMSEA), Akaike's information criterion (AIC), Bayesian information criterion (BIC), and consistent Akaike information criterion (CAIC) were used. If $P > 0.05$ in the χ^2 test, the constructed model was judged correct [28], while GFI of ≥ 0.95 , AGFI of ≥ 0.95 , CFI of ≥ 0.95 , and RMSEA of ≤ 0.06 indicate a good fit [28]. To

compare models, AIC, BIC, and CAIC were used; the smaller the value, the better the model.

(3) IBM SPSS statistics for Windows, Version 24, and Amos 23 software (IBM Corp., Armonk, NY, USA) was used for statistical analysis.

4. Ethical considerations

This study was approved by the Fukuoka University Medical Ethics Committee (approval number: 2018M079). All managers of the visiting-nursing stations provided permission for the investigation. We asked the administrators to assure the staff that participation was not compulsory. We considered that, by answering the survey and replying to the survey form, participants were providing consent to participate.

Results

1. Participants' sociodemographic factors

Table 1 shows the participants' sociodemographic factors and psychological-distress scores. Of the 1,022 home-visit nursing staff approached, 245 responses were collected (collection rate: 23.9%). Complete data from 182 of the 245 were used in the analysis. Of these respondents, 16 were male (8.8%) and 165 were female. Average age was 45.1 (± 8.3) years. Regarding occupation, 154 were nurses (84.6%), with 28 having other roles (15.4%). Regarding marital status, 132 were married (72.5%) and 48 were unmarried (26.4%). Average working hours per day was 7.7 (± 1.7). Overall, 128 participants (70.3%) were members of a 24-hour on-call system.

2. Relationship between sociodemographic factors and psychological distress

There was a weak positive correlation between working hours and psychological distress ($r = .233$, $P = .002$). Psychological distress was significantly higher among those who worked at nursing stations with an on-call system (5.8 ± 4.9) than among those without such a system (4.2 ± 4.3 ; $P = .039$).

3. Correlation coefficients between each scale, and Cronbach's α values for each scale

Table 2 summarizes the average value of each scale score, the correlations between each scale, and re-

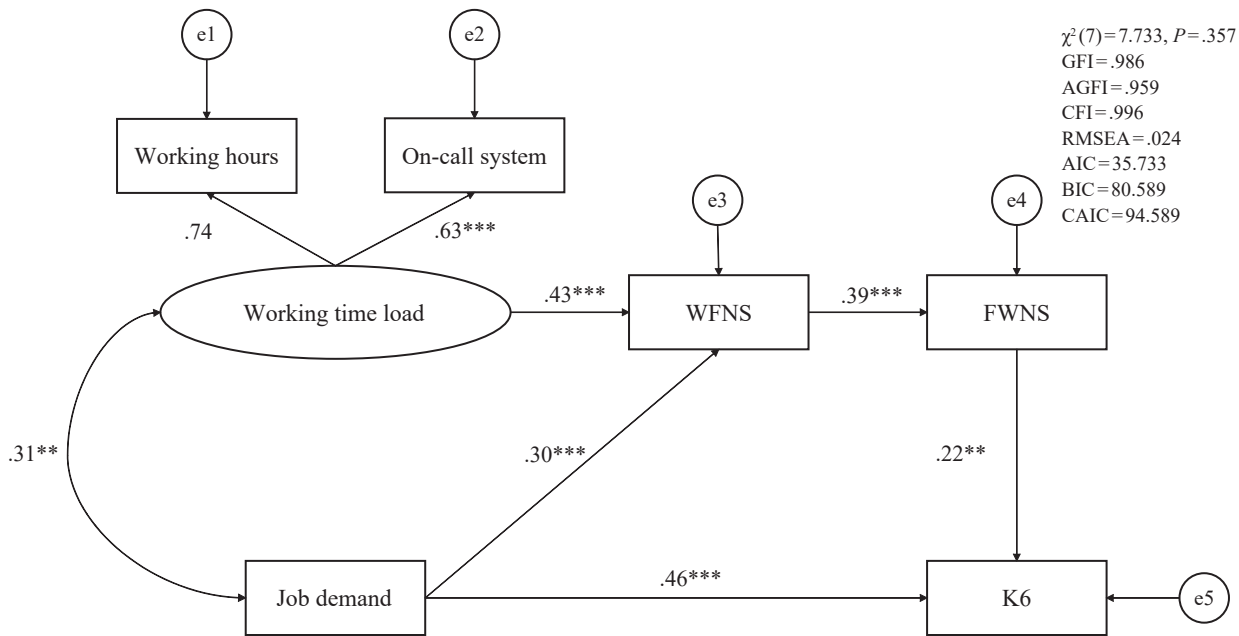


Figure 1. Model 1-2. *** $P < .001$, ** $P < .01$, * $P < .05$, GFI: goodness of fit index, AGFI: adjusted goodness of fit index, CFI: comparative fit index, RMSEA: root mean square error of approximation, AIC: Akaike information criterion, BIC: Bayesian information criterion, CAIC: consistent Akaike information criterion

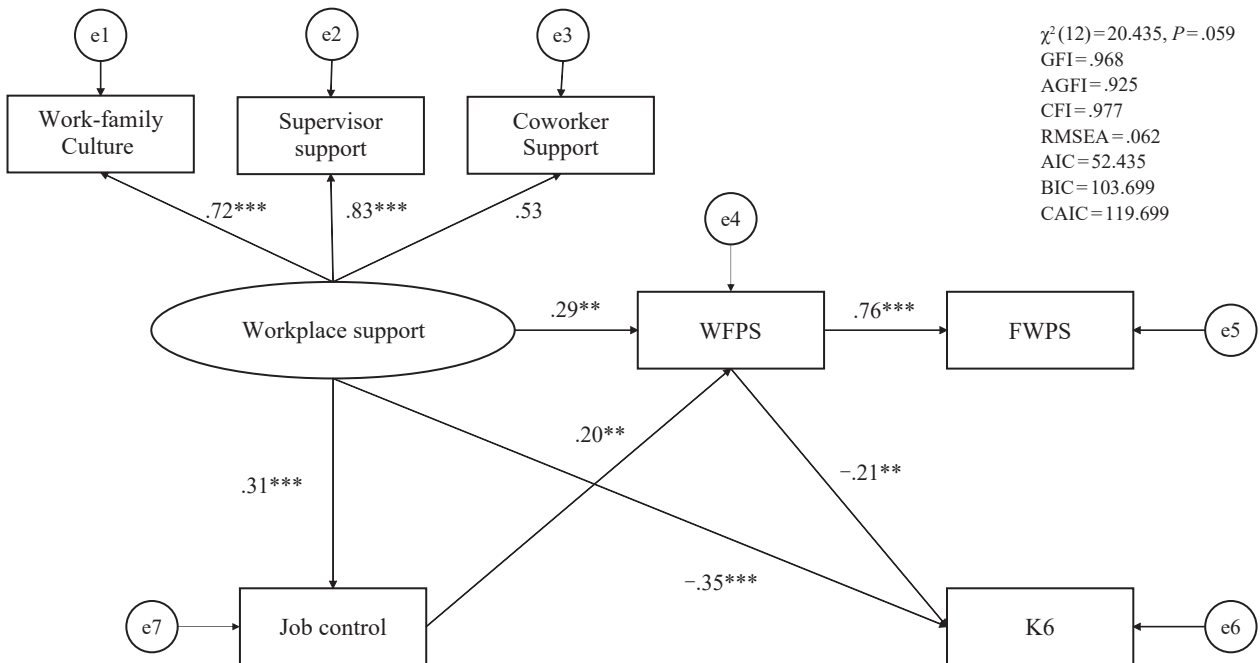


Figure 2. Model 2-2. *** $P < .001$, ** $P < .01$, * $P < .05$, GFI: goodness of fit index, AGFI: adjusted goodness of fit index, CFI: comparative fit index, RMSEA: root mean square error of approximation, AIC: Akaike information criterion, BIC: Bayesian information criterion, CAIC: consistent Akaike information criterion

Table 1. Sociodemographic factors and means and standard deviations in K6 scores of the participants (n = 182)

		n (%) or mean \pm SD ⁴⁾	K6	P
Sex ¹⁾	Male	16(8.8)	5.4 \pm 4.2	0.879
	Female	165 (90.7)	5.3 \pm 4.8	
	Missing data	1 (0.5)		
Age (years) ²⁾		45.1 \pm 8.3	r = -0.54	0.469
Occupation ¹⁾	Nurse	154 (84.6)	5.3 \pm 4.8	0.806
	Other	28 (15.4)	5.5 \pm 4.3	
Work experience (months) ²⁾		230.5 \pm 105.3	r = -0.047	0.532
Highest level of education ³⁾	High school major	18 (9.9)	5.6 \pm 3.9	0.899
	Professional school	121 (66.5)	5.1 \pm 4.8	
	Junior college	17 (9.3)	5.6 \pm 4.2	
	University/Graduate school	26 (14.3)	5.8 \pm 5.3	
Marital status ¹⁾	Married	132 (72.5)	5.0 \pm 4.6	0.184
	Unmarried	48 (26.4)	6.0 \pm 5.0	
	Missing data	2 (1.1)		
Number of households ²⁾		3.5 \pm 1.4	r = -0.049	0.512
Number of dependents ²⁾		0.7 \pm 1.0	r = 0.072	0.359
Experience as a home-visit nursing staff (months) ²⁾		102.0 \pm 74.4	r = 0.004	0.963
Employment status ¹⁾	Full time	125 (68.7)	5.7 \pm 4.7	0.155
	Other	56 (30.8)	4.6 \pm 4.8	
	Missing data	1 (0.5)		
Length of service at present workplace (months) ²⁾		89.9 \pm 71.7	r = -0.047	0.554
Average working hours per day (hours) ²⁾		7.7 \pm 1.7	r = 0.233	0.002**
Member of an on-call system ¹⁾	Yes	128 (70.3)	5.8 \pm 4.9	0.039*
	No	54 (29.7)	4.2 \pm 4.3	

** $P < .01$, * $P < .05$

¹⁾: t-test, ²⁾: Pearson's correlation coefficient, ³⁾: one-way analysis of variance, ⁴⁾: SD; standard deviation

Table 2. Correlation coefficient values between each scale and Cronbach's α values (n=182)

	mean	SD	Pearson's correlation coefficient values for all key variables									Cronbach's α
			1	2	3	4	5	6	7	8	9	
1. K6	5.3	4.7										0.898
2. Work-family culture	32.6	7.6	-.400**									0.906
3. Work to family negative spillover (WFNS)	6.3	4.3	.388**	-.439**								0.907
4. Family to work negative spillover (FWNS)	1.1	1.4	.296**	-.279**	.390**							0.744
5. Work to family positive spillover (WFPS)	6.1	2.9	-.332**	.317**	-.180*	-.116						0.772
6. Family to work positive spillover (FWPS)	7.1	3.2	-.263**	.225**	-.175*	-.175*	.765**					0.833
7. Job demands	32	4.9	.501**	-.345**	.438**	.170*	-.189*	-.084				0.579
8. Job control	69	7.5	-.268**	.214**	-.051	.035	.289**	.215**	-.073			0.579
9. Supervisor support	11.7	2.3	-.319**	.595**	-.174*	-.137	.252**	.134	-.309**	.245**		0.892
10. Coworker support	12.5	1.8	-.122	.322**	.119	-.072	.202**	.080	.039	.194**	.491**	0.847

** $P < .01$, * $P < .05$

spective Cronbach's α values. Job demands ($r=.501$), work-family culture ($r=-.400$), WFNS ($r=.388$), WFPS ($r=-.332$), and supervisor support ($r=-.319$) showed moderate or high correlations with psychological distress.

Work-family culture ($r=-.439$), job demands ($r=.438$), and FWNS ($r=.390$) showed moderate or high correlations with WFNS. FWPS ($r=.765$) and work-family culture ($r=.317$) showed moderate or high correlations with WFPS.

4. Relationship among working time load, job demands, WFNS, FWNS, and psychological distress

The Model 1-1's goodness-of-fit was confirmed, and the causal model was determined to be within the range stipulated in the original hypothesis. Table 3 shows the goodness-of-fit of Model 1-1 and Model 1-2 (which represented a virtual structure). Model 1-2, shown in Figure 1, is a model that excludes paths that were not significant in Model 1-1. The goodness-of-fit values for Model 1-2 were as follows: $\chi^2(7)=7.733$, $P=.357$, GFI=.986, AGFI=.959, CFI=.996, and RMSEA=.024; this represented a good fit. According to Model 1-2, job demands are related to psychological distress ($\beta=.46$, $P<.001$) and WFNS ($\beta=.302$, $P<.001$). The working time load to WFNS ($\beta=.43$, $P<.001$), the WFNS to FWNS ($\beta=.39$, $P<.001$), and the FWNS to psychological distress ($\beta=.22$, $P<.001$) were significant. Regard-

ing the impact on psychological distress, job demands (0.49) had a higher overall impact than working time load (0.037), but working time load (0.43) had a greater direct effect on WFNS than did job demands (0.3).

5. Relationship between workplace support, job control, WFPS, FWPS, and psychological distress

Model 2-1's goodness-of-fit was confirmed, and the causal model was determined to be within the range stipulated in the original hypothesis. Table 3 shows the goodness-of-fit of Model 2-1 and Model 2-2 (which represented a virtual structure). Model 2-2, shown in Figure 2, is a model that excludes paths that were not significant in Model 2-1. The goodness-of-fit of values for Model 2-2 were as follows: $\chi^2(12)=20.435$, $P=.059$, GFI=.968, AGFI=.925, CFI=.977, RMSEA=.062; this indicated a good fit. According to Model 2-2, the relationship between workplace support, psychological distress ($\beta=-.35$, $P<.001$), job control ($\beta=.31$, $P<.001$), and WFPS ($\beta=.29$, $P=.002$) were significant, respectively. The indices of influence from job control to WFPS ($\beta=.20$, $P=.007$), WFPS to FWPS ($\beta=.76$, $P<.001$), and WFPS to psychological distress ($\beta=-.21$, $P=.004$) were also significant. The results indicate that workplace support has a direct positive impact on psychological distress. The overall effect of workplace support (-0.42) was the highest among the variables that affect psychological distress, while supervisor support had the greatest impact among the constituent factors of workplace support. Although indirect effects of workplace support and job control on FWPS and direct effects from WFPS to FWPS were observed, no direct effects of FWPS on psychological distress were observed.

Table 3. Goodness-of-fit of the path diagrams of the models

	Model 1-1	Model 1-2	Model 2-1	Model 2-2
GFI	0.993	0.986	0.972	0.968
AGFI	0.971	0.959	0.922	0.925
CFI	1	0.996	0.98	0.977
RMSEA	0	0.024	0.64	0.062
AIC	35.769	35.733	53.342	52.435
BIC	87.033	80.589	111.014	103.699
CAIC	103.033	94.589	129.014	119.699
χ^2	3.769	7.733	17.342	20.435
df	5	7	10	12
P	0.583	0.357	0.067	0.059

GFI: goodness of fit index, AGFI: adjusted goodness of fit index, CFI: comparative fit index, RMSEA: root mean square error of approximation, AIC: Akaike information criterion, BIC: Bayesian information criterion, CAIC: consistent Akaike information criterion

Discussion

In this study, two variables were identified as work-related factors that increase the stress of home-visit nursing staff: job demands and working time load (being a member of an on-call system, working hours). In the model analysis, the path from working time load to psychological distress was demonstrated to be: (1) working time load \rightarrow WFNS \rightarrow FWNS \rightarrow psychological distress, while the paths from job demands to psychological distress were revealed to be: (2) job demands

→ WFNS → FWNS → psychological distress, and (3) job demands → psychological distress. Two variables, workplace support (supervisor support, coworker support, work-family culture) and job control, were demonstrated to be work-related factors that reduce stress. The model analysis showed that psychological distress is influenced by workplace support through: (4) workplace support → job control → WFPS → psychological distress, (5) workplace support → WFPS → psychological distress and (6) workplace support → psychological distress. We hypothesized that WFPS mediates the effect of FWPS on psychological distress, but FWPS showed no effect on psychological distress. These results suggest that, in order to improve the psychological distress of home-visit nursing staff, it is necessary not only to reduce job demand and working time load, but also to improve WFNS and WFPS. Work-family research has identified that social support from supervisors is an important resource that can reduce the negative effects of work and family stressors [29]. The management of home-visit nursing staff must rely on the discretion of the home-visit nursing station manager. Therefore, managers should be flexible in providing individual support considering the family situation of each staff, if they feel that doing so will lead to a reduction in WFNS and an increase in WFPS.

Job demands had the strongest effect on psychological distress, but working time load had a stronger effect on WFNS than did job demands. This may be related to conflicts caused by household demands (e.g., childcare, parental care, relationship with spouse) and working time load to meet those demands [30]. Studies have suggested that home-visit nurses' temporal pressures may directly affect their mental health [10, 11], but the present results show that WFNS and FWNS mediate this relationship; this finding has implications for developing measures for addressing this issue. Individuals with household responsibilities who also regularly work overtime can experience difficulty adjusting to their working time load, and being on call (especially at night) can reduce sleep time and negatively impact home and professional performance the following day. For nurses working in hospitals, shift work increases conflicts between work and family, reduces sleep quality, and adversely affects health status [31], and visiting nurses who feel working time load

during work are likely to experience emotional fatigue [10, 11] and tend to have a higher burnout risk [32]. For these reasons, managers should seek to identify staff members who have high home-related responsibilities and provide support such as consideration when allocating overtime and exemptions from on-call duties.

The daily work schedule of home-visit nursing must be decided autonomously, albeit with coordination with other professionals and organizations, so that patients continue to receive sufficient, timely care [33]. Thus, visiting nurses tend to require greater discretionary abilities regarding their work when compared to hospital nurses. The high job demands of home-visit nurses may adversely affect their mental health [8], but the present findings indicate that WFPS mediates these positive effects on mental health. Job demands and working time load can spread to the home and affect mental health; thus, it is necessary to build management systems that increase staff's job control in home-visit nursing stations.

There are some limitations to this research. First, the generalizability of the findings is limited and the analysis method was limited because the participants were all sourced from Fukuoka Prefecture, and there was a low response rate. Second, we could not fully investigate the family factors (such as with or without children and the number of children) of the study subjects, meaning we could not fully examine the "family-work spillover". Another important concept in work-life balance, the crossover model [34], was not verified. Detailed information on home-visit nursing services (e.g., number of visits per day, home-visit nursing expertise, size of home-visit nursing station, etc.) should also be investigated. Third, since this was a cross-sectional study, we could not determine the causal relationships between variables. In this research, the model derived from job-related stressors was primarily verified, but the influence of household-related stressors can be assumed as large as that of job-related stressors. In future, we will use a crossover model to clarify the impacts of stressors on relationships with significant others (e.g., spouse) at home. Revalidation is also required; it is necessary to conduct longitudinal studies involving random sampling, with consideration of regional characteristics and the

difference of the position and occupation in the visiting-nurse station, and to identify causal relationships between variables.

Conclusion

This study indicated that job demands and working time load may adversely affect the mental health of home-visit nursing staff through the mediation of WFNS. It was also suggested that high job control and workplace support may have a positive effect on mental health through the mediation of WFPS.

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Conflicts of Interest

The authors declare that they have no conflict of interest.

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