

Psychosocial Factors of Overtime Work in Relation to Work-Nonwork Balance: a Multilevel Structural Equation Modeling Analysis of Nurses Working in Hospitals

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Abstract

Purpose Few studies have investigated the impact of psychosocial factors on overwork and employee well-being while taking into account the complex relationships between such factors and the effect of workplace. The present study aimed to examine the association between psychosocial factors of overtime work and work-nonwork balance using a multilevel structural equation modeling (SEM) technique.

Methods A survey was conducted among nurses working in three hospitals ($n=603$) in Japan. After confirming the constructs of the factors by confirmatory factor analysis (CFA) and exploratory factor analysis (EFA), a multilevel SEM was conducted to investigate the direct and indirect effects of involuntary and voluntary overtime work on work-nonwork balance at both individual and workplace levels.

Results Both involuntary and voluntary overtime work factors were further differentiated into two factors (four factors in total). Involuntary overtime work directly decreased work-nonwork balance on both levels; voluntary overtime work had a direct positive effect. However, voluntary overtime work had a negative indirect effect on work-nonwork balance satisfaction.

Conclusions The use of multilevel SEM techniques to evaluate the association of clinical factors with work-nonwork balance demonstrated that involuntary overtime work has a

negative effect on work-nonwork balance and voluntary overtime work had a positive direct effect but a negative indirect effect.

Keywords Work-nonwork balance · Workplace · Voluntary · Involuntary · Overtime · Intrinsic motivation · Extrinsic motivation

Introduction

Of the many indicators of employee well-being, work-nonwork balance (e.g., work-life balance, work family conflict, and work home interference) has attracted the attention of researchers over the past decades due to the significant demographic shifts in industrialized societies, such as the rising proportion of women, dual-earner couples, and single parents in the paid workforce [1–6]. Although the definitions of work-nonwork balance are many and varied [7], the recent trend is shifting toward the idea that not only employees who have families but also “everyone” who has no care responsibilities should be included in work-nonwork balance studies [8]. Further, the “nonwork” domain includes a wide variety of activities, such as leisure and hobbies in addition to activities related to family issues. In the present study, we defined work-nonwork balance as the balance between paid work and unpaid activities such as family care, leisure, and hobbies.

The effect of work-nonwork balance on employee well-being has been investigated in several reviews [6, 9–13]. Further, the negative impact of work-nonwork balance on physical health [14, 15], mental health [16–26], or both [3, 27–29] has been evaluated. As for the determinants of work-nonwork balance, Geurts et al. states that the amount of time occupied by employment is one of the most obvious ways for

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occupational life to affect family life [30]. Recent studies indicate that quality in addition to quantity, i.e., psychosocial aspects of overtime work such as the distinction between voluntary and involuntary overtime work, is assumed to be an important moderator between overtime work and well-being [31–33]. An analogous concept of involuntary overtime work is the loss of control over working hours, of which a negative effect on well-being has been investigated in several studies [34–39]. A recent study clarified the difference between involuntary and voluntary overtime work regarding the impact on fatigue and job satisfaction [31]. Given that it has already been clarified that psychosocial factors of overtime work affect well-being, we designed the present study to evaluate two complex aspects of work-nonwork balance: the direct and indirect effects of work-nonwork balance and its hierarchical structure at both individual and workplace levels.

When considering the direct effects of work-nonwork balance, involuntary overtime work is likely to impair well-being, although this is not the case for voluntary overtime work. As more hours of work are generally associated with greater income, this may increase well-being. However, when considering the effect in combination with involuntary overtime work, the association becomes less apparent. A recent study reported when overtime work is a required one, it appears to offset the otherwise greater happiness and mental healthiness produced by its additional income [34]. Although voluntary overtime work may have a positive impact on work-nonwork balance directly, this effect becomes unclear when considering the indirect effect through involuntary overtime work. Further, overtime work cannot always be recognized explicitly as “involuntary” or “voluntary.” There may be a gray area between voluntary and involuntary overtime work that is hard to define [31]. We assumed that involuntary/voluntary overtime work is an underlying latent factor behind reasons of overtime work which may concurrently occur. These latent factors may further be differentiated into several factors. Specifically, involuntary overtime work does generate not only from quantitative reasons such as workload but also from more qualitative reasons such as pressures from supervisors [36, 38]. In the present study, we assumed that the latent factor “involuntary overtime work” comprised two factors: involuntary overtime work due to workload and conformity.

With regard to the hierarchical structure, it is natural that within workplaces, employees associate with each other and are influenced by their social context. This indicates that the workplace as a whole has some effect, independent from the individual effect, and if this is not analyzed appropriately, it may bring about inaccurate estimates. It is necessary to assume both workplace levels and individual levels in analyses; these will be discussed in further detail in the “Methods” section.

Regarding the effect of involuntary overtime work, it is likely that involuntary overtime work has a negative effect on work-nonwork balance at the individual level, according to the results of studies on work time control [34–39]. Further, it seems plausible that involuntary overtime work has a negative impact on work-nonwork balance at the workplace level. Accordingly, we proposed hypothesis 1 of the present study as follows:

Hypothesis 1: Involuntary overtime work due to workload and conformity decreases work-nonwork balance satisfaction at both individual and workplace levels.

Regarding voluntary overtime work, the effect on work-nonwork balance may differ between individual and workplace levels. Golden et al. found that those who work extra hours voluntarily had significantly lower perceptions of job demands interfering with family life compared with those working overtime mandatorily [34]. As such, voluntary overtime work on individual level may increase work-nonwork balance. At the workplace level, Tsuru reported that voluntary overtime work by co-workers, particularly by supervisors, may generate involuntary overtime work for other employees [40]. If voluntary overtime work is shared within the workplace, involuntary overtime work may increase for some employees; thus, work-nonwork balance may be impaired. We set hypothesis 2 of the present study as follows:

Hypothesis 2: Voluntary overtime work increases work-nonwork balance at the individual level but decreases work-nonwork balance at the workplace level.

As for the combination effect of involuntary and voluntary overtime work, at the workplace level, voluntary overtime work may relate positively to involuntary overtime work as stated in hypothesis 2. At the individual level, we assumed the same positive relation as at the workplace level and set hypothesis 3 of the present study as follows:

Hypothesis 3: Voluntary overtime work is positively associated with involuntary overtime work, thereby decreasing work-nonwork balance satisfaction through increased involuntary overtime work.

The aim of the present study is to examine the direct and indirect effects of psychosocial factors of overtime work on employee well-being: involuntary and voluntary overtime work on work-nonwork balance satisfaction at both individual and workplace levels using a multilevel structural equation modeling (SEM) technique in the hierarchical structured sample of nurses nested in workplaces. Nurses were chosen as the sample population as they are predominantly women and work shift-wise; both these factors are considered to strengthen the negative association between long work hours and well-being [41–43]. Therefore, the necessity to reduce overtime work may be strong among nurses, for which clarifying the structure of psychosocial overtime work may bring about applicable solutions.

Methods

Participants and Procedure

The original survey was administered at three hospitals in Tokyo, of which 993 full-time working nurses (enrolled nurses excluded) working in general acute wards (intensive-care, emergency, and psychiatric wards excluded) were included. Self-administered questionnaires designed to assess relevant work-life balance factors were distributed from October to November 2013. These data have a multilevel structure with nurses nested within workplaces (wards). Demographic characteristics of individuals (age, sex, years of experience, years in current workplace, education, marital status, children, and night shifts) were collected. Of the 993 questionnaires distributed, 619 were returned, resulting in a response rate of 62.3 %. We excluded questionnaires in which over 10 % of the items were not answered. As a result, 603 questionnaires were included in the study analysis.

Measures

All factors were measured using self-developed questionnaires. Items were generated from a review of relevant literature, including unpublished questionnaires obtained from a range of sources.

Involuntary Overtime Work due to Workload

We defined “involuntary overtime work due to workload” as overtime work due to an inappropriate amount of work required to be completed in a given amount of time in accordance with Caplan’s definition of workload [44]. This factor was measured by questions such as “I have to work over hours because there are so much works to be done in my ward” (1, “strongly disagree”; 5, “strongly agree”).

Involuntary Overtime Work due to Conformity

“Involuntary overtime work due to conformity” was defined as the overtime work generated from implicit pressures from colleagues or supervisors. According to the group dynamic theory, group norms are among the most potent devices that groups have for controlling member behavior [45]. If a norm to stay at the workplace when other members are working exists within a workplace, returning home earlier than others may be a violation to the group norm. The fear of punishment may oblige employees to work overtime. This factor was measured by questions such as “I feel uneasy to go back even when my work is done out of regard to my colleagues” (1, strongly disagree; 5, strongly agree).

Voluntary Overtime Work

“Voluntary overtime work” was defined as overtime work done for positive reasons. According to Tucker [36], a worker may opt to work longer hours in order to enjoy the associated benefits (e.g., job enrichment and self-actualization). This factor was measured by questions such as “I work over time because I would be highly valued” (1, strongly disagree; 5, strongly agree).

Work-Nonwork Balance Satisfaction

According to the definition of work-nonwork balance in the “Introduction” section, “work-nonwork balance satisfaction” was defined as the satisfaction the employee perceives for the balance between paid work and unpaid activities. This factor was measured by questions such as “My work and life (hobby, family, leisure, and so on) are in good balance” (0, strongly disagree; 10, strongly agree).

Statistical Analyses

We conducted multilevel SEM analyses to investigate the study hypotheses. As nested data from nurses are dependent on each other within the workplaces (wards), the assumption of the independence of observations is violated. Accordingly, single-level analyses would result in incorrect standard errors and estimates [46]. On the other hand, the multilevel technique allows us to gain correct estimates by separating the whole variance into within (individual) and between (workplace) levels. Amongst the several kinds of multilevel analysis, we chose multilevel SEM analysis as it allows more than one mediation at multiple levels of analysis in addition to investigating direct effects [47].

In multilevel SEM analysis, variance-covariance matrices are separated into within (individual) and between (workplace) levels, allowing models to be separated into two levels. Scores obtained from the questionnaire were separated into two latent scores: within and between scores [48], which were calculated from the separated variance-covariance matrix. When the nested structured sample was analyzed by single-level analysis, we were unable to determine whether the scores of work-nonwork balance were high due to the workplace (e.g., good management) or to nurse individual (e.g., high ability). The workplace-level model examines the work-nonwork balance of the workplace as a whole. The individual-level model examines the work-nonwork balance of nurses compared with that of other members of the workplace.

In order to conduct multilevel SEM analyses, two preparation steps must be performed. First, we investigated whether measured factors fit the obtained data and had sufficient reliability as the items were self-developed. We conducted

confirmatory factor analysis (CFA), followed by exploratory factor analysis (EFA) (if the fit of the model was poor), as it is reasonable to follow-up a poor-fitting CFA model with an EFA [49]. Regarding the EFA, the number of the factors was selected according to an eigenvalue of over 1.00. Items that did not have factor loadings greater than 0.40 to any of the factors were excluded from the subsequent analysis. Then the items that composed each factor were taken the average and transformed into one variable in the multilevel SEM model.

Second, we investigated whether psychosocial overtime factors could be included at the workplace level of multilevel SEM, which we referred intraclass correlation (ICC). ICC is an indicator of the degree of within-cluster dependency. Higher ICC values imply higher similarity of data within the cluster, and a very low ICC value suggests exclusion from the workplace-level model. Data with an ICC of <0.05 were excluded from the workplace-level analysis of multilevel SEM.

After these preparatory steps, we conducted multilevel SEM analyses. Following the recommendations of Hu and Bentler [50], a good model fit was indicated by $P > 0.05$ on the chi-square test, scores of 0.90 or higher on the CFI, and scores under 0.05 for the RMSEA and SRMR parameters. Demographic variables were introduced to the SEM model if the correlation with work-nonwork balance was found to be significant. All statistical analyses were conducted using the Mplus version 7.2 and R 3.0.2 software.

Results

Baseline Characteristics

Of the 603 staff nurses, 569 (94.4 %) were women and 28 (4.6 %) were men (mean age, 30.62 years; SD, 7.12). The mean years of experience and years in the current workplace were 7.94 years (SD, 7.08) and 3.02 years (SD, 2.63), respectively. Regarding educational status, 66.9 % of the patients held bachelor degrees. The proportion of married participants and those with children were 26.1 and 15.4 %, respectively. The proportion of nurses who worked in night shifts was 93.6 %.

Confirmatory and Exploratory Factor Analysis

We first conducted CFA but were unable to obtain a good fit (CFI, 0.892; TLI, 0.875; RMSEA, 0.072). Thus, we conducted EFA with a five-factor model selected according to eigenvalues. Eigenvalues were as follows: factor 1, 5.19; factor 2, 2.20; factor 3, 1.96; factor 4, 1.55; and factor 5, 1.20 (factor 6, 0.74). The results of EFA and the correlations between the factors are shown in Table 1. Factors 1–3 were composed of items for involuntary overtime work due to conformity, involuntary overtime work due to workload, and work-nonwork

balance satisfaction as assumed in the hypothesis. Factors 4 and 5 were composed of items contrary to the hypothesis. The item assumed to compose the factor “voluntary overtime work” was separated into two factors. One was composed of the two items “I work overtime because I would be highly valued” and “The overtime money is crucial for my life,” and the other was composed of items such as “I don’t feel it oppressed to work long.” We assumed the former factor as an indicator of extrinsic motivation and the latter factor as an indicator of intrinsic motivation. Thus, the fourth factor was named “voluntary overtime work due to extrinsic motivation” and the fifth factor was “voluntary overtime work due to intrinsic motivation.”

Investigation of ICC

ICC of each factor is shown in Table 2. We decided to exclude voluntary overtime work due to extrinsic motivation and voluntary overtime work due to intrinsic motivation from the workplace-level model because of ICC values of only 0.03 and 0.02, respectively.

Multilevel SEM Model

In the individual-level model, paths were depicted first according to the hypothesis and the nonsignificant path was then deleted. In the workplace-level model, two involuntary overtime work factors were found to have a very strong correlation (0.60) and the existence of an underlying latent variable was implied. Thus, a latent variable, involuntary overtime work, consisting of two involuntary overtime work variables was created.

An overview of the final model is shown in Fig. 1. The fit indices for the multilevel SEM indicated a good model fit ($\chi^2(9)$, 9.14; $P=0.424$; RMSEA, 0.005; CFI, 1.00; TLI, 0.998) and individual-level and workplace-level SRMR indices (SRMRW, 0.022; SRMRB, 0.002). For the individual-level model, both involuntary overtime work due to workload and involuntary overtime work due to conformity had a negative effect on work-nonwork balance. Voluntary overtime work due to extrinsic motivation had a weak positive effect on work-nonwork balance. Voluntary overtime work due to intrinsic motivation had no significant effect on work-nonwork balance. Both involuntary overtime work factors were positively associated with both voluntary overtime work factors. For the workplace-level model, the latent variable “involuntary overtime work” had a significant negative effect on work-nonwork balance.

The indirect effect of voluntary overtime work on work-nonwork balance satisfaction is shown in Table 3. Voluntary overtime work due to both extrinsic and intrinsic motivation had a negative effect on work-nonwork balance satisfaction indirectly.

Table 1 Factor loadings and interfactor correlations of the psychosocial overtime work factors

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
I feel uneasy to go back even when my work is done out of regard to my colleagues	0.83	0.06	0.03	-0.11	0.04
I feel uneasy to go back when my boss and superiors still remain in my ward	0.88	-0.08	0.02	-0.01	0.05
I feel unpleasant when I see newcomers or juniors leave the ward before seniors	0.41	-0.05	-0.02	0.20	0.08
It is unfavorable to go back when others still remain in my ward	0.59	0.07	0.01	0.15	-0.09
I have to work over hours because many of my colleagues in my ward is engaged in overwork	0.49	0.29	-0.08	0.25	-0.07
I have to work over hours because there are so much works to be done in my ward	0.07	0.84	-0.02	-0.02	0.01
The work hour in my ward tends to be long because there are sudden deterioration of the patients and emergency admission	-0.01	0.65	0.05	0.02	0.03
I have to work over hours because the manpower in my ward is in shortage	0.03	0.83	-0.01	-0.01	0.01
I have to work over hours because I have to write the nurse record	0.02	0.87	0.02	-0.04	0.03
I cannot deal with the degree of severity and the number of assigned patients during the fixed time	-0.03	0.79	0.00	0.06	0.01
I work over time because I would be highly valued	0.08	-0.02	0.01	0.73	0.02
The overtime money is crucial for my life	-0.04	0.00	0.04	0.67	0.10
It is natural to work over hours if one has passion for his/her job	0.03	0.07	-0.08	0.17	0.45
I sometimes find myself working overtime unaware when I am buried in my work	-0.03	0.11	-0.02	-0.02	0.56
I don't feel it oppressed to work long	0.02	-0.23	0.05	0.02	0.56
My work and my life (hobby, family, and leisure) are in good balance	0.06	-0.10	0.83	-0.02	0.01
Both my work and my life (hobby, family, and leisure) are fulfilled	-0.02	0.02	0.96	-0.01	-0.01
My work and my life (hobby, family, and leisure) influence each other in a good way	-0.12	0.08	0.48	0.17	-0.01
Correlation between factors					
Factors	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1	1.00	0.36	-0.21	0.24	0.18
Factor 2		1.00	-0.26	0.18	0.18
Factor 3			1.00	-0.05	0.01
Factor 4				1.00	0.26
Factor 5					1.00

Discussion

The present study investigated the relationships between voluntary/involuntary overtime work and the work-nonwork balance of nurses in a comprehensive model considering the effect of both individual and workplace. To our knowledge, this is one of the first studies to investigate both individual and workplace effects of psychosocial factors on nurse well-being using the multilevel SEM technique. In what follows, we will investigate the following hypothesis:

Table 2 Means and ICC of between (workplace) level analysis of psychosocial overtime work factors

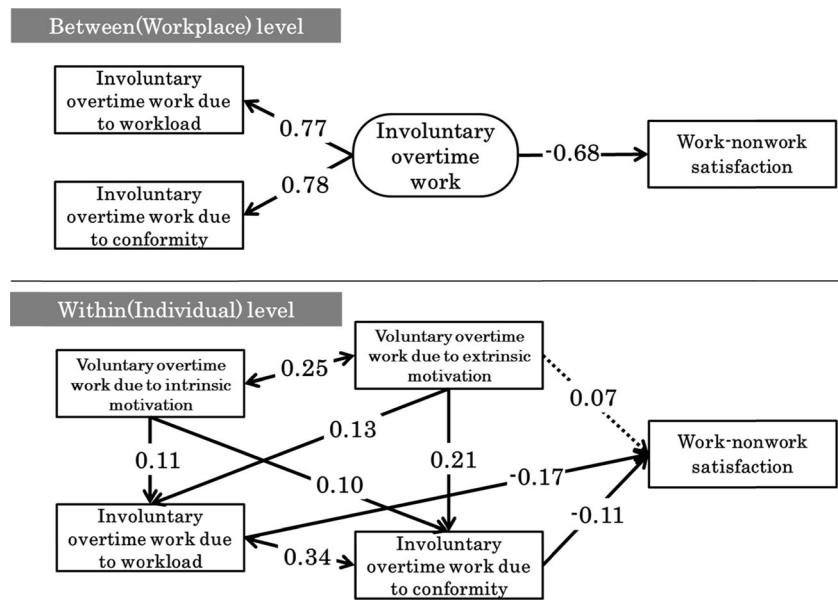
Factor	Means	ICC
Involuntary overwork due to conformity	2.91	0.13
Involuntary overwork due to workload	3.63	0.44
Voluntary overwork due to extrinsic motivation	1.38	0.03
Voluntary overwork due to intrinsic motivation	2.04	0.02
Work-nonwork satisfaction	4.83	0.10

Hypothesis 1: Involuntary overtime work due to workload and conformity decreases work-nonwork balance satisfaction at both individual and workplace levels.

The results of the present study supported hypothesis 1. At the individual level, both involuntary overtime work factors decreased work-nonwork balance satisfaction. This result corroborates previous studies on the role of involuntary (mandatory) overtime work in employee well-being [34–39]. Further, this result is in line with those of the studies on nurses demonstrating that mandatory overwork increases musculoskeletal disorders [51] and work-related injuries and illness [52]. It should be noted that individual-level scores in multilevel models are the deviation from the cluster mean. Therefore, this result should be interpreted as nurses working overtime more involuntarily compared to the other members of the workplace will have a relatively lower work-nonwork balance than the other members, regardless of the work-nonwork balance of the workplace as a whole.

At the workplace level, the latent variable “involuntary overtime work” had a strong negative effect on work-nonwork balance. The shared experience of involuntary

Fig. 1 Standardized path coefficients of multilevel SEM investigating the effect of involuntary and voluntary overwork on work-nonwork satisfaction, including mediating effects. The model is adjusted according to sex, age, and years on the current ward (not shown for visibility). *Black solid lines* represent coefficients significant to $P < 0.05$. *Dashed lines* represent coefficients significant to $P < 0.10$



overtime work within the workplace decreased work-nonwork balance of the workplace as a whole. This indicates that individuals are not solely responsible for overtime work. According to ICC values, a significant proportion of overtime work, particularly overtime work due to workload (ICC, 0.44), is undertaken for workplace reasons, indicating the importance of workplace strategies.

Hypothesis 2: Voluntary overtime work increases work-nonwork balance at the individual level but decreases work-nonwork balance at the workplace level.

This hypothesis was partly supported by the results of the present study. Contrary to our hypothesis, the result of EFA demonstrated that voluntary overtime work was differentiated into two factors: voluntary overtime work due to intrinsic motivations and voluntary overtime work due to extrinsic motivations. This can be explained by the motivation theory that differentiates between extrinsic and intrinsic motivation [53]. Intrinsic motivation is an activity engaged in for its own sake, for some inherent pleasure or satisfaction. Extrinsic motivation is an activity to seek out anticipated satisfaction obtained

from motivation such as money or reputation. It was confirmed that in regard with voluntary overwork, these two motivation concepts were empirically distinguished.

At the individual level, voluntary overtime work due to intrinsic motivation had no significant effect on work-nonwork balance. On the other hand, although the effect was fairly weak, increases in voluntary overtime work due to extrinsic motivation has a positive effect on work-nonwork balance. The appetite and satisfaction gained by wage and reputation was large enough to offset and bring about additional positive effects, even after accounting for overtime work. This is in line with previous finding that majority of those who work overtime voluntarily did not feel that job demands interfered with family life [34]. It should be noted that this positive relation is true only if the effect of involuntary overtime work is fixed. When the concurrent effect of involuntary overtime work is taken into account, these results are likely to change, as discussed in hypothesis 3. At the workplace level, voluntary overtime work did not have sufficient variance to be included in the workplace-level analysis. This indicates that

Table 3 Standardized parameter estimates of the indirect effects of psychosocial overtime work factors on work-nonwork balance satisfaction according to the multilevel SEM model

Indirect effect	Mediator	Parameter estimate (β)
Voluntary overwork due to extrinsic motivation	Involuntary overtime work due to conformity	-0.024*
	Involuntary overtime work due to workload	-0.023**
	Sum of indirect effect	-0.047**
Voluntary overwork due to intrinsic motivation	Involuntary overtime work due to conformity	-0.011*
	Involuntary overtime work due to workload	-0.019*
	Sum of indirect effect	-0.031**

* $P < .05$; ** $P < .01$

voluntary overtime work is almost entirely explained by individual reasons. Involuntary overtime work had a comparatively high ICC, indicating that “have to do” situations are shared within the workplace. However, voluntary overtime work, i.e., “want to do” situations, depends only on individuals and is not affected by social context.

Hypothesis 3: Voluntary overtime work is positively associated with involuntary overtime work, thereby decreasing work-nonwork balance satisfaction through increased involuntary overtime work.

The results of the present study supported this hypothesis. Both forms of voluntary overtime work indirectly decreased work-nonwork balance through involuntary overtime work. As previously shown, voluntary overtime work due to extrinsic motivation has a positive effect on work-nonwork balance; thus, the overall effect on work-nonwork balance is almost zero when direct and indirect effects are considered together. This indicates that when nurses engage in overtime work to obtain satisfaction such as a higher wage, satisfaction does increase, though at the same time, the adverse effects are progressive, resulting in the negation of the beneficial effects. The latter process may be unconscious but may be acknowledged when one engages in overtime work voluntarily. A prior study found that when nurses worked more than 4 hours of voluntary paid overtime in the average week, the likelihood of adverse events and medical errors increased [54]. We must be aware that overtime work to seemingly fulfill satisfaction may ultimately have negative effects on nurse well-being and endanger patient safety.

The strength of the present study was that we were able to use the multilevel SEM technique. By analyzing workplace and individual effects concurrently, the observed variable can be separated into two latent variables: workplace and individual. Without multilevel analysis, we were unable to identify whether the effect estimated by the analysis occurred due to workplace or individual reasons, which limits the ability to form effective strategies. By using multilevel SEM, it is possible to calculate individual estimates controlled for workplace and vice versa, thereby allowing measurements based on more accurate evidence.

However, the present study had several limitations. First, data were collected in a cross-sectional manner. As such, causal relationships were inconclusive. The relationships proposed by our hypotheses require further testing by longitudinal studies. Second, work-nonwork balance and psychosocial overtime work factors were assessed on the basis of responses to the original self-developed questionnaire. Although the reliability of those constructs is assured by EFA, they have yet to be validated. Third, the present study is based on self-reported measures and thus may be affected by issues of common-method variance. Therefore, the true associations between variables may be weaker than the relationships observed by the present study. Fourth, the study population was Japanese

nurses working in hospitals, indicating generalizations to other countries and occupations should be done with caution. In particular, “overtime work due to conformity” may be stronger in Japan compared with other countries as collectivism is considered to be stronger in Japan [55]. Thus, further research is required to determine whether the findings of the present study can be generalized to other Asian and Western countries.

Conclusions

In conclusion, the present study using a multilevel-SEM technique demonstrated that overtime work can be separated into involuntary and voluntary overtime work. These can be further differentiated according to the reason for overtime work. Involuntary overtime work had a negative effect on work-nonwork balance at both workplace and individual levels. Although voluntary overtime work had either a positive effect or no effect on work-nonwork balance directly, a negative indirect effect was observed. The findings of the present study indicate that psychosocial factors related to overtime work have distinct effects on employee well-being.

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Author Contributions Mayumi Watanabe designed the study, developed the methodology, collected the data, performed the analysis, and wrote the manuscript. Keita Yamauchi designed the study and modified the manuscript.

Compliance with Ethical Standards

Conflict of Interest Mayumi Watanabe and Keita Yamauchi declare no conflicts of interest.

Ethical Approval We conformed to the Helsinki Declaration concerning human rights and informed consent, and we followed correct procedures concerning treatment of humans in research. The whole procedure was approved by the Ethics Committee of the Graduate School of Health Management, the University of Keio.

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