

Work-family conflict and sleep disturbance: the Malaysian working women study

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Abstract: This study aimed at assessing effect of the four dimensions of work-family conflicts (strain and time-based work interference into family and family interference into work) on sleep disturbance in Malaysian working women. This cross-sectional study was conducted among 325 Malaysian married working women. Multiple-stage simple random sampling method was used to recruit women from public service departments of Malaysia. Self-administrated questionnaires were used to measure the study variables and data were analyzed using SPSS version 21. We found that high level of the four dimensions of work-family conflicts significantly increase sleep disturbance. Our analyses also revealed an age-dependent effect of the work-family conflict on sleep disturbance. Women in their 20 to 30 yr old suffer from sleep disturbance due to high level of time-based and strain-based work-interference into family. However, the quality of sleep among women aged 30–39 were affected by strain-based family-interference into work. Finally, women older than 40 yr had significantly disturbed sleep due to strain-based work-interference into family as well as time-based family interference into work. Our findings showed that sleep quality of working women might be disturbed by experiencing high level of work-family conflict. However, the effects of inter-role conflicts on sleep varied among different age groups.

Key words: Work-family conflict, Sleep, Life-cycle perspective, Sleep disturbance

Introduction

Employees spend almost a third of their daily time at work and the same amount of time asleep. These two important domains can affect health and well-being of employees. Sleep problems are critical issues in the working population¹⁾. Several work characteristics such as higher job demands, physical effort at work and night shift have been linked to increased sleep disturbance among employees²⁾. In addition, increased sleep disturbance was shown to be higher in married employees²⁾ with significantly

higher sleep disturbance among female employees^{3, 4)}. These findings suggest a need for research on determining the factors related to poor sleep quality among married working women.

Moreover, increased female labor force participation, especially married women with children have exacerbated the complications for balancing working-life with household and childcare responsibilities. It has been shown that women engaged in a greater share of domestic and child care responsibilities compared to men in both developed^{5, 6)} and developing countries such as Malaysia⁷⁾. Malaysia is a rapidly developing country which has faced increasing female labor force participation. These demographic changes attract Malaysian scholars to issues such as work-family conflict. Lack of ability to balance work

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and home responsibilities may cause work-family conflict. Interference between work and family life has been shown to affect health and health-related behaviors⁸⁻¹⁰ including sleep disturbance and sleep complaints¹¹⁻¹³.

Sleep is an essential prerequisite for human functioning¹⁴. Sleep quality refers to the variety of disorders ranging from difficulties in falling asleep and staying asleep. However, sleep quantity refers to the amount of time spent in sleeping^{15, 16}. Sleep studies showed that both sleep quality and quantity are important^{17, 18}. Majority of sleep research are conducted in the laboratory, while the sleep research can also be conducted in field research¹⁵. One of the common tools for measuring sleep in the field research is actigraphs which is used for measuring both sleep quality and quantity^{15, 19}. On the other hand, there are varieties of self-reported scales which measure sleep disorders. Although, self-rating sleep may overestimate sleep¹⁷ but, it has been recommended as a helpful instrument to conduct sleep studies on organizational psychology¹⁵. Schat & Kelloway²⁰ developed the Physical Health Questionnaire (PHQ) which is able to measure sleep disturbance in the organizational and work settings. This scale questions about frequency of difficulties in getting sleep, waking up during the night, having nightmare and disturbed sleep.

Some studies have reported that work-family conflict is associated with sleep complaints among Japanese civil servants²¹, Finish employees¹², British employees¹¹ and Swedish population²². However, the linkage between work-family conflict and sleep disturbance is not studied in Malaysia previously. Barnes *et al.*²³ expanded the previous knowledge by finding a strong negative association between time spent at work with time spent sleeping. In addition, an interaction between work and family in predicting sleep also was reported. In other word, there was an inverse association between times spent at work with times spent sleeping when there was a higher amount of time spent with family. Furthermore, it has been shown that work-family conflict, both in short-term and long-term predict sleep deficiencies²⁴.

Despite the advances in examining the association between work-family conflict and sleep quality and/or quantity, little is known about the effect of multi-dimensional construct of work-family conflict on sleep. Conceptually, work-family conflict has been defined as a multi-dimensional construct. Two directions have been identified for the inter-role conflict, including Work-Interference into Family (WIF) and Family Interference into Work (FIW). This is a reciprocal relationship in which work issues occur if the job obligations remain unfulfilled because one's

family interferes with work. Consequently, work issues interfere with family domain. Nevertheless, work-family conflict is not limited to the two mentioned directions and is expanded to a four dimensional construct²⁵. These dimensions are time and strain based inter-role conflict. The four dimensions of work-family interferences need to be distinguished and assessed separately because each one may has a unique set of consequences. To date, no attention has been paid to the four dimensions of work-family conflict among Malaysian sample. Therefore, in this study, we use the four dimensions of time-based WIF (WIFt), strain-based WIF (WIFs), time-based FIW (FIWt) and strain-based FIW (FIWs). The present study aimed to investigate effects of the four dimensions of work-family conflict on sleep disturbance in the presence of related confounders among married Malaysian working women.

Sleep disturbance is associated with physical activity²⁶, BMI²⁷, job characteristics²⁸ general health status²⁹ and health-care utilization³⁰. Therefore, in this study we included the following factors as the control one; work characteristics, background factors, physical activity, Body Mass Index (BMI), general health, longstanding disease and frequency of outpatient and inpatient visit during last 12 months.

Subjects and Methods

This cross-sectional study is part of a bigger study that was conducted among Malaysian women working as civil servants. This study obtained ethics approval from National University of Malaysia, Medical Centre (UKMMC). Respondents were randomly recruited from different public departments in Selangor, Kuala Lumpur and Putrajaya. Women who agreed to participate in this study signed a written consent form. Data analyses were based on 325 married working women with at least having one child and minimum of 6 months work experience in the current positions. Women with a history of mental illness and current treatment with psychological medication were not eligible to enter into this study. A series of self-administrated questionnaire was used in this study which are presented below.

Background factors and BMI

Age, education, number of children, duration of working hours per week was obtained from the respondents. Weight and height of employee were measured to calculate their BMI.

Sleep disturbance

Sleep disturbance was measured using Physical Health Questionnaire (PHQ)²⁰. This questionnaire contains four items which asks about frequency of difficulties in getting sleep, waking up during the night, having nightmare and disturbed sleep. An example of the item is: How often have you had difficulty getting to sleep at night? The response options range from 1 (not at all) to 7 (all of the time) which yield in a total score of 4 to 28 and the higher score indicate higher sleep disturbance. The Cronbach's alpha for the sleep disturbance was 0.94.

Work-family conflict questionnaire

Work-family conflict was measured using the questionnaire developed by Kelloway²⁵ and has been validated in the Malay language³¹. The questionnaire includes 22 Likert type scale with response option ranging from 1 (strongly disagree) to 5 (strongly agree). There are four dimensions including time-based WIF (WIFt), strain-based WIF (WIFs), time-based FIW (FIWt) and strain-based FIW (FIWs). There are 6 items for each strain-based dimension and 5 items for each time-based dimension. The score for time-based WIF and FIW range from 5–25 while, the score for strain-based WIF and FIW range from 6–30. The higher scores indicate higher level of inter-role conflict. The Cronbach alpha for time-based WIF, strain-based WIF, time-based FIW and strain-based FIW was 0.83, 0.76, 0.76 and 0.84, respectively.

In order to examine effect of work-family conflict on sleep disturbance, we ranked the level of conflict according to the calculated tertiles. The first tertile is called low level, second tertile medium level and finally the third tertile is called high level of work-family conflict. Based on our findings, first tertile of time-based WIF and FIW ranged from 5–10, second tertile range from 11–14 and the last tertile range from 15–25. For the strain-based WIF and FIW, the first tertile ranged from 6–13, second tertile ranged from 14–16 and the last tertile ranged from 17–30.

Health indicators

Single item question were used to measure the respondent's general health status. The item was "In general, how do you rate your health status?" The response option was 5 items Likert type scale ranging from 1 "very poor" to 5 "excellent". Furthermore, women were asked to state any longstanding disease they have had. Women were also asked to identify frequency of visiting a medical doctor as well as hospitalization during past 12 months.

Statistical analysis

The analyses in the current study started with reporting descriptive statistics of socio-demographic factors, work-family conflict dimensions, sleep disturbance and other variables. Next, we examined the association between each dimension of work-family conflict within the three tertile of WFC and sleep disturbance using ANOVA. Analysis of covariance (ANCOVA) was conducted to assess the effect of three levels of strain and time-based work-family conflict and family-work conflict on sleep disturbance in the presence of the potential confounders. These confounders were age, educational achievement, number of children, caring for elderly, level of physical activity, general health status, BMI, longstanding disease, frequency of inpatient and outpatient visit during the last 12 months. We conducted a models to examine the effect of the four dimensions of work-family conflict on sleep disturbance. In addition, the interaction effect of any significant confounder and WFC on sleep disturbance was examined. We checked the moderating effect of age on the association between WFC dimensions and sleep disturbance by adding the interaction of WFC and age to the model. Respondents were classified into three groups and these groups were; group 1=20–29 yr, group 2=30–39 yr and group 3=more than 40 yr old.

Results

Sample characteristics are presented in Table 1. The mean age of the 325 married working women who had at least one child was 36.3 (SD=9.1) yr old. These women had average 2.3 (SD=1.3) children and 65.5% (n=213) of them had education up to the undergraduate. Women in this study reported that they are working for 42.7 (SD=5.3) h per wk in average. In terms of physical exercise, majority of women (66.2%) were categorized in low level of physical activity category.

In addition, respondents were asked to rate their health in general and 58.5% (n=190) rated their health as good, 10.5% (n=34) excellent, 27.7% (n=90) fair, 3.1% (n=10) poor and 0.3% (n=1) very poor. For further analysis we dichotomized health as 0=good (excellent and good) vs. 1=not good (fair, poor and very poor).

With regards to the frequency of outpatient visit, women reported average 3.66 (SD=3.9) visits during last year and the mean of hospitalizations (more than 24 h) was 0.32 (SD=0.67). In terms of longstanding health problem, 6.8% (n=22) reported having health problem. The mean of sleep disturbance was 13.2 (SD=3.4), the minimum score was 4

Table 1. Sample description

Variables	Mean ± SD	N (%)
Age	36.3 ± 9.1	-
No children	2.3 ± 1.3	-
Education		
Undergraduate	-	213 (65.5%)
Postgraduate	-	112 (34.5%)
Work experience	42.7 ± 5.3	-
Physical activity		
Low	-	215 (66.2%)
High/Moderate	-	110 (33.8%)
General health		
Excellent	-	34 (10.5%)
Good	-	190 (58.5%)
Fair	-	90 (27.7%)
Poor	-	10 (3.1%)
Veery poor	-	1 (0.3%)
Outpatient visit	3.66 ± 3.90	-
BMI	25.3 ± 24.9	-
Hospitalization	0.32 ± 0.67	-
Longstanding Health problem		
Health problem	-	22 (6.8%)
Sleep disturbance	13.2 ± 3.40	-
Age category		
20–29	-	102 (31.4)
30–39	-	123 (37.8)
>40	-	100 (30.8)

and the maximum score was 25.

Table 2 shows the mean and standard deviation of sleep disturbance among the tertiles of the four dimensions of work-family conflict. One way ANOVA was conducted to investigate the difference in sleep disturbance among the tertiles of inter-role conflicts. As it was shown in Table 2, mean score of sleep disturbance significantly is higher in the 3rd tile for all of the four dimensions.

The results of ANCOVA (Table 3) showed that time-based WIF (2,482)=3.89, $p=0.03$, WIFs (2,482)=8.65, $p=0.01$, FIWt (2,482)=5.21, $p=0.02$ and FIWs (2,482)=5.09, $p=0.02$ are significantly associated with sleep disturbance after adjusting for the effect of potential confounders. The only control variable that was shown to significantly affect sleep disturbance was age (1,482)=11.87, $p<0.001$. Thereby, age could be a confounder on the association between WIFt and sleep disturbance. We checked the moderating effect of age on the association between WFC dimensions and sleep disturbance by adding the interaction of WFC* age to the model. The findings showed that there was a significant interaction for the effect of age and WFC on sleep disturbance for the

Table 2. Mean and standard deviation of sleep disturbance among tertiles of the four dimensions of inter-role conflict

Dimen-sions	Sleep Disturbance Mean (SD)			<i>p</i>
	1st tertile	2nd tertile	3rd tertile	
WIFt	12.9 (SD= 3.3)	12.8 (SD= 3.4)	14.1 (SD= 3.5)	0.006
WIFs	12.3 (SD= 3.3)	12.9 (SD= 3.3)	14.4 (SD= 3.5)	0.000
FIWt	12.8 (SD=3.2)	12.8 (SD= 3.6)	14.2 (SD= 3.4)	0.004
FIWs	12.4 (SD= 3.6)	13.1 (SD= 3.3)	13.8 (SD= 3.4)	0.029

p is the significant level of ANOVA, WIFt: Work Interference Family time-based, WIFs: Work Interference Family strain-based, FIWt: Family Interference Work time-based, FIWs: Family Interference Work strain-based

Table 3. ANCOVA for the effect of inter-role conflict on sleep disorders

	F	<i>p</i>
Age	11.87	<0.001
No children	0.02	0.88
Elderly care	0.65	0.43
Education	0.10	0.76
PA	0.02	0.94
General health	0.03	0.80
BMI	0.51	0.10
Outpatient	0.09	0.73
Inpatient	0.99	0.27
Longstanding disease	0.30	0.61
WIFt	3.89	0.03
WIFs	8.65	0.01
FIWt	5.21	0.02
FIWs	5.09	0.02
WIFt * Age	2.16	0.04
WIFs * Age	3.09	0.02
FIWt * Age	2.10	0.04
FIWs * Age	2.33	0.04

PA: Physical Activity, Outpatient: Frequency of outpatient visit, Inpatient: Frequency of inpatient visit, WIFt: time-based Work Interference Family, WIFs: strain-based Work Interference Family, FIWt: time-based Family Interference into Work, FIWs: strain-based Family Interference into Work

four dimensions of work-family conflict (Table 3).

In order to elaborate magnitude of the effect of WFC on sleep disturbance among different age group, respondents were classified into three groups. These groups were; group 1=20–29 yr, group 2=30–39 yr and group 3=more than 40 yr old (Table 4).

Table 4. Effect of the four dimensions of work-family conflict on sleep disturbance among three different age groups

		20–29 yr		30–39 yr		>40 yr	
		b	<i>p</i>	b	<i>p</i>	b	<i>p</i>
WIFt	Level 2 vs. Level 1	1.19	0.21	0.80	0.24	0.46	0.59
	Level 3 vs. Level 1	2.29	0.007	0.40	0.56	1.27	0.07
WIFs	Level 2 vs. Level 1	0.68	0.43	0.37	0.59	0.90	0.26
	Level 3 vs. Level 1	2.16	0.01	1.86	0.68	1.95	0.03
FIWt	Level 2 vs. Level 1	0.21	0.79	0.35	0.59	1.45	0.11
	Level 3 vs. Level 1	1.11	0.22	1.20	0.09	1.84	0.03
FIWs	Level 2 vs. Level 1	1.82	0.86	1.41	0.08	1.10	0.83
	Level 3 vs. Level 1	1.03	0.35	2.29	0.02	1.90	0.36

The digits are *p* values Obtained from ANCOVA to investigate the effect of inter-role conflict on sleep disturbance after controlling for several potential confounders.

The ANCOVA analyses among the three different age groups are presented in Table 4. The first tertile of WIFt (low level of WIFt) was set as the reference category for further interpretation. The planned contrast revealed that having high WIFt, $p < 0.01$, and 95% CI (0.65, 3.94) significantly increased sleep disturbance compared to having low level of WIFt among women aged 20–29 yr old. Whereas, the analysis of covariance among women aged 30–39 yr old as well as more than 40 yr old did not show a significant effect of WIFt on sleep disturbance.

For the effect of WIFs on sleep disturbance, planned contrast revealed that having high WIFs, $p < 0.05$, and 95% CI (0.41, 3.91) significantly increased sleep disturbance compared to having low level of WIFs among women aged 20–29 yr old. The similar pattern reported for women aged more than 40 yr old in which having high level of WIFs, $p < 0.05$ and 95% CI (0.12, 3.79) significantly increased sleep disturbance compared to having low level of WIFs. However, women aged 30–39 yr old were not affected by sleep problems due to their experienced WIFs.

For the effect of WIFs on sleep disturbance, our results showed that women in the two extreme age groups (20–29 yr group as well as more than 40 yr) are affected.

Regarding the effect of FIWt on sleep quality, planned contrast in ANCOVA analysis showed that having high level of FIWt, $p < 0.05$ and 95% CI (0.21, 3.47) significantly increased sleep disturbance compared to having low level of FIWt only among women older than 40 yr old. Finally, for the effect of FIWs on sleep disturbance, planned contrast revealed that having high FIWs, $p < 0.05$, and 95% CI (0.23, 3.57) significantly increased sleep disturbance compared to having low level of FIWs only among women aged 30–39 yr old.

Our results showed that effect of the four dimensions of inter-role conflict on sleep depends on age. In general, our findings showed that women in their 20–29 yr age significantly suffer from sleep problems due to time-based and strain-based WIF. On the other hand women aged 30–39 yr, are significantly suffered from sleep problem due to high level of strain-based FIW. Finally, women older than 40 yr old suffer from sleep problems due to high level of strain based WIF and time-based FIW.

Discussion

The present study examined effects of the four dimensions of work-family conflicts on sleep disturbance. Our analysis showed that the four dimensions of inter-role conflict significantly disturbed working women sleep and the established associations are different among tertiles of inter-role conflicts. These results remain significant even after adjusting for BMI, Physical activity, general health status and several other health indicators.

Findings from this study showed that after controlling for effects of several confounders, strong levels of the four dimensions of work-family conflict still significantly predict sleep disturbance. These findings show that only women who experience high level of inter-role conflicts may suffer from sleep disturbance. A number of previous studies have shown the association between work-family conflicts and sleep problems^{11, 12, 21}). However, to the best of our knowledge, this is the first study among Malaysian sample that identify adverse effect of work-family conflict on sleep disturbance. Our study was able to show the robustness of the established association by adjusting for physical activity, BMI and several health statuses.

Another highlight from the findings of this study is the age-dependent effect of work-family conflicts on sleep disturbance. The age-dependent consequences of work-family conflict on well-being was shown earlier among Malaysian sample³²). However to the best of our knowledge, this is the first study examines effects of work-family conflict on sleep disturbance among different age categories. Our findings showed that women in their 20s suffer from sleep problems due to high level of time-based and strain-based WIF. Placing life-cycle perspective at the focus of exploration for work and family life, help us to improve the knowledge about unique consequences of work and family arrangement in different life stages³³). Women in their 20s have newly entered in their job and are advancing their career which certainly is a time consuming and stressful role which might interfere with their family role. On the other hand, these women mainly have young children which require special attention and plenty of time. Consequently, almost one third of a daily time which is spent at work, along with strain originated at workplace cross over into family domain and eventually would be a risk for sleep disturbance.

In addition, our findings revealed that sleep quality of women in their 30s is affected by experiencing high level of strain-based FIW. Commonly, women at their 30s have established their career and are oriented in their job positions. On the other hand, our findings showed that 83.3% of these women have children younger than 5 yr old. Therefore, strain associated with family responsibilities interfere with work domain and magnitude of this type of conflict is strong enough to lead to sleep disturbance.

With regards to the women in their 40s, we found that high level of strain-based WIF and time-based FIW significantly affect sleep. These findings show that these women struggle to maintain their career since they do experience strain originated at work which cross over into family domain. Additionally, these women experience time limitation to fulfill job responsibilities which stem from plenty of time consumed at family. Further investigation into our findings showed that none of the women aged more than 40 yr old in this study had children less than 6 yr old. Furthermore, around one quarter of these women work over time up to 16 h per wk. The common consideration for women in their late family stages is that their children are grown up and are less dependent which consequently decrease the amount of time need to be spent at family. On the other hand, women in their 40s are expected to well-established their career and are expected to have less strain at workplace³⁴). However despite to these common consid-

erations, we found that women in this stage of life are still struggle for the amount of time need to be spent at family as well as high level of strain at workplace. These findings clearly show a transitional stage in the work and family life of women aged more than 40 yr old. This transition could be job promotion to a high level position which is more stressful and require the women to be highly committed and responsible. For the family life, this transition could be sending out their children to the university or engagement of these women in taking care of grandchildren. These findings are in line with previous research that highlighted the importance of life-course perspective on work-family arrangement³⁵). Therefore, considering life-course approach is a meaningful strategy for investigation of work-family conflicts and their consequences. Because, as it was shown in this study, women in different life stages have unique criteria which separate their type and consequences of work and family conflict. This is one of the key strength of this study that revealed effects of work-family conflicts on sleep disturbance among three different age categories are not similar and future researchers are recommended to focus on life-cycle approach.

Another key strength of this study is measurement of the multi-dimensional work-family conflict construct. This is due to the fact that each dimension has its own unique consequences and investigation of several inter-role conflicts allows us to find problematic area in balancing work and family demands. Interventional programs that help working women to reduce workplace stressor may lead to better sleep quality. One of the very well-known programs is Family Friendly Policies (FFP) that is implemented in several countries including Malaysia. However, according to the recent evidences from Malaysia, there still need to enforce effective implementation of such policies and to ensure availability of FFP to all employees^{36, 37}).

On the other hand, there are some limitations in this study which need to be addressed. The first limitation is use of self-reported data. Another limitation in this study is use of the cross-sectional design which does not allow us to conclude causality for the established associations. In addition, future researchers may benefit from investigating the effect of work-family conflict on sleep disturbance among male employee. This would help us to understand the gender differences in the effect of work-family conflict on sleep across different life-cycle.

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