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SPECIAL ISSUE ARTICLE

Factors associated with work–family enrichment among Chinese nurses assisting Wuhan's fight against the 2019 COVID-19 pandemic

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Abstract

Aims and objectives: To examine the relationship between work–family enrichment and two contextual factors (job support and family support), together with two personal factors (family boundary flexibility and prosocial motivation) among Chinese nurses assisting Wuhan in its fight against the Coronavirus Disease 2019 (COVID-19) pandemic.

Background: The COVID-19 pandemic was first reported in Wuhan, China, and has now spread worldwide, which has brought attention to the pivotal role of nurses in public health emergencies. Work–family enrichment is a bidirectional structure, including work-to-family enrichment and family-to-work enrichment, that can yield many mutually beneficial results in both work and family domains among clinical nurses. However, few studies have investigated work–family enrichment and its influential factors among front-line nurses during public health emergencies.

Methods: A cross-sectional research design was adopted with a snowball sample of 258 Chinese nurses assisting Wuhan's anti-pandemic efforts. Data were collected from 21 March 2020 until 10 April 2020 through a battery of online questionnaires. Descriptive, univariate and hierarchical linear regression analyses and a Pearson correlation test were performed. A STROBE checklist was used to report findings.

Results: The results showed that prosocial motivation, family support and job support predicted high work-to-family enrichment in those nurses, while prosocial motivation, family support and family boundary flexibility predicted high family-to-work enrichment.

Conclusions: The study confirmed the importance of paying attention to the work–family enrichment of front-line medical workers during the COVID-19 pandemic, so that they could concentrate on their anti-pandemic work and maintain their enthusiasm for disaster nursing.

Relevance to clinical practice: The findings can help health administrators in affected countries around the world identify the influential factors of work–family enrichment among front-line nurses during infectious disease outbreaks, specifically in the areas of mobilising nurses' prosocial motivation and giving sufficient job support.

KEYWORDS
Chinese nurse, Coronavirus Disease 2019, family boundary flexibility, family support, family-to-work enrichment, job support, prosocial motivation, work-to-family enrichment

What does this paper contribute to the wider global clinical community?

- This study provides a reference concerning work–family enrichment and the factors that influence such enrichment among Chinese anti-epidemic nurses for health administrators in affected countries around the world.
- Healthcare administrators should pay attention to not only front-line nurses' personal safety and health but also their emotional needs for family.
- Under the condition of insufficient human resources, we believe that mobilising the prosocial motivation of front-line nurses is an effective way to promote their work–family enrichment during the COVID-19 pandemic.

1 | INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic was initially reported in Wuhan city (Hubei province, China) in December 2019 and has caused a large global outbreak. COVID-19 has caused innumerable human casualties and serious economic loss and has posed a challenge to global public health (Ahn et al., 2020). As of 26 July 2020, COVID-19 has caused a total of approximately 15,785,641 confirmed cases and 640,016 deaths worldwide. On the same day, the cumulative number of confirmed cases in Europe alone was as many as 3,216,335, with 210,261 deaths (World Health Organization, 2020a).

COVID-19 has brought attention to the important role of nurses, especially in infection prevention, infection control and public health during infectious disease outbreaks (Mo et al., 2020). By 1 March 2020, the Chinese government had assigned a total of 28,679 nurses from other provinces to assist Hubei (National Health Commission of the People's Republic of China, 2020a). On 7 April 2020, World Health Organization (WHO) Director-General Dr. Tedros Adhanom Ghebreyesus said that nurses were the backbone of any health system and that they must get the support they need to keep the world healthy (World Health Organization, 2020b). In previous research, there were conflicts between work and family when nurses were required to respond to a public health emergency (Shih et al., 2009). However, a growing line of recent literature suggests that nurses' work and family can also be mutually beneficial (Ghislieri et al., 2017; Rastogi & Saikia, 2019; Yasir et al., 2019), although those relationships have been less investigated during the COVID-19 pandemic. Work–family enrichment is one construct representing how work and family can be mutually beneficial; it can be divided into work-to-family enrichment (WFE) and family-to-work enrichment (FWE) (Greenhaus & Powell, 2006). WFE occurs when resources gained at work improve the quality of life of family domain, whereas FWE occurs when resources gained at home improve the quality of life of work domain. WFE and FWE can bring many positive consequences to nurses. WFE is related to nurses' higher job satisfaction (Yasir et al., 2019), higher work engagement (Rastogi & Saikia, 2019) and lower turnover intention (Ghislieri et al., 2015); FWE is related to nurses' higher life satisfaction (Yasir et al., 2019) and higher marriage satisfaction (Van Steenbergen et al., 2014). Given the important role of nurses during infectious disease outbreaks, it is critical that health administrators attend to nurses' WFE and FWE. This could help nurses balance their multiple roles and result in a better response to public health emergencies.

The existing studies of medical workers during the COVID-19 pandemic have mostly focused on their mental health (Petzold et al., 2020) and work stress load (Mo et al., 2020). Few studies have investigated work–family enrichment among medics during the COVID-19 outbreak.

1.1 | Background

1.1.1 | Work–family enrichment

With a growing attention to positive psychology, an increasing number of studies in the work–family literature have shifted a perspective from conflict to enrichment, focusing on the positive interaction between work and family domains (Lapierre et al., 2018). Although a variety of terms have been used to describe the positive interactions between work and family domains, work–family scholars point out that 'work–family enrichment' encompass terms such as enhancement, facilitation and positive spillover (Carlson et al., 2006) and offer the broadest conceptualisation of the positive side of the work–family interface (Zhang et al., 2018). Accordingly, this study focuses on 'work–family enrichment'. In the seminal work by Greenhaus and Powell (2006), work–family enrichment was defined as the extent to which experiences in one domain (work or family) improve the quality of life in another domain (family or work, respectively). Most of the existing theoretical models of enrichment agree that the influential factors of work–family enrichment could be roughly divided into two main categories: contextual factors and personal factors (Wayne et al., 2007; ten Brummelhuis & Bakker, 2012).

1.1.2 | Contextual factors

A great body of empirical studies has confirmed the positive effect of contextual factors, such as job support (Ghislieri et al., 2017; Rashid et al., 2011) and family support (Siu et al., 2015), on nurses' work–family enrichment. Since out-of-city nurses in assistance to Wuhan were far away from their original working units and their families, it is worth discussing whether their perceived job and family support would change and whether this change would affect their work–family enrichment. In this study, job support included support from medical aid teams and supervisors in medical aid team; family support referred to support from family members.

According to work–family theory, work-related resources could be more effectively used in the work domain while improving the quality of life in family domain; the same relationship exists for family-related resources (Greenhaus & Powell, 2006; Wayne et al., 2007; ten Brummelhuis & Bakker, 2012). For instance, work-related factors (e.g. job support) showed a greater correlation with WFE, while family-related factors (e.g. family support) most likely affected FWE. Nonetheless, a study of work–family enrichment of nurses in Malaysia found cross-domain effects. Namely, job support predicted high FWE, and family support predicted high WFE (Rashid et al., 2011). Considering the possibility of cross-domain effects, our first and second hypotheses are:

H1a. Job support will be positively related to nurses' WFE.

H1b. Job support will be positively related to nurses' FWE.

H2a. Family support will be positively related to nurses' FWE.

H2b. Family support will be positively related to nurses' WFE.

1.1.3 | Personal factors

In terms of personal factors, previous studies were mostly focused on demographic factors (e.g. gender) (Baral & Bhargava, 2011) and emotional factors (e.g. negative and positive affect) (Tement & Korunka, 2013). Other personal factors such as boundary preferences (Yasir et al., 2019) and collectivist values (Hassan et al., 2020) have attracted more of researchers' attention recently, but more empirical evidence is needed.

One of the important characteristics of boundary preferences was boundary flexibility, subdivided into work boundary flexibility and family boundary flexibility (Clark, 2000). Extensive empirical research has established a positive relationship between work boundary flexibility and the two directions of work–family enrichment (Pedersen & Jeppesen, 2012; Rastogi et al., 2016). However, we know little about the effects of family boundary flexibility on work–family enrichment. Family boundary flexibility indicates an employee's ability and willingness to leave the family domain to meet work needs (Matthews et al., 2010). During the COVID-19 pandemic outbreak, nurses in assistance to Wuhan have had to temporarily abandon their roles as parents, spouses and children in order to meet the demands of their work roles (Jackson et al., 2020), which would be particularly challenging for nurses in that position. Hence, it is worthwhile to explore the extent of their family boundary flexibility and its influence on WFE and FWE. In the theoretical literature, family boundary flexibility is considered one of factors for facilitating WFE and FWE (Bulger et al., 2007). Consequently, we propose our third hypothesis:

H3a. family boundary flexibility will be positively related to nurses' WFE.

H3b. family boundary flexibility will be positively related to nurses' FWE.

Collectivism is one form of prosocial motivation (Batson et al., 2011). Although Hassan et al. (2020) pointed out that collectivist values are positively correlated with work–family enrichment, few studies have examined the relationship between prosocial motivation and the two directions of work–family enrichment. Prosocial motivation is defined as individual desire to expend effort to benefit other people (Grant & Sumanth, 2009). Nursing is an occupation with high levels of dedication towards others (patients). Nurses' prosocial motivation has been widely acknowledged as an important factor (Nesje, 2015; Ong et al., 2019), especially in various anti-pandemic emergencies (Ulmer, 2017). Many studies have emphasised the benefits of prosocial motivation for public health practitioners in the workplace, such as higher organisational commitment (Nesje, 2015); higher work engagement (Zhang et al., 2019) and lower turnover intent (Ong et al., 2019), but few empirical studies have been undertaken to understand the impact of prosocial motivation on WFE and FWE among medical workers. Kim and Las found that prosocial motivation was a positive predictor of WFE in their qualitative research (Kim & Las Heras, 2012), but this finding may need confirmation in quantitative research. Based on Kim, et al.'s qualitative study, we put forward our fourth hypothesis:

H4a. Prosocial motivation will be positively related to nurses' WFE.

H4b. Prosocial motivation will be positively related to nurses' FWE.

In sum, the purpose of this study is to assess the effect of two contextual factors (job and family support) and two personal factors (family boundary flexibility and prosocial motivation) on WFE and FWE among Chinese nurses assisting Wuhan's fight against the COVID-19 pandemic.

2 | METHODS

2.1 | Design and sample

This was a cross-sectional study. Snowball sampling was used to recruit Chinese nurses in assistance to Wuhan who met the following criteria: (a) has worked in Wuhan for one week or longer; (b) is working as a front-line health care worker with direct engagement of patients with COVID-19. Of the 281 eligible nurses who participated in this study, a total of 258 nurses completed the valid questionnaires (23 were excluded due to incomplete questionnaires), for a 91.8% response rate. The number of samples required for this study was calculated to be 68 by using a G*Power 3.1.0 program with a medium effect size of .15, significance level of .05 and power of .8 (Cohen, 1988). Thus, our sample had adequate power to test the stated hypothesis. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) (Appendix S1) was chosen as a checklist for this study.

2.2 | Data collection

Data were collected from 21 March until 10 April 2020 through a questionnaire website platform, which sent a web link or Quick Response (QR) code to computers or smartphones. Participants were recruited by snowball sampling. Different medical teams, mostly composed of nurses, had been designated to Wuhan from other provinces in China; the corresponding author contacted some nurses she knew on those medical teams and asked them to forward the link or code to their own team members or to members of other teams. She also encouraged them to forward the link or QR code to as many other medical teams as possible, until adequate participants were enrolled. An information sheet attached to the questionnaires described the measures to ensure anonymity and voluntary participation and provided guidelines for completing the questionnaires. When the nurses clicked the link or scanned the QR code, the first page was an information sheet with 'Agree' and 'Disagree' buttons at the bottom. Once participants chose 'Agree', the questionnaire would appear, which took potential participants approximately 10 minutes to complete.

2.3 | Instruments

The instruments of this study included the General Information Questionnaire, Work–family Enrichment Questionnaire, Job Support Questionnaire, Family Support Questionnaire, Family Boundary Flexibility Scale and Prosocial Motivation Scale.

Based on literature review (Ghislieri et al., 2017) and expert consultation, the following general information was selected as control variables: gender, age (in years), marital status, highest educational level completed, having a child under the age of 18 or not, position in home workplace, work experience (in years), channels of participation in Wuhan's anti-pandemic efforts and family members' general attitude towards participants temporarily working in Wuhan.

WFE and FWE were evaluated using the 14-item Chinese version of the Work–Family Enrichment Questionnaire (Tang et al., 2009), which is a modified version of Carlson's Work–Family Enrichment Scale (Carlson et al., 2006). The scale contained two directions: work-to-family enrichment scale (seven items) and family-to-work enrichment scale (seven items). The participants responded on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Higher scores indicated that the participants perceived greater WFE or FWE. An example item of WFE was 'My work brings me a sense of accomplishment and satisfaction, which makes my family think I am a positive and optimistic person'. An example item of FWE was 'When I work under pressure and resistance, the organisation always gives encouragement and help'. The Cronbach's α of work-to-family enrichment scale and family-to-work enrichment scale in this study was .912 and .960, respectively.

Job support was measured by the Chinese version of Job Support Questionnaire, which was developed by Li and Zhao (2009). The scale contained 20 items and could be categorised into two dimensions: organisational support and supervisor support. The scoring ranged from 1 = strongly disagree to 5 = strongly agree, with a respondent's total score in the range of 20–100 points. The higher the score, the more the individual perceived job support. An example item was 'When I work under pressure and resistance, the organisation always gives encouragement and help'. The Cronbach's α was 0.960 in this study.

Family support was measured by the Chinese version of Family Support Questionnaire (Li & Zhao, 2009), which contained two dimensions: emotional support and instrumental support. The scale was a 5-point Likert scale with 10 items, with a respondent's total score between 10 and 50. The scoring ranged from 1 = strongly disagree to 5 = strongly agree. The higher the score, the more the individual perceived family support. An example item was 'My family is interested in my work'. The Cronbach's α was .900 in this study.

Family boundary flexibility was evaluated by the Chinese version of Family Boundary Flexibility Scale, which was established by Matthews et al. (2010), and was translated and culturally adjusted by Ma et al. (2014). This 7-item scale consisted of two dimensions: family boundary flexibility-ability and family boundary flexibility-willingness. Participants rated each item from 1 = strongly disagree to 5 = strongly agree, with the total score in the range of 7–35 points. Higher scores indicate greater perceived family boundary flexibility. An example item was 'In order to fulfil my responsibilities at work, I am willing to readjust the schedule of activities I have set with my family'. The Cronbach's α was .872 for this study.

Prosocial motivation was measured by the 5-item Prosocial Motivation Scale developed by Grant and Sumanth (2009). Each item was scored on a 5-point Likert Scale (1 = strongly disagree, 5 = strongly agree). The score for the 5 items was summed, giving a total score between 5 and 25. Higher scores indicated greater prosocial motivation. An example item was 'I prefer to work where I can make a positive impact on others'. The Cronbach's α was .959 in this study.

2.4 | Data analysis

The data were analysed using IBM SPSS software version 25.0 (SPSS Inc.). Descriptive statistics were calculated to describe the following study variables: demographic variables, job support, family support, family boundary flexibility and prosocial motivation. The independent t tests and one-way analysis of variance (ANOVA) were performed to analyse the differences in WFE and FWE among the nurses with different demographics. Pearson correlation analysis was used to measure the relationship between the study variables (job support, family support, family boundary flexibility and prosocial motivation) and WFE and FWE. Because another study found hierarchical linear regression to be an effective method for assessing the relative impact of independent variables on work–family enrichment (Ghislieri et al., 2017), this study also used this method. In hierarchical regression, known predictors evidenced by other studies should be entered into the model first, and then, the new predictors can be entered (Field, 2013). Hence, the hierarchical linear regression models of the nurses' WFE and FWE were developed as follows: In Step 1, unique associations of demographic characteristics as control variables to WFE or FWE were tested. Job and family support were entered in Step 2. Family boundary flexibility and prosocial motivation were entered in Step 3. Statistical significance was set as $p < .05$.

2.5 | Ethical considerations

All measures involving human participants were performed in accordance with the ethical standards of the institutional research committee (IRB of behavioural and nursing research in School of Nursing of Central South University, IRB Approval Number: E202028) and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

3 | RESULTS

3.1 | General information of the nurses

Out of the 258 nurses who participated in this survey, a majority of participants were females (93.8%), were married (65.1%), had a bachelor's degree (83.3%) and had a child under the age of 18 (53.9%). The average age of the participants was 31.88 (SD = 5.91) years old, and the mean working experience was 10.53 (SD = 6.69) years. The majority (85.7%) of participants were staff nurses, whereas others were head nurses. Additionally, 88.0% of the nurses actively signed up to go to Wuhan to assist their anti-pandemic efforts, while 12.0% were appointed to do so by their home hospital. Family members' general attitude towards participants temporarily working in Wuhan were as follows: unsupported attitude (32.9%), supported attitude (47.7%) or did not know about the nurse's participation due to the nurse's withholding of that information (19.4%). Other demographic information about the nurses is presented in Table 1.

3.2 | Effects of general information on WFE and FWE among the nurses

Independent sample t tests showed that there were significant differences in the nurses' WFE by channels of participation in Wuhan's anti-pandemic efforts ($t = 3.024$, $p = .003$). In addition, there were significant differences in the nurses' FWE by position in home workplace ($t = -2.255$, $p = .028$) and channels of participation in Wuhan's anti-pandemic efforts ($t = 2.654$, $p = .008$). These results showed that nurses who volunteered to participate in Wuhan's anti-pandemic efforts had the higher WFE and FWE compared with those assigned by hospital. In addition, the staff nurse's FWE was lower than the head nurse's (shown in Table 1).

One-way ANOVA showed that there were significant differences in the nurses' WFE ($F = 6.961$, $p < .001$) and FWE ($F = 5.169$, $p = .002$) by their family members' general attitude towards participants temporarily working in Wuhan. The LSD post hoc tests showed that the nurses whose families maintained unsupported attitude had the least WFE and FWE compared with nurses in the other three groups (shown in Table 1).

3.3 | Pearson's correlations of nurses' WFE and FWE with family boundary flexibility, prosocial motivation, job support, family support

There were significant positive correlation among all the study variables. WFE was observed to have a significant positive correlation with job support ($r = .456$, $p < .001$), family support ($r = .481$, $p < .001$), family boundary flexibility ($r = .384$, $p < .001$) and prosocial motivation ($r = .479$, $p < .001$). FWE was observed to have a significant positive correlation with job support ($r = .384$, $p < .001$), family support ($r = .495$, $p < .001$), family boundary flexibility ($r = .447$, $p < .001$) and prosocial motivation ($r = .556$, $p < .001$) (shown in Table 2).

3.4 | Predictors associated with WFE and FWE among the nurses

The results of the two hierarchical multiple regression with the nurses' WFE and FWE as the dependent variables are displayed in Tables 3 and 4, respectively. Both hierarchical multiple regression models met the following criteria (Field, 2013): (a) independent residuals (Durbin-Watson statistic was 1.906 and 2.010, respectively, 1 < criterion <3); (b) criteria of homoscedasticity and linearity (using a plot of standardised residuals against standardised predicted values), and normality (using histograms and P-P plots) were met; (c) no multicollinearity (all the Variance Inflation Factor (VIF) values were <2, criteria: no VIF values above 10 and average close to 1 for all regressions); (d) no exclusion of influential outliers was required (all standardised residual <|3|, Cook's distance max was 0.073 and 0.093, respectively, criterion <1).

TABLE 1 General information and univariate analysis of WFE and FWE of the nurses (n = 258)

General information	*n* (%)	Mean ± SD	Range	WFE points	*t*/*F*(*p*-value)	FWE points	*t*/*F*(*p*-value)
Gender					−0.212 (.832)[a]		−0.945 (.345)[a]
Male	16 (6.2)			29.25 ± 5.22		29.81 ± 4.29	
Female	242 (93.8)			29.50 ± 4.61		30.74 ± 3.78	
Age (years)		31.88 ± 5.91	22–57		1.623 (.184)[b]		0.970 (.407)[b]
≤25	38 (14.7)			28.55 ± 4.80		30.57 ± 4.30	
26 ~ 35	152 (58.9)			29.28 ± 4.72		30.42 ± 3.86	
36 ~ 45	63 (24.4)			30.49 ± 4.31		31.28 ± 3.42	
≥ 46	5 (1.9)			30.00 ± 3.39		32.00 ± 2.82	
Marital status					0.169 (.845)[b]		0.068 (.934)[b]
Unmarried	84 (32.6)			29.66 ± 4.21		30.75 ± 3.87	
Married	168 (65.1)			29.42 ± 4.88		30.67 ± 3.82	
Divorced	6 (2.3)			28.66 ± 3.66		30.16 ± 3.06	
Highest educational level					0.487 (.615)[b]		1.156 (.316)[b]
Associate degree	26 (10.1)			30.07 ± 4.07		31.57 ± 3.41	
Bachelor degree	215 (83.3)			29.48 ± 4.69		30.64 ± 3.88	
Master degree and above	17 (6.6)			28.64 ± 4.80		29.82 ± 3.41	
Having a child under the age of 18					−0.319 (.750)[a]		−0.208 (.836)[a]
Yes	139 (53.9)			29.40 ± 4.86		30.64 ± 3.88	
No	119 (46.1)			29.58 ± 4.38		30.73 ± 3.74	
Position in home workplace					−1.417 (.158)[a]		−2.255 (.028)[a]
Staff nurse	221 (85.7)			29.32 ± 4.74		30.50 ± 3.91	
Head nurse	37 (14.3)			30.48 ± 3.85		31.75 ± 2.96	
Working experience (years)		10.53 ± 6.69	2–39		1.492 (.217)[b]		1.895 (.131)[b]
≤ 5	71 (27.5)			29.81 ± 4.63		31.00 ± 3.93	
6 ~ 9	64 (24.8)			28.53 ± 4.22		29.73 ± 3.47	
10 ~ 19	88 (34.1)			29.55 ± 5.08		30.87 ± 4.11	
≥20	35 (13.6)			30.40 ± 4.06		31.31 ± 3.16	
Channels of participation in Wuhan's anti-pandemic efforts					3.024 (.003)[a]		2.654 (.008)[a]
Voluntary participation	227 (88.0)			29.80 ± 4.47		30.91 ± 3.68	
Hospital assignment	31 (12.0)			27.16 ± 5.22		29.00 ± 4.34	
Family members' general attitude towards participants temporarily working in Wuhan					10.478 (<.001)[b]		7.595 (.001)[b]
Unsupported attitude[c]	85 (32.9)			27.74 ± 5.01		29.55 ± 4.01	
Supported attitude	123 (47.7)			30.62 ± 4.13		31.57 ± 3.45	
Did not know about the participant's involvement in Wuhan's anti-pandemic efforts	50 (19.4)			29.66 ± 4.32		30.42 ± 3.83	

[a]Independent sample *t* tests.

[b]One-way ANOVA.

[c]Unsupported attitude: Because there were only two strongly opposed that did not satisfy the assumptions of the data for an ANOVA test, so we combined the strongly opposed attitude and inexplicit attitude into the same group and named it unsupported attitude group.

TABLE 2 Pearson's correlations test between WFE/FWE and job support, family support, family boundary flexibility, prosocial motivation (n = 258)

Variables	Mean (SD)	Range	1	2	3	4	5	6
1 Work-to-family enrichment	29.48 (4.63)	15–35	1					
2 Family-to-work enrichment	30.68 (3.81)	13–35	.767	1				
3 Job support	72.76 (13.61)	26–100	.456	.384	1			
4 Family support	39.06 (6.32)	22–50	.481	.495	.529	1		
5 Family boundary flexibility	28.31 (4.94)	7–35	.384	.447	.430	.461	1	
6 Prosocial motivation	22.27 (2.69)	10–25	.479	.556	.411	.461	.463	1

Note: All values statistically significant at $p < .01$ (two-tailed).

TABLE 3 The hierarchical regression analysis of WFE

	Model 1		Model 2		Model 3	
Variables	β	t	β	t	β	t
Constant		20.537		7.050		3.282
Step1: Control variables						
Channels[a]	−0.145*	−2.285	−0.110*	−2.020	−0.095	−1.806
Family main attitude[b]	0.144*	2.271	0.086	1.570	0.056	1.057
Step2: Contextual factors						
Job support			0.259***	4.174	0.184**	2.945
Family support			0.328***	5.328	0.227***	3.605
Step 3: Personal factors						
Family boundary flexibility					0.086	1.437
Prosocial motivation					0.236***	3.845
R^2	0.054		0.312		0.367	
Adjusted R^2	0.046		0.301		0.352	
$\triangle R^2$	0.054		0.258		0.055	
F	7.224**		28.674***		24.255***	

Notes: R^2: R-squared; ΔR^2: delta R-squared; β: Standardised Beta.

[a]Channel of participation in Wuhan's anti-pandemic efforts: 1 = voluntary participation, 2= hospital assignment.

[b]Family members' general attitude towards participants temporarily working in Wuhan: 1 = unsupported attitude, 2 = supported attitude, 3 = did not know about the participant's involvement in Wuhan's anti-pandemic efforts.

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Based on results from the independent t tests and one-way ANOVA, control variables, namely channels of participation in Wuhan's anti-pandemic efforts and family members' general attitude towards participants temporarily working in Wuhan, were first entered into the hierarchical linear regression (Model 1); then contextual factors, including job and family support (Model 2); and lastly personal factors, containing family boundary flexibility and prosocial motivation (Model 3). Model 1 suggested that the nurses' demographic factors explained 5.4% of the variance in WFE (F(2, 255) = 7.224, p = .001). Model 2 accounted for an additional 25.8% of the variance when controlling for related demographic factors (F(4, 253) = 28.674, $p < .001$). Model 3 further explained an additional 5.5% of the variance when controlling for related demographic factors and contextual factors (F(6, 251) = 24.255, $p < .001$). In the third model, the nurses' WFE could be explained by the following three predictors, listed in descending order: prosocial motivation (β = 0.236, $p < .001$), family support (β = 0.227, $p < .001$) and job support (β = 0.184, p = .003). However, our results did not confirm H3a, because family boundary flexibility had no significant influence on WFE (β = 0.086, p = .152). This final model explained 35.2% (adjusted R^2) of the total variance in the nurses' WFE (shown in Table 3).

TABLE 4 The hierarchical regression analysis of FWE

	Model 1		Model 2		Model 3	
Variables	***β***	***t***	***β***	***t***	***β***	***t***
Constant		20.472		9.982		5.525
Step1: Control variables						
Position [a]	0.111	1.807	0.075	1.407	0.020	0.402
Channels [b]	−0.134 *	−2.098	−0.104	−1.869	−0.085	−1.666
Family main attitude [c]	0.084	1.320	0.033	0.594	−0.016	−0.304
Step2: Contextual factors						
Job support			0.157*	2.479	0.036	0.596
Family support			0.395***	6.274	0.245***	4.025
Step 3: Personal factors						
Family boundary flexibility					0.166**	2.842
Prosocial motivation					0.340***	5.728
R^2	0.045		0.286		0.412	
Adjusted R^2	0.034		0.271		0.396	
$\triangle R^2$	0.045		0.241		0.127	
F	3.971**		20.140***		25.063***	

Notes: R^2: R-squared; ΔR^2: delta R-squared; β: Standardised Beta.

[a]Position in original organisation: 1 = staff nurse, 2 = head nurse;

[b]Channel of participation in Wuhan's anti-pandemic efforts: 1 = voluntary participation, 2= hospital assignment.

[c]Family members' general attitude towards participants temporarily working in Wuhan: 1 = unsupported attitude, 2 = supported attitude, 3 = did not know about the participant's involvement in Wuhan's anti-pandemic efforts

*p < .05, **p < .01, ***p < .001.

With regard to FWE, control variables that included position in home workplace, channels of participation in Wuhan's anti-pandemic efforts and family members' general attitude towards participants temporarily working in Wuhan were entered into the hierarchical linear regression at the first step (Model 1); then contextual factors, including job and family support (Model 2); and lastly personal factors, containing family boundary flexibility and prosocial motivation (Model 3). Model 1 suggested that the nurses' demographic factors explained 4.5% of the variance in WFE (F(3, 254) = 3.971, p = .009). Model 2 explained an additional 24.0% of the variance when controlling for related demographic factors (F(5, 252) = 20.140, p < .001). Model 3 explained an additional 12.7% of the variance when controlling for related demographic factors and contextual factors (F(7, 250) = 25.063, p < .001). In the third model, the nurses' FWE could be explained by the following three predictors, listed in descending order: prosocial motivation (β = 0.340, p < .001), family support (β = 0.245, p < .001) and family boundary flexibility (β = 0.166, p = .005). However, our results did not confirm H1b, because job support had no significant influence on FWE (β = 0.036, p = .552). This final model explained 39.6% (adjusted R^2) of the total variance in the nurses' FWE (shown in Table 4).

4 | DISCUSSION

H1a was confirmed: job support was a positive predictor of WFE. Unexpectedly, the impact of job support (β = 0.184) on the nurses' WFE was less than that of family support (β = 0.227). These findings could be linked to the research background of the present sample. Given the high risk of infection, limited personal protective equipment and staff shortages, job support provided by health administrators was more focused on the personal safety of nurses in the anti-pandemic work (Wang et al., 2020). However, the job support targeting front-line nurses' emotional needs for their family was relatively scarce (Lai et al., 2020). Besides worrying about personal safety, the nurses also had to face the loneliness of being far away from their hometowns and loved ones as well concerns about their family members' health (Chen et al., 2020). The Chinese government became aware of front-line medics' emotional needs for family and actively implemented policies that met these emotional needs. For example, government workers supported the mental health of front-line nurses through caring conversations and necessary psychological assistance. Community staff visited the nurses' families and paid attention to the needs of their children and older family members, so

that the nurses could concentrate on their work in Wuhan (National Health Commission of the People's Republic of China, 2020b).

Regarding H1b, our study had no evidence to confirm the cross-domain effect of job support on FWE, a result that differed from those of Rashid et al. (2011). In non-epidemic situations, supervisors have greater ability to provide job support that has a cross-domain effect on FWE for the clinical nurses (Rashid et al., 2011; Rofcanin et al., 2018). For example, a flexible working schedule allowed nurses to arrange their family responsibilities reasonably (e.g. care their child) and engage more fully in personal life, which in turn had a positive influence on their work involvement through positive affect (Pedersen & Jeppesen, 2012). Health administrators should implement flexible schedules for health workers if they or their family members are impacted by a stressful event during the COVID-19 pandemic (Mo et al., 2020). However, flexible working schedule might not be possible during the pandemic due to insufficient human resources and the uncertainty of anti-pandemic work. Hence, job support did not play a vital role in the positive interaction from family to work among the nurses in this study.

H2a and H2b were both confirmed. Family support was a positive predictor of FWE among the nurses (H2a). In addition, a cross-domain effect of family support on WFE among the nurses was confirmed (H2b), which was similar to the study conducted by Rashid et al. (2011). Deeply influenced by the traditional cultural values of Confucianism, Chinese people place a lot of emphasis on harmonious family relationships; thus, demands from an individual's work domain can be understood and tolerated by their family members in China (Chen et al., 2015; Siu et al., 2015). In this study, a majority of the nurses who sacrificed their family duties to anti-pandemic work were supported by their family members (shown in Table 1), and good family support set the foundation to nurses' better performance in the anti-pandemic work. Conversely, since nurses play an important role in helping those suffering from pain and diseases, family members may be proud of nurses' participation in the pandemic anti-pandemic work (Chen et al., 2015). Moreover, Chinese media has included extensive, laudatory coverage for anti-pandemic medical workers, which has increased their family members' feelings of pride and has reinforced medical workers' positive experience in the family domain.

However, H3a was refuted. There was no significant correlation between family boundary flexibility and WFE. COVID-19 placed unprecedented pressures on the nurses. Chinese nurses postponed weddings, returned to work while pregnant or lactating and even came out of retirement in order to aid Wuhan's anti-pandemic efforts. Most anti-pandemic nurses were female, and because Chinese females usually undertake more family responsibilities than males, female nurses had particular difficulties in balancing a job and family responsibilities (Wu et al., 2011). Although most of the nurses in this study volunteered to participate in Wuhan's anti-pandemic work, they also feel guilty for being unable to fulfil their family responsibilities. When multiple roles are in conflict, certain psychological pressures may be present (Mo et al., 2020) and WFE is more difficult to attain. Therefore, we encourage front-line nurses to stay in touch with their families through digital methods. If possible, we also agreed that nurses should turn to their leaders for job support. Furthermore, H3b was confirmed. Our findings verified the conclusion of theoretical literature by Bulger et al. (2007) that family boundary flexibility was an important factor for facilitating FWE.

Lastly, H4a and H4b were both confirmed. The current study not only confirmed the qualitative results from Kim and Las Heras (2012) that prosocial motivation was a facilitating factor of WFE, but also found prosocial motivation was an influential promoting factor of FWE. Prosocial motivation enabled medical workers to instill a sense of honour in family members and to better educate their children by applying the knowledge they learned from their anti-pandemic work, so as to increase the active interaction from work to family (Kim & Las Heras, 2012). Furthermore, prosocial motivation has been widely confirmed as an important factor to promoting the positive experience of medical workers in the workplace (Nesje, 2015; Ong et al., 2019; Zhang et al., 2019). A recent study indicated that Chinese medical staff working on the front lines had a low frequency of burnout during the COVID-19 pandemic (Wu et al., 2020), and most of them were willing to care for patients suffering from infection with the COVID-19 (Shi et al., 2020). Faced with the challenge of anti-pandemic work, all localities quickly formed nursing teams to assist Wuhan's anti-pandemic efforts. Indeed, Chinese medical workers dedicated themselves to protecting the health of the masses and exuded a sense of responsibility and collectivism in the fight against the COVID-19 pandemic (Mo et al., 2020). Despite insufficient human resources, mobilising the prosocial motivation of medics was an effective way to increase their motivation to work during the public health emergency. Noticeably, long-term results showed that high prosocial motivation may deplete nurses' limited work enthusiasm, attenuating the enrichment between the work and family domains (Rofcanin et al., 2018). Therefore, the government should advance the pandemic prevention system while supporting the health care workforce during the COVID-19 pandemic, through such means as the cultivation of public health talent, a flexible medical personnel distribution system, reasonable financial reward policies etc. (Adams & Walls, 2020).

4.1 | Limitations

There were several limitations of this study. First, similar to other studies (Mo et al., 2020), the non-probability sample may not be representative of all Chinese front-line nurses fighting against COVID-19, since this study only investigated nurses in aid to Wuhan. Further studies should be conducted at multiple sites and in other regions in China. Furthermore, data were collected at only one point in time; thus, causality between the nurses' work–family enrichment and influential factors cannot be assumed. Lastly, this was only a cross-sectional, observational study. In addition to recognition of the roles of WFE and FWE in supporting front-line nurses, we also recommend examination of direct interventions such as mindfulness or positive coping training to reduce the stress associated

with working under pandemic conditions. These could be done as observational studies with repeated measurements or possibly in randomised controlled comparisons of different potentially stress reduction strategies.

5 | CONCLUSION

Given the key role of nurses during the COVID-19 outbreaks, the present study examined the work–family enrichment of Chinese anti-pandemic nurses assisting Wuhan, considering both WFE and FWE. Health administrators could provide a series of timely and effective psychological assistance for front-line nurses to improve their work–family enrichment, such as psychological consultation hot-line, teaching videos of psychological intervention and article pushing of working experience of front-line medics on network platform etc. Furthermore, health administrators could establish a WeChat group to contact all front-line nurses and their families, share the work situation of front-line nurses to their families to obtain family members' understanding and support for their work. This study confirmed the important effects of prosocial motivation, family support and job support on facilitating WFE. Furthermore, the impacts of prosocial motivation, family support and family boundary flexibility on promoting FWE were confirmed.

6 | RELEVANCE TO CLINICAL PRACTICE

The findings could help health administrators in affected countries around the world identify influential factors of work–family enrichment among front-line nurses during infectious disease outbreaks, promoting their enthusiasm to do disaster nursing. We believe that despite insufficient human resources, mobilising the prosocial motivation of medics was an effective way to increase their motivation to work during the public health emergency. However, the government should also advance the pandemic prevention system while supporting medical workers, in order to maintain their limited work enthusiasm. Health administrators should not only be concerned about anti-pandemic nurses' personal safety, but should also pay attention to their emotional needs for family. We also encourage the front-line nurses to stay in touch with their families and turn to their leaders for job support. Furthermore, the present study also contributes to work–family literature by using a sample of Chinese nurses on the front-line of the COVID-19 pandemic.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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