PERSONALITY & INDIVIDUAL DIFFERENCES | RESEARCH ARTICLE

Effort–reward ratio, over-commitment and burnout: a cross-sectional study among Vietnamese healthcare professionals

Bui Thi Hong Thai¹*, Nguyen Thi Nhu Trang², Vu Thy Cam³, Le Thu Trang⁴ and Pham Thi Huyen Trang⁵

Abstract: In an effort to understand burnout, this study assesses the associations between effort–reward ratio, over-commitment and burnout among healthcare professionals. This study applies cross-sectional design using self-reported questionnaires. A total of 1162 doctors and nurses from 15 hospitals in Vietnam voluntarily participated in this survey. The questionnaire is composed of three parts: (1) questions of demographic and work-related information; (2) the 22-items version of the Effort-Reward Imbalance Questionnaire (Siegrist et al., 2004); and (3) the 22-items Maslach Burnout Inventory—Human Service Survey-Medical Personal (Maslach & Jackson, 1986). Descriptive analysis, linear regression and structural equation model (SEM) are conducted to examine variables and the relations between them. Over-commitment and effort–reward ratio are related to all dimensions of burnout. Over-commitment is also positively related to effort–reward ratio. SEM analysis suggests that effort–reward ratio mediates the relationship between over-commitment and burnout. This study supports the effort–reward theory and further suggests that effort–reward imbalance

ABOUT THE AUTHORS

Associate Professor, Dr. phil., Bui Thi Hong Thai is a Psychology lecturer and researcher. She is also working as an independent counseling psychologist. Both of her research interests and counseling service focus on adults’ mental health.

Associate Professor, Dr. phil., Nguyen Thi Nhu Trang is a Social Work lecturer and researcher. Her research interests include adolescents and family, delinquency and mental health. She also provides counseling services for adolescents with stress or depression.

Dr. Vu Thy Cam is a psychiatrist. Her research interest and practice focus on issues related to stress and depression.

Dr. phil., Le Thu Trang is a lecturer and researcher whose work focuses on psychological counseling for prisoners in prisons.

Pham Thi Huyen Trang is a Social Work lecturer. Her research interests include social work ethics, social work with people with disability and social work in hospital settings.

PUBLIC INTEREST STATEMENT

Whether or not how healthcare professionals perceive the ratio between the effort they pay and the reward they receive in workplace relates to their levels of over-commitment and burnout? Surveying 1162 healthcare professionals working at 15 hospitals in Vietnam, this paper documented that the more healthcare professionals perceive a negative imbalance between effort and reward, the more they feel burnout. Overcommitment – a personal characteristics - is also found positively related to the increase of burnout among them. Interestingly, SEM analysis suggests that effort-reward ratio mediates the relationship between over-commitment and burnout, meaning that over-commitment may be indirectly related to burnout by increasing the employees’ perceived effort-reward imbalance. This study, therefore, supports the notion that psychological characteristics, in addition to work conditions and organizational structures, is a powerful factor explaining workers’ vulnerability to stress and burnout. The findings hence contribute some practical implications for organizational practitioners in working with burnout of healthcare professionals.
and over-commitment are significantly related to burnout level among healthcare professionals. Over-commitment can also predict employees' perceived effort–reward ratio. The study hence contributes some practical suggestions for organizational practitioners in working with burnout of healthcare professionals.

**Subjects:** Asian Studies; Health & Society; Public Health Policy and Practice

**Keywords:** Effort–reward imbalance; over-commitment; burnout; healthcare professionals

### 1. Introduction

Healthcare professionals working in hospitals are usually exposed to stressful conditions such as work overload; working with patients' pain, fear or even death; or interpersonal conflicts in their daily work (Huang et al., 2020; Pérez-Francisco et al., 2020; Portoghese et al., 2014). Accordingly, burnout has been recognized as a popular mental health issue among them, especially during the outbreak of Covid-19 pandemic (Jalili et al., 2021; Leo et al., 2021).

Burnout is defined as “a syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment that can occur among individuals who do ‘people work’ of some kind” (Maslach & Jackson, 1981, p. 1). Emotional exhaustion—the core dimension of burnout—is regarded as an individual aspect, referring to employees' emotional tiredness because of the demanding interpersonal contacts with other people. Depersonalization—the interpersonal aspect of burnout—refers to their cynical and callous attitude towards clients or patients. Lack of personal accomplishment refers to the aspect of self-evaluation and is characterized by a reduced sense of competency and productivity (Maslach & Leiter, 1997; Maslach et al., 2001). Burnout is hence found to be positively related to mental health issues, such as depression and anxiety (Koutsimani et al., 2019; Vasconcelos et al., 2018).

Among theoretical frameworks explaining work-related stress or burnout, effort–reward imbalance model (Siegrist, 1996, 2016) is considered as one of the most important frameworks guiding occupational health research. Since it was introduced in 1984, this model has quickly become a popular theoretical guide for studies on mental health of employees in work settings, and has also experienced some revisions since then (Van Vegchel et al., 2005). The effort–reward imbalance model is based on the social exchange premise and on the notion of distributive justice (Siegrist, 2008), holding that employees seek a balance between what they contribute (efforts) and what they receive in return (rewards) at work. The balance of this reciprocity plays a vital role in making employees feel fulfilled at work, without which they may experience strong negative emotions and, in the long run, may have physical and mental health issues, such as distress or burnout (Avanzi et al., 2014; Hayes et al., 2019; Violanti et al., 2018).

Originally, Siegrist (1996) proposed that Effort was composed of extrinsic factors (job demands and obligations) and intrinsic factors (individual’s critical coping and their need for control and approval), and Reward was made of money, esteem and status control. In this original version, over-commitment was both extrinsic and intrinsic. Siegrist argued that those who were highly over-committed to work tended to pay more effort in work thanks to the combined effect of both the job demands and obligations and their need for control and approval. Lately, the author made some critical revision to this ERI model, in which Effort and Reward were conceptualized as extrinsic control structure that the organization employed to urge employees accomplish their job: defining demands and obligations to make sure that employees would invest their Effort in work, and providing Rewards (money, esteem, security/career opportunities) to maintain their effort, and Over-commitment was re-defined as an intrinsic factor representing employees' need for control and approval. Siegrist held that over-commitment affected both employees' perception of the effort they were paying and the reward they were receiving (Van Vegchel et al., 2005). Siegrist (2016) proposed a new model of effort–reward imbalance as follows (see Figure 1):
Many studies have later documented that high effort–reward imbalance (ERI) and high over-commitment (OC) exerted a negative impact on both physical health (e.g., Chen et al., 2016; Kivimäki et al., 2002; Kumari et al., 2004; Yu et al., 2013) and mental health of employees (Kikuchi et al., 2009; Kinman, 2016; Penz et al., 2019), as proposed by the author of ERI model. Regarding the relationship between ERI and burnout, most studies, though using different burnout scales (e.g., Copenhagen burnout scale, Maslach burnout inventory—general scale, or Maslach burnout inventory—human service survey), showed that higher ERI and higher OC were significantly associated with burnout level of employees working in different occupations (Avanzi et al., 2014; Violanti et al., 2018). This association is especially true for healthcare professionals (Bhembe & Tsai, 2019; Hayes et al., 2019). In general, these studies supported the theory by Siegrist (2016) that imbalance reciprocity between (high) cost and (low) gain at work was associated with elevated relative risks of both physical and mental health issues among employees. Recently, some research raised the question of how each component of ERI model individually and jointly affected employees’ mental health. Some authors claimed that both two-way interaction (effort × reward) and three-way interaction (effort × reward × over-commitment) can predict life satisfaction (e.g., Kinman & Jones, 2008); some others reported moderating role of OC in the relationship between reciprocal imbalance and mental health’s outcomes, in which OC can aggravate the association between ERI and mental health issues (Feuerhahn et al., 2012; Kinman, 2016; Yuan et al., 2021). However, a systematic review by Siegrist and Li (2016) finds that the results of this interaction are inconsistent, and a majority of studies fail to support the hypothesis.

If most of the current studies treated ERI components as independent variables which individually or jointly affected mental health outcomes, to our best knowledge there were only a few studies that examined the association between ERI components to see if they can predict each other. Interestingly, these studies supported two opposite directions: one claimed that OC predicted ERI, whereas the other held that ERI predicted OC. The first line of study, conceptualizing OC as “personal pattern of coping with work demands” (Siegrist & Marmot, 2004, p. 1467), argued that OC mediated the association between ERI and mental health issues. The longitudinal study of Hinsch et al. (2019) documented that ERI was a significant predictor of mental health problems when OC is not included in the analysis. However, this association turned statistically insignificant when OC was introduced into the analysis as a covariate. Hinsch et al. (2019) concluded that ERI

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**Figure 1. The model effort-reward imbalance at work** (source: Siegrist, 2016).
affected mental health problems indirectly through OC. The mediating role of OC was also affirmed in the cross-sectional study by Wang et al. (2017) on Chinese population.

In contrast, Feldt et al. (2016) argued that OC was a risk factor for increasing the imbalance between effort and reward at work. Their 8-year longitudinal study demonstrated that high OC predicted high effort, low reward and high ERI. This result was affirmed in all five assessments during this longitudinal study. These authors also examined the reversed association to see if Effort and Reward can predict OC, however their data did not support this direction.

The contradictory findings on the association between effort–reward imbalance and Over-commitment raised the need for further study to identify if OC predicts ERI or vice versa. Besides, how sustainable the effect of ERI and OC on the mental health of employees is still questionable. If cross-sectional studies often documented the independent effect of ERI and OC on physical and mental health issues, longitudinal studies documented contradictory findings on the impact of ERI on mental health issues in general and burnout in particular. For example, some studies showed that ERI affected depression at the start of the study and 5-year follow-up (Rugulies et al., 2012) or ERI was associated with exhaustion at both time 1 and time 2 two years later (Leineweber et al., 2021). However, some other longitudinal studies reported that the impact of ERI on psychological distress remained significant after 1 year but then dramatically decreased (Shimazu & de Jonge, 2009). On the contrary, the impact of OC on employees’ mental health outcomes was documented to be quite consistent in both the longitudinal studies of Hinsch et al. (2019) and Feldt et al. (2016).

In this context, the purpose of this study is to investigate the association between over-commitment (OC), effort–reward ratio (ERR) and burnout, as well as the role of ERR in the association between OC and burnout. We seek to explain how the interaction between environmental and personal factors affects burnout, and by doing so, we adopt the conceptualization in that OC is a psychological characteristic as proposed in the new version of ERI model by Siegrist (2016). This examination may provide some theoretical contributions for a deeper understanding of the mechanism underlying ERI model as well as burnout in relation to ERR and OC. Furthermore, the findings may contribute to some implications for organizations in designing preventative strategies to save their employees from burnout. In addition, whereas many studies have assessed mental health of Vietnamese healthcare workers and commonly reported a high rate of healthcare workers experiencing depression, anxiety and stress (e.g., Nguyen Ngoc et al., 2020; Quang et al., 2021), little is known about burnout among Vietnamese healthcare workers, and studying on the relationship between ERI and burnout among Vietnamese healthcare workers remains a gap.

In summary, the purpose of the current study is to develop and test a conceptual model of the relationship between intrinsic (over-commitment) and extrinsic (effort–reward ratio) factors and burnout (emotional exhaustion, depersonalization, and personal accomplishment) among Vietnamese healthcare professionals. We propose three hypotheses as presented in Figure 2.

Figure 2. Hypothesized model.
Hypothesis 1a: Over-commitment is related to all dimensions of burnout, Hypothesis 1b: Effort–reward ratio is related to all dimensions of burnout;

Hypothesis 2: Over-commitment is related to effort–reward ratio;

Hypothesis 3: Effort–reward ratio mediates the relationship between over-commitment and all dimensions of burnout.

2. Methodology

2.1. Participants and procedure
This is a cross-sectional study. We applied the convenient sampling strategy and sent out 1500 self-reported questionnaires to doctors and nurses working at 15 hospitals in Hanoi, Da Nang, and Ho Chi Minh city, Viet Nam during September and October 2020. First, an invitation to participate in the study was sent out to doctors and nurses in selected hospitals, and then those who agreed to participate in the research received a self-reported questionnaire. Each questionnaire was put in an envelope to ensure confidentiality. Participants were asked to put the completed questionnaire into the envelope again and sealed when finishing, then gave it back to our contact person at the hospital. Of the 1500 questionnaires sent out, 1162 valid ones were collected, making up a response rate of 77.5%.

The majority of participants were female (65.8%). Mean age was 32.12 years (SD = 8.19), with a range from 21 to 70 years. More than half of participants were married (58.5%), about one-third of them were single (38.9%), and the others were separated or divorced (2.6%). Two-thirds of participants were nurses (66.4%), and the others were doctors. A small rate (11.4%) of them simultaneously had a second job at a private healthcare center. 70.3% of participants worked on average 8 hours per day, 20.9% worked from 8 to 10 hours per day, and 8.9% worked more than 10 hours per day. 51.7% of survey participants had less than 5 years of work experience, 21% had 6–10 years, 10% had 11–15 years and 17.3% had more than 15 years.

3. Measurement
The questionnaire included a set of questions on participants' demographics information such as gender, age, marital status and work information such as occupation (doctor or nurse), average working hours per day, having second job, and the following scales. Repeated forward-backward translation procedure was adopted in this study as advised by (Van de Vijver & Hambleton, 1996) for all scales. The scales were first translated independently into Vietnamese by one organizational psychologist and one clinical psychologist. After that, the two translated versions were discussed to create the draft version. Then, the Vietnamese version was translated back into English by an independent translator who did not know about the tool, and compared with the original English version. Next, face validity of the draft versions was assessed among 54 doctors and nurses to test their understanding of the language translation. Participants reported that they understood the items as their intended meaning, thus no further refinement of item content was necessary.

3.1. Effort–reward imbalance and over-commitment
This study uses the 22-items version of the Effort-Reward Imbalance Questionnaire (Siegist et al., 2004). This tool consists of three subscales including: (1) 5-item effort scale which referred to demanding aspects of the work environment (e.g., “I have constant time pressure due to a heavy work load”); (2) 11-item reward scale tapping three kinds of benefit, namely, “financial reward”, “esteem reward”, and “promotion and job security” (e.g., “Considering all my efforts and achievements, I receive the respect and prestige I deserve at work”); and (3) 6-item over-commitment referring intrinsic factors (e.g., “As soon as I get up in the morning, I start thinking about work problems”). Participants responded to the items on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). An effort–reward ratio was computed for each respondent according to the formula: \( \frac{e}{r \times c} \) (Siegist et al., 2004). In which, “e” is the sum score of the effort scale, “r” is the sum score of the reward scale, and “c” is a correction factor for
different numbers of items in the numerator and denominator (the number of items in the numerator divided by the number of items in the denominator: 5/11 = 0.454545). In some studies, researchers often use 1 as cut-off point to determine the imbalance between effort and reward, with effort–reward ratio ≤1 indicating that participants did not report effort–reward imbalance, and effort–reward ratio >1 indicating that participants reported effort–reward imbalance (Niedhammer et al., 2004). In this study, effort–reward ratio (ERR) is a continuous variable. The higher the value of ERR participants report, the more participants perceive an imbalance between the effort they pay and the reward they receive at work. For overcommitment, higher scores represented higher overcommitment to work.

Previous studies unanimously reported satisfactory internal consistencies for all three scales with Cronbach’s alpha value above 0.70 (e.g., Kinman & Jones, 2008). In our study, these values were 0.81, 0.72, and 0.74 for effort, reward, and over-commitment, respectively. The three-factor structure of the tool was also confirmed previously (e.g., Feuerhahn et al., 2012; Siegrist et al., 2004). In the current study, results from a confirmatory factor analysis (CFA) revealed also that a three-factor model (effort, reward, over-commitment) fitted the date reasonably well: comparative fit index—CFI = 0.91 and Tucker-Lewis index = 0.91 were considered adequate, the Root Mean Squared Error of Approximation—RMSEA = 0.07 and Standardized Root Mean Square Residual—SRMR = 0.06 were acceptable (Brown & Cudeck, 1993).

3.2. Burnout
We used the 22-item Maslach Burnout Inventory—Human Service Survey-Medical Personnel—MBI-HSS (Maslach & Jackson, 1986) to evaluate burnout among doctors and nurses. This instrument consisted of three subscales including Emotional exhaustion with nine items (e.g., “I feel emotionally drained from my work”), Depersonalization with five items (e.g., “I've become more callous toward people since I took this job”), and Personal accomplishment with eight items (e.g., “I feel exhilarated after working closely with my patients”). Items were scored from 0—never, 1—a few times a year, to 6—daily. Higher score of emotional exhaustion and depersonalization indicates a higher risk of burnout, while higher score of personal accomplishment indicates a lower risk of burnout.

Different studies found different factorial structures of MBI-HSS, from one-factor model to five-factor model, some studies kept all 22 items, while some discarded some items to assure fit indices of the model (see, Loera et al., 2014). The validation of this tool in Vietnamese healthcare professionals confirmed a three-factor structure, which was similar to Maslach’s original version with satisfactory fit index: CFI = 0.96, TLI = 0.95, RMSEA = 0.05, and SRMR = 0.06. Cronbach’s alpha value was 0.91, 0.77, and 0.88 for Emotional Exhaustion, Depersonalization, and Personal Accomplishment, respectively (Bui et al., 2022).

4. Statistical analysis
We first analyzed descriptive statistics (mean value, standard deviation), then using Pearson’s correlation coefficients to analyze the correlations among effort, reward, over-commitment, emotional exhaustion, depersonalization, and personal accomplishment. The associations between effort–reward imbalance, over-commitment and burnout dimensions and covariate variables were examined using a linear regression. The mediating analyses were performed with structural equation modelling (SEM), using AMOS version 23.0. The model fit was evaluated by several fit indices: Comparative Fit Index (CFI), Turkey-Levis Index (TLI), Root Mean Square Error of Approximation (RMSEA) with 90% confidence intervals, and the Standardized Root Mean Square Residual (SRMR). Hu and Bentler (1999) recommended researchers to adopt cutoff values close to .95 for the TLI and the CFI, cutoff values close to .06 for the RMSEA, and cutoff values close to .08 for the SRMR. We also report $\chi^2$ but do not focus on the significance of the ratio of the Chi-square and its related degree of freedom ($\chi^2 / df$), because $\chi^2$ is almost significant, suggesting a poor model fit when the sample size is large (Jöreskog, 1993). All statistical analyses were performed using IBM SPSS version 23.0 (SPSS Inc., Chicago, IL, USA) and Analysis of Moment Structures (AMOS) version 22.0 (IBM, New York, NY, USA). Statistical significance was set at p < 0.05.
5. Ethical considerations
The study protocol was reviewed and approved by the Institutional Review Board, Vietnam National University, Hanoi School of Medicine and Pharmacy (approval no. 06/2020/CN-HDDD).

All nurses and doctors participated in this study on a volunteer basis and their participation is kept anonymous. All participants fully understood the research and signed an informed consent form before joining this study, and were ensured that they could leave the study any time they wanted without any harm.

6. Results

6.1. Correlations among study variables
Table 1 shows the mean scores of all burnout scales and ERI components, and correlations between them. Our study found that effort, effort-reward ratio, and over-commitment had a positive correlation with Emotional Exhaustion and Depersonalization, while the correlations between ERR and OC with personal accomplishment were negative. We found no statistically significant correlation between Effort and Personal Accomplishment. On the contrary, reward had a negative correlation with Emotional Exhaustion and Depersonalization, while it had positive correlation with Personal Accomplishment. These results indicate that high Effort, high ERR, and high OC were negatively associated with Emotional Exhaustion and Depersonalization.

6.2. Linear regression analysis
Table 2 presents the results of regression analysis. Our data documents that only gender and income relate to burnout, however they only relate to certain aspects of burnout and the strength of the relationship is quite weak. To be specific, female employees seem to be more inclined to emotional exhaustion than their male counterparts, employees who receive higher salaries tend to perceive more personal accomplishments. In the meantime, ERR is positively related to emotional exhaustion ($\beta = 0.44, p < 0.001$), and depersonalization ($\beta = 0.30, p < 0.001$), whereas negatively related to personal accomplishment ($\beta = -0.21, p < 0.001$). OC has a positive relationship with emotional exhaustion ($\beta = 0.31, p < 0.001$) and depersonalization ($\beta = 0.26, p < 0.001$), but its relationship with personal accomplishment is found negative ($\beta = -0.06, p < 0.05$). Among the three aspects of burnout, our data show that emotional exhaustion is most related to ERR and OC, 50% of the variance of emotional exhaustion can be explained by ERR and OC. Next, data show that 29.4% of the variance of depersonalization can be explained by ERR and OC, whereas only 3.5% of the variance of personal accomplishment is related to the variance of ERR and OC.

6.3. Model testing
Figure 3 illustrates the correlations and relevant estimates, using a structural equation model to analyze them. When adding the socio-demographic variables as covariates, the direction of the associations among the core variables in the SEM remains unchanged, and the changes in the corresponding coefficients are insignificant. Therefore, the socio-demographic variables are not confounding factors. All indices meet the reference value, indicating that this model fits data well ($\chi^2 = 9.61, \text{df} = 2, p = 0.008, \text{TLI} = 0.95, \text{CFI} = 0.97, \text{RMSEA} = 0.07 (90\% \text{CI:} 0.03-0.13)$, and $\text{SRMR} = 0.02$).

A bias-corrected bootstrap with 2000 replications using maximum likelihood estimation is used for each path. The estimates for direct, indirect, and total effects with bias-corrected 95% CI (confidence intervals) are shown in Table 3. The total effect results indicate that over-commitment is significantly positively correlated with Emotional Exhaustion ($\beta = 0.62, 95\% \text{CI} [0.58, 0.65]) and Depersonalization ($\beta = 0.48, 95\% \text{CI} [0.43, 0.53])$, while negatively correlated with Personal Accomplishment ($\beta = -0.06, 95\% \text{CI} [-0.12, -0.01]$). These results support the H1a—Over-commitment is related to burnout. Effort-reward imbalance is positively correlated with Emotional Exhaustion ($\beta = 0.47, 95\% \text{CI} [0.42, 0.52]) and Depersonalization ($\beta = 0.33, 95\% \text{CI} [0.29, 0.41])$, while negatively correlated with Personal Accomplishment ($\beta = -0.21, 95\% \text{CI} [-0.29, -0.13]$). These results support the H1b that effort-reward ratio is related to burnout.
Table 1. Descriptive data and correlations between effort, reward, over-commitment and study outcomes (N = 1162)

|                          | Range   | Mean (SD)   | 1     | 2     | 3     | 4     | 5     | 6     |
|--------------------------|---------|-------------|-------|-------|-------|-------|-------|-------|
| 1. Effort                | 5–25    | 12.58 (4.46)| -     | -     | -     | -     | -     | -     |
| 2. Reward                | 22–55   | 39.95 (6.67)| -0.24***| -     | -     | -     | -     | -     |
| 3. Effort-reward ratio   | 0.20–2.00| 0.72 (0.31)| 0.91***| -0.57***| -     | -     | -     | -     |
| 4. Overcommitment        | 6–30    | 14.31 (4.68)| 0.67***| -0.30***| 0.68***| -     | -     | -     |
| 5. Emotional Exhaustion  | 0–54    | 14.97 (11.76)| 0.62***| -0.40***| 0.67***| 0.62***| -     | -     |
| 6. Depersonalization     | 0–30    | 7.48 (5.98) | 0.45***| -0.36***| 0.52***| 0.48***| 0.73***| -     |
| 7. Personal Accomplishment| 0–48   | 32.01 (9.64)| -0.02, ns | 0.41***| -0.16***| -0.06* | -0.04, ns | -0.06* |

*p < 0.05; **p < 0.001; ns - non significant
Besides, over-commitment is significantly positively correlated with effort–reward imbalance ($\beta = 0.68$, 95% CI [0.64, 0.71]). This result supports the H2 that over-commitment is positively related to effort–reward ratio.

Our study observes that over-commitment has a significantly indirect effect on Emotional Exhaustion ($\beta = 0.32$, 95% CI [0.28, 0.36]), on Depersonalization ($\beta = 0.24$, 95% CI [0.20, 0.29]), and on Personal Accomplishment ($\beta = -0.14$, 95% CI [-0.20, -0.09]) through effort–reward imbalance, which indicates a mediating role of effort–reward imbalance on the association between over-commitment and burnout. These results support the H3 that effort–reward ratio mediates the relationship between over-commitment and burnout.

**7. Discussion**
The purpose of the current study is to examine the relationship between effort–reward ratio, over-commitment and burnout. We also study whether over-commitment can predict effort–reward ratio, and furthermore, if effort–reward ratio functions as a mediator in the relationship between over-commitment and burnout. Our findings document that both over-commitment and effort–reward ratio are related to all the three dimensions of burnout. To be specific, OC and ERR are positively associated with Emotional Exhaustion and Depersonalization, while negatively associated with Personal Accomplishment. This finding is in the same line as previous cross-sectional and longitudinal

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**Table 2. Linear regression of factors significantly associated with burnout’s dimensions**

| Independent variables | Emotional exhaustion | Depersonalization | Personal accomplishment |
|-----------------------|----------------------|-------------------|-------------------------|
|                       | Beta | t     | Beta       | t     | Beta   | t   |
| Constant              | -    | -2.97** | 2.23*      | -1.56, ns | -0.02 | -0.32, ns |
| Gender                | 0.05 | 2.08* | -0.05 | -1.56, ns | 0.09 | 2.70** |
| Income                | -0.02 | -0.95, ns | -0.01 | -0.42, ns | -0.21 | -4.69*** |
| Effort-reward ratio   | 0.44  | 14.09*** | 0.30 | 8.00*** | -0.06 | -2.19* |
| Overcommitment        | 0.31  | 10.01*** | 0.26 | 7.12*** | 29.4  | 3.50 |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, gender (0-male, 1-female)
studies on the relationship between effort-reward imbalance and burnout, as well as between over-commitment and burnout (e.g., Bakker, Killmer, Siegrist & Schaufeli, 2000; Alvarado et al., 2021; Violanti et al., 2018). Besides, some studies document the relationship between both effort and reward with the three aspects of burnout; however, OC has association with only depersonalization and emotional exhaustion and no relationship with personal efficacy or personal accomplishment (Yuan et al., 2021). Siegrist (1996) explains that a stressful work environment, such as when employees perceive the reward that they receive do not deserve the efforts they make at work, might significantly contribute to psychological distress. In the same line with this explanation, Maslach and Leiter (2016) argue that insufficient recognition and reward in the workplace increase employee’s vulnerability to burnout, because it not only devalues the work and the workers but also brings about the feelings of inefficacy. Hence, the increase of ERR may lead to the increase in Emotional Exhaustion and Depersonalization, while result in the decrease in employees perceived Personal accomplishment. Regarding the relationship between over-commitment and aspects of burnout, Oren and Littman-Ovadia (2012) claim that overcommitted employees tend to put unrealistic expectations upon work and invest inappropriately large effort; therefore, they are more likely to undergo sustained strains at work. This argument is supported by the study of Philp et al. (2012), which showed that perfectionism boosted overcommitment and then burnout. Perfectionists and over-committed persons pursue high standards at work, and in order to achieve their standards they work very hard even though this hard-working may create negative impacts on their physical and mental health. As a result, burnout may occur.

Table 3. Path coefficients between structural variables and significance test of mediating way

| Model pathways                                                                 | Estimated | 95% CI        |
|-------------------------------------------------------------------------------|-----------|---------------|
| **Total effects**                                                             |           |               |
| Over-commitment → Emotional Exhaustan                                        | 0.62      | (0.58)—(0.65) |
| Over-commitment → Personal Accomplishment                                     | 0.48      | (0.43)—(0.53) |
| Effort-reward imbalance → Emotional Exhaustan                                 | -0.06     | (-0.12)—(-0.01)|
| Effort-reward imbalance → Depersonalization                                   | 0.47      | (0.42)—(0.52) |
| Effort-reward imbalance → Personal Accomplishment                             | 0.35      | (0.29)—(0.41) |
| Over-commitment → Effort-reward imbalance                                     | -0.21     | (-0.29)—(-0.13)|
| Over-commitment → Personal Accomplishment                                     | 0.68      | (0.64)—(0.71) |
| **Direct effects**                                                            |           |               |
| Over-commitment → Emotional Exhaustan                                        | 0.30      | (0.24)—(0.36) |
| Over-commitment → Personal Accomplishment                                     | 0.24      | (0.17)—(0.31) |
| Effort-reward imbalance → Emotional Exhaustan                                 | -0.08     | (-0.01)—(-0.16)|
| Effort-reward imbalance → Depersonalization                                   | 0.47      | (0.42)—(0.52) |
| Effort-reward imbalance → Personal Accomplation                               | 0.35      | (0.29)—(0.41) |
| Over-commitment → Effort-reward imbalance                                     | -0.21     | (-0.29)—(-0.13)|
| Over-commitment → Personal Accompliation                                      | 0.68      | (0.64)—(0.71) |
| **Indirect effects**                                                          |           |               |
| Over-commitment → Emotional Exhaustan                                        | 0.32      | (0.28)—(0.36) |
| Over-commitment → Personal Accompliation                                      | 0.24      | (0.20)—(0.29) |
| Effort-reward imbalance → Personal Accomplation                               | -0.14     | (-0.20)—(-0.09)|

Further, this study observes that high over-commitment can predict high perceived effort–reward ratio. Taken that over-commitment is conceptualized as a psychological characteristic, this finding suggests that when employees are over-committed to their job, they work intensively—even beyond what is considered necessary at work (Siegrist et al., 2004)—not only because of the pressure from the control structure of their organization but also because of their personal desire for being approved and recognized by others (Matschinger et al., 1986; Siegrist et al., 2004). Since their excessive effort often do not receive adequate rewards, their over-commitment boosts their perceived imbalance between effort and reward, as Feldt et al. (2016) suggested. Besides, Siegrist (2016, p. 83) emphasizes that overcommitment, though conscious or unconscious, contributes to the perception of imbalance between effort and reward at work even in the absence of extrinsic pressure. This means that not only in the exceptionally stressful conditions, such as the outbreak of Covid-19 pandemic, over-committed workers may experience more effort–reward imbalances than their colleagues, even in normal working conditions.

Finally, the results support our hypothesis that ERR plays a mediating role in the relationship between over-commitment and burnout. In other work, OC can increase the vulnerability of burnout by increasing employees’ perceived effort–reward imbalance. In the study of Feldt et al. (2016), OC is theorized as personal characteristics which is stable over time, or even increase when individuals age. According to our study, high OC is related to the increase of ERI and by doing so it increases burnout. This finding hence provides an explanation for the notion that being overly committed to one’s work can be exhausting in the long run (Van Vegchel et al., 2005), which clarifies the psychological mechanism underlying the association between OC and burnout. In addition, elucidating the associations between components of effort–reward imbalance contributes to a more profound understanding of the roles of intrinsic and extrinsic factors in relation to work stress or burnout.

The results also have some implications for organizational managers and practitioners in developing preventive mental health services for their organizations, specifically during stressful working conditions such as Covid-19 pandemic. Over-committed healthcare professionals may need psychological support more than their colleagues. Organizational counsellors or social workers may consider helping over-committed employees to explore their own emotional and cognitional motivations underlying their over-commitment at work. This understanding may in its turn help them to establish an immanent balance to avoid the risk of burnout. In addition, strategies to boost employees’ perception of rewards in work also may help reduce the level of burnout. Besides increasing salary or other material benefits for employees as reward for their effort, organizations may consider developing strategies to help their employees feel more valued and meaningful in work. Strategies to create opportunities for employees to perceive that their career is always in an advanced progress, if they pay effort in work may help keep them productive while reducing their risk for burnout.

Last but not least, the context of Covid-19 pandemic was mentioned here and there throughout this paper. It should be noted that this study was conducted in the first wave of Covid-19 pandemic, which created an enormous pressure for healthcare workers in many countries. Accordingly, much of the literature we referred to in this study took into account the impact of Covid-19 pandemic on healthcare workers’ mental health issues. However, this first wave left a modest impact on Vietnam society. The infection rate in Vietnam during this time is exceptionally low (Le et al., 2021). Therefore, we believe that the context of Covid-19 did create some pressure for Vietnamese healthcare professionals during the time of data collection, however this pressure is not enough to make any remarkable effect on the relationship between ERR, OC and burnout among this particular population. Accordingly, we believed that the findings of this study stay true for normal working conditions of healthcare professionals instead of only true for specific conditions.

8. Conclusion
The results of this study provide that ERI and OC are directly related to healthcare professionals’ burnout. Besides, the results suggest that OC may be indirectly related to burnout by increasing the employees’ perceived ERI. This study, therefore, supports the notion that psychological characteristics, in addition to work conditions and organizational structures, are a powerful factor explaining
workers' vulnerability of stress and burnout as claimed by Maslach and Leiter (2016). In practice, the findings suggest that prevention and intervention strategies for healthcare professionals’ burnout should pay attention to not only providing rewards (whether materials, recognition or career opportunity) but also workers' personal characteristics. In other words, besides the institutional strategies applying to all employees, organizational practitioners such as counsellors or social workers should resort to a client-centered approach when working with the burnout of healthcare professionals.

9. Limitations
This is a cross-sectional study, which is unable to establish causal relationships between variables, whereas mediation implies causal relationships. Therefore, this study is unable to confirm the mediating role of ERI in the relationship between OC and burnout. However, this finding provides some initial evidence for further studies whose research design allows testing causal relationships to consider whether they can elucidate the psychological mechanisms explaining burnout based on OC and ERI. Besides, when examining the relationship between ERR, OC and burnout, we did not control for mental disorders. Taking into account that mental disorders may have an impact on the way individuals perceive their burnout and ERR, studies on this topic in the future may consider examining the role of mental health issues in the interaction between ERR, OC and burnout.

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Author details
Bui Thi Hong Thai1
E-mail: hongthaibui.psy@gmail.com
ORCID ID: http://orcid.org/0000-0003-2163-7572
Nguyen Thi Nhu Trang2
ORCID ID: http://orcid.org/0000-0003-0224-2970
Vu Thy Cam3
Le Thu Trang4
Pham Thi Huyen Trang5
1 Faculty of Psychology, VNU University of Social Sciences and Humanities, Viet Nam National University, Ha Noi, Viet Nam.
2 Faculty of Sociology, VNU University of Social Sciences and Humanities, Viet Nam National University, Ha Noi, Viet Nam.
3 National Institute of Mental Health, Ha Noi, Viet Nam.
4 Faculty of Psychology, The People’s Police Academy, Ha Noi, Viet Nam.
5 Faculty of Social Sciences and Humanities, Hanoi Metropolitan University, Ha Noi, Viet Nam.

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