Author's response to reviews

Title: Effort reward imbalance and quality of life of healthcare workers in military hospitals: a cross-sectional study

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Author's response to reviews: see over
Responses to Reviewer 1:

Thank you for your thoughtful review of our manuscript.

We completed the major compulsory revision and re-wrote the Abstract, Introduction, Methods, Results and Conclusion sections, putting more focus on the main research question. Our responses to the specific suggestions are as follows:

In Table 1, we considered these variables as confounders due to previous studies had reported their relevance to job stress. Some workers attribute their stress to psychosocial factors, such as employment status, the care of young children, marital relationships, and susceptibility rooted in personality factors (Firth-Cozens, 1986; Dowell, 2001; Coomber, 2002; Lu, 2006); alcohol dependence (Head et al., 2004); smoking and alcohol drinking (Kessler, 1994; Dewa, 2004).


In Table 2, we omitted systolic BP and fasting sugar, in accordance with the reviewer’s suggestion.

Abstract:
In the rewritten Abstract, the sentence causing confusion was deleted and the abbreviation WHOQOL-BREF was introduced. In accordance with the reviewer’s comments, we also deleted the results regarding higher educational level, lower systolic blood pressure, more hypnotic drug history etc.

Introduction:
In the revised Introduction, we start with the Taiwan situation as previously mentioned on page 5. We then continue with job insecurity and emotional distress from reorganization.

We tried to conceptualize and measure general health and quality of life in the same manner as systemic reviews of GHQ (Stansfeld et al., 1999; Niedhammer et al., 2006; Tzeng et al., 2009) and WHOQOL (Stansfeld et al., 1998; Yao et al, 2002; Skevington et al., 2004; Tzeng et al., 2009). According to Lahelma (2005), we cited this epidemiological study on page 3 and 12, studies comparing social-economic inequality in health using several health indicator are scarce. He magnituded the job stress across the key health domains such as subjective, functional and medical domains. The art in terms of ERI and psychological morbidity / quality of life in this study might follow the better standard as Lahelma.

We deleted our description of the ERI model as being “recently developed.”

The reviewer commented on the meaning of the sentence, “For example, health status has been self-rated by the grades ranging form one to eight … or one to five” on page 4. We were presenting the weaknesses of measures of job stress outcomes. We deleted these sentences. Instead, we make the distinction and meaning clear on page 14 of the revised manuscript, where the following is written: “Unlike general health outcomes graded from one to eight by self-report, the WHOQOL-BREF is used to assess all domains of QOL (Niedhammer et al., 2006).”

On page 5 of the revised manuscript, we introduce the abbreviation WHOQOL.

We shifted the description “To do this….,” from the end of page 5 to the Methods section on page 8.

**Methods:**
We replaced ‘subjects’ with ‘respondents’ throughout the revised manuscript.

We excluded respondents with major diseases because the presence of disease would likely influence the outcome measurements GHQ and QOL, we added this state on page 6.

**Participants:**
We deleted the material that the reviewer found difficult to understand (“In southern Taiwan, the hospitals will be on the list of schedule.”) and condensed the response rates (we deleted “…9 of the 11 physicians, 57 of the 60 nurses, and 67 of the 69 other personnel…3/31 physicians, 85/90 nurses, and 69/71 other personnel…54/131 physicians, 278/460 nurses, and 169/346 other personnel”). However, we retained the response rates by hospital because we believe this information is important for the assessment of biases in our study.

**Instruments:**
We collected “…each subject's basic anonymous information, including … marital status, smoking history, history of alcohol consumption and hypnotic drug use, and
life events in the past six months” because all of these factors are likely associated with the outcome measurements. This description of information collected remains in the revised manuscript. We added the statement, “These data are likely associated with the outcome measures” to the revised manuscript to explain the relevance of this information.

The website address provided by the reviewer (http://www.uni-duesseldorf.de/medicalsociology/Psychometric_information_and_d.145.0.html) provides effort-reward imbalance questionnaire data analysis and psychometric information as well several references we had cited in this article, such as:


In the section of introduction (page 4 and 5) and method (page 9), we had cited the psychometric detail information as the website.

**Results:**

To correct the lack of correspondence between the text and tables, the different occupational groups described in the text (“There were notable group differences. The average age of the "others" group was 38.3 years, clearly older than the other two groups. More nurses were unmarried, physicians had a higher level of education [p<0.001] and a greater number of life events. The "others" group consumed more alcohol [p=0.018] and more often had a history of smoking history than the physicians and nurses [p<0.001] [Table 1].”) were deleted.

We pursue the question of how far the association of ERI and psychological morbidity/QOL differs in between occupational groups in this study sample in an article that was published in Industrial Health (2009). In that article, we found that “Nurses had the highest GHQ scores (nurses 32.1% vs. physicians 28.3% and others 22.4%). On the WHOQOL, nurses had worse psychological and environment domain scores (12.7 and 13.1, respectively) and physicians scored the worst for the physical and social domain as compared to nurses and other specialists.” For this reason, we have not repeated the analysis of that question here.

We deleted the variables mentioned at the end of p.11 (systolic BP, drug history etc.) that the reviewer identified as not being of primary interest.

In accordance with the reviewer’s comments, we have stuck to one order throughout the manuscript: psychological morbidity and QOL.

We agreed your comments about we did not make proper the mediator/moderator analysis by table 4. We deleted the statement of mediator and moderator in abstract and discussion.

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We have removed all terms that suggest causation from our manuscript (predictor, effects, relationship, influence etc.).

Table 1 was revised, and brackets were placed around all numbers and percentages.
We added the overcommitment data to Table 2 and tested the means between ERI groups, showing significant findings in both sexes. We have made it clear that we are presenting means, and have used commas and decimals in a consistent way.

In the revised manuscript, we have omitted Table 3 because of the small sample size after stratifying the population. The other reason is that we added the overcommitment data to Table 2.

The reviewer is unclear of our analysis in Table 4. We wanted to know what variables were associated with ER ratio, psychological morbidity and QOL. The other reason is that we wanted to indirectly investigate potential mediating/moderating effects, even though we did not analyze these effects by a path-analysis. In order to make a conservative conclusion, we deleted the mediator and moderator discussion in the text.

**Discussion:**
We rewrote the discussion based on more focused results.
1. We deleted “ER ratio might be the mediator and the overcommitment might be the moderator between psychosocial factors to GHQ and QOL” from the first and last paragraph of the Discussion and from the Abstract.
2. In the second paragraph, we added a description about how reorganization was inversely associated with ER ratio, as follows: “Reorganization was inversely associated with ER ratio, which may be explained by several reasons. First, the two merged hospitals had fewer patients, acute wards, and emergency cases, as well as lower surgery volumes. These factors will reflect a lower work load, which will undoubtedly lead to lower effort and lower ER ratios. Second, the larger volume hospital was undergoing accreditation ranking, which will increase both extrinsic and intrinsic effort among its employees. This would likely lead to a higher ER ratio. Third, the National Health Insurance in Taiwan, a health-access resource, and the Ministry of National Defense, which was under financial stress, implemented “the essence of the case” policy. Before and during the merge period, the preparation and reimbursement strategy announced by the Medical Affairs Bureau might decrease the hardship experienced by workers made redundant. Whatever the reason for high ER ratios among workers in the three hospitals, psychological morbidity and poor QOL were associated with job stress.

Thank you for your advice.

Yours sincerely,
Dong-Sheng Tzeng
Responses to Reviewer 2

Thank you for your suggestions. Here are our responses to your comments:

1. We agree that these personnel were actually convenience sample, which cannot represent the whole situation. We have added the following sentences to the limitation section of the Discussion on page 16: “Our second limitation is that our study population were healthcare workers in hospitals, where many studies have found higher job stress and psychological morbidity (Burbeck et al., 2002; Clarke and Singh, 2004; Coomber et al., 2002; Ramirez et al., 1995; 1996; Tzeng et al., 2009), suggesting that the results cannot be generalized to the general population. This also means that the results may underestimate the relationship between job stress and health outcome, because a high turnover rate in healthcare workers has been noted in studies throughout the world. Those remaining at their jobs may be healthier than those who have left (the healthy worker effect).”

2. We added a discussion (page 11) of the reasons why reorganization did not have as much impact as accreditation: “Reorganization was inversely associated with ER ratio, which may be explained by several reasons. First, the two merged hospitals had fewer patients, acute wards, and emergency cases, as well as lower surgery volumes. These factors will reflect a lower work load, which will undoubtedly lead to lower effort and lower ER ratios. Second, the larger hospital was undergoing accreditation ranking, which will increase both extrinsic and intrinsic effort among its employees. This would likely lead to a higher ER ratio. Third, the National Health Insurance in Taiwan, a health-access resource, and the Ministry of National Defense, which was under financial stress, implemented “the essence of the case” policy. Before and during the merge period, the preparation and reimbursement strategy announced by the Medical Affairs Bureau might decrease the hardship experienced by workers made redundant.”

We agree with your opinion and decided to delete “under reorganization” from the title. We rewrote the first sentence in the Abstract conclusion as: “There was a clear association between ERI and QOL in the healthcare workers in the military hospitals...”
under reorganization and accreditation in this study.” We delete “When health policy makers are making decisions about hospital reorganization and accreditation ranking, they should consider how changes in job characteristics and psychosocial parameters will affect the healthcare workers in these hospitals.”

3. Psychological morbidity and quality of life did differ between occupational groups, and this information was published in *Industrial Health* (2009). In that study, we found that: “Nurses had the highest GHQ scores (nurses 32.1% vs. physicians 28.3% and other 22.4%). On the WHOQOL, nurses had worse psychological and environment domain scores (12.7 and 13.1, respectively) and physicians scored the worst for the physical and social domain as compared to nurses and other specialists.” We added a description of the limitation of using mixed data from different job categories on page 17: “Third, the lower response rate from Kaohsiung General Hospital (especially from the other personnel who were older), which had a more balanced male: female ratio, higher work loading, and was undergoing accreditation ranking, compared with the higher response rates from the two merged hospitals, may have introduced selection bias.”

On page 6 of the revised manuscript, we have added background information about the three hospitals to present different degrees of stress. “Pingtung Hospital is a regional hospital with 3 acute wards and 100 beds, an emergency volume of 300 cases per month and a resource utilization of about ten million Taiwan dollars per month…Penghu Hospital is a regional hospital with 5 acute wards and 150 beds, an emergency volume of 600 cases per month and a resource utilization of about fifteen million Taiwan dollars per month. The average work hours per week for physicians, nurses, specialized and administrative personnel for these two merged hospitals are 60, 36, 40 and 34, respectively…Kaohsiung General Hospital is a teaching hospital with 20 acute wards and 650 beds, 50 ICU beds, an emergency volume of 5500 cases per month and a resource utilization of about 150 million Taiwan dollars per month. In this hospital, the average work hours per week for physicians, nurses, specialized and administrative personnel are 78, 44, 42 and 34, respectively.”

4. Social support has been studied as a possible predictor of health-related quality of life (QOL) (Stansfeld et al., 1998). The social support measure used by Stansfeld was the demand-control model (Job content questionnaire, Karasek, 1979) which is a different control concept than the ERI. Several studies have documented the independent
explanatory power of the ERI scales compared with the demand-control-model scales (Karasek et al. 1998) despite the fact that the 'demand' and 'effort' scales show modest to strong correlations (ranging between r = .30 and r = .60; Calnan et al. 2001, Tsutsumi et al., 2001, among others).

In this study, we analyzed QOL using the regression method, with separate domains for financial, esteem and social status control in the “reward” category, and found that social status control was positively associated with QOL (B = 0.45, β = 0.09, p = 0.019, 95% CI: 0.07 to 0.83). This finding matched the result in Table 4—that the ER ratio was inversely associated with QOL. In this study, we agree your opinion in social support is related to health status.

In terms of different jobs and different hospitals, in the revised manuscript, on page 11, we have added: “As can be seen in table 4, we used a forward stepwise regression analysis to determine variables independently associated with ER ratio, psychological morbidity and QOL. We found that female sex and being a nurse were positively associated with ER ratio, while age and working in reorganized hospital were inversely associated with ER ratio.

In terms of different stages of reorganization, a follow-up study was performed and the data are being prepared for publication. In that analysis, “At follow up, the high-strain group did not have a greater prevalence of psychological morbidity, although significant differences in QOL remained. Job control and social support directly affected QOL (B = 0.42, p < 0.001; B = 0.41, p = 0.038, respectively) and psychological demand indirectly affected QOL through its direct effect on psychological morbidity (B = 0.12, p < 0.001).”

Why the demographic and personal data are independent variables? We considered these variables as confounders due to previous studies had reported their relevance to job stress. Some workers attribute their stress to psychosocial factors, such as employment status, the care of young children, marital relationships, and susceptibility rooted in personality factors (Firth-Cozens, 1986; Dowell, 2001; Coomber, 2002; Lu, 2006); alcohol dependence (Head et al., 2004); smoking and
alcohol drinking (Kessler, 1994; Dewa, 2004).

5. The revised manuscript has been edited by a native-English speaker with scientific expertise.

6. The IRB approval code number was (IRB096IV004) and this information has been added to the Methods section of the revised manuscript (page 6).

7. The horizontal lines were removed from Table 4.

8. The data were not normally distributed. Though there were 791 study subjects in this survey, but there were some limitations in the process of study such as healthy worker effect, limitation in selection of sample such as the larger hospital care severer cases but lower response rate. We discussed these limitation on page 16 and 17.

Thank you for your advice.
Yours sincerely,

Dong-Sheng Tzeng

References


Dowell AC, Westcott T, McLeod DK & Hamilton S. A survey of job satisfaction,


