



A Study into Psychosocial Work Stressors and Health Care Productivity

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Abstract

Background: World Health Organization's Healthy Workplace Framework and Model has emphasized addressing psychosocial work stressors as one of the important avenues toward creating a conducive workplace. Management and interventions of these adverse stressors have been unremarkable; impairing work productivity.

Objective: To explore the effect of psychosocial work stressors on health service productivity.

Methods: Using Copenhagen Psychosocial Questionnaire II and Healthcare Productivity Survey, a cross-sectional study was conducted on 225 health and allied health professionals in the largest referral hospital in Brunei. Multiple linear regression was used to explore the relationship of each domain of work productivity to indicators of psychosocial work stressors.

Results: Psychosocial work stressors explained more than 50% of the variance for health care productivity. Influence at work, role clarity, rewards and job satisfaction were among the factors with the highest contributions to this relationship.

Conclusion: Crucial factors were identified and discussed, however, due to complexity of this relationship, international collaborations and efforts are required to ameliorate adverse effects of psychosocial stressors and improve health service productivity.

Keywords: Occupational Stress; Efficiency; Quality of health care; Reward; Job satisfaction

Introduction

The World Health Organization's Healthy Workplace Framework and Model has emphasized addressing psychosocial work stressors as one of the important avenues toward creating a conducive workplace.¹ Various stressors or factors could be termed “psychosocial” because they were related to psychological and social aspects of the workplace.² Tuveesson and Eklund described psychoso-

cial work environment as a multi-factorial system that encompasses the work, the workers and the environment.³ The implications of adverse psychosocial work stressors are diverse.

A systematic review that analyzed 26 studies shows that job stress is significantly associated with increased risk of cardiovascular morbidity and mortality.⁴ The IPD-Work Consortium in a meta-analysis of 5700 incidents of cancer events in 116 000 European men and women sug-

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gests that work-related stress may increase risk of cancer.⁵ A Finnish study examining 2784 female nurses reveals that increased demands at work increases risk of absence due to psychiatric disorders, particularly depression and anxiety.⁶ The cascades of negative effects not only affects physical and mental dimensions, but also lowers job satisfaction.⁷ increases intention to leave,⁸ and increases sickness absence due to lowered immune function⁹ that exacerbates the *status quo* and eventually affects workers' level of productivity;¹⁰ a costly consequence for any workplace organization.

Despite the increasing number of management and interventions to minimize the consequences of those adverse effects, the results have been unremarkable and the issues have persisted, impairing work productivity.¹¹ We conducted this study to explore the relationship of psychosocial work stressors on health service productivity at the largest referral hospital in Brunei.

Materials and Methods

Using self-administered questionnaires, a cross-sectional study was conducted to explore the relationship between psychosocial work stressors and health care productivity.

All registered health professionals (doctors, nurses, midwives, *etc*) and allied health professionals (pharmacists, lab technicians, dieticians, paramedics, *etc*) working at the largest referral hospital in Brunei, the Raja Isteri Pengiran Anak Saleha Hospital, was invited to participate in this study from September to November 2018. The minimum sample size was calculated to be 219, assuming an acceptable precision of 5% in a finite population of 1922 health care professionals, an expected proportion of 80%, and a 95% confidence interval.¹²

Data Collection

Psychosocial Work Stressors

Psychosocial work stressors were measured using the second version of the Copenhagen Psychosocial Questionnaire (COPSOQ II), developed by the National Research Centre for the Working Environment, Denmark.¹³ This instrument provides a comprehensive measurement of psychosocial stressors or factors affecting the modern workplace. Thirteen factors were extracted from the instrument for the purpose of this study; those included influence at work, social support, work-family conflict, general health, job satisfaction, skill discretion, commitment to work, predictability, rewards, role clarity, quality of leadership, trust in management, and justice and respect. Five response categories were used for each item except for "job satisfaction" and "work-family conflict," which had four response categories. The latter determined either intensity (0 "to a very small extent," 1 "to a small extent,"

TAKE-HOME MESSAGE

- World Health Organization's Healthy Workplace Framework and Model has emphasized addressing psychosocial work stressors as one of the important avenues toward creating a conducive workplace.
- Management and interventions of these adverse stressors have been unremarkable, impairing work productivity.
- Psychosocial work stressors explained more than 50% of the variance observed for health care productivity.
- Influence at work, role clarity, rewards, and job satisfaction were among the factors with the highest contributions to this relationship.
- International collaborations and efforts are required to ameliorate adverse effects of psychosocial stressors and improve health service productivity.

2 “somewhat,” 3 “to a large extent,” and 4 “to a very large extent”) or frequency (0 “never/hardly ever,” 1 “seldom,” 2 “sometimes,” 3 “often,” and 4 “always”). Higher mean scores represent high levels of the underlying variable being measured.

Health Care Productivity

Health care productivity was measured with the modified healthcare productivity survey (HPS).¹⁰ This tool is a 17-item instrument that measures five subscales—cognitive demands, time demands, communication, providing support, and safety and competency. The items are rated with five response categories (1 “decreased productivity,” 2 “somewhat decreased productivity,” 3 “no change in productivity,” 4 “somewhat increased productivity,” and 5 “increased productivity”). Score of 3 indicates no change to productivity; >3, improved ability to be productive at work; and <3, decreased ability to be productive at work.

Ethics

The research protocol of this study has been reviewed and approved by the Research Ethics Committee, the Ministry of Health. Informed written consent was obtained from all participants prior to participating in the study.

Statistical Analysis

All three instruments were re-established for validity and reliability. Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity were used to determine the factorability of each tool. Factor analysis, using principal component extraction technique with varimax rotation, was used to reduce the items and establish the construct validity. Internal consistency reliability of the scales of each instrument was established using Cronbach's α .

Multiple linear regression analyses with stepwise automatic variable selec-

tion procedure were also used to identify the independent factors. The factors were then selected based on the best model for each outcome in simple linear regression. The significant factors were then checked for interaction effects. Variance inflation factor (VIF) was used to check for multicollinearity. Residual plots were used to check for assumption for overall linearity, linearity of each numerical independent variable, normality, and equal variance. Standardized residual plots were used to check for outliers. All statistical analyses were performed using IBM SPSS® ver 21. All statistical tests were two-sided. A p value <0.05 was considered statistically significant.

Results

Two-hundred and twenty-five health and allied health professionals participated in the study; 145 (64.4%) were nurses, 48 (21.3%) allied health professionals, and 32 (14.2%) were doctors. The majority of the respondents were female (74.7%) with a mean age of 39.9 (SD 8.9) years. The median work experience of participants was 11 (IQR 9) years. Almost two-thirds (64.9%) of the respondents were married.

Table 1 presents the factor loading and Cronbach's α for the Copenhagen Psychosocial Questionnaire version II (COPSOQ II); the initial factorability check showed possible factoring (KMO 0.720, χ^2 3835.5, $p < 0.001$). All factor loadings were >0.4 with no cross-loadings, which demonstrated good convergent and divergent validity. The overall total variance explained was 91.3%. Cronbach's α was within acceptable range of >0.7), except for three variables: commitment to work (α 0.56), predictability (α 0.69) and skill discretion (α 0.63).

Table 2 illustrates the convergent and divergent validity, and internal consistency reliability of the Healthcare Productivity Survey; the initial check demonstrated

Table 1: Factor loadings and Cronbach's α of Copenhagen Psychosocial Questionnaire II (n=225)

| Variable (No. of items) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | Cron- bach's α |
|---------------------------------|----------------|----------------|------------------|-------|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------------------|
| Influence at work (2) | 0.865 0.886 | | | | | | | | | | | | | 0.778 |
| Social sup- port (2) | | 0.919 0.743 | | | | | | | | | | | | 0.806 |
| Work-family conflict (2) | | | -0.896 -0.838 | | | | | | | | | | | 0.879 |
| General Health (1) | | | | 0.896 | | | | | | | | | | - |
| Job Satis- faction (1) | | | | | 0.957 | | | | | | | | | - |
| Skill discre- tion (2) | | | | | | 0.321 0.684 | | | | | | | | 0.632 |
| Commit- ment to work (2) | | | | | | | 0.936 0.339 | | | | | | | 0.563 |
| Predictabil- ity (2) | | | | | | | | 0.805 0.590 | | | | | | 0.690 |
| Rewards (2) | | | | | | | | | 0.475 0.840 | | | | | 0.753 |
| Role clarity (2) | | | | | | | | | | 0.668 0.828 | | | | 0.769 |
| Quality of leadership (2) | | | | | | | | | | | 0.836 0.787 | | | 0.841 |
| Trust in manage- ment (2) | | | | | | | | | | | | 0.475 0.624 | | 0.778 |
| Justice and Respect (2) | | | | | | | | | | | | | 0.720 0.904 | 0.839 |

Factor analysis (Principal component extraction, varimax rotation). Only loadings above 0.30 are presented.

possible factoring (KMO 0.899, χ^2 5176.3, $p < 0.001$) that explained 80.6% of the total variance observed. All factor loadings were > 0.4 with no cross-loadings, which demonstrated good convergent and divergent validity. Cronbach's α was between 0.815 and 0.927, which suggested very good internal consistency reliability.

Table 3 illustrates the relationship between the psychosocial work stressors and the health care productivity domains. In terms of cognitive demands, multiple linear regression demonstrated that 54.3% of the variance could be explained by influence work, skill discretion, rewards, role clarity, and quality of leadership where they were positively significant toward cognitive demands except for rewards which showed an inverse relationship, after it was adjusted for confounding variables. Meanwhile, for time demands, the regression analysis demonstrated that 27.1% of the variance observed could be explained by influence at work, work-family conflict, and quality of leadership where they were significantly related to time demands after they were adjusted for confounding variables.

In terms of communication, the adjusted r^2 showed that 30.6% of the variance observed could be explained by influence at work, job satisfaction, and justice and respect at work after adjusting for significant confounders. For providing support, role clarity showed that 25% of the variance could be explained after adjusting for significant psychosocial factors. In terms of safety and competency, the analysis showed that 35.5% of the variance could be explained by influence at work, general health, commitment to work, rewards, role clarity, and justice and respect at work after adjusting for significant confounding factors.

Discussion

This study explored the relationship be-

Table 2: Factor loadings and Cronbach's α of Healthcare Productivity Survey (n=225)

| Variables (No. of items) | 1 | 2 | 3 | 4 | 5 | Cronbach's α |
|---------------------------|-------|-------|-------|-------|-------|---------------------|
| Cognitive demands (5) | 0.502 | | | | | 0.927 |
| | 0.765 | | | | | |
| | 0.866 | | | | | |
| | 0.734 | | | | | |
| | 0.715 | | | | | |
| Time demands (3) | | 0.819 | | | | 0.876 |
| | | 0.564 | | | | |
| | | 0.396 | | | | |
| Communication (2) | | | 0.846 | | | 0.815 |
| | | | 0.700 | | | |
| Providing support (4) | | | | 0.756 | | 0.914 |
| | | | | 0.846 | | |
| | | | | 0.743 | | |
| | | | | 0.824 | | |
| Safety and competency (3) | | | | | 0.447 | 0.866 |
| | | | | | 0.813 | |
| | | | | | 0.387 | |

tween psychosocial work factors and health care productivity among health care professionals using the COPSOQ II and Healthcare Productivity Survey, which demonstrated good validity and reliability. We found several interesting findings. First of all, influence at work appears to be crucial in the overall relationship of psychosocial factors toward health care productivity domains. In other words, the degree of influence in the workplace could predict productivity level of employees. Higher level management would have more control over their workload and potentially be more productive, compared to subordinates, particularly those perceiv-

Table 3: Relationship between psychosocial work stressors and health care productivity (n=225). The figures are crude and adjusted slopes came from simple and multiple linear regression, respectively.

| Outcome | Independent Variable | Crude b (95% CI) | Adjusted b (95% CI) |
|-----------------------------|-----------------------------|---------------------|------------------------|
| Cognitive demands | Influence at work | 0.25 (0.17 to 0.34) | 0.19 (0.11 to 0.27) |
| | General health | 0.13 (0.03 to 0.23) | — |
| | Skill discretion | 0.51 (0.42 to 0.60) | 0.34 (0.21 to 0.47) |
| | Commitment to work | 0.26 (0.15 to 0.37) | — |
| | Predictability | 0.24 (0.13 to 0.34) | — |
| | Rewards | 0.12 (0.01 to 0.22) | -0.19 (-0.29 to -0.08) |
| | Role clarity | 0.41 (0.30 to 0.52) | 0.28 (0.15 to 0.41) |
| | Quality of Leadership | 0.41 (0.30 to 0.51) | 0.23 (0.10 to 0.35) |
| | Trust in management | 0.45 (0.34 to 0.55) | — |
| Justice and Respect at work | 0.11 (0.00 to 0.21) | — | |
| Time demands | Influence at work | 0.21 (0.12 to 0.30) | 0.16 (0.06 to 0.25) |
| | Work-family conflict | 0.11 (0.01 to 0.21) | 0.25 (0.14 to 0.36) |
| | Skill discretion | 0.30 (0.19 to 0.40) | — |
| | Predictability | 0.14 (0.04 to 0.25) | — |
| | Role clarity | 0.19 (0.07 to 0.31) | — |
| | Quality of Leadership | 0.26 (0.14 to 0.37) | 0.24 (0.10 to 0.39) |
| | Trust in management | 0.23 (0.12 to 0.34) | — |
| Communication | Influence at work | 0.16 (0.07 to 0.26) | 0.20 (0.10 to 0.30) |
| | Social support | 0.15 (0.04 to 0.26) | — |
| | Job satisfaction | 0.37 (0.20 to 0.51) | 0.30 (0.15 to 0.45) |
| | Skill discretion | 0.24 (0.13 to 0.35) | — |
| | Commitment to work | 0.21 (0.10 to 0.33) | — |
| | Predictability | 0.28 (0.17 to 0.38) | — |
| | Role clarity | 0.30 (0.18 to 0.41) | — |
| | Quality of Leadership | 0.27 (0.16 to 0.39) | — |
| | Trust in management | 0.37 (0.26 to 0.48) | — |
| | Justice and Respect at work | 0.24 (0.14 to 0.34) | 0.19 (0.05 to 0.33) |

Continued

Table 3: Relationship between psychosocial work stressors and health care productivity (n=225). The figures are crude and adjusted slopes came from simple and multiple linear regression, respectively.

| Outcome | Independent Variable | Crude b (95% CI) | Adjusted b (95% CI) |
|---------------------|-----------------------------|---------------------|---------------------|
| Providing support | Skill discretion | 0.29 (0.20 to 0.39) | — |
| | Commitment to work | 0.22 (0.12 to 0.32) | — |
| | Predictability | 0.28 (0.18 to 0.37) | — |
| | Role clarity | 0.41 (0.32 to 0.51) | 0.35 (0.22 to 0.48) |
| | Quality of Leadership | 0.26 (0.16 to 0.36) | — |
| | Trust in management | 0.28 (0.18 to 0.38) | — |
| | Justice and Respect at work | 0.12 (0.03 to 0.22) | — |
| Safety & Competency | Influence at work | 0.12 (0.03 to 0.21) | 0.14 (0.05 to 0.23) |
| | General health | 0.11 (0.02 to 0.21) | 0.14 (0.23 to 0.04) |
| | Job satisfaction | 0.21 (0.05 to 0.36) | — |
| | Skill discretion | 0.30 (0.19 to 0.41) | — |
| | Commitment to work | 0.30 (0.19 to 0.41) | 0.17 (0.04 to 0.29) |
| | Predictability | 0.28 (0.18 to 0.38) | — |
| | Rewards | 0.13 (0.03 to 0.24) | 0.24 (0.36 to 0.12) |
| | Role clarity | 0.38 (0.27 to 0.49) | 0.45 (0.30 to 0.60) |
| | Quality of Leadership | 0.27 (0.16 to 0.39) | — |
| | Trust in management | 0.36 (0.25 to 0.46) | — |
| | Justice and Respect at work | 0.26 (0.16 to 0.36) | 0.36 (0.23 to 0.49) |

ing their work as a burden, which induces stress and lower work engagement and hence less productive.¹⁴ This put in perspective importance of adequate managerial support through good quality leadership and improvement of employees' skill discretions (skill developments) to enhance productivity especially in terms of cognitive and time demands.^{15,16}

Secondly, role clarity appears to be equally important in this relationship, particularly toward cognitive demands, providing support, and safety and competen-

cy. This reiterated findings from previous studies that insufficient information about decisions for the employees could hinder productivity.¹⁵ Employees with clear roles were more confident, able to assess and evaluate performance, initiate positive working environment and instill positive influence toward their colleagues, resulting in increased work productivity.^{17,18}

Thirdly, congruent to previous studies, the present result also highlighted importance of rewards and productivity, particularly, improvement in cognitive demands

and safety and competency. Multiple pay incentives have shown to improve productivity where facilitating and rewarding creativity enhances employees creativity and motivates them to work harder because they feel more competent in approaching the task.^{19,20} However, lack of rewards in the workplace such as feedbacks, social supports and career opportunities, have shown to lower motivation and competency, leading to stress, burnout and disappointment.²¹

Job satisfaction was also identified as a significant contributing factor toward productivity in the present study. Improving job satisfaction has been shown to provide organizational and personal benefits such as reduced turnover intention in many previous studies. In this study, job satisfaction was also shown to improve communication. It could be postulated that with increased time in an organization, the employees' expectations become more realistic, and frequent interaction between colleagues improves relationship, which in return lowers their stress, avoid depression or burnout, and increases productivity.²²

Finally, it is also important to emphasize that interplay between these factors are not unidirectional but a web of complex relationship. In the present study, general health improved safety and competency, which might include increase in time demands. Increasing time demands might decrease productivity since extant evidence shows that they would increase risk of developing adverse health outcomes such as work-related musculoskeletal disorders and stress or undesired organizational outcomes such as absenteeism and demotivation, causing poor service and low productivity.²³

Overall, the present results showed that psychosocial work stressors contribute to more than 50% of health care productivity, which signifies importance for organi-

zational efforts to address these identified stressors in order to boost health service productivity. Influence at work, role clarity, rewards and job satisfaction were among the factors that displayed the highest contributions in this relationship.

Like in any studies, the results should be interpreted within its limitations. This study is cross-sectional in nature, which limits causal relationships and prospective implications. Use of self-administered questionnaire may be subjected to reporting bias. Generalizability of findings outside of this demography should consider confounding factors such as culture, religion and work ethics, to minimize extrapolation effects. Future studies might consider international collaboration since these factors are not isolated occurrence; instead, they are common in most modern workplaces. Therefore, global interventions are necessary and essential for assessment, monitoring and management of psychosocial stressors to boost health service productivity. The complexity of the relationship reported requires international collaborations to ameliorate adverse effects of psychosocial stressors and improve health service productivity.

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Conflicts of Interest: None declared.

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