JOB STRAIN AMONG PHYSICIANS IN BANGKOK, THAILAND

MIKIO TSUKAMOTO

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF PRIMARY HEALTH CARE MANAGEMENT
FACULTY OF GRADUATE STUDIES
MAHIDOL UNIVERSITY
2005

ISBN: 974-04-5735-5

Thesis
entitled

JOB STRAIN AMONG PHYSICIANS IN BANGKOK, THAILAND

Mr. Mikio Tsukamoto
Candidate

Assoc. Prof. Boonyong Keiwkarnka
Dr.P.H.
Major-Advisor

Prof.Santhat Sermsri
Ph.D.
Co-Advisor

Asst.Prof.Prakairat Sukumalchart
Ph.D.
Co-Advisor

Assoc.Prof.Yothin Sawangdee
Ph.D.
Co-Advisor

Assoc. Prof. Rassmidara Hoonsawat
Ph.D.
Dean
Faculty of Graduate Studies

Assoc. Prof. Sirikul Isaranurug
M.D., Dip.Thai Board of Pediatrics
Chair
Master of Primary Health Care Management
ASEAN Institute for Health Development

Thesis
entitled

JOB STRAIN AMONG PHYSICIANS IN BANGKOK, THAILAND

was submitted to the Faculty of Graduate Studies, Mahidol University
for the degree of Master of Primary Health Care Management

on
March 22, 2005

Mikio Tsukamoto
Mr. Mikio Tsukamoto
Candidate

B. Keiwkarnka
Assoc. Prof. Boonyong Keiwkarnka
Dr.P.H.
Chair

Panee Vong-ek
Asst. Prof. Panee Vong-Ek
Ph.D.
Member

Santhat S.
Prof. Santhat Sermsri
Ph.D. Ph.D.
Member

Prakairat Sukumalchart
Asst.Prof. Prakairat Sukumalchart
Ph.D.
Member

Assoc. Prof. Yothin Sawangdee
Ph.D.
Member

Rassmidara Hoonsawat
Assoc. Prof. Rassmidara Hoonsawat
Ph.D.
Dean
Faculty of Graduate Studies
Mahidol University

Sirikul Isaranurug
Assoc. Prof. Sirikul Isaranurug
M.D., Dip.Thai Board of Pediatrics
Director
ASEAN Institute for Health Development
Mahidol University

ACKNOWLEDGEMENT

This thesis would not have been possible without the help and support of many people.

I would like to express my appreciation to Assoc. Prof. Boonyong Keiwkarnka, Major-Advisor, Prof. Santhat Sermsri, Assoc. Prof. Yothin Sawangdee, and Assist. Prof. Prakairat Sukumalchart, Co-advisors, for their academic advice, supervision, and encouragement for completing this thesis. I am grateful to Assoc. Prof. Panee Vong-Ek for her advice as the external examiner.

I would like to express my appreciation to the staffs of M.P.H.M. office and staffs of AIHD supporting data collection and translation of questionnaires for this thesis.

I am grateful to all of the hospitals that agreed to participate in my study and all of the physicians who share their time for this study. I also would like to give my special thanks to all coordinators in each hospitals for collecting data, without their cooperation, this study would not be completed.

Followings are the hospitals that kindly participated in this study; Bangkok Hospital, Charoen Krung Pracharak Hospital, Hua Chiew Hospital, Institute of Kallaya Rajanakarin, Kasemrat Hospital, National Cancer Institute, Paolo Memorial Hospital, Phyathai 3 Hospital, Police Hospital, Rachanukul Hospital, Rajavithi General Hospital, Saint Louis Hospital, Siriraj Hospital, Thai Nakarin Hospital, and Veteran Hospital (in alphabetical order).

Finally, I would like to express my special thanks to all Thai people to help and support my work and life in Thailand.

Mikio Tsukamoto

JOB STRAIN AMONG PHYSICIANS IN BANGKOK, THAILAND

MIKIO TSUKAMOTO 4737950 ADPM/M

M.P.H.M (PRIMARY HEALTH CARE MANAGEMENT)

THESIS ADVISORS: BOONYONG KEIWKARNKA, Dr.P.H., SANTHAT SERMSRI, Ph.D., YOTHIN SAWANGDEE, Ph.D., PRAKAIRAT SUKUMALCHART, Ph.D.

ABSTRACT

This study is survey research designed to study job strain among physicians in Bangkok, Thailand. The sample consisted of 283 physicians working in 15 hospitals that had over 200 beds in Bangkok. The 12-item version of the General Health Questionnaire (GHQ) was used to measure the psychiatric morbidity and the effort-reward imbalance (ERI) questionnaire was used to assess job stress among physicians. The effort, reward, effort/reward ratio, and overcommiment scale were used to study job strain, job stress being represented by effort/reward ratio in this study. The results of this study revealed that physical demand at work was the most stressful effort for physicians and poor job promotion was the most stressful reward. Age, part-time job, income, daily work-hours, sector, living status, leisure time had significant relationships with job stress. The physicians who were satisfied with their job had lower job stress. High-risk of overcommitment and psychiatric cases showed higher risk of job stress. Multivariate logistic regression analysis showed that working in the public sector (OR=2.17), with a part-time job (OR=2.38), and with a high-risk of overcommitment (OR=3.43) were the risk factors of job stress and having leisure time (OR=0.47) was a protective factor of job stress. No other factors such as age, income, daily work-hours, and living status had any significant associations with job stress. Multivariate logistic regression analysis revealed that only job stress had a significant association with psychiatric cases, hence, job stress might be a risk factor of psychiatric disorder (OR=4.77). In comparison between public and private sector, total efforts score were higher in public, and total rewards score were higher in private. Total effort/reward ratio was higher in public. High-risk of overcommitment and psychiatric cases had a higher proportion in public.

KEY WORDS: JOB STRESS/ JOB STRAIN/ EFFORT-REWARD IMBALANCE/ PHYSICIAN

80 P. ISBN 974-04-5735-5

CONTENTS

Page

CONTENT (Cont.)

LIST OF TABLES

TABLE Page

LIST OF TABLES (Cont.)

TABLE Page

LIST OF ABBREVIATIONS

AIHD : ASEAN Institute for Health Development

ERI : Effort-reward imbalance

GHQ : General Health Questionnaire

OR : Odds ratio

CHAPTER 1
INTRODUCTION

1.1 Rationale and Justification of the Study

In recent drastic economical development of Thailand, enormous environmental changes have appeared in the nature of society and of workplace. The stress has been one of the major concerns of the health status in modern Thai society. Many researchers have reported that the stress might be a cause of physical and mental symptoms, such as high blood pressure, cardiovascular disease, fatigue, and insomnia. Recently, the occupational stress has become an important problem in the urbanized society.

Physicians have been playing an important role to cope with the health problems, however, physicians' health itself have not been concerned for a long time. Shortage of the physicians is one of the problems in Thailand. For example, there are fewer physicians in Thailand than in Japan. In Thailand, physician to population ratio is 1: 3,427 in year 2000. Contrary, physician to population ratio in Japan is 1: 496 in year 2003 (1). In 2000, there are 25,039 physicians registered with the Medical Council, in Thailand but only 18,025 are actually practicing. It was estimated by Thai government that 25,000 physicians were required, thus, there was a deficit of 7,000 physicians approximately (2). It is easy to imagine that physicians in Thailand have been facing the hard workload.

In Thailand, since 1989, the proportion of physicians in the public sector has been declining, while the proportion of physicians in private sector has been increasing. The proportion of physicians in the public sector has decreased from 93.3% in 1971 to 76.3% in 1995, while the proportion of physicians in private sector has been increasing from 6.7% to 23.7% during same period (2). It must be an important issue to investigate the reason why many physicians have been seeking jobs

in private sector instead of public sector.

In 2001, the percentage of specialists awarded certificates of specially training was 58.0% and that of general practitioners was 42.0% (2). The trends of training for specialists have been increasing. The changing recent trend of physicians' choice of specialty has been seen in worldwide. In developed countries, large portion of the physicians tends to become specialist. The decreased number of general practitioner in public sector must be one cause of increased workload of physicians in public sector.

In Bangkok metropolis, the number of public hospitals is 43, which have 16,260 beds, the number of private hospitals is 98, which has 11, 834 beds in 2000. In Bangkok metropolis, there are 29 general hospitals over 200 beds in public sector excluding medical school hospital, 25 hospitals over 200 beds in private sector in 2001 (2).

The workloads, which is represented by number of outpatients plus adjusted number of inpatients, per physicians in general hospitals in public sector is 13,121.5 and that in private hospitals is 6,369.3 in 2000 (2). Physicians in public hospital have greater workloads than that in private in Thailand. The number of patient per physicians is not always correspondent with the physicians' workload itself, but it must be one of the appropriate scales to represent their workload.

A hard workload might be one of a nature of health services. In the U.S.A, the mean number of working hours per week by surgical staff was 70.4 hours, with only 44.1% having at least 1 day per week free from clinical duties. Up to 95% of general surgeons are paged overnight at least once per week, with 73% returning from home at least once during week (3). In the UK, the suicide rate for medical doctors is approximately twice of the national average (4).

Physicians are also thought to be susceptible to "burnout", a description for

work-related distress that combines emotional exhaustion, depersonalization, and a sense of low personal accomplishment. In Canada, approximately 26% of physicians are experiencing high stress, and this was associated with emotional exhaustion and depersonalization (5).

Despite of physician's hard workload, it is difficult to take a rest free from their clinical duties. Lim et al. (2002) reported that doctors in the teaching hospital in Bangkok recorded lower rate of short-term and long-term sick absence compare to the health personnel among different work types (6).

For many years, occupational environment of the physicians and their health problems related to their occupation have not been concerned thus much. There is increasing concern about the poor mental and physical health of physicians. There are many reports in developed countries that medical professionals are experiencing burnout and high levels of stress (5, 7, 8, 9, 10, 11), however, there are few investigations about the mental and physical health problem among health personnel in Thailand thus far (12, 13).

Modern Thai society has been facing various problems related to stress. The shortage of medical personnel in Thailand leads to increase the job stress. Job stress impairs both personal and social functioning. At the organizational level, job stress is associated with negative organizational outcomes such as absence from work, high staff-turnover rates, and diminished productivity. While some people may quit the job because of job stress, others will stay but will do the minimum performance rather than their very best. This decline in the quality of work and in both physical and mental health can be costly for the society. Because of the relation between job stress and work overload, job stress of physicians may be an important indicator of health care system overload.

To maintain and promote the physical and mental health of the physicians are important issues in the present Thai society. The aim of this study is to evaluate the mental health conditions among physicians working in the hospitals in Bangkok

metropolitan, Thailand, and to compare the prevalence of job stress among physicians between private and public hospitals in Bangkok, Thailand.

1.2 Research Problems

1. What is the prevalence of job strain among physicians working in the hospitals in Bangkok, Thailand?
2. How are the socio-demographic factors related to job strain among physicians in Bangkok, Thailand?

1.3 Research Objectives

1.3.1 General objective

To identify the prevalence of job strain and its relation with socio-demographic factors among physicians in Bangkok, Thailand.

1.3.2 Specific objectives

1. To identify the prevalence of job strain among physicians in Bangkok, Thailand.

2. To identify the differences of job strain among socio-demographic factors of physicians in Bangkok, Thailand.

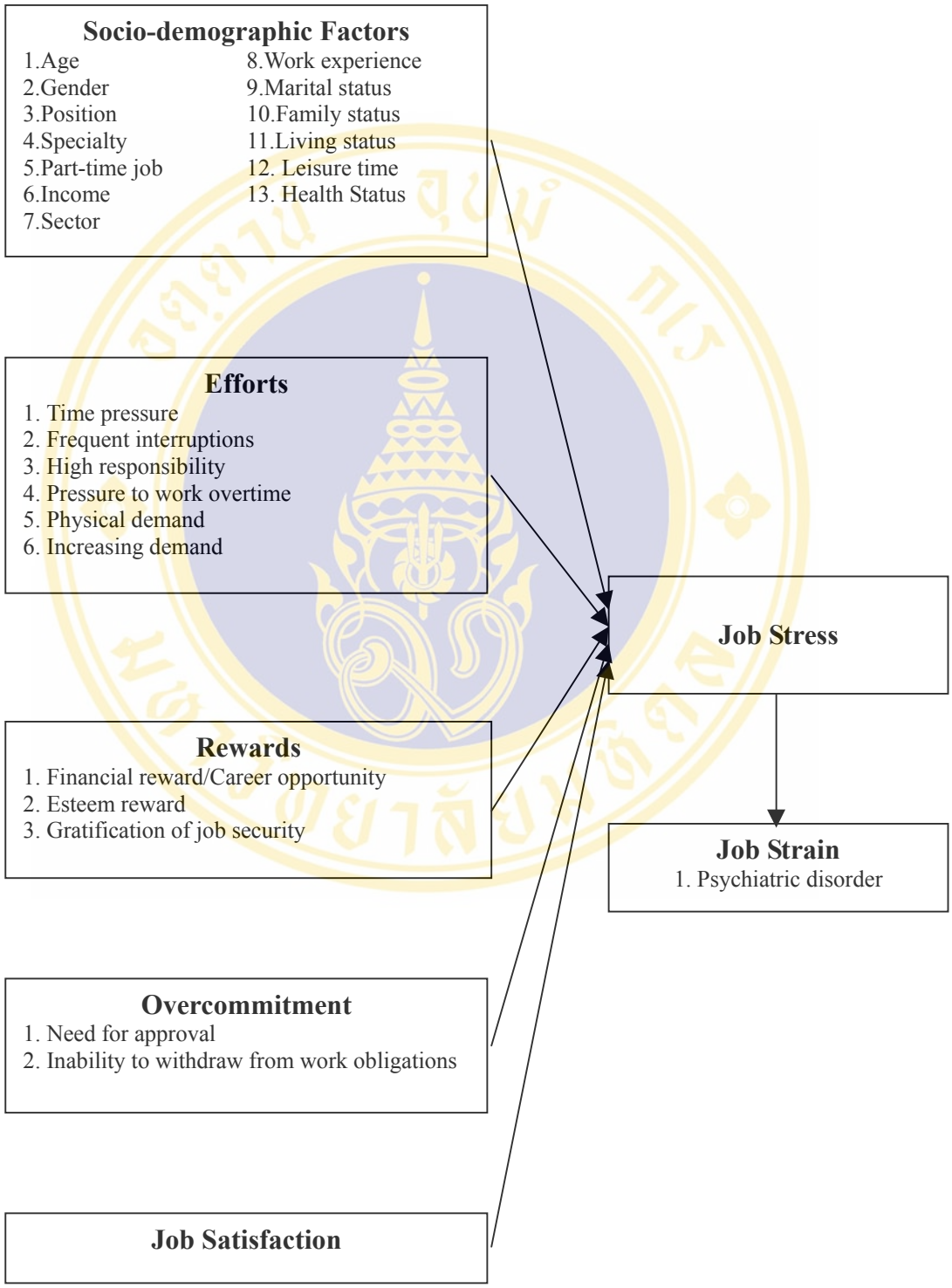
3. To compare the prevalence of job strain of physicians between private and public hospitals in Bangkok, Thailand.

1.4 Research Hypothesis

1. There are different levels of job strain among socio-demographic factors of physicians in Bangkok, Thailand.

2. Physicians working in the public hospitals have much higher job strain at work than those who are working in the private hospitals in Bangkok, Thailand.

1.5 Conceptual Framework



1.6 Operational Definitions

Job stress refers to the overall transactional process to respond the stressors. Job stress is the imbalanced situation between efforts and rewards in this study. The theoretical approach of this study is based on the effort reward imbalance model. It premises that work-related benefits depend on a reciprocal relationship between efforts and rewards at work. The effort-reward imbalance model claims that work characterized by both high efforts and low rewards represents a reciprocity deficit between costs and gains. This imbalance may cause sustained strain reactions. In addition, this process will be intensified by a personality characteristic such as overcommitment.

Job strain refers to the individual's psychological, physical, and behavioral responses to the stressors. Job strain in this study is the psychological symptoms. Psychiatric morbidity measured by 12-item version of General Health Questionnaire (GHQ) was considered as the psychological strain in this study. The GHQ was designed to cover four identifiable elements of psychological strain: depression, anxiety, social impairment, and hypochondriasis.

Socio-demographic factor in this study refers to the individual demographic characteristics of Thai physicians working in the hospital in Bangkok such as age, gender, job position, job specialty, marital status, family status, work experience, income, leisure time, and health status. The job position refers to the position in the job of the physicians in hospital such as internship, resident, senior resident, chief of the staff, and director of the hospital. The job specialty refers to the specialty in the job of the physicians in hospital such as general practice, anesthesiology, surgery, ophthalmology, otorhinolaryngology, dermatology, obstetrics gynecology, urology, pediatrics, orthopedics, radiology, pathology, psychiatry and internal medicine. The marital status could be divided into five categories such as single, married, widowed, divorced, and separated. The work experience refers to the time in years from the date of starting work as physicians in the present hospitals until the date of data collection. The income refers to the total amount of salary and other income that the

physicians earn in recent one month. The leisure time means whether if the physicians have enough time for leisure.

Job satisfaction refers to the overall estimation of satisfaction of the individual physicians with the present job. The concept of job satisfaction is the discrepancy between what an individual expects about their job compared with how much of this job actually delivers. One question about overall job satisfaction was asked to evaluate the physicians' satisfaction levels. The physicians rated their overall job satisfaction 1 (not at all) to 5 (very much). The subjects scored 1, 2, 3, were categorized into "not-satisfied" group and subjects scored 4, 5, were categorized into "satisfied" group in this study.

Efforts refer to the job demands and/or obligation that are imposed on the physicians. Efforts include time pressure, frequent interruption, responsibility, pressure to work overtime, physical demand, and increasing demand.

Rewards refer to the occupational rewards distributed by the employer and by society consist of money, esteem, and job security/career opportunities. In the financial and career rewards, sufficient job promotion, sufficient job positions, appropriate work prospect, and adequate salary were included. In the esteem rewards, sufficient respect by superiors, sufficient respect by colleagues, adequate support, fair treatment, and sufficient respect and prestige were included. In the gratification of job security, situational changes at work and job security were included.

Overcommitment refers to the cognitive-motivational pattern of coping with demands characterized by an excessive work-related over commitment and high need for approval. The aspects of this coping pattern were defined as need for approval, competitiveness and latent hostility, impatience and disproportionate irritability and inability to withdraw from work obligations. Highly overcommitted employees will respond with more strain reactions to an effort-reward imbalance, in comparison with less overcommitted employees.

1.7 Limitations of the study

1. All data was self-reported data. The data evaluated were cross-sectional and did not provide an understanding of the causal order of effects or the estimation of potential feed back.

2. Although questionnaires were carefully translated from English to Thai by the expert and confirmed the equivalence of the questionnaires by independent back-translation, question of equivalence that depends on the language difference remains. The questionnaire translated to Thai from English-version of effort-reward imbalance questionnaire was not authorized by developer.

CHAPTER 2
LITERATURE REVIEW

This research is examined job-related strain and its influencing factors of the physicians in Thailand. The related studies are reviewed.

2.1 The concept of stress

Stress means the overall transactional process to respond the stressors. Stress is not a factor that exists in the individual or the environment, but it exists in an ongoing process transacting with their environments, making appraisals of those encounters, and attempting to cope with the issues. Transactional definition of stress is the idea that stress is a dynamic cognitive state. It is a disruption of homeostasis or an imbalance that is required for restoration of that imbalance or restoration of homeostasis (14, 15, 16). The term transaction implies that stress is neither in the person nor in the environment but in the relationship between the person and environment (17). The transactional definition of stress reveals three important themes, a dynamic cognitive state, a disruption or imbalance in normal functioning, and the resolution of that disruption or imbalance.

2.2 Work-related stressors

Stressors mean the events or properties of events that are encountered by individuals. Stressors are the antecedent conditions. Cartwright and Cooper have differentiated six primary work-related stressors, factors intrinsic to the job itself, roles in the organization, relationships at work, such as those with supervisors, colleagues and subordinates, career development issues, organizational factors, including the structure and the climate of the organization as well as its culture and political environment, and the home-work interface (18).

2.2.1 Intrinsic job characteristics

2.2.1.1 Workload

The amount of work that physician has to perform is a significant stressor for many physicians. Both overload and underload can generate psychological and physical strain. It is also important to distinguish between quantitative and qualitative workload.

2.2.1.2 Work Hours

The number of hours that a physician works can produce strain. A meta-analysis of research in this field (19) obtained small but statistically significant correlations between hours of work and overall health, as well as both physiological and psychological health symptoms.

2.2.1.3 New Technology (increasing demand)

In a rapidly changing medical field, some skills may quickly become out of date. When new technology is introduced to medical field and individual physician feels unable to cope with the innovations, potentially stressful situations may develop. Computer utilization also at all levels of organizations has increased dramatically in recent years, physicians also should adopt the new systems. Effort to master of new technology could be a source of strain for physicians.

2.2.1.4 Exposure to Risk and Hazards

Physicians are facing the physical danger to expose hazardous materials and communicable diseases. These special risks associated with the occupation are regarded as a source of strain. Physicians are also exposed to the risk of occupational allergy (20).

2.2.2 Organizational Roles

2.2.2.1 Responsibility

Responsibility has been identified as a potential stressor associated with physicians' roles in their health systems. Too much responsibility is clearly a source of strain, lack of responsibility may also be stressful if the physician perceives this as a work underload. For physicians, extremely high responsibility for human lives and safety might be a major source of psychological strain.

2.2.3 Work Relationships

It is clear that negative interpersonal relations and the absence of support from colleagues and superiors can be a major stressor for many workers (21). Conversely, having social support from others within the organization can directly reduce psychological strain (22).

2.2.3.1 Relationship with superiors

Interpersonal relations with supervisors are major stressor for many workers. Inconsiderate or non-supportive behavior from a supervisor appears to contribute significantly to job pressure, and close supervision and rigid performance monitoring can also be stressful (23).

2.2.3.2 Relationship with colleagues

Support and respect by colleagues can reduce the stress at work.

2.2.3.3 Social support at work

Social support at work can reduce the workers stress, especially when worker is in difficult situation at work. Social support in the group unity, interpersonal trust, and linking for a supervisor is associated with decreased levels of job strain and better health (24).

2.2.3.4 Treatment at work

Unfair treatment causes stressful atmosphere at work.

2.2.4 Career Development

There is growing evidence that a perceived lack of promotion opportunities and lack of progress in one's career represent primary sources of job dissatisfaction and may function as major stressors for many people (25).

2.2.4.1 Job Insecurity

For individual workers, redundancy not only affects current and future income but also challenges the person's general self-esteem, which is closely linked with job status and overall wellbeing (26).

2.2.4.2 Promotion and Career Advancement

Advancement in one's career or promotion within the organization is cited as major source of dissatisfaction and psychological strain (27). Both under- and over-promotion can have serious negative effects on individual wellbeing and satisfaction

levels.

2.2.5 Organizational Factors

Hierarchical, bureaucratic organizational structures may allow little participation by employees in decisions affecting their work. Lack of participation in the decision-making process, lack of effective consultation and communication, office politics and no sense of belonging have all been identified as potential organizational stressors. It is apparent that clearly outlined formal work procedures may have positive benefits for workers but that overly formalized organizational process may be harmful, particularly among professional groups, such as physicians.

2.2.6 Work-home interaction

Managing the interaction between one's job and various roles and responsibilities off the job is potential source of strain (28). Job conditions can produce negative emotional reactions such as reduced self-esteem, feelings of uncertainty, loss of a sense of competence, that affect interactions within the family (29). These negative emotional reactions at work can lead to expressions of irritability toward family members or withdrawal from family interaction to recover (30). Similarly, the strains of family life may carry over into the work situation.

2.3 Assessing Job-Related Strains

Job-related strains are categorized into three different categories such as physiological strain, psychological strain, and behavioral strain.

2.3.1 Physiological Strain

Research has focused on three types of physiological indicators, cardiovascular symptoms, biochemical symptoms, and gastrointestinal symptoms. Self-reported measures of physical symptoms are related to a variety of work stressors (31).

2.3.2 Psychological Strain

Psychological strains resulting from the job stressors are the most commonly

studied. Psychological strains are strongly correlated to work-related stressors. The two most frequently used psychological measures are job dissatisfaction and tension/anxiety. Job dissatisfaction measures are classified into six subcategories, general dissatisfaction, and dissatisfaction with supervision, work, colleague, salary, and promotion. Other variables are organizational commitment, job involvement, tendency to leave, and absence (31).

2.3.3 Behavioral Strain

Behavioral strains have been divided into two major categories. The first category included those of significance to the organization; responses that have a direct impact on organizational functioning, including such behaviors as job performance, turnover, and absenteeism. The second category covered those of significance to the individual, including use of alcohol, smoking, other substance use, and destructive behavior (32).

2.4 Theoretical model of job strain

Health adverse and health promoting psychosocial work environments are defined by the interaction between a person's cognition, emotions, and behaviors and his/her social environment. Two models have been achieving particular attention in recent years; demand control model (33, 34) and the model of effort-reward imbalance at work (14, 15).

2.5 Effort-reward imbalance model

Effort-reward imbalance model was introduced by Siegrist et al. in 1996. The theory of the effort reward imbalance model is that an imbalance between high efforts and low rewards leads to sustained strain reactions. Efforts, rewards, and overcommitment are crucial aspects of the model. Efforts represent job demands and/or obligations that are imposed on the worker. Occupational rewards distributed by the employer and by the society consist of money, esteem, and job security/career opportunities. The imbalance between efforts and rewards may cause sustained strain

reactions. In addition, this process will be intensified by overcommitment such as personality characteristic. Overcommitment can be defined as the person-specific component, whereas efforts and rewards are the situation-specific components. In the long run, the imbalance between high effort and low reward at work increases illness susceptibility as a result of continued strain reactions. A final assumption concerns individual differences in the experience of effort-reward imbalance. People characterized by a motivational pattern of excessive work-related commitment and a high need for approval is at increased risk of strain from asymmetric exchange. As a result, their susceptibility to the frustration of reward expectancies is increased. It can be considered a psychological risk factor in its own, even in the absence of structural conditions of imbalance at work. Overcommitment is hypothesized to modify the effect of health produced by effort-reward imbalance at work (14, 15).

The effort-reward imbalance model at work

2.6 Measurement of psychiatric morbidity

The GHQ is designed to identify two main classes of problem: inability to carry out one's normal healthy functions, and the appearance of new phenomena of a distressing nature. The GHQ was designed to cover four identifiable elements of

distress: depression, anxiety, social impairment, and hypochondriasis (chiefly indicated by organic symptoms). The 12-item version of this instrument is a valid and reliable screening tool for psychological morbidity in community samples and occupational settings. This instrument was the basis of determining the point prevalence of psychiatric morbidity in the study sample (35).

2.7 Related articles

2.7.1 Studies about the psychological strain

McManus et al. reported links between burnout and stress in UK doctors. The study showed that high level of personal accomplishment increased stress levels, and depersonalization lowered stress levels (36).

Elit et al. reported approximately 26% of physicians are experiencing high stress, and this is strongly associated with emotional exhaustion and high depersonalization. Fourteen percent of Canadian gynecologic oncologists are actively looking for alternative jobs and 45% are trying to decrease the number of hours worked per week (5).

Graham et al. found that job stress was associated with emotional exhaustion and psychiatric morbidity perceived stress at work result in poor mental health. Job satisfaction protected doctors from burnout, but depersonalization was unrelated to psychiatric morbidity (37).

Grunfeld et al. reported that cancer care workers are experiencing burnout and high level of stress and that large numbers are considering leaving or decreasing their work hours (8).

Ramirez et al. reported that the surgeons generally had the highest scores for stress and satisfaction factors. In contrast, radiologists had the lowest scores on the stress factors and had the lowest scores for satisfaction factors. Radiologists reported the most burnout in terms of low personal accomplishment. It is likely that surgeons

are protected from burnout and psychiatric morbidity by receiving positive and immediate feedback from their patients and relatives regularly (7).

Shimizu et al. studied the job stress among fulltime occupational physicians in Japan and reported that the job stress was influenced by gender, age and the number of employees served (38).

Deschamps et al. studied the occupational stress in the police in France and found that police officer with a high stress level belong to the groups; no leisure-time activities, no hobbies and age over 30. They considered the stress at work was an ill-health provoking factor. This population is adversely affected by lack of available manpower and long working hours (39).

2.7.2 Studies about the physiological strain

Greiner et al. reported that associations between self-reported job problems and hypertension were dependent on the level of objective stressors. When observer-based stressor level was low, the association between self-reported frequency of stressors and hypertension was high. When the observer-based stressor level was high, the association was inverse, this might be indicative of denial of stress or alexithymia (40).

Kunz-Ebrecht et al. reported that work stress and socioeconomic status are related differently to cortisol responses to waking and cortisol output over the day. Job control may partly mediate socioeconomic status differences in cortisol in men, while job demands are more relevant for woman (41).

Nakamura et al. studied that correlation of cellular immunity with burnout, stress, health behaviors and physical factors. In this study, stress-induced immunosuppression was not observed. However, there are some reports that stress-induced immunosuppression accounts for individuals who experience stressful life events more susceptible to a variety of illness. This topic needs further examination (42).

Nakata et al. reported that in white-collar male daytime workers, psychological job stress factors such as interpersonal conflicts with fellow employee, job satisfactions, and social support were independently associated with a modestly increased risk of insomnia (43).

Nasermoaddeli et al. reported that increasing psychological stress at the workplace may decrease sleep quality in Japanese civil servants, but a high sense of coherence may attenuate the adverse impact of job strain. Senses of coherence are composed of comprehensibility, manageability and meaningfulness (44).

Peter et al. reported the predictable possibility of coronary risk estimation by combined information from two stress models, the job strain model and the effort-reward imbalance model (45).

Siegrist reported the effects of chronic exposure to high effort and low reward conditions at work on cardiovascular diseases and hormonal reactions in the paper that introduced the model of effort-reward imbalance (14).

2.7.3 Studies about the behavioral strain

Heslop et al. studied the associations between job satisfaction, self-perceived stress, cardiovascular risk factors and mortality. They found that men who reported less satisfaction with their job at 2nd screening that at baseline smoked a greater number of cigarettes each day than those who were very satisfied with their jobs at both baseline and follow-up. For both men and women there was no significant difference in mortality from cardiovascular disease according to job satisfaction after adjustment for age and occupational class, or age, occupational class and cardiovascular disease risk factors (46).

2.7.4 Studies about interventions of stress management

Shimazu et al. studied the effects of a stress management program for teachers on their stress responses, social support, and coping and reported that a program that focuses on a particular group, those with high stress responses or high job control,

might be effective in enhancing coping skills, increasing social support, and reducing stress responses (47).

Shimizu et al. showed that the worksite health promotion based on the interview-based health promotion program had the potential to improve cardiovascular risk factors of Japanese employees. The program consisted of health measuring, group education, and health interviewing all employees to help with their behavioral change (48).

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Study design

This is social survey research with the application of the confidential self-reported questionnaires. Participants completed a self-report questionnaire, which delivered to them and a completed questionnaire was collected by an office of hospital director.

The questionnaire consists of 5 parts such as socio-demographic and job characteristics, psychiatric morbidity, effort/reward, overcommitment, and job satisfaction.

3.2 Study population

The study population was physicians working in hospitals in Bangkok, Thailand. There are 141 hospitals in Bangkok metropolis and was classified into private and public hospital. In Bangkok metropolis, there are 29 public general hospitals that have over 200 beds excluding medical school hospitals, and 25 private hospitals that have over 200 beds.

Then, directors of all 54 hospitals that have over 200 beds were contacted and were asked the permission of the study. All of the hospitals of each classification that gave a permission to study were selected as target hospitals. Three hundred and fifty self-reported questionnaires were given to the hospital directors and date of return was identified. In each hospital, coordinator for data collection was chosen by directors or the ethical committee of the hospital. Samples were randomly selected by the coordinator in each hospital. All data were mailed to researcher after collecting by coordinator.

3.3 Sample size estimation

Ho: $P_1 = P_2$

$$n = \frac{[Z_\alpha \sqrt{2\overline{PQ}} + Z_{1-\beta}\sqrt{P_1Q_1 + P_2Q_2}]^2}{(P_1 - P_2)^2}$$

α =0.05, β =0.10

P_1=0.40 Q_1=0.60

P_2=0.20 Q_2=0.80

$$\bar{P} = \frac{P_1 + P_2}{2} = 0.30$$

n = 109 in each group. Assumed response rate would be 80% and invalid response rate would be 5%, therefore, total number of sample size should be

n = 109x2/0.8/0.95 = 286.8

Estimated sample size = 287

3.4 Research Instrument

The self-reported questionnaire consists of five parts such as socio-demographic and job characteristics, psychiatric morbidity, effort and reward, overcommitment, and job satisfaction.

3.4.1 Socio-demographic and job characteristics

Age, gender, marital and family status, job position, job specialty, job experience, income, work hours, hobby, leisure time, time consumption for traffic to the office.

3.4.2 Psychiatric morbidity

The GHQ with the 12-item version is a widely accepted and reliable screening test for psychiatric morbidity in community samples and occupational settings. 12

symptoms of psychiatric morbidity are rated according to whether they have been experienced “not at all”, “same as usual “,” rather more than usual” or “much more than usual” in the past few weeks. Each item is scored 0 (not at all or the same as usual) or 1 (rather or much more than usual). Individual scoring 4 or more are estimated to have psychiatric morbidity. Studies validating the GHQ-12 against standardized psychiatric interviews indicated that individuals scoring 4 or more have a high probability of being “case” of psychiatric disorder (49).

3.4.3 Effort and reward imbalance questionnaire

The effort scale in the questionnaire contains six items of which the content varies from physical load, time pressure, interruptions, responsibilities, working overtime, to increasing demands. When the stressful situations mentioned in the items do not exist, they are scored 1. When the stressful situations exist but not at all distressed by those situations, they are scored 2, somewhat distressed situations get scored 3, distressed situations get scored 4, and very distressed situations get scored 5. Total score vary from 6 to 30. The higher score means the higher extrinsic effort experienced by responder.

The reward in the questionnaire consists of 11 items, and is measured as a composite measure. A three-factor structure underlies the concept of reward, such as money, esteem, and security/career opportunities. When the stressful situation does not exist, they are scored 5. When the stressful situation exist but not at all distressed, they are scored 4, somewhat distressed scored 3, distressed scored 2, and very distressed scored 1. Total score vary from 11 to 55. The lower score means the lower extrinsic reward experienced by responder.

Effort/reward ratio was used to measure the level of imbalanced situation between effort and reward at work in this study. Effort/reward ratio was calculated by putting the effort score in the numerator and the reward score in the denominator whereas the former score had been multiplied by eleven and the latter score had been multiplied by six for correction to adjust for the unequal number of items (15).

Effort/reward ratio was grouped into two groups by using number of top quartile (Q3) at a cutting point as follows. When effort/reward ratio was equal or more than Q3, the subject was categorized into high-risk group. When effort/reward ratio was less than Q3, the subject was considered as a low-risk group in this study.

3.4.4 Overcommitment questionnaire

This part was developed to represent overcommitment (personal characteristics), mainly consisting of need for approval, competitiveness, disproportionate irritability, and inability to withdraw from work. The scorings are followings; strongly disagree scores 1, disagree scores 2, agree scores 3, and strongly agree scores 4. The question number 3 is scored by reversed coding. Total score vary from 6 to 24. The lower score means the lower commitment to work. The top quartile of scores is categorized into high-risk (overcommitment) group. Remains are categorized into low-risk group.

3.4.5 Overall satisfaction at work and about Tsunami disaster-related questionnaire

This part was developed to measure overall self-estimation about job satisfaction and to evaluate the effect of the recent Tsunami disaster (26th December 2004) to physicians working in Bangkok.

3.4.5.1 Overall job satisfaction

One question about overall job satisfaction was asked and effort/reward ratio was compared among satisfaction levels. The physicians rated their overall job satisfaction 1 (not at all) to 5 (very much). The subjects scored 1, 2, 3, were categorized into “not-satisfied” group and subjects scored 4, 5, were categorized into “satisfied” group.

3.4.5.2 Tsunami disaster-related over workload and stress

The effect of recent Tsunami disaster on the routine work is scored 1 (not at all) to 5 (very much), respectively. If there is increased routine work by the Tsunami disaster, the stress with Tsunami disaster on the routine work is scored 1 (not at all) to 5 (very much), respectively.

3.5 Statistical Analysis

Differences of means of effort score, reward score, and effort/reward ratio among Socio-demographic factors were analyzed by t-test and one-way ANOVA. Associations between psychiatric morbidity, job stress, and overcommitment, job satisfaction were analyzed by Chi-square test. Correlations were analyzed by Pearson correlations. Multiple logistic regression analysis was also used. All statistical analyses were computed by the MINITAB® software version 13.1.

3.6 Reliability test of questionnaires

The prepared two sets of questionnaires, which were the GHQ and Effort-Reward Imbalance (ERI) questionnaire, were translated into Thai from English. The linguistic equivalence of the questionnaire was checked by experts with independent back-translation.

The reliability of the questionnaire was tested with 24 samples by using internal consistency method, which revealed that the α-coefficient of the GHQ was 0.752 and effort-reward imbalance questionnaire was 0.728, respectively.

CHAPTER 4
RESULTS

The subjects of this study included 283 physicians from 15 hospitals in Bangkok. The data was collected by self-reported questionnaire.

4.1 Socio-demographic characteristics of physicians

Table 1 showed the socio-demographic characteristics of physicians.
Three hundred thirty three questionnaires were replied and 20 cases were excluded by missing values (13 cases) and by invalid subjects (7 cases responded by dentists).

Gender of the physicians, 66.1% was male and 33.9% was female. The average age of physicians was 44.5 years old and standard deviation (SD) was 11.4. Age group was categorized into 4 groups. The biggest proportion of the age group was 45 to 54 years old (29.0%), second was 35 to 44 years old (25.4%), third was equal or less than 34 years old (23.0%), equal or more than 55 years old was 22.6%.

Job position in the present hospital were categorized into three groups, most of the physicians were full time employed staffs of the hospital (67.5%).

Mean of monthly income of physicians was 76,430 Baht and SD was 54,086. Income groups were categorized into 4 groups. Almost half of the physicians' monthly income fell into the group of 25,000 to 75,000 Baht.

Mean of the experience in present job was 11.23 years and SD was 9.71. Less than 5 years was 35.6% and more than 15 years was 35.2%.

Mean of traveling time to the office was 79.1 minutes and SD was 46.8. Half of physicians (48.4%) working in Bangkok spend more than 80 minutes for traveling to

the office per day.

Mean of daily work hours was 9.30 hours and SD was 2.25 hours. More than half of physicians work overtime daily (more than 8 hours, 58.7%) and more than one fifth of physicians work more than 10 hours daily (21.7%).

Many of physicians (76.6%) were from Bangkok, 19.5% was from the city outside of Bangkok, and 3.9% was from village in up-country.

Table 1 Socio-demographic characteristics of physicians in Bangkok

Socio-demographic Characteristics	n	%
Gender	283	100.00
Male	187	66.1
Female	96	33.9
Age Group	283	100.00
≤34	65	23.0
35≤ ≤44	72	25.4
45≤ ≤54	82	29.0
55≤	64	22.6
Mean 44.5, SD 11.39		
Job position	283	100.00
Intern/Resident	28	9.9
Staff	191	67.5
Chief/Director	64	22.6
Monthly Income (Baht)	260	100.00
< 25,000	25	9.6
25,000 ≤ < 75,000	119	45.8
75,000 ≤ <125,000	87	33.5
125,000 ≤	29	11.1
Mean 76,430, SD 54,086		
Experience in present job (Years)	278	100.00
< 5.0	99	35.6
5.0 ≤ <10.0	41	14.8
10.0 ≤ <15.0	40	14.4
15.0 ≤	98	35.2
Mean 11.23, SD 9.71		
Traffic time to office (minutes)	281	100.00
< 40	59	21.0
40 ≤ < 80	86	30.6
80 ≤ <120	51	18.1
120 ≤	85	30.3
Mean 79.13, SD 46.77		

Table 1 Socio-demographic characteristics of physicians in Bangkok (cont.)

Socio-demographic Characteristics		n	%
Daily work hours	(hours)	281	100.00
	≤ 8.0	116	41.3
8.0 <	≤ 9.0	46	16.4
9.0 <	≤ 10.0	58	20.6
10.0 <		61	21.7
Mean 9.30, SD 2.25			
Home town		282	100.00
Bangkok		216	76.6
Other city		55	19.5
Village		11	3.9
Marital Status		283	100.00
Married		191	67.5
Single/Others		92	32.5
Spouse's Job		191	100.00
Yes		163	85.3
No		28	14.7
Child (among married)		191	100.00
Yes		169	88.5
No		22	11.5
Job Sector		283	100.00
Public		131	46.3
Private		152	53.7
Specialty		283	100.00
General Practitioner		93	32.9
Surgery		42	14.8
Obstetrics Gynecology		35	12.4
Pediatrics		26	9.2
Otorhinolaryngology		15	5.3
Internal Medicine		15	5.3
Radiology		10	3.5
Orthopedics		9	3.2
Anesthesiology		8	2.8
Ophthalmology		8	2.8
Psychiatrics		8	2.8
Rehabilitation		6	2.1
Urology		2	0.7
Dermatology		2	0.7
Others		4	1.4

Table 1 Socio-demographic characteristics of physicians in Bangkok (cont.)

Socio-demographic Characteristics	n	%
Specialty group	283	100.0
Internal	156	55.1
Surgical	127	44.9
Living Status	282	100.00
Own house	183	64.9
Others	99	35.1
Part-time job	282	100.00
Yes	108	38.3
No	174	61.7
Leisure time	283	100.00
Yes	188	66.4
No	95	33.6
General Health Status	282	100.00
Good	192	68.1
Not Good	42	14.9
Uncertain	48	17.0

Marital status of physician showed that single/divorced/widow/separated was 32.5%, married was 67.5%. Within married physicians, 85.6% of spouses had jobs and 14.4% were housewives. Most of married physician had child or children (88.3%) and 11.7% had no child.

The job sectors of physician were categorized into public (46.3%) and private sectors (53.7%).

The physicians' specialties were shown in table 1. The general practitioner was 32.9% of physicians and 67.1% of physicians was working as a specialist.

Living status of physicians showed that 64.9% of physicians were living in their own houses and remains were living in other categories (35.1%), such as parents' house, renting apartment, or dormitory of hospitals. Some of physicians working for hospitals had part time job (38.3%) other than their full time job in the present hospital.

In personal daily life, 33.6% of physicians had not enough leisure time within recent two months.

Their self-estimated general health status showed 68.1% of them estimated themselves in good health and 14.9% of them estimated that they were not healthy, and 17.0% of physicians answered that they could not estimate their health status.

4.2 Measurement of job stress

In this study, the measurement of the effort-reward imbalance at work was constructed as an indicator of job stress. The theoretical approach of this study is based on the premise that work-related benefits depend on a reciprocal relationship between efforts and rewards at work. Efforts represent job demands and/or obligation that are imposed on the employee. Occupational rewards distributed by the employer and by society consist of money, esteem, and job security/career opportunities. The effort-reward imbalance model claims that work characterized by both high efforts and low rewards represents a reciprocity deficit between costs and gains. This imbalance may cause sustained strain reactions. In addition, this process sill be intensified by overcommitment (a personality characteristic), such that highly overcommitted employees will respond with more strain reactions to an effort-reward imbalance, in comparison with less overcommitted employees. Positive emotions evoked by appropriate social rewards promote well health. Therefore, effort, reward, effort-reward ratio, and overcommitment were computed to analyze the stress level at work.

4.2.1 Effort

Effort was calculated by the six item questionnaires, including time pressure, frequent interruptions, high responsibility, pressure to work overtime, physical demand at work, and increasing demand at work. Each questionnaire of the effort scale was rated 1 to 5. The rating procedure is defined as follows with higher ratings meaning to higher efforts: 1: does not apply; 2: does apply, but subject does not consider her/himself distressed; 3: does apply and subject considers her/himself

somewhat distressed; 4: does apply and subject considers her/himself distressed; 5: does apply and subject considers her/himself very distressed. Total sum score of each questionnaire about effort was calculated and scored for effort scale. Effort score varied 6 to 30 (15).

Table 2 Effort

Variables	Total (n=283)	
	Mean	SD
Effort	12.88	4.36
Time pressure	2.00	1.11
Frequent interruptions	1.74	1.02
Responsibility	2.38	0.98
Pressure to work overtime	1.80	1.00
Physically demanding work	2.50	0.98
Increasing demand	2.46	1.03

The mean ± standard deviation (SD) of effort was 12.88±4.36 among physicians. The mean±SD of subgroups of effort showed that time pressure (2.00± 1.11), frequent interruptions (1.74±1.11), high responsibility (2.38±0.98), pressure to work overtime (1.80±1.00), physically demanding work (2.46±1.03), increasing demand (2.46±1.03). Physical demand at work was the most stressful effort for physicians, increasing demand was second, and high responsibility was the third.

4.2.2 Reward

With the similar method used above, reward scale was calculated by eleven item questionnaires. Rewards had three-factorial structure of occupational reward. First component (4 items) was defined by financial reward and a career-related aspect, and it was calculated by summing the score of each questionnaire about job promotion, job position, work prospect, and salary. Second component (5 items) was defined by esteem reward, and it was calculated by summing the score of each questionnaire about respect by superiors, respect by colleagues, support at work, treatment at work, and adequate respect and prestige of work. Third component (2 items) was defined by the gratification of job security and it was calculated by summing the score of each questionnaire about undesirable change at work and job security. The rating procedure was performed in analogy to effort. After coding

procedures, lower ratings point to lower rewards. Sum score of these ratings was calculated, which varies between 11 to 55. The lower the score, the fewer occupational rewards are supposed to be received by the subject (15).

Table 3 Reward

Variables	Total (n=283)	
	Mean	SD
Reward	48.74	5.47
First component (financial/career reward)	16.82	2.53
Poor job promotion	3.36	0.97
Insufficient position	4.79	0.59
Inadequate work prospect	4.51	0.84
Inadequate salary	4.16	1.12
Second component (esteem reward)	23.07	2.61
Insufficient respect by superiors	4.65	0.78
Insufficient respect by colleagues	4.84	0.78
Inadequate support	4.53	0.88
Unfair treatment	4.37	0.96
Insufficient respect/prestige	4.67	0.69
Third component (gratification of job security)	8.84	1.40
Undesirable change	4.32	0.85
Job insecurity	4.52	0.85

Total reward score of physician was 48.74±5.47. First component was 16.82±2.53, second component was 23.07±2.61, and third component of reward was 8.84±1.40. Poor job promotion was the most stressful issue for physicians.

4.2.3 Effort/reward ratio

Effort/reward ratio was used to measure the level of imbalanced situation between effort and reward at work in this study. Effort/reward ratio was calculated by putting the effort score in the numerator and the reward score in the denominator whereas the former score had been multiplied by eleven and the latter score had been multiplied by six for correction to adjust for the unequal number of items (15).

Table 4 Effort/reward ratio of physicians

Variables	Total (n=283)	
	Mean	SD
Effort/Reward ratio	0.503	0.222

4.2.4 Risk of effort-reward imbalance

Effort/reward ratio was grouped into two groups by using number of top quartile (Q3) at a cutting point as follows. When effort/reward ratio was equal or more than Q3, the subject was categorized into high-risk group. When effort/reward ratio was less than Q3, the subject was considered as a low-risk group in this study.

Table 5 Risk of effort/reward imbalance of physicians

Risk of effort/reward imbalance	n	%
High	71	25.1
Low	212	74.9

Seventy-one cases (25.1%) were categorized into the high-risk group of effort-reward imbalance.

4.2.5 Overcommitment

Overcommitment is a personality characteristic based on the cognitive, emotional and motivational elements of behavior that reflect and excessive ambition in combination with the need to be approved and esteemed. Overcommitment was defined as the person-specific component, whereas efforts and rewards were defined the situation-specific component. Overcommitment was considered as a risk factor to modify and intensify the effort-reward imbalance. Overcommitment to the job was measured by a six-item questionnaire. Items range from 1 (low overcommitment) to 4 (high overcommitment). The scale score was calculated by summing of each item values (15).

Table 6 Overcommitment scale

Variables	Total (n=283)	
	Mean	SD
Overcommitment	13.25	3.08

Overcommitment scale of physicians was 13.25±3.08.

4.2.6 Risk of overcommitment of physicians

Overcommitment was grouped into two groups by using number of top quartile (Q3) at a cutting point as follows. When overcommitment score was equal or more than Q3, the subject was categorized into high-risk group. When overcommitment was less than Q3, the subject was considered as a low-risk group in this study.

Table 7 Risk of overcommitment of physicians

Risk of overcommitment	n	%
High	83	29.3
Low	200	70.7

High-risk group of overcommitment included 83 cases (29.3%) of physicians.

4.2.7 Psychiatric disorder

Psychiatric disorder was measured by using the 12-item GHQ to assess the mental health of physicians. The GHQ is a screening instrument designed to detect current, diagnosable psychiatric disorders. Psychiatric “case” was detected by coding of each item of the GHQ questionnaire. Each item is scored 0 (“not at all” or “same as usual”) or 1 (“rather more than usual” or “much more than usual”), giving a maximum score of 12. Individuals scoring 4 or more are estimated to be psychiatric “case” (49).

Table 8 Psychiatric disorder and psychiatric case

Psychiatric disorder	Total (n=283)	
	n	%
Case	32	11.3
Not-case	251	88.7

Psychiatric case included 32 subjects (11.3%) in this study.

4.3 The comparisons of job stress among socio-demographic factors

Student's t-test and one-way ANOVA were used to compare mean of effort/reward ratio. P-value less than 0.05 was considered as significant.

4.3.1 Age

Table 9 Comparison of mean of effort/reward ratio among age groups

Age group	n	mean	SD	F	p-value
≤ 34	65	0.514	0.202	4.83	0.003*
35 ≤ ≤ 44	72	0.554	0.226		
45 ≤ ≤ 54	82	0.518	0.239		
55 ≤	64	0.417	0.192		

Table 9 showed the comparison of mean of effort-reward among age groups. Effort/reward ratio showed significant difference among age group of physicians (p=0.003). Multiple comparisons showed that age group "35 to 44" had significant higher effort/reward ratio than age group " 55≤ " and age group " 45 to 54 " had significant higher effort/reward ratio than age group " 55≤ ". In other words, age group equal or more than 55 years old had lower job stress than age group " 35 to 44 " and " 45 to 54 ".

4.3.2 Gender

Table 10 Comparison of mean of effort/reward ratio among gender

Gender	n	mean	SD	t-value	p-value
Male	187	0.494	0.231	-1.03	0.302
Female	96	0.522	0.203		

Table 10 showed the comparison of mean of effort-reward.
There were no significant differences of effort/reward ratio between male and female. Job stress had no significant differences among genders.

4.3.3 Job position

Table 11 Comparison of mean of effort/reward ratio among job position

Job position	n	mean	SD	F	p-value
Intern/Resident	28	0.519	0.209	1.17	0.312
Staff	191	0.490	0.209		
Chief/Director	64	0.537	0.261		

Table 11 showed the comparison of mean of effort-reward ratio. There were no significant differences of effort/reward ratio among job positions. Job stress had no significant differences among job positions.

4.3.4 Specialty status

Table 12 Comparison of mean of effort/reward ratio among specialty status

Specialist	n	mean	SD	t-value	p-value
Yes	197	0.496	0.228	-0.86	0.391
No	86	0.520	0.207		

Table 12 showed the comparison of mean of effort-reward ratio. There was

no significant difference of effort/reward ratio between specialist and not-specialist. Job stress had no significant difference between specialist and not-specialist of physicians.

4.3.5 Part-time job

Table 13 Comparison of mean of effort/reward ratio among part-time job status

Part-time job	n	mean	SD	t-value	p-value
Yes	108	0.547	0.239	2.50	0.013*
No	174	0.477	0.206		

Table 13 showed the comparison of mean of effort-reward ratio. There was significant difference among part-time job status in comparison of mean of effort/reward ratio. The physicians who had the part-time jobs outside of present hospital had higher job stress than those who did not have part-time jobs.

4.3.6 Income

Table 14 Comparison of mean of effort/reward ratio among income groups

Monthly income	n	mean	SD	t-value	p-value
<75,000	144	0.538	0.245	2.51	0.013*
75,000≤	116	0.468	0.200		

Table 14 showed the comparison of mean of effort-reward ratio. Lower income group had significant higher effort/reward ratio. The lower income group of the physicians had higher job stress.

4.3.7 Workload (overtime work)

Table 15 Comparison of mean of effort/reward ratio among daily work hours

Daily work hours	n	mean	SD	t-value	p-value
≤ 8.0	116	0.470	0.221	-2.13	0.034*
8.0 <	165	0.527	0.221		

Table 15 showed the comparison of mean of effort-reward ratio. Overtime work group (more than 8 hours per day) had significant higher job stress among physicians.

4.3.8 Job experience

Table 16 Comparison of mean of effort/reward ratio among job experience

Job experience (years)	n	mean	SD	t-value	p-value
<10.0	140	0.514	0.208	0.97	0.335
10.0≤	138	0.488	0.236		

Table 16 showed the comparison of mean of effort-reward ratio. There were no significant differences of effort/reward ratio among job experience length. The job experience of present hospital had no effect on the job stress.

4.3.9 Sector

Table 17 Comparison of mean of effort/reward ratio among sectors

Sector	n	mean	SD	t-value	p-value
Private	152	0.445	0.173	-4.83	<0.001*
Public	131	0.571	0.252		

Table 17 showed the comparison of mean of effort/reward ratio between

public and private sector. There was significant difference of job stress between public and private sector. The public sector had higher job stress than private.

4.3.10 Marital status

Table 18 Comparison of mean of effort/reward ratio among marital status

Marital status	n	mean	SD	t-value	p-value
Married	191	0.486	0.220	-1.86	0.064
Single/Others	92	0.539	0.223		

Table 18 showed the comparison of mean of effort-reward ratio. There were no significant differences in effort/reward ratio among marital status. Marital status had no relationship with the job stress.

4.3.11 Child status

Table 19 Comparison of mean of effort/reward ratio among child status (Among 191 married physicians)

Child status	n	mean	SD	t-value	p-value
Yes	169	0.483	0.221	-0.66	0.514
No	22	0.515	0.214		

Table 19 showed the comparison of mean of effort-reward ratio. There were no significant differences of job stress among child status.

4.3.12 Spouse's job

Table 20 Comparison of mean of effort/reward ratio among spouse's job

Spouse's job	n	mean	SD	t-value	p-value
Yes	163	0.483	0.219	-0.676	0.676
No	28	0.503	0.226		

Table 20 showed the comparison of mean of effort-reward ratio. There were no significant differences of job stress among spouse's job status. Spouse's job status had no relationship to job stress.

4.3.13 Hometown

Table 21 Comparison of mean of effort/reward ratio among hometown

Hometown	n	mean	SD	t-value	p-value
Bangkok	216	0.514	0.230	1.65	0.101
Others	66	0.467	0.192		

Table 21 showed the comparison of mean of effort-reward ratio. There was no significant difference of job stress among hometown status.

4.3.14 Living status

Table 22 Comparison of mean of effort/reward ratio

Living status	n	mean	SD	t-value	p-value
Own house	183	0.480	0.223	-2.47	0.014*
Others	99	0.547	0.214		

Table 22 showed the comparison of mean of effort-reward ratio. The physicians living their own houses had lower job stress than others.

4.3.15 Leisure time

Table 23 Comparison of mean of effort/reward ratio among leisure time status

Leisure time	n	mean	SD	t-value	p-value
Yes	188	0.453	0.184	-5.12	<0.001*
No	95	0.603	0.255		

Table 23 showed the comparison of mean of effort-reward ratio. There were significant differences of effort/reward ratio among leisure time status. The physicians who did not have enough leisure time showed higher job stress than those who had leisure time.

4.3.16 Health status

Self-estimated health status was asked and effort/reward ratio was compared among groups.

Table 24 Comparison of mean of effort/reward ratio among health status

Health status	n	mean	SD	F	p-value
Good	192	0.470	0.205	8.26	0.001*
Not good	42	0.609	0.272		
Not sure	48	0.546	0.207		

Table 24 showed the comparison of mean of effort-reward ratio. The physicians those who estimated their health status “good” had lower effort/reward ratio than others.

The physicians those who estimated their health status “good” had lower job stress.

4.3.17 Overall job satisfaction

One question about overall job satisfaction was asked and effort/reward ratio was compared among satisfaction levels. The physicians rated their overall job

satisfaction 1 (not at all) to 5 (very much). The subjects scored 1, 2, 3, were categorized into "not-satisfied" group and subjects scored 4, 5, were categorized into "satisfied" group.

Table 25 Comparison of mean of effort/reward ratio among job satisfaction

Overall satisfaction	n	mean	SD	t-value	p-value
Satisfied	121	0.434	0.155	-5.28	<0.001*
Not satisfied	144	0.567	0.252		

Table 25 showed the comparison of mean of effort/reward ratio among job satisfaction. Almost half of the physicians were satisfied with their present job and satisfied group (45.7%) had significant lower job stress than not-satisfied group.

4.3.18 Overcommitment

Table 26 Comparison of mean of effort/reward ratio among overcommitment

Overcommitment	n	mean	SD	t-value	p-value
High-risk	83	0.639	0.254	6.30	<0.001*
Low-risk	200	0.447	0.180		

Table 26 showed high-risk group of overcommitment had significant higher effort/reward ratio than low risk group.

4.3.19 Psychiatric disorder

Table 27 Comparison of mean of effort/reward ratio between psychiatric disorder

Psychiatric disorder	n	mean	SD	t-value	p-value
Case	32	0.709	0.305	4.21	<0.001*
Not-case	251	0.477	0.195		

Table 27 showed the difference of effort/reward ratio among psychiatric risk groups. Psychiatric case group had significant higher job stress than others.

4.4 Correlations among variables

Table 28 Correlations among variables

	Age	Income	Job experience	Work hours	Traffic time	Over-commitment
Income	0.263 <0.001*					
Job experience	0.745 <0.001*	0.141 0.023*				
Work hours	-0.217 <0.001*	-0.079 0.205	-0.168 0.005*			
Traffic time	-0.013 0.832	-0.063 0.310	-0.047 0.440	0.058 0.334		
Over-commitment	-0.083 0.162	-0.217 <0.001*	-0.038 0.531	0.151 0.011*	0.025 0.676	
Effort/reward ratio	-0.162 0.006*	-0.136 0.029*	-0.050 0.409	0.137 0.021*	0.039 0.517	0.483 <0.001*

Cell Contents: Pearson correlation (Upper) p-value (Lower)

Job stress had negative correlations with age and income. Job stress had positive correlations with work hours and overcommitment. Overcommitment had negative correlation with income. Overcommitment had positive correlations with work hours.

4.5 Multivariate logistic regression analysis with high-risk of job stress

Table 29 Multivariate analysis with high-risk of job stress

(High-risk: n=71, Low-risk: n=212)

Predictor	Coefficient	SE Coefficient	Z	P	Odds Ratio	95% Confidence Interval	
Constant	-1.8921	0.3638	-5.20	<0.001		Lower	Upper
Public sector	0.7762	0.3281	2.37	0.018*	2.17	1.14	4.13
Part-time job (+)	0.8686	0.3184	2.73	0.006*	2.38	1.28	4.45
Leisure (+)	-0.7588	0.3160	-2.40	0.016*	0.47	0.25	0.87
High-risk of overcommitment	1.2339	0.3209	3.85	<0.001*	3.43	1.83	6.44

Log-Likelihood = -131.454 Test that all slopes are zero: $X^2 = 55.342$, DF = 4, p-value < 0.001

As shown in above, multivariate logistic regression analysis showed that four factors showed significant associations with high-risk of job stress. The results showed that working in the public sector (OR=2.17), having a part-time job (OR=2.38), and high-risk of overcommitment (OR=3.43) were significant risk factors of high-risk of job stress among physicians, and having a leisure time was a significant protective factor of job stress among physicians (OR=0.47). No other factors such as age, income, marital status, daily work-hours, living status, health status, and job satisfaction showed significant associations with job stress (data were not shown). OR stands for odds ratio.

4.6 Multivariate logistic regression analysis with psychiatric case

Table 30 Multivariate analysis with psychiatric case

(psychiatric case: n=32, not-case: n=251)

Predictor	Coefficient	SE Coefficient	Z	P	Odds Ratio	95% Confidence Interval	
Constant	-2.6587	0.5044	-5.27	<0.001		Lower	Upper
Public sector	0.3358	0.4509	0.74	0.456	1.40	0.58	3.39
Part-time job (+)	-0.2773	0.4298	-0.65	0.519	0.76	0.33	1.76
Leisure (+)	-0.4915	0.4264	-1.15	0.249	0.61	0.27	1.41
High-risk of overcommitment	0.4746	0.4283	1.11	0.268	1.61	0.69	3.72
High-risk of job stress	1.5616	0.4460	3.50	<0.001*	4.77	1.99	11.42

Log-Likelihood = -85.928 Test that all slopes are zero: $X^2 = 27.642$, DF = 5, p-value < 0.001

Multiple logistic regression analysis was used to identify the associations between psychiatric case and factors. Only high-risk of job stress had a significant association with psychiatric case in this study (OR=4.77).

4.7 The comparison among sectors

4.7.1 Comparisons of socio-demographic factor among sectors

Table 31 Comparisons of Socio-demographic factors among sectors

Variables	Public (n=131)		Private (n=152)			
	Mean	SD	Mean	SD	t-value	p-value
Age	40.8	9.5	47.7	11.9	-5.37	< 0.001*
Income	49,155	38,310	102,879	54,121	-9.26	< 0.001*
Job experiences	10.08	7.73	12.2	11.1	-1.89	0.060
Daily work hours	9.82	2.28	8.84	2.12	3.70	< 0.001*
Travel time to office	83.0	51.1	75.8	42.5	1.27	0.206

Table 31 showed the Comparisons of Socio-demographic and working factors among sectors. Age and income in private sector were higher than those in public significantly. Daily work hour was significantly higher in public sector than in private sector. There was no difference of the travel time to office among sectors.

4.7.2 Comparisons of efforts among sectors

Table 32 Comparisons of efforts among sectors

Variables	Public (n=131)		Private (n=152)			
	mean	SD	mean	SD	t-value	p-value
Effort	14.18	4.70	11.77	3.71	4.73	< 0.001*
Time pressure	2.36	1.14	1.70	0.98	5.19	< 0.001*
Frequent interruptions	1.98	1.10	1.53	0.91	3.73	< 0.001*
Responsibility	2.54	0.98	2.24	0.95	2.65	0.009*
Pressure to work overtime	1.99	1.06	1.63	0.93	3.02	0.003*
Physically demanding work	2.64	1.02	2.39	0.94	2.17	0.031*
Increasing demand	2.66	1.04	2.28	1.00	3.07	0.002*

Total score of efforts was significantly higher in public than in private. All of subcomponents of efforts, stressful situations by time pressure, frequent interruption, high responsibility, pressure to work overtime, physically demanding work and increasing demand were significantly higher in public than in private sector. Most stressful component of efforts in public was increasing demand at work and

most stressful component of efforts was physically demanding work in private.

4.7.3 Comparisons of reward among sectors

Table 33 Comparisons of rewards among sectors

Variables	Public (n=131)		Private (n=152)			
	mean	SD	mean	SD	t-value	p-value
Reward	47.50	5.84	49.80	4.91	-3.54	< 0.001*
First component	16.08	2.77	17.46	2.11	-4.67	< 0.001*
Poor job promotion	3.31	1.00	3.40	0.94	-0.83	0.408
Insufficient position	4.72	0.69	4.86	0.48	-1.91	0.057
Inadequate work prospect	4.41	0.90	4.60	0.77	-1.86	0.064
Inadequate salary	3.64	1.22	4.61	0.80	-7.72	< 0.001*
Second component	22.56	2.78	23.52	2.37	-3.11	0.002*
Insufficient respect by superiors	4.51	0.92	4.78	0.61	-2.8	0.006*
Insufficient respect by colleagues	4.76	0.63	4.91	0.41	-2.25	0.025*
Inadequate support	4.51	0.90	4.55	0.87	-0.33	0.743
Unfair treatment	4.18	1.03	4.55	0.87	-3.25	0.001*
Insufficient respect/prestige	4.60	0.76	4.74	0.63	-1.77	0.078
Third component	8.87	1.35	8.82	1.45	-0.33	0.744
Undesirable change	4.20	0.91	4.43	0.79	-2.25	0.025*
Job insecurity	4.67	0.76	4.39	0.91	2.86	0.004*

Total score of rewards were higher in private than in public. Subcomponents of rewards such as, appropriateness of job promotion, sufficiency of job position, appropriateness of work prospect had no differences among sectors. Appropriateness of salary, sufficiency of respect by superiors, sufficiency of respect by colleagues, appropriateness of support at work, fairness of treatment at work, appropriateness of respect and prestige, job circumstance change, were significant higher in private than in public. Job security was higher in public than in private. As a whole, public sector showed higher efforts and lower rewards significantly than private sector.

4.7.4 Associations of high-risk of job stress, high-risk of overcommitment, and psychiatric case with sectors

Table 34 Association of risk of job stress with sectors

Sector	Low-risk	High-risk	Total
Private	131(86.2)	21(13.8)	152(100.0)
Public	81(61.8)	50(38.2)	131(100.0)
		Chi-square=22.201, DF=1, p-value<0.001*	

Table 35 Association of risk of overcommitment with sectors

Sector	Low-risk	High-risk	Total
Private	122(80.3)	30(19.7)	152(100.0)
Public	78(59.5)	53(40.5)	131(100.0)
		Chi-square=14.575, DF=1, p-value<0.001*	

Table 36 Association of psychiatric disorder with sectors

Sector	Not-case	Case	Total
Private	141(92.8)	11(7.2)	152(100.0)
Public	110(84.0)	21(16.0)	131(100.0)
		Chi-square=5.425, DF=1, p-value=0.020*	

Job stress had significant association with sector. High-risk of job stress showed higher proportion in public sector.

Risk of overcommitment had significant association with sector. High-risk of overcommitment showed higher proportion in public sector.

Psychiatric disorder had significant association with sector. Psychiatric case showed higher proportion in public sector.

In public sector, physicians had higher risk of job stress, higher risk of overcommitment and higher risk of psychiatric disorder.

4.7.5 Comparisons of job stress and job satisfaction among sectors

Table 37 Comparison of overall job stress among sectors

Total (n=265) Variables	Public (n=113) mean	SD	Private (n=152) mean	SD	t-value	p-value
Overall stress at work	2.44	0.79	2.18	0.65	-2.88	0.004*

Self-estimated overall stress at work was significantly higher in public than in private.

Table 38 Comparison of overall job satisfaction among sectors

Total (n=265) Variables	Public (n=113) mean	SD	Private (n=152) mean	SD	t-value	p-value
Overall satisfaction at work	3.29	0.69	3.54	0.76	2.77	0.006*

Self-estimated overall satisfaction with work was significantly higher in private than in public.

4.7.6 Comparisons of Tsunami-related workload and job stress

The data-collecting period began from 2 weeks after Tsunami disaster to southern Thailand and ended at 6 weeks after that disaster. Researcher concerned that disaster affected on routine workload of physicians in Bangkok and added two questionnaires related to Tsunami disasters.

Table 39 Comparisons of Tsunami-related workload among sectors

Total (n=265) Variables	Public (n=113) mean	SD	Private (n=151) mean	SD	t-value	p-value
Tsunami related workload	1.39	0.60	1.43	0.72	0.47	0.638

There was no significant difference in Tsunami disaster-related workload

between public and private sector.

Table 40 Comparison of Tsunami related job stress among sectors

Total (n=239) Variables	Public (n=98) mean	SD	Private (n=141) mean	SD	t-value	p-value
Tsunami related job stress	1.44	0.68	1.31	0.55	-1.54	0.126

There was no significant difference of Tsunami disaster-related job stress between public and private sector.

CHAPTER 5
DISCUSSION

The present study was intended to identify influencing factor of job strain among physicians in hospitals in Bangkok, Thailand.

5.1 Job stress among physicians

5.1.1 Effort

Physicians were suffered by physically demanding work, increasing demand, and high responsibility. Although developer of the effort-reward imbalance questionnaire recommended excluding the questionnaire about physical demand for white-collar worker (15), the job of physicians demanded physical workload as part of the typical task profile. Increasing demand might be due to the development of modern medicine and new technologies. Physicians should obtain newer information and technologies of current medicine. It is no doubt physicians had to aware of high responsibility on their job.

5.1.2 Reward

Physicians were suffered by poor job promotion at work mostly and inadequate salary secondly. It might be due to the fact that physicians' job promotion was highly depends on their experiences, in other words, age. They had to climb up the promotion ladder step by step in order of age.

Physicians were suffered by inadequate salary as a reward. Fair distribution of reward based on the amount of effort they paid should be considered. Physicians were satisfied with sufficient respect by colleagues and sufficient position at work. As compared with other European studies, reward score was relatively high among Thai physicians. The cultural difference might affect on the results. The appropriateness of applying the questionnaire that was developed in Europe to Thai

physicians should be discussed in future study.

5.1.3 Effort-reward ratio

Effort-reward ratio was used to measure the level of imbalanced situation between effort and reward. The effort-reward ratio was considered as an indicator of job stress in this study. Top quartile was categorized into the high-risk group of job stress. High-risk group of job stress included 71 cases (25.1%) of physicians.

5.1.4 Overcommitment

Top quartile was categorized into high-risk group of overcommitment. Eighty-three cases (29.3%) were included in high-risk group.

5.1.5 Psychiatric disorder

According to the GHQ, psychiatric case included 32 physicians (11.3%). This result showed that Thai physicians maintained quite healthy mental status compare to other countries in Europe and USA (7, 8, 9, 10).

5.2 Relationship between job stress and Socio-demographic factors

5.2.1 Age

It was found that age group 35 to 44 and 45 to 54 had higher job stress than age group equal or above 55. In this study, all of the physicians aged over 60 (24 cases) were in private sector. Those biased distributions of sector might affect on the job stress level of physicians in the age group of above 55 years old.

5.2.2 Gender

Job stress had no significant difference among gender. Job stress among Thai physicians had no gender difference. In the study of Japanese full-time occupational physicians, male had less stress than female (38). In other study, particularly low income and minority women are more likely to expose job stress than man. In addition, women experience a number of unique stressors such as sexual harassment and gender discrimination. (50, 51). This result from our study might suggest that

gender equity at work was already established in Thai medical society.

5.2.3 Job position

Job stress had no significant difference among job position of the physicians in the hospital. The study performed in UK reported different job position had different stress level among hospital workers (10). The reason why job position had no relationship with job stress in this study was that there was little variety of job positions in this study, most of the physicians were categorized into "full time staff". It is necessary to categorize the characteristics of positions clearly to detect the differences in future study.

5.2.4 Job specialty

Job stress had no significant difference between specialist and not-specialist. Some reports mentioned that the different specialty of physicians had different stress level (7, 9). It was difficult to study stress level among different specialties, because number of the physicians in each specialty was limited in this study. There was no significant difference of job stress between internal and surgical (data were not shown).

In this study, 69.6% was a specialist and 30.4% was a general practitioner. According to the national report by Thai government in 2001, the percentage of specialists was 58.0% and that of general practitioners was 42.0%. The proportion of specialists was higher among physicians in this study. This is due to the fact most specialists tend to concentrate to the higher level, bigger size, and more advanced hospital in the big city, like Bangkok. The changing recent trend of physicians' choice of specialty has been seen in worldwide. In developed countries, large portion of the physicians tends to become specialist, however, general practitioner must have important role in the primary health care system in Thailand. Therefore, the trend of physician's choice to become specialist should be considered and policy maker must provide long-term vision about health system in Thailand.

5.2.5 Part-time job

The physicians who had a part time job outside of the hospital had higher job stress. In many cases, physicians have to go to another hospital for their part-time job after the routine work in the full-time job. Part-time job might be an over night duty in the hospital. This hard workload must be the stressful situation for physicians. Twenty-four hours continuous duty in the hospital tends to force physicians become frustrated and physically exhausted and this situation may become a cause of malpractice cases in medicine. In public hospital, young physicians could not earn adequate salary from their full-time job, therefore, the young, low income, and hard-work physicians have to go to get part-time job. Inadequate salary in public hospital and shortage of the number of the physicians as a work force in medicine may be causes of these problems. In Japan, hard workload of interns and young residents in the public hospital caused considerable number of deaths from overwork of young physicians. This issue had become a serious social problem in Japan. Overwork by interns was prohibited and higher salary by public hospital was settled by law in present.

5.2.6 Income

It was found that lower income group had higher job stress. This fact meant that inadequate salary for their work was one of the stressors at work. Monetary reward might be the one of the most important reward for highly professionalized job, like physicians. Equal distribution of rewards is required to create the fair atmosphere at work.

5.2.7 Work hours

Over workload must be one of the stressful situations for physicians and increased stress level was found in this study. Different type of over workload should be considered in future study. Overnight duty was not considered and daily work hours did not represent the workload situation of physicians correctly. Weekly workload and number of overnight duties might be appropriate for measuring workload of physicians.

Longer workload group (more than 9 hours per day) showed higher score of overcommitment (p=0.008, data were not shown). These facts suggested that overcommitted physicians tended to work longer than the others do.

5.2.8 Job experience

It was found that present job experience had no significant difference in job stress. Job experience is not the stressor at work for physicians.

5.2.9 Sector

It was found that job stress had significant difference between public and private sectors. Public sector had higher effort and lower reward. Details about the comparisons among sectors were discussed in latter part of this chapter.

5.2.10 Marital status

It was found that job stress had no significant difference among marital status. Even there was no statistical significant difference among marital status (p=0.064), job stress score was lower in married physicians. This fact suggested that the psychological support by spouse could reduce the job stress. It was verified that there was significant association between job stress groups and marital status (Chi-square=5.354, p=0.021, data were not shown).

5.2.11 Child status

Existence of child or children in married physicians was not a stressor in this study.

5.2.12 Spouse's job

Spouse's job was not a related factor to job stress in this study. This might be affected by the cultural difference among countries. In Thailand, a two-income family situation is common, therefore, spouse's job status had no effect on the job stress.

5.2.13 Hometown

Hometown status was not a job stressor of physicians in this study. However, physicians from Bangkok had higher overcommitment risk than others (data were not shown, p=0.022). Life in the big city, like Bangkok, demands competitive spirit for surviving in social achievement. Physicians in Bangkok might tend to commit to their job excessively.

5.2.14 Living status

Physicians living in their own house had lower job stress. In other categories, there were parents' house, rental apartment, and hospital dormitory. Living in secure condition in the daily life would be reducing their job stress. There is a possibility to be confounded by other variables, such as income and age.

5.2.15 Leisure time

Physicians who had leisure time had lower job stress. It is important to have enough relaxing time away from work for reducing job stress and those who could have a leisure time had no risk of overcommitment (data were not shown, p<0.001). The results of multivariate analysis showed that having a leisure time must be a possible good intervention to reduce job stress.

5.2.16 Health status

Self-estimated health status of physicians showed their self-estimation was consistent with the degree of job stress.

5.2.15 Overall job satisfaction

Higher satisfaction group had lower job stress. Job satisfaction could be a protective factor of job stress or lower stress circumstances make physicians happy and satisfied with their job.

5.2.16 Overcommitment

High overcommitment group had higher job stress. Overcommitment could intensify job stress and could be a one of the risk factor of job stress. Higher level of

overcommitment has a higher risk of poor health, independently of an effort-reward imbalanced situation. These results were consistent with other report (52).

5.2.17 Psychiatric disorder

Psychiatric case group had higher job stress. Multivariate analysis showed that the job stress might be a one of the risk factors of psychiatric disorder. Reducing job stress could be a one of the interventions of psychiatric disorder and protection of mental health at work.

5.2.18 Multivariate analysis of job stress

Multivariate analysis showed that four factors in this study were significant; 1. whether or not has a part-time job, 2. whether or not have a leisure time, 3. overcommitment, and 4. sector. The physicians who are working in the public hospital, with part-time job, without leisure time, and with a personality of high overcommitment, are the most susceptible of job stress.

5.2.19 Multivariate analysis of psychiatric case

Multiple logistic regression analysis showed that only job stress was a risk factor of psychiatric case (OR=4.77). Reduction of job stress was urgent need for protect and promote physicians' mental health at work.

5.3 Comparison of job stress between public and private sectors

Average age of physicians in private sector was older than in public sector, because interns and residents were included in public sector in this study and all sixties were in private. Income in private was higher than in public. Age had correlation with income, therefore, income difference might depend on age difference to a certain degree. When incomes were compared in same age group, private had still higher income than public in each age group (data were not shown).

In addition to the public's longer daily workload, proportion of whether or not has a part-time job was higher in public. More than half of physicians in public had

part-time job (53.4%) and only quarter of physicians had part-time job in private (25.2%). This fact showed that public had higher workload compare to the private. Not only daily work hours and part-time job but also the increased number of patients should be considered as an increased workload of physicians. Since the enforcement of "Thirty-Baht scheme" in October 2001, many patients who had "Thirty-Baht card" went to public hospitals and increased the workload of public hospitals. This might be the one cause of higher effort in public than private.

Total score of efforts was higher in public and all of the subcomponents of effort, such as, time pressure, frequent interruptions, high responsibility, pressure to work overtime, and increasing job demand, were higher in public.

Total score of rewards was higher in private sector. In the component of financial and career reward, adequate salary had higher reward in private. In subgroup of financial and career reward, such as job promotion, job position, and work prospect had no differences among sectors. In the component of esteem reward, all subcomponents of reward such as, respect by superiors, respect by colleagues, support at work, and fair treatment at work had higher in private. In the component of gratification of job security reward, undesirable change had higher reward in private, however, job security had higher score in public. As a whole, physician in public gives higher effort and takes lower reward by employer in terms of stress at work. Job security had higher reward in public than in private. There is one possibility to explain about this fact. This might be affected by the economical crises in 1997. During that economical crisis, some private hospitals might be in a critical moment. The concerns about job security must be stronger in private sector. Even during that crisis, public sector had provided robust job security for physicians.

In this study, public sector demanded higher efforts to physicians and private sector provided higher rewards for physicians. However, we should concern other aspects of rewards provided by public sector and efforts demanded by the private sector. First, this study did not consider other rewards such as social security and welfare provided by public sectors for physicians. Merit of being public officials

must not be small to compensate for lower reward at work for physicians. Second, about the efforts of physicians, we should consider the countless efforts to master the advanced medical new technology at the present time to catch up with it and the efforts to prevent the being sued for malpractice must be another newly coming efforts. The patients visiting private hospitals are likely to be higher educated and wealthier people (53). These prosperous people generally tend to seek more advanced, high-tech medicine, such as endoscope surgery, and minimum invasion surgery and other high-tech examinations that needs much knowledge and techniques. In present globalization, the information about modern technologies is easy to obtain even for general people. Symmetrical distribution of the information of medicine and equity of the accessibility for better medicine should be achieved ideally. Although physicians have to learn new technologies in medicine regardless of sector difference, the likelihood being sued by patients may be higher in the private sector. That could be an enormous stressor for physicians in private sector.

It is no doubt that the relationship with the patients is not always a stressor for physicians, the good relationship with the patients could be splendid reward for most of the physicians, for instance, the gratitude from the patients must be the highest pleasure for physicians. One study in UK compared the stress level among different specialty, found the fact that surgeons generally had the highest scores for stress, and had highest satisfaction scores simultaneously. Reporter concluded that surgeons were protected from burnout and psychiatric morbidity by receiving positive and immediate feedback from their patients and relatives regularly (7).

As an important stressor for physicians, we should consider the exposure to risk and hazards. Physicians are facing the physical danger to expose hazardous materials and communicable diseases. This occupation specific risk should be considered as a source of strain of physicians.

Overcommitment represents the personal characteristic and this is one of the risk factor of job stress. In public sector, overcommitment had higher than in private sector. This risk factor tends to make physicians commit to their job excessively and

intensify the risk of job stress. Effort-reward imbalance and overcommitment have different time lagged effects such that working an effort-reward imbalance has short-term effects, whereas overcommitment is a long-term determinant (54).

Proportion of psychiatric disorder was higher in public (16.0%) than in private (7.2%), significantly (p=0.002), and had association with job stress. Trial to reduce job stress is important for good mental health of physicians.
Overall job satisfaction was higher in private and had negative correlation with job stress. Job satisfaction could be a protective factor from job stress. In public sector, support system for psychiatric problems should be established and the intervention to promote job satisfaction and to reduce job stress is essential.

5.4 Comparison with other country

According to the report about 20,000 Japanese workers in 2004, mean±SD of effort of Japanese worker was 13.0±5.0, reward was 35.5±8.0, effort/reward ratio was 0.56±0.33, and overcommitment was 13.9±3.1, respectively (55). There was no significant difference of effort between Thai physicians and Japanese workers; however, reward was significantly high in Thai physicians ($p<0.001$) and effort/reward ratio was significantly high in Japanese workers (p=0.004). Overcommitment was significantly high in Japanese workers ($p<0.001$). One of the merits of utilizing the standardized tool for the scientific study is ability to compare the results by the equivalent tool. However, the culturally different perception of effort and reward might affect the results of the studies. In the globalization of work society, the common reliable tool for assessing the job stress is essential for comparing data from different countries or cultures.

CHAPTER 6
CONCLUSION AND RECOMMENDATION

6.1 Conclusion

This study was a cross-sectional survey research conducted during January 2005 to March 2005 to study job stress among physicians in the hospitals in Bangkok. Self-reported questionnaires were distributed and collected by coordinators in each hospital. Effort-reward imbalance questionnaire was used to assess the job stress and the GHQ was used for detecting psychiatric morbidity among physicians. Socio-demographic characteristics were included in questionnaires. The data were collected and two hundred and eighty-three cases were used for analysis in this study.

Age, income, part-time job, overtime work, sector, living status, leisure time, self-estimated health status, and job satisfaction had significant relationships with job stress. The risk of overcommitment and psychiatric disorder had significant associations with risk of job stress.

Multivariate analysis revealed that the factors that had significant associations with the job stress were sector, part-time job, leisure time, and risk of overcommitment. The factor that had significant association with the psychiatric disorder was only the risk of job stress in this study. The physicians who are working in the public sector, with part-time job, without leisure time and with high-risk of overcommitment are the most likely susceptible to the job stress.

Comparisons of job stress among sectors revealed that public sector cost higher effort and gained lower reward than private sector. Total score of efforts was significantly higher in public than in private. All of subcomponents of efforts, stressful situations by time pressure, frequent interruption, high responsibility, pressure to work overtime, physically demanding work and increasing demand were

significantly higher in public than in private sector. Most stressful component of efforts in public was increasing demand at work and most stressful component of efforts was physically demanding work in private. Total score of rewards were higher in private than in public. Subcomponents of rewards such as, appropriateness of job promotion, sufficiency of job position, appropriateness of work prospect had no differences among sectors. Appropriateness of salary, sufficiency of respect by superiors, sufficiency of respect by colleagues, appropriateness of support at work, fairness of treatment at work, appropriateness of respect and prestige, job circumstance change, were significant higher in private than in public. Job security was higher in public than in private. As a whole, public sector showed higher efforts and lower rewards significantly than private sector. The risk of overcommitment had significant association with sector. High-risk of overcommitment showed higher proportion in public sector. Psychiatric disorder had significant association with sector. Psychiatric case showed higher proportion in public sector. In public sector, physicians had higher risk of job stress, higher risk of overcommitment and higher risk of psychiatric disorder.

The restore of imbalance of effort and reward at work is essential to reduce the job stress and to maintain well health at work. The theoretical concept of effort-reward imbalance model could be a significant tool to make a strategy for intervention of job stress.

6.2 Recommendation

6.2.1 Recommendation for future study

High effort and low reward conditions at work are likely to occur in those groups of the workforce that exhibits a low level of occupational status control (56). However, among higher status groups, e.g. physicians, these conditions may be common as well. Physicians are most likely to accept extra work and additional responsibilities from their strategic reasons to compete for promotion aspects. Prolonged condition of effort-reward imbalance may cause a psychological disorder.

In this study, separated effects of effort-reward imbalance and overcommitment were analyzed. Modifying effect of overcommitment on effort-reward imbalance should be analyzed simultaneously. Overcommitment is a risk factor and modifier of effort-reward imbalance, thus, the interaction between effort-reward imbalance and overcommitment should be investigated for further understanding of the health at work. Further more, study about the interactions among three components of the model, such as effort, reward, and overcommitment, should be done in future. As an indicator of the situation of effort-reward imbalance, effort/reward ratio was used in this study. In this case, it is impossible to detect the difference between high-efforts with high-rewards situation and low-effort with low-reward situation. Ratio showed the same result in this case. Psychological risk might be different between high-effort with high-reward and low-effort with low-reward situations (52) in spite of same value of effort/reward ratio.

This study relied on self-reported measures of both independent and dependent variables. This might happen to exaggerate the strength of relationships. Two established and scientifically widespread questionnaires were used in this study. The GHQ was used to measure the psychiatric morbidity as an outcome of psychological symptom and questionnaire of the effort-reward imbalance was used to measure job stress in this study. Both questionnaires were widely used and established in western countries. However, the validity to use those questionnaires in different cultural situation from Europe should be considered in future study.

In data analyzing process, arbitrary cut-off points of the variables were chosen for categorizing groups. Since there were neither natural nor clinically based thresholds available, top quartile (Q3) had been used as cut-off points in this study. In other research, top tertile, top quartile, mean+standard deviation were used. Standardization for categorizing data should be done in future.

The psychiatric morbidity was significant relationship with effort-reward imbalance in this study. Although, sustained situation of effort-reward imbalance could cause psychiatric disorder, causal relationship should be interpreted carefully,

because this study was cross-sectional study. Longitudinal study could add more information for the intervention of job related stress (57, 58).

Finally, for more precise data analysis, bigger sample size and more equally distributed job specialty would be recommended in future research.

6.2.2 Recommendation for reduction of job stress based on the effort reward imbalance model

The effort reward imbalance model focuses on the importance of combination of high effort and low reward to produce stressful situations. Considering two components, recovering the balance between effort and reward at work is the best interventional approach (58).

6.2.2.1 Effort

The reduction of longer workload, excessive overtime work, and frequent overnight duty were basic approach for the reduction of over workload. Physically demanding job style should be modified to reduce physical strain. Because of the shortage of human resources of health personnel, it is likely to be difficult in reality to reduce workload, appropriate monetary reward or compensatory reward should be provided. Equal distribution of workload and responsibility among job positions is important to produce the fairness and reliable atmosphere at work. Sufficient provision of the opportunity to learn new techniques and knowledge may help physicians to reduce the effort to catch up with new techniques and stimulate the intellectual interest of physicians.

6.2.2.2 Reward

Although monetary reward could be direct and effective reward for work in many cases, compensatory reward should be considered simultaneously such as, leisure facility, exercise room, nurseries, a child-rearing leave, and vacation facilities for physicians and their family.

Fair job promotion and opportunity is considered as an important reward.

Proper and sufficient esteem by superior, colleagues and good relationship with subordinate are essential for the creation of supportive and fair climate at work. Monitoring system to check and maintain the good balance of effort and reward at work is essential for employee's good health. The education and training opportunity for employer about employee's health should be taken in to account. Counseling system to find the job-related strain is required for employee's health at work.

REFERENCES

1. Health and Welfare Statistics Association. Journal of Health and Welfare Statistics 2003. Tokyo. Health and Welfare Statistics Association, 2003. (in Japanese).
2. Wibulpolprasert S. Thailand Health Profile 1999-2000. Bangkok. Ministry of Public Health, 2000.
3. Winslow ER, Bowman M, Klingensmith ME. Surgeon Workhours in the Era of Limited Resident Workhours. J Am Coll Surg. 2004; 198: 111-117.
4. Charlton J, Kelly S, Dunnell K, Evans B, Jenkins R. Suicide deaths in England and Wales: trends in factors associated with suicide deaths. Popul Trends 1993; 69: 34-42.
5. Elit L, Trim K, Mand-Bains IH, Sussman J, Grunfeld E, in conjunction with the Society of Gynecology Canada. Job satisfaction, stress, and burnout among Canadian gynecologic oncologists. Gynecologic Oncology 2004; 94: 134-139.
6. Lim A, Chongsuvivatwong V, Geater A, Chayaphum N, Thammasuwan U. Influence of Work Type on Sickness Absence among Personnel in a Teaching Hospital. J Occup Health 2002; 44: 254-263.
7. Ramirez AJ, Graham J, Richards MA, Cull A, Gregory WM. Mental health of hospital consultants: the effects of stress and satisfaction at work. Lancet 1996; 347: 724-28.
8. Grunfeld E, Whelan TJ, Zitzelsberger L, Willan AR, Montesanto B, Evans WK. Cancer care workers in Ontario: prevalence of burnout, job stress and job satisfaction. JAMC 2000; 163(2): 166-169.
9. Graham J, Ramirez AJ, Field S, Richards MA. Job Stress and Satisfaction Among Clinical Radiologists. Clinical Radiology 2000; 55: 182-185.
10. Calnan M, Wainwright D, Forsythe M, Wall B, Almond S. Mental health and stress in the workplace: the case of general practice in UK. Soc Sci Med 2001; 52: 499-507.
11. Takeda F, Yokoyama E, Miyake T, Ohida T. Mental Health and Job Factors in Social Workers at Social Welfare Offices. J Occup Health 2002; 44:

385-390.

12. Tyson PD, Pongruengphant R. Five-year follow-up study of stress among nurses in public and private hospitals in Thailand. International Journal of Nursing Studies 2004; 41: 247-254.
13. NaTakuatung K. Stress and quality of work life of government officials in Srithanya hospital [Master of Science (Public Health)]. Bangkok: Faculty of Graduate Studies, Mahidol University, 2004.
14. Siegrist J. Adverse Health Effects of High-Effort/Low-Reward Conditions. Journal of Occupational Health Psychology1996; 1: 27-41.
15. Siegrist J, Starke D, Chandola T, Godin I, Marmot M, Niedhammer I et al. The measurement of effort-reward imbalance at work: European comparisons. Soc Sci Med 2004; 58(8): 1483-1499.
16. Dewe P, Cox T, Ferguson E. Individual strategies for coping with stress and work: A review. Work and Stress 1993; 7: 5-15.
17. Lazarus RS. Theory-based stress management. Psychological Inquiry 1990; 1: 3-13.
18. Cooper C, Cartwright S. Healthy mind, healthy organization: A proactive approach to occupational stress. In: Cooper CL, Dewe PJ, O'Driscoll MP. Organizational Stress, A Review and Critique of Theory, Research, and Applications. London: Sage Publications, 2001.
19. Sparks K, Cooper C, Fried Y, Shirom A. The effects of work hours on health: A meta-analytic review. In: Cooper CL, Dewe PJ, O'Driscoll MP. Organizational Stress, A Review and Critique of Theory, Research, and Applications. London: Sage Publications, 2001.
20. Sato K, Kusaka Y, Suganuma N, Nagasawa S, Deguchi Y. Occupational Allergy in Medical Doctors. J Occup Health 2004; 46: 165-170.
21. Narayanan L, Menon S, Spector P. Stress in the workplace: A comparison of gender and occupations. Journal of Organizational Behavior 1999; 20: 63-74.
22. Beehr T, McGrath J. Social support, occupational stress and anxiety. In: Cooper CL, Dewe PJ, O'Driscoll MP. Organizational Stress, A Review and Critique of Theory, Research, and Applications. London: Sage

Publications, 2001.

23. O'Driscoll M, Beehr T. Supervisor behaviors, role stressors and uncertainty as predictors of personal outcomes for subordinates. In: Cooper CL, Dewe PJ, O'Driscoll MP. Organizational Stress, A Review and Critique of Theory, Research, and Applications. London: Sage Publications, 2001.
24. McLean A. Work Stress. In: Cooper CL, Dewe PJ, O'Driscoll MP. Organizational Stress, A Review and Critique of Theory, Research, and Applications. London: Sage Publications, 2001.
25. Rabinowitz W, Falkenbach K, Travers J, Valentine C, Weener P. Worker motivation: Unsolved problem or untapped resource? In: Cooper CL, Dewe PJ, O'Driscoll MP. Organizational Stress, A Review and Critique of Theory, Research, and Applications. London: Sage Publications, 2001.
26. Burke R, Cooper C. Organizations in crisis: Downsizing, restructuring and privatizations. In: Cooper CL, Dewe PJ, O'Driscoll MP. Organizational Stress, A Review and Critique of Theory, Research, and Applications. London: Sage Publications, 2001.
27. Jewell L. Contemporary industrial/organizational psychology, In: Cooper CL, Dewe PJ, O'Driscoll MP. Organizational Stress, A Review and Critique of Theory, Research, and Applications. London: Sage Publications, 2001.
28. O'Driscoll M. The interface between job and off-job roles: Enhancement and conflict. In: Cooper CL, Dewe PJ, O'Driscoll MP. Organizational Stress, A Review and Critique of Theory, Research, and Applications. London: Sage Publications, 2001.
29. Menaghan E. Work experiences and family interaction processes: The long reach of the job. In: Cooper CL, Dewe PJ, O'Driscoll MP. Organizational Stress, A Review and Critique of Theory, Research, and Applications. London: Sage Publications, 2001.
30. Burley K. Family variables as mediators of the relationship between work-family conflict and marital adjustment among dual-career men and women. In: Cooper CL, Dewe PJ, O'Driscoll MP. Organizational Stress, A Review and Critique of Theory, Research, and Applications. London: Sage Publications, 2001.

31. Cooper CL, Dewe PJ, O'Driscoll MP. Organizational Stress, A Review and Critique of Theory, Research, and Applications. London: Sage Publications, 2001.
32. Jex SM, Beehr TA. Emerging theoretical and methodological issues in the study of work-rekated stress. In: Cooper CL, Dewe PJ, O'Driscoll MP. Organizational Stress, A Review and Critique of Theory, Research, and Applications. London: Sage Publications, 2001.
33. Karasek R. Job demands, job decision latitude, and mental strain: Implications for job redesign. In: Cooper CL, Dewe PJ, O'Driscoll MP. Organizational Stress, A Review and Critique of Theory, Research, and Applications. London: Sage Publications, 2001.
34. Karasek R, Theorell T. Healthy Work. New York: Basic Books, 1990.
35. McDowell I, Newell C. MEASURING HEALTH: A Guide to Rating Scales and Questionnaires. Second Edition. New York: Oxford University Press, 1996: 225-237.
36. McManus JC, Winder BC, Gordon D. The causal links between stress and burnout in a longitudinal study of UK doctors. Lancet 2002; 359: 2089-90.
37. Graham J, Potts HWW, Ramirez AJ. Stress and burnout in doctors. Lancet 2002; 360: 1975-1976.
38. Shimizu T, Hiro M, Mishima N, Nagata S. Job Stress among Japanese Full-Time Occupational Physicians. J Occup Health 2002; 44: 348-354.
39. Deschamps F, Paganon-Badinier I, Marchand A, Merle C. Sources and Assessment of Occupational Stress in the Police. J Occup Health 2003; 45: 358-364.
40. Greiner B, Krause N, Ragland D, Fisher J. Occupational stressors and hypertension: a multi-method study using observer-based job analysis and self reports in urban transit operators. Soc Sci Med 2004; 59: 1081-1094.
41. Kunz-Erbrecht SR, Kirschbaum C, Steptoe A. Work stress, socioeconomic status and neuroendocrine activation over the working day. Soc Sci Med 2004; 58: 1523-1530.
42. Nakamura H, Nagase H, Yoshida M, Ogino K. Natural Killer (NK) Cell Activity and NK Cell Subset in Workers with a Tendency of Burnout. J

Psychosomatic Res. 1999; 46: 6: 569-578.

43. Nakata A, Haratani T, Takahashi M, Kawakami N, Arito H, Kobayashi F et al. Job stress, social support, and prevalence of insomnia in a population of Japanese daytime workers. Soc Sci Med 2004; 59: 1719-1730.
44. Nasermoaddeli A, Sekine M, Hamanishi S, Kagamimori S. Job Strain and Sleep Quality in Japanese Civil Servants with Special Reference to Sense of Coherence. J Occup Health 2002; 44: 337-342.
45. Peter R, Siegrist J. CHRONIC WORK STRESS, SICKNESS ABSENCE, AND HYPERTENSION IN MIDDLE MANAGERS: GENERAL OR SPECIFIC SOCIOLOGICAL EXPLANATIONS? Soc Sci Med 1997; 45: 1111-1120.
46. Heslop P, Smith GD, Metcalfe C, Maeleod J, Hart C. Change in job satisfaction, and its association with self-reported stress, cardiovascular risk factors and mortality. Soc Sci Med 2002; 54: 1589-1599.
47. Shimazu A, Okada Y, Sakamoto M, Miura M. Effects of Stress Management Program for Teachers in Japan: A Pilot Study. J Occup Health 2003; 45: 202-208.
48. Shimizu T, Horiguchi I, Kato T, Nagata S. Relationship between an Interview-Based Health Promotion Program and Cardiovascular Risk Factors at Japanese Companies. J Occup Health 2004; 46: 205-212.
49. Goldberg D, Williams P. A user's guide to the General Health Questionnaire. Windsor: NFER-Nelson, 1991.
50. Nelson D, Hitt MA. Employed women and stress: Implication for enhancing women's mental health in the workplace. In: Quick JC, Murphy LR, Hurrell J. Stress and Well-being at Work: Assessments and Interventions for Occupational Health. Washington DC: American Psychol Assoc., 1992.
51. Baker E, Israel B, Schurman S. ROLE OF CONTROL AND SUPPORT IN OCCUPATIONAL STRESS: AN INTEGRATED MODEL. Soc Sci Med 1996; 43(7): 1145-1159.
52. Jonge J, Bosma H, Peter R, Siegrist J. Job strain, effort-reward imbalance and employee well-being: a large-scale cross sectional study. Soc Sci Med 2000; 50: 1317-1327
53. Phillips DR. Health and Health Care in the Third World. First edition. London.

Longman Development Studies, 1990.

54. Vegchel N, Jonge J, Bosma H, Schaufeli W. Reviewing the effort-reward imbalance model: drawing up the balance of 45 empirical studies. Soc Sci Med 2005; 60(5): 1117-1131.
55. Tsutsumi A. Japanese version ERI Questionnaire manual 2004 March. [PDFfile].
Available from: http://eisei.med.okayama-u.ac.jp/jstress/ERI/index.htm (in Japanese).
56. Siegrist J, Marmot M. Health inequalities and the psychosocial environment-two scientific challenges. Soc Sci Med 2004; 58: 1463-1473.
57. Tsutsumi A, Nagami M, Morimoto K, Matoba T. Responsiveness of measures in the effort-reward imbalance questionnaire to organizational changes. A validation study. Journal of Psychosomatic Research 2002; 52: 249-256.
58. Tsutsumi A, Kawakami N. A review of empirical studies on the model of effort-reward imbalance at work: reducing occupational stress by implementing a new theory. Soc Sci Med 2004; 59: 2335-2359.

APPENDIX

APPENDIX
QUESTIONNAIRES

JOB STRAIN AMONG PHYSICIANS IN BANGKOK, THAILAND

Part 1 (17 items)

Please check or write your answer which most applies to you.

Please answer ALL questions.

1. How old are you now? …… years old.

2. What is your gender? ☐Male ☐Female

3. What is your position in this hospital?
   ☐Internship ☐Resident ☐Senior Resident ☐Chief ☐Director
   ☐Others. (Specify) ……..

4. What is your specialty in your job? (e.g. general practice, surgery, etc.)
   (Specify) ……

5. What is your marital status?
   ☐Single ☐Married ☐Divorced ☐Widowed ☐Separated

6. If married, what kind of job of your spouse has?
   ☐Government ☐Private employee ☐Self employee
   ☐Others. Specify……

7. How many children (own children or adopted ones) do you have?
   Boy…….. Girl…….

8. How much is your monthly income approximately? ……Baht/month.

9. How many years have you worked in this hospital?

……years

10. Apart from your main employment with the hospital, do you have any other jobs? ☐Yes. ☐No.

11. In total, how many hours per day do you spend working for? ……. Hours

12. Do you have a hobby, in which you are engrossed? ☐Yes. ☐No.

13. Have you had enough leisure time in recent two months? ☐Yes. ☐No.

14. How do you rate your general health status?

☐Good ☐Poor ☐Uncertain

15. Where is your hometown?

☐Bangkok ☐Up-country

↳ ☐in the city ☐village

16. Where and who are you living with?

☐Parents' house ☐Apartment ☐Own house ☐Others (specify)……

17. How long does it take to your office from home?

…….. minuets

Part 2 (12 items)

Please answer ALL the questions on the following pages simply by putting check sign which you think most applies to you.

1. Over the past two weeks, have you been able to concentrate on whatever you're doing?

☐Better than usual, ☐Same as usual, ☐Less than usual, ☐Much less than usual.

2. Have you lost much sleep over worry during past two weeks?

☐ Not at all, ☐N o more than usual, ☐Rather more than usual, ☐Much more than usual.

3. In the past two weeks, have you felt that you are playing a useful part in things?

☐ More so than usual, ☐Same as usual, ☐Less useful than usual, ☐Much less useful.

4. Have you felt capable of making decisions about things over the past two weeks?

☐ More so than usual, ☐Same as usual, ☐Less so than usual, ☐Much less capable.

5. Have you felt constantly under strain in the past two weeks?

☐ Not at all, ☐N o more than usual, ☐Rather more than usual, ☐Much more than usual.

6. Over the past two weeks, have you felt you couldn't overcome your difficulties?

☐ Not at all, ☐N o more than usual, ☐Rather more than usual, ☐Much more than usual.

7. Have you been able to enjoy your normal day-to-day activities in the past two weeks?

☐ More so than usual, ☐Same as usual, ☐Less so than usual, ☐Much less than usual.

8. In the past two weeks, have you been able to face up to your problems?

☐ More so than usual, ☐Same as usual, ☐Less able than usual, ☐Much less able

9. Have you been feeling depressed in the past two weeks?

☐ Not at all, ☐N o more than usual, ☐Rather more than usual, ☐Much more than usual.

10. Have you been losing confidence in yourself lately?

☐ Not at all, ☐N o more than usual, ☐Rather more than usual, ☐Much more than usual.

11. Have you been thinking of yourself as a worthless person lately?

☐ Not at all, ☐N o more than usual, ☐Rather more than usual, ☐Much more than usual.

12. In the past two weeks, have you been feeling reasonably happy, all things considered?

☐More so than usual, ☐About same as usual, ☐Less so than usual, ☐Much less than usual.

Part 3 (17 items)

For each of the following statements, please indicate whether you agree or disagree with it. If you agree or disagree, please also indicate how much you are generally distressed by this situation (1 = I am not at all distressed; 2 = I am somewhat distressed; 3 = I am distressed; 4 = I am very distressed). Thank you for answering ALL statements.

1. I have constant time pressure due to a heavy workload.

☐Disagree

☐Agree

☐1. I am not at all distressed. ☐2. I am somewhat distressed.

☐3. I am distressed. ☐4. I am very distressed.

2. I have many interruptions and disturbances in my job.

☐Disagree

☐Agree

☐1. I am not at all distressed. ☐2. I am somewhat distressed.

☐3. I am distressed. ☐4. I am very distressed.

3. I have a lot of responsibility in my job.

☐Disagree

☐Agree

☐1. I am not at all distressed. ☐2. I am somewhat distressed.

☐3. I am distressed. ☐4. I am very distressed.

4. I am often pressured to work overtime.

☐Disagree

☐Agree

☐1. I am not at all distressed. ☐2. I am somewhat distressed.

☐3. I am distressed. ☐4. I am very distressed.

5. My job is physically demanding.

☐Disagree

☐Agree

☐1. I am not at all distressed. ☐2. I am somewhat distressed.

☐3. I am distressed. ☐4. I am very distressed.

6. Over the past few years, my job has become more and more demanding.

☐Disagree

☐Agree

☐1. I am not at all distressed. ☐2. I am somewhat distressed.

☐3. I am distressed. ☐4. I am very distressed.

7. I receive the respect I deserve from my supervisors.

☐Agree

☐Disagree

☐1. I am not at all distressed. ☐2. I am somewhat distressed.

☐3. I am distressed. ☐4. I am very distressed.

8. I receive the respect I deserve from my colleagues.

☐Agree

☐Disagree

☐1. I am not at all distressed. ☐2. I am somewhat distressed.

☐3. I am distressed. ☐4. I am very distressed.

9. I experience adequate support in difficult situations.

☐Agree

☐Disagree

☐1. I am not at all distressed. ☐2. I am somewhat distressed.

☐3. I am distressed. ☐4. I am very distressed.

10. I am treated unfairly at work.

☐Disagree

☐Agree

☐1. I am not at all distressed. ☐2. I am somewhat distressed.

☐3. I am distressed. ☐4. I am very distressed.

11. I have experienced or I expect to experience an undesirable change in my work situation.

☐Disagree

☐Agree

☐1. I am not at all distressed. ☐2. I am somewhat distressed.

☐3. I am distressed. ☐4. I am very distressed.

12. My job promotion prospects are poor.

☐Disagree

☐Agree

☐1. I am not at all distressed. ☐2. I am somewhat distressed.

☐3. I am distressed. ☐4. I am very distressed.

13. My job security is poor.

☐Disagree

☐Agree

☐1. I am not at all distressed. ☐2. I am somewhat distressed.

☐3. I am distressed. ☐4. I am very distressed.

14. My current occupational position adequately reflects my education and training.

☐Agree

☐Disagree

☐1. I am not at all distressed. ☐2. I am somewhat distressed.

☐3. I am distressed. ☐4. I am very distressed.

15. Considering all my efforts and achievements, I receive the respect and prestige I deserve at work.

☐Agree

☐Disagree

☐1. I am not at all distressed. ☐2. I am somewhat distressed.

☐3. I am distressed. ☐4. I am very distressed.

16. Considering all my efforts and achievements, my work prospects are adequate.

☐Agree

☐Disagree

☐1. I am not at all distressed. ☐2. I am somewhat distressed.

☐3. I am distressed. ☐4. I am very distressed.

17. Considering all my efforts and achievements, my salary / income is adequate.

☐Agree

☐Disagree

☐1. I am not at all distressed. ☐2. I am somewhat distressed.

☐3. I am distressed. ☐4. I am very distressed.

Part 4 (6 items)

Please indicate to what extent (1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree) you personally agree or disagree with these statements.

1. I get easily overwhelmed by time pressures at work.

☐1. Strongly Disagree ☐2. Disagree ☐3. Agree ☐4. Strongly Agree

2. As soon as I get up in the morning, I start thinking about work problems.

☐1. Strongly Disagree ☐2. Disagree ☐3. Agree ☐4. Strongly Agree

3. When I get home, I can easily relax and 'switch off' work.

☐1. Strongly Disagree ☐2. Disagree ☐3. Agree ☐4. Strongly Agree

4. People close to me say I sacrifice too much for my job.

☐1. Strongly Disagree ☐2. Disagree ☐3. Agree ☐4. Strongly Agree

5. Work rarely lets me go, it is still on my mind when I go to bed.

☐1. Strongly Disagree ☐2. Disagree ☐3. Agree ☐4. Strongly Agree

6. If I postpone something that I was supposed to do today, I'll have trouble sleeping at night.

☐1. Strongly Disagree ☐2. Disagree ☐3. Agree ☐4. Strongly Agree

Part 5 (4 items)

Please indicate to what extent (1 = Not at all; 2 = Slightly; 3 = Moderately; 4 = Quit a bit; and 5 = Extremely) you personally agree or disagree with these statements.

1.Overall, have you had stress with your job?

☐1.Not at all ☐2.Slightly ☐3.Moderately ☐4.Quite a bit ☐5.Extremely

2.Overall, are you satisfied with your job?

☐1.Not at all ☐2.Slightly ☐3.Moderately ☐4.Quite a bit ☐5.Extremely

3.Has Tsunami disaster in Thailand affected your routine work?

☐1.Not at all ☐2.Slightly ☐3.Moderately ☐4.Quite a bit ☐5.Extremely

4.If so, have you had stress with Tsunami disaster regarding your job?

☐1.Not at all ☐2.Slightly ☐3.Moderately ☐4.Quite a bit ☐5.Extremely

This is the end of all questions.

Thank you very much for your cooperation.

BIOGRAPHY

NAME	Mikio Tsukamoto
DATE OF BIRTH	December 11, 1958
PLACE OF BIRTH	Tokyo, Japan
INSTITUTION ATTENDED	Nagasaki University, School of Medicine, Japan
PRESENT POSITION	Medical Doctor Department of Surgery II, School of Medicine, Nagasaki University, Japan