

**THE IMPACT OF THE PHYSICAL AND
PSYCHOLOGICAL STRESS ON EMPLOYEES'
PRODUCTIVITY: A STUDY ON AN ENGINEERING
CONSULTANCY FIRM, MALAYSIA**

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Abstract

Work stress is a pervasive problem that is faced by many organisations. This research seeks to examine the effects of work stress on the productivity of employees. This study is focus on knowledge workers in an engineering consultancy firm. Results of the research have revealed that work stress do have tremendous impact on the physical and psychological wellbeing of employees, which in turn results in lower productivity. The research revealed that high level of stress is pervasive amongst the employees of the company and is primarily caused by job task and management style. While the firm has taken some initiatives to address work stress, this was found to be not sufficiently effective. Hence, the management should revisit its measures and direct its efforts to deal with the primary job stressors in order to improve productivity.

Keywords: consultancy firm, physical stress, psychological stress, employees' productivity, job stressors

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1.0 Introduction

Work stress amongst employees is a pervasive issue that affects companies of all sizes. International bodies such as International Labor Organization (ILO) and World Health Organization (WHO) has recognized the harmful effect of stress. WHO defines work stress as the “response that people may have when presented with work demands and pressures, that are not matched to their knowledge and abilities, and which challenges their ability to cope” (WHO, 2015). In addition, stress can lead to psychological problems, absenteeism, physical health problems, poor attention, etc; which in turn causing workplace accident and poor productivity (Soylu, 2007).

In a survey commissioned by the American Psychological Association within the United States, almost two-thirds of the respondents had attributed work as the main source of stress (American Psychological Association, 2014). Indeed, it is not possible to entirely eliminate work-related stress. Conversely, some may even argue that stress at the work place is necessary for satisfactory performance. A research highlights that peak performance is attained when people encounter pressure at moderate level (Ong, 2015). Moreover, United States claims that 550 million working days are lost annually, due to physical and psychological related stress absenteeism in the workplace (Danna & Griffin, 1999; Soylu, 2007).

As work related stress has wide ranging implications for both the employees and their companies, hence, companies should give due attention to address this problem.

1.1 Statement of the problem

P. H. &Neh Corp. Ltd. is incepted since 1976, it is an engineering consultancy company offering services in the field of civil, structural, mechanical and electrical engineering to the private and public sector as well as turnkey contractors. The services provided by the company covers all aspects of a construction project, such as design, contract administration, construction management and post construction stage.

The company faces an on-going challenge to achieve consistency in the productivity of their employees. The company's staff resources are organised to project teams based on the required skillsets. Project teams may face tight project deadlines, demanding clients, complex and challenging engineering projects, unforeseen problems, which crop up during the project, changes in project scope midway during a project, and the need to deal with multiple

stakeholders on a project. These situations lead to work stress that could adversely impact productivity and delivery of quality of service.

1.2 Purpose of the Research

This research seeks to achieve the following:

- a. To identify key factors that have led to employee work stress at P. H. &Neh Corp. Ltd;
- b. To examine the physical effects of work stress on the productivity of the employees;
- c. To examine the psychological effects of work stress on the productivity of the employees.

1.3 Significance of the Research

The findings of this research would provide the top management of P. H. &Neh Corp Ltd., a better understanding on the key factors that have led to work stress amongst its employees, include stress from the physical and psychological aspect. These insights would be useful for the identification of a more targeted and result driven approach, to better management of employees' work stress and productivity.

In fact, the study on occupational stress related to professional consulting firm is scarce (Block, 2011). To date, little research has been focused on consultancy professional with regards to self-perceptions of occupational stress. In the case of Malaysia, majority of the researches related to occupational stress examine for the need of medical sciences, rare to have this topic related to the needs of employees, or link it to the management efficiency. The findings in this research will provide some insights about major determinants of organizational stress; the implications of work stress from the physical and psychological aspects of employees, as well as its implication to productivity. Again, this findings may be relevant to other firms with similar work context.

1.4 Conceptual framework

The independent variables are the job stressors, which include: the design of work tasks; management style; interpersonal relationships and job roles. As for dependent variables, they are the physical and psychological stress; followed by the productivity.

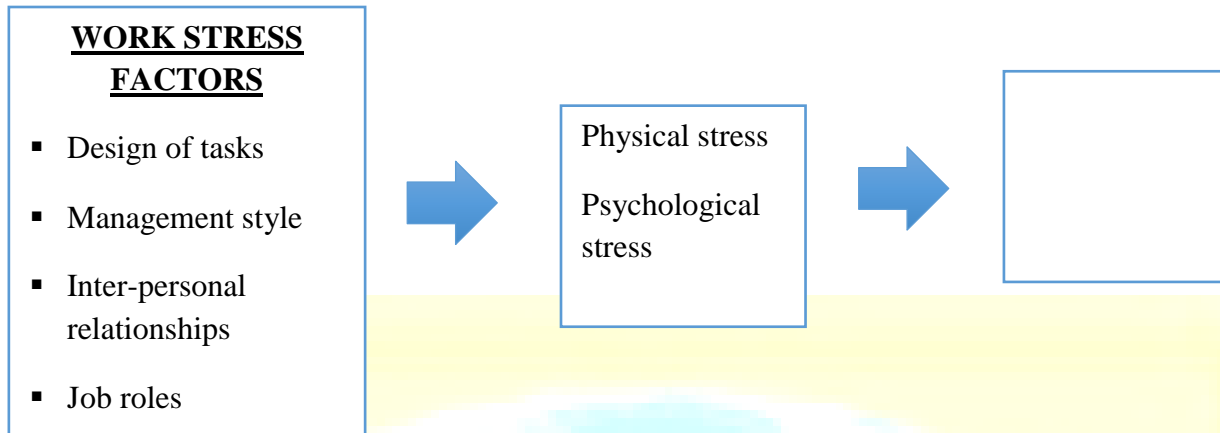


Diagram 1: Research framework of the relationship between work stress and the productivity of employees

Source: amended from the National Institute for Occupational Safety & Health, Department of Health & Human Services, US; American Psychological Association on physical & psychological effects of work stress.

2.0 Literature review

Work related stress is a harmful physical and emotional response that is triggered when there is a mismatch between the job and the capabilities, resources or needs of the employee (National Institute for Occupational Safety and Health, 2015). Numerous studies have been conducted on this topic, as it is a problem not confined to specific companies, industry or country.

2.1 Demand and control model

The demand and control model seeks to explain the implication psychological demand and job control on work stress (Karasek, 1979); Griep et al. (2015). Psychological demand includes pace and intensity of work, whereas, job control refers to worker's autonomy and job skills requirements.

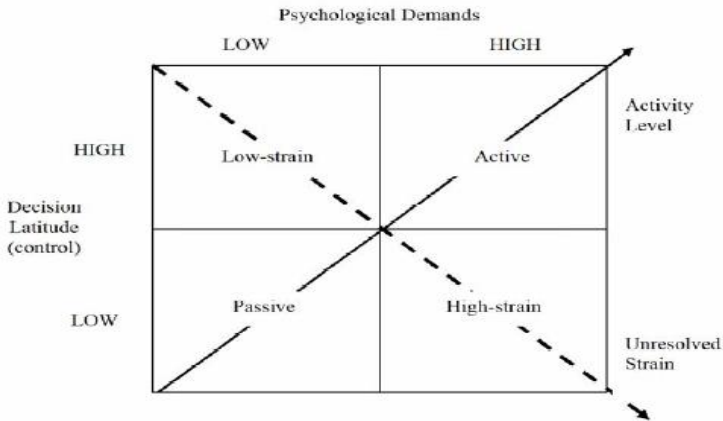


Diagram 2.1: Karasek's demand and control model

In the context of active jobs, job control is high and psychological demand is high as well. This model explains that the high psychological demands would not adversely affect an employee, as she or he would have the freedom to decide on the most appropriate course of actions to address problems faced.

Under the quadrant of passive jobs, both job demands and job controls are low. Consequently, such jobs are not challenging and may result in deterioration of an employee's performance over time. It further reduces the self-efficacy of employees, resulting in more passive lifestyles (Griep et al., 2015).

Under the quadrant of low strain jobs, the degree of job control is high while psychological job demands are low. This situation would result in employees who would face low stress levels, and consequently would be happier than the average worker.

As for the quadrant of high-strain jobs, the model implied that employees who are faced with high demands, but who has little control over the circumstances of the job, are more likely to feel stress and experience dissatisfaction, over employees who do.

2.2 Inverted-U model

The inverted-U model is developed by Robert Yerkes and John Dodson, it seeks to show the relationship between pressures with performance. This model states that peak performance is achieved when moderate pressure is applied on people. This statement indicates the positive inputs of stress, it is supported by research of Grant (2008); Hastings & Horne (2004); Bono & Illies (2006).

However, as more pressure is applied, performance would start to decrease, sometimes rapidly as people experience exhaustion, health problems and burnout. Where pressure is low, people may be complacent and performance would be low (Mindtools.com, 2015).

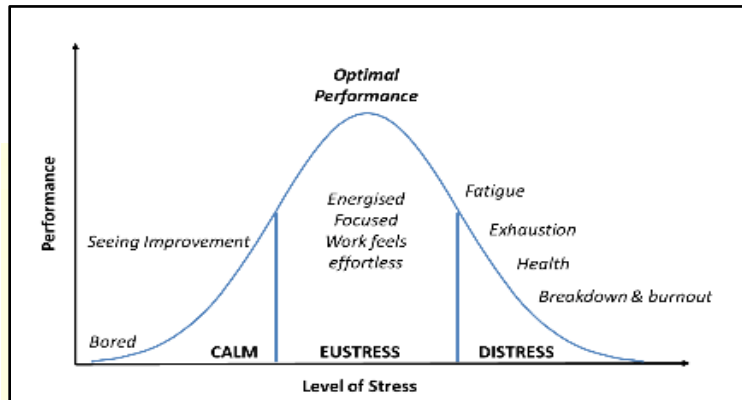


Diagram 2.2: The inverted-U model

2.3 Causes of stress

The National Institute for Occupational Safety and Health of the United States, Department of Health and Human Services has identified 5 work conditions which may result in work stress. These 5 stressful work conditions, the job stressors are stated in Table 1 below.

Job stressors	Description
The design of tasks	Heavy workload, infrequent rest breaks, long work hours, shift work, hectic and routine tasks that have little inherent meaning, non-utilisation of worker's skills and minimal sense of control over allocated tasks
Management style	Lack of participation by workers in decision making, poor communication in the organization, lack of family-friendly policies.
Inter-personal relationships	Poor social environment, lack of support or help from colleagues or supervisors.
Job roles	Conflicting or uncertain job expectations, or too much responsibilities
Career concerns	Job insecurity and lack of opportunities for career growth, advancement or promotion.
Environmental conditions	Unpleasant or dangerous physical conditions such as crowding, noise, air pollution or ergonomic problems.

Table 1: Work conditions which may lead to stress as identified by The National Institute for Occupational Safety and Health; Department of Health and Human Services, US.

In one empirical research conducted on employees of private sector universities, it was concluded that the main causes of stress are workload, role conflict and inadequate monetary rewards (Ali et al., 2014). Some employees view handling multiple assignments at the same time or undertaking conflicting job roles as challenging, and this creates stress in them. In addition, employees who are not fairly remunerated in accordance with their efforts may also end up feeling stress.

In a survey commissioned by the American Psychological Association in 2008, the survey respondents have identified the top stressors, by order of importance to be low salaries, heavy workload, lack of opportunity for growth and advancement, unrealistic job expectations and job insecurity (American Psychological Association, 2008).

2.4 Productivity

Essentially, productivity is about the efficient use of resources, such as capital, labour, land and materials to produce goods and services. Achieving high productivity would mean achieving greater output, in terms of quantity and quality with the same amount of resources.

From the review of a literature, it is observed that an organization's productivity is affected by internal and external factors (Prokopenko, 1987). Internal factors are those that are within the control of the organization and may be further categorised between hard and soft factors. Examples of hard factors are product, plant and equipment, technology and materials and energy.

On the other hand, soft factors include people; organization and systems; work methods; and management style. The literature suggests that where the people element is concerned, the quality of the workforce and quality of working life can result in better productivity.

2.5 Effects of work stress on employees' productivity

Stress at work is not only detrimental to the employee but also to the company. Many research and studies have concluded that there is a relationship between work stress and employees' health which in turn affects productivity.

At the individual level, stress can adversely affect a person physically. Some studies have also found that work stress also increases the risks of serious health ailments such as cardiovascular disease and musculoskeletal disorders (Stellman, 1998). Physical stress is an

external force in a worker's environment, which manifests a temporary or permanent physical impairment. Signs and symptoms of stress including headache, various bodily aches, gritting, infection, low immune system, etc. (The American Institute of Stress, 2015).

Many studies on the association of job stress and health behaviour have been conducted in Europe or North America, which indicated the relationship between these 2 variables (Griep et al., 2015; Kamran et al., 2015). In a survey conducted by the American Psychological Association, 53% of the respondents report that they have the problem of fatigue, 52% report that they face sleeplessness, 47% have headache, 35% have stomach upset while 34% encountered muscular tension due to work stress (American Psychological Association, 2008).

In addition, stress has psychological effects on individuals too. Psychological stress or emotional stress is defined as a psychological process between an individual and a situation (Cox, 1993). For instance, stress can affect a person's mood and sleep (National Institute for Occupational Safety and Health, 2015). Mental stress could result in poor concentration, bad temper, low morale and job dissatisfaction at work (Health Advocate Inc., 2015). Apart from that, other signs and symptoms of psychological stress include: frustration, hostility, depression, wild mood swing, overreaction to petty annoyance, etc (The American Institute of Stress, 2015). The findings of Golkar et al., (2014) reveal that chronic work stress has an impaired ability to modulate emotion and further weakens the limbic system. Other relevant studies include Dewe et al. (2012) and Mann (2004), which highlight the negative influences of stress on the emotion of employees. Other studies have found that stressful work conditions would also result in increased absenteeism, sloppiness and intention to leave the organisation, all of which would impact productivity at work (National Institute for Occupational Safety and Health, 2015).

Stress could also lead to "presenteeism", a term which is used to describe employees who come to work, but are not as productive as they should due to illness, stress or other distractions (Willingham, 2008). In one survey, the results indicated that 60% of employees had experienced lower productivity due to stress while at work (Health Advocate Inc., 2015).

A survey conducted by Tower Watson, a professional services company, has concluded that high levels of stress would lead to lower productivity (Towers, 2014). Results of the survey have shown that highly stressed employees are taking an average of 4.6 days of medical leave per year, as compared to 2.6 days for employees who experienced low stress.

3.0 Methodology

3.1 Research Design

The key objective of this research project is to study the relationship between factors of work stress and their impact on employees' productivity, so that effective measures could be identified to address them. Hence, this research is essentially an explanatory study. Each independent variable will be evaluated if it contributes to physical and psychological stress, and hence affected the productivity of employees.

3.2 Data Collection

The target of this research would be the employees of P H&NehSdn. Bhd. which consists of 8 directors, 6 associate directors, 48 engineers and another 183 employees. Out of 245 staff, our survey would cover 70 staff which would constitute to almost one third of the total population. The survey was conducted based on convenience sampling technique as this technique is cost effective and less time consuming as compared to other methods. The findings were analysed using Partial least squares analysis (PLS), which is suitable for identifying factors that are significant in contributing specific outcomes. Also, it is suitable for smaller sample size research.

3.3 Questionnaire format

Section A of the questionnaire is about the personal details of the respondents, include: gender, age, marital status, job position, and years of employment.

As for section B is about stress factors, the factors which contribute to work stress. Issues which take into considerations include: design of job tasks; management style; inter-personal relationship & job roles.

Under the categories of job tasks' design, employees are to rate their perceptions on factors contributing to stress: long working hours; tight deadlines; routine & boring tasks; complex tasks; mismatch of skills, less autonomy over job tasks; lack of manpower; and lastly heavy workload. As for the management style, questions include lack of participation in decision making; and poor two-way communications between management and employees. While under the category of interpersonal relationship, questions are related to poor working relationship between supervisor and colleagues; dealing with difficult clients.

Another category of questions under the design of work is job roles, 3 questions are used: conflicting roles at work; many different roles in work; job ambiguities.

Section C is related to work stress on physical effect and psychological effect. The physical effects including various health problems; bodily discomfort and aching; exhaustion and fatigue. As for the psychological effects, there are sleep problems; mood swings; anxiety & depression; lack of concentration. Section D is about job productivity, which is evaluated through the perceptions of employees, these include: absenteeism; level of productivity; missed deadline; errors in work; job dissatisfaction.

4.0 Findings and discussion

4.1 Demographic factors

Based on the questionnaire, majority of the employees in this firm are male, 34% of them are technical expertise in engineering, as for the rest, majority are officers in the firm. 55% of them are young adults whom are less than 40 years old.

4.2. Job stressors and physical stress

The diagram 3.1 below shows the job stressors: job tasks; management style; interpersonal relationship & job roles which causing physical stress and further influence the productivity. 77.9% of the variance of the physical stress of employees is explained by job task; management style; relationship & job roles, hence, affecting the employees' productivity.

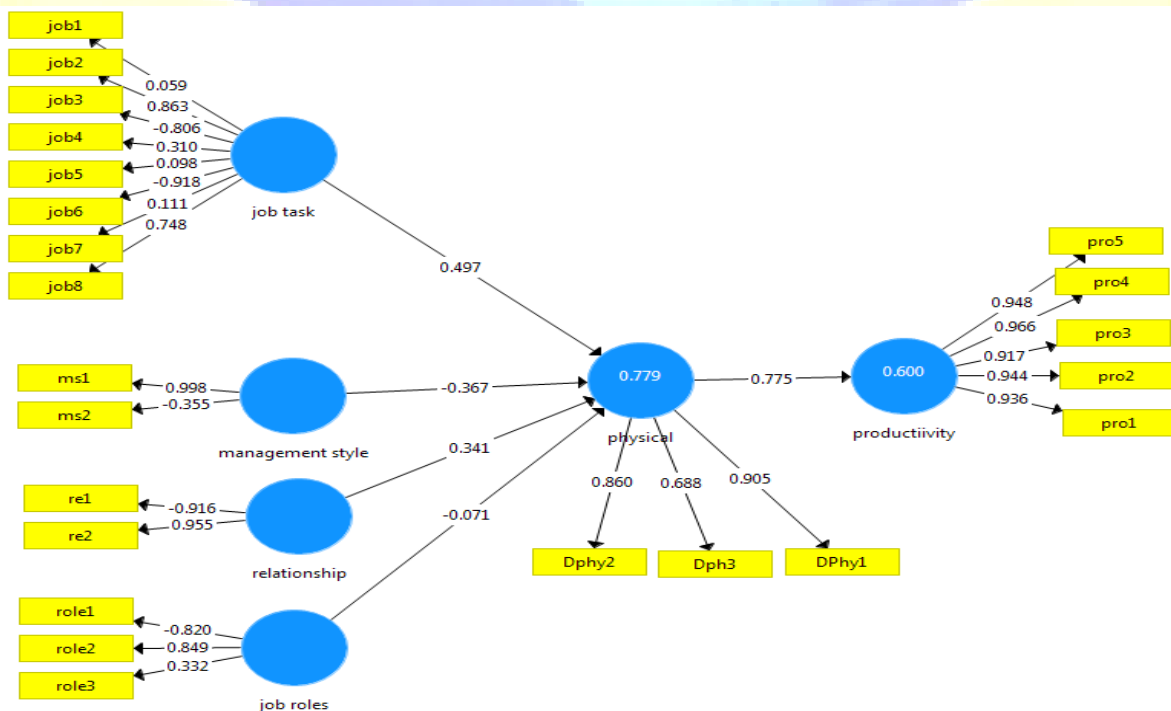


Diagram 3.1: The significant relationship between job stressors and physical stress; and the effect of physical stress on productivity

4.3 Path Co-efficient value and physical stress

Based on the findings, job roles (p value > 0.05 , table 2) is not significant in causing physical stress of employees in the workplace. Items in the job roles include: conflicting responsibilities; handling too many roles; unclear job roles. Among these items, unclear job roles is the most insignificant in causing physical stress. In this context, it indicates that the firm has done proper allocation of work tasks; there is less problem with conflicting work task, employees do not handling too many roles at the same time; also, there is less ambiguities in work tasks.

As for the rest of the factors, they are all significant in causing employees' physical stress. This means that the firm management may need to look into area such as design of job task, these include long working hours; tight deadlines; routine and boring task; complex task, less utilize of skills; less control over allocated tasks and lack of manpower. The significant of heavy workload in causing physical stress is aligned with the results of American Psychological Association (2008). Under this group of questions, routine and boring task has negative outer loading (diagram 3.1), indicating it is the most insignificant factor contributing physical stress. This also reveals that workload in the firm is not routine and boring but challenging.

As for the management style, it is significant in causing physical stress, however, it is not so much of the problem of poor communication (outer loading= -0.355 , diagram 3.1), but rather due to a result of lack of participation in decision making. These findings support the explanation of the Karasek's demand and control model (1979), which highlights that employees who face high job demand but have little control over the circumstances of the job, are more likely to feel stress.

Next job stressor is relationship factor, this stress is not due to poor relationship in the workplace but caused by dealing with difficult clients. Difficult demand of clients causing physical stress can be the results of the nature of work, the project teams or engineers need frequent site visits and meeting clients, which in the long run causing physical fatigue. This stress may persist in the long run, as demanding clients are uncontrollable factors for the management. The management may give more support to the staff in order to fulfil clients' demand and reduce this stress level.

	Original Sample (O)	Sample Mean (M)	Standard Error (STERR)	T Statistics (O/STERR)	P Values
job roles -> physical	-0.071	-0.079	0.150	0.474	0.636
job task -> physical	0.497	0.443	0.214	2.321	0.021
management -> physical	-0.367	-0.352	0.078	4.707	0.000
physical -> productivity	0.775	0.779	0.034	22.934	0.000
relationship -> physical	0.341	0.332	0.107	3.183	0.002

Table 2: Path coefficient vales

4.5 Job stressors and psychological stress

Based on the results from diagram 3.2, 81% of variance of the psychological stress of employees is explained by job task; management style, relationship and job role. Thus, this psychological stress further influence the employees' productivity.

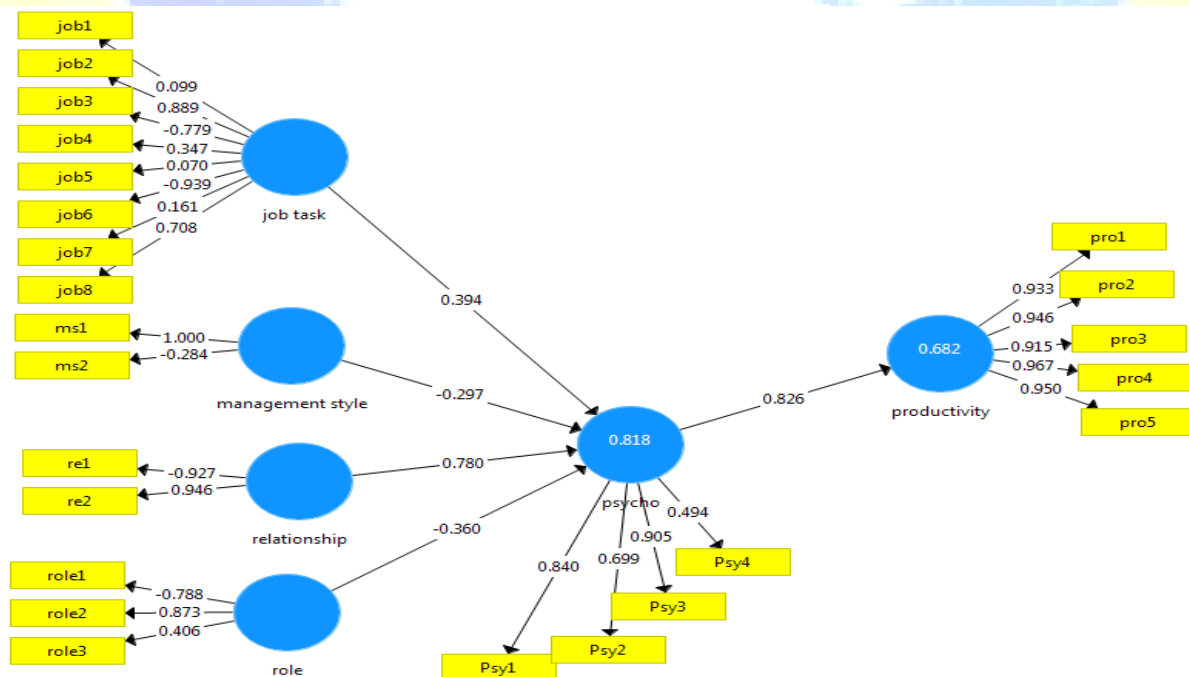


Diagram 3.2: The significant relationship between job stressors and psychological stress; and the effect of psychological stress on productivity.

4.6 Path Coefficient value and psychological stress

Based on the findings of table 3, relationship (p value > 0.05) is not significant in contributing psychological stress. The outer loading values of the 2 items show that the relationship stress is more from dealing with difficult and demanding clients, less from the poor relationship within the workplace. The result is contrast with factors causing physical stress, which indicates that relationship is significant in causing stress. However, both outer loading values (from diagram 3.1 & 3.2) show that major relationship stress is due to the difficult and demanding clients, not due to poor relationship within the workplace. Overall, the impact of these demand clients is causing more of physical stress and has little impact on psychological stress.

Again, job role (p value > 0.05) is not significant in the psychological stress, this is align with the results for physical stress. Again, it is proven that the firm has had appropriate arrangement of workload, no ambiguity in the job roles etc. Hence, the physical and psychological stress of employees are not cause by job role.

As for another 2 factors, design of job task and management style, both are significant in contributing psychological stress. The results are similar to the physical stress. As for job task, similar to the case of physical stress, the psychological stress is caused by long hours; tight deadlines; complex tasks; not utilizing skill, low level of control over allocated task and lack of manpower, but not caused by routine and boring job (outer loading = -0.779, diagram 3.2). Using the interpretation of Inverted U model, employees are in the state of distress, which is not healthy to the firm and productivity.

Lastly, for the problem of management style, results of employees rating show that this problem is due to lack of participation in decision making, not poor communication (outer loading = -0.284, diagram 3.2), this is similar with the previous results for physical stress.

	Original Sample (O)	Sample Mean (M)	Standard Error (STERR)	T Statistics (O/STERR)	P Values
job task -> psycho	0.394	0.380	0.118	3.342	0.001

management style ->						
psycho	-0.297	-0.291	0.068	4.350	0.000	
psycho -> productivity	0.826	0.831	0.039	21.009	0.000	
relationship -> psycho	0.780	0.643	0.442	1.764	0.078	
role -> psycho	-0.360	-0.240	0.291	1.238	0.216	

Table 3: path coefficient values

4.8 Physical stress and psychological stress on productivity

In order to examine the impact of physical and psychological effect on employees' productivity, it is found that 75% of the productivity is explained by the variation of physical stress and the psychological stress, with employees give higher rating to psychological stress (0.634). Therefore, psychological stress has more impact on the productivity of employees.

The syndromes of physical stress re: health problems like headache, high blood, heart ailments; body discomfort such as muscle pains, muscle tension; exhaustion and fatigue. The findings confirm the statements of Stellman (1998); Griep, et al. (2015), National Institute for Occupational Safety and Health (2015) & Health Advocate Inc. (2015), which show the impact of physical stress and health problems.

While the effects of psychological stress include: sleep problems; mood swings; anxiety and depression; and lack of concentration. Again, this result support the report of the American Psychological Association (2008).

The effect of both physical stress and psychological stress on productivity are indicated in various ways, such as: absenteeism; less productive; missed deadlines; poor concentration; job dissatisfaction and intention to leave. Among them, poor concentration resulting in errors is most impactful, followed job dissatisfaction and intention to leave; next is less productive at work. Productivity level is less affected by absenteeism and missed deadline. These findings further strengthen the conclusion made by Towers (2014) that high levels of stress would lead to lower productivity.

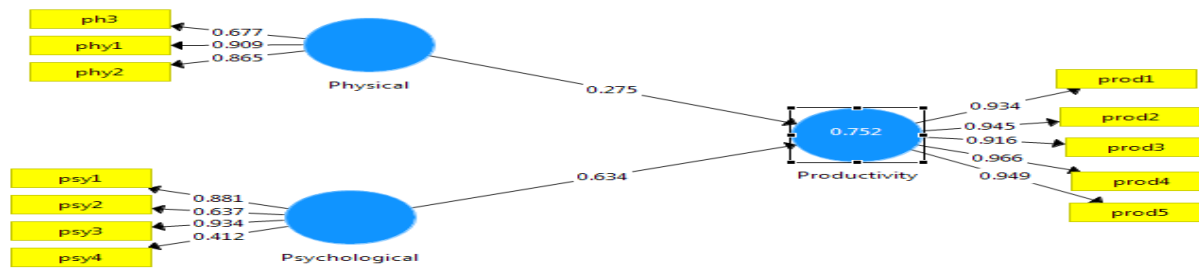


Diagram 4: The impact of physical and psychological stress on productivity

5.0 Conclusion

Based on the results, it is clear that job task; management style and relationship are significant in causing physical job stress but not job role. As regarding the psychological job stress, job task, management style are significant in contributing psychological stress.

For both physical and psychological stress related to job tasks, include: long working hours; tight deadlines; routine & boring tasks; complex tasks; mismatch of skills, less autonomy over job tasks; lack of manpower; and lastly heavy workload. The management may need to restructure the workloads, review realistic deadlines or have more empowerment to staff.

As for problem related to management style, it is due to lack of participation in decision making. As most of the core employees are knowledge workers, not low skill workers, therefore, autonomy can be the key factor which brings in job enrichment and satisfaction.

In a nutshell, the top management needs to look into those controllable internal factors in order to reduce the physical and psychological stress of work, so that they are fit to go for the long haul for greater organizational achievements.

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