

**STRESS AND JOB SATISFACTION AMONG SCHOOL
TEACHERS IN MALAYSIA: THE ASSOCIATION WITH
THE PSYCHOSOCIAL WORKING ENVIRONMENT AND
ORGANIZATIONAL JUSTICE**

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**FACULTY OF MEDICINE
UNIVERSITY OF MALAYA
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**STRESS AND JOB SATISFACTION AMONG SCHOOL TEACHERS IN
MALAYSIA: THE ASSOCIATION WITH THE PSYCHOSOCIAL WORKING
ENVIRONMENT AND ORGANIZATIONAL JUSTICE**

ABSTRACT

Teachers have been observed to be experiencing an increased incidence of work-related stress in Malaysia. Specific psychosocial working environment (PWE) characteristics and fairness at work in the teaching profession are such pertinent factors that evolve into negative sequelae of work such as stress and job dissatisfaction. Growing disillusionment in the teaching profession has gradually manifested into various somatic and psychological symptoms. Issues pertaining to psychological wellbeing have been found to influence productivity. Schools have reported teachers' dissatisfaction with their jobs, and stress-induced illnesses often affect work performance, job commitment and dedication. Teachers work closely with the nation's youth, thus are imperative in passing positivity. PWE and organizational justice (OJ) models are widely used work-stress models and have been found to be consistent in predicting physical, mental and psychological health outcomes in varying occupational groups, including teachers. This study was conducted in three phases. Phase I included the psychometric assessment of the translated Malay language version of the Organizational Justice Scale Questionnaire (OJSQ) and Job Satisfaction Survey (JSS) questionnaire. It consisted of assessments in terms of internal consistency, test-retest reliability and Exploratory Factor Analysis of the translated instruments. Phase II was the assessment of PWE and OJ incidence, risk factors and distribution in relation to stress and job satisfaction amongst school teachers in Selangor. Participants were recruited in a cross-sectional manner via multi-stage random sampling of teachers serving in regular public secondary and vernacular schools. Analyses included weightage imputations, descriptive statistics, complex-

sample and multivariable fixed-effects analysis. Phase III consisted of an objective subsample analysis to determine the correlation between salivary cortisol and secretory IgA with stress. Phase I: The Malay language version of the OJSQ and JSS demonstrated good psychometric properties and a reliable instrument among Malay speaking teachers. Phase II: Approximately 38.6% of teachers reported high job strain. Although higher job demand (JD) and lower job control (JC), social support (SS) and OJ were associated with higher stress scores, no statistical significance was found ($p > 0.05$). Higher JC ($p < 0.05$, 95% CI 145.4-151.94), SS ($p < 0.001$, 95% CI 151.6, 159.4) and higher OJ scores (PJ: $p < 0.05$, 95% CI 145.3, 152.4; IJ: $p < 0.05$, 95% CI 147, 154.5; DJ: $p < 0.05$, 95% CI 148.1, 156.1) was however associated with higher levels of job satisfaction. After correcting for socio-demographic and working characteristics, higher JC ($\beta = 6.16$, 95% CI 1.82, 10.5), SS ($\beta = 13.22$, 95% CI 8.45, 17.9.5), PJ ($\beta = 2.21$, 95% CI 1.79, 4.21), IJ ($\beta = 3.85$, 95% CI 2.32, 7.38) and DJ ($\beta = 10.14$, 95% CI 6.5, 13.74) were significantly associated with higher job satisfaction. Phase III: No correlation was reported between salivary stress biomarkers and stress scores. Higher levels of JC, SS and OJ factors correlated with higher levels of job satisfaction and although no statistical significance was found, there was however, a correlation between PWE and OJ factors with stress scores. These findings should be proposed the Ministry of Education's Occupational Safety and Health committee to set precedence in improving teachers' working environment and conditions via continuity of research and intervention modules.

Keywords: psychosocial working environment, organizational justice, stress, job satisfaction, Malaysian public school teachers

**TEKANAN DAN KEPUASAN KERJA DI KALANGAN GURU-GURU
SEKOLAH MALAYSIA: HUBUNGKAIT DENGAN PERSEKITARAN KERJA
PSIKOSOSIAL DAN KEADILAN ORGANISASI**

ABSTRAK

Guru-guru diperhatikan mengalami peningkatan kejadian tekanan berkaitan dengan pekerjaan di Malaysia. Ciri-ciri khusus PWE dan keadilan di tempat kerja dalam profesion pengajaran adalah faktor-faktor penting yang berubah menjadi sekuel kerja yang negatif seperti tekanan dan ketidakpuasan pekerjaan. Peningkatan kekecewaan dalam profesion pengajaran, kurang sokongan dan pengiktirafan yang sewajarnya terhadap sumbangan guru telah secara beransur-ansur dimanipulasikan kepada pelbagai gejala somatik dan psikologi. Isu yang berkaitan dengan kesejahteraan psikologi sering dikaitkan dengan produktiviti. Sekolah telah melaporkan ketidakpuasan guru terhadap pekerjaan mereka, dan penyakit yang disebabkan oleh tekanan kerap memberi kesan kepada prestasi kerja, komitmen kerja dan dedikasi. Guru-guru bekerja rapat dengan pelajar dan generasi masa depan negara kita. Ini adalah penting untuk menerapkan nilai-nilai yang diharapkan daripada pendidik. Persekitaran kerja psikososial dan model keadilan organisasi kini digunakan secara meluas dalam model tekanan kerja dan didapati konsisten dalam meramalkan kesihatan fizikal, mental dan psikologi dalam pelbagai kumpulan pekerjaan, termasuk guru. Kajian ini dijalankan dalam tiga fasa. Fasa I adalah penilaian psikometrik versi Bahasa Melayu yang diterjemahkan daripada soal-selidik Skala Keadilan Organisasi (OJSQ) dan Soal Selidik Kepuasan Kerja (JSS). Ia terdiri daripada penilaian dari segi konsistensi dalaman, kebolehpercayaan ujian-ujian dan analisis *Exploratory Factor Analysis*. Fasa II adalah penilaian kejadian PWE dan OJ, faktor risiko dan edaran yang berkaitan dengan tekanan dan kepuasan kerja di kalangan guru sekolah di Selangor. Pensampelan responden dijalankan secara

multistage random sampling dari sekolah-sekolah menengah dan vernakular awam, dan direkrut secara keratan-rentas. Analisa termasuk statistik deskriptif, analisis kompleks dan analisis multivariat. Fasa III adalah analisis sub-sampel objektif untuk menentukan korelasi antara kortisol air liur dan secretory IgA dengan tekanan. Fasa I: Versi Bahasa Melayu OJSQ dan JSS menunjukkan sifat psikometrik yang baik dan instrumen ini boleh digunakan di kalangan guru-guru yang berbahasa Melayu. Fasa II: Kira-kira 38.6% guru melaporkan tekanan pekerjaan yang tinggi. Walaupun JD yang lebih tinggi, JC yang lebih rendah, SS yang rendah dan OJ yang rendah melaporkan tahap tekanan yang lebih tinggi, tiada kepentingan statistik dijumpai ($p > 0.05$). Walaubagaimanapun, JC yang lebih tinggi ($p < 0.05$ 95% CI 145.4-151.94), SS ($p < 0.001$ 95% CI 151.6, 159.4) dan tahap faktor-faktor keadilan organisasi (PJ: $p < 0.05$, 95% CI 145.3, 152.4; IJ: $p < 0.05$ 95% CI 147, 154.5; DJ: $p < 0.05$ 95% CI 148.1, 156.1) dikaitkan dengan kepuasan tahap kerja yang lebih tinggi. Selepas penyesuaian dibuat untuk ciri-ciri sosio-demografi dan kerja, skor JC yang lebih tinggi (β - 6.16, 95% CI 1.82, 10.5), SS (β - 13.22, 95% CI 8.45, 17.9.5), IJ (β - 3.85, 95% CI 1.32, 7.38) and DJ (β - 10.14, 95% CI 6.5, 13.74) secara signifikan dikaitkan dengan kepuasan kerja yang lebih tinggi. Tahap III: Tiada hubungan kait didapati diantara biomarker air liur dengan skor tekanan. Tahap lebih tinggi JC, SS dan OJ menunjukkan tahap kepuasan kerja yang lebih tinggi. Walaupun tidak mempunyai korelasi statistik, namun kaitan antara faktor-faktor PWE dan OJ dengan skor tekanan dapat ditunjukkan. Penemuan ini harus dikemukakan kepada Jawatankuasa Keselamatan dan Kesihatan Pekerjaan Kementerian Pendidikan Malaysia untuk menerapkan keutamaan dalam meningkatkan persekitaran kerja guru dan keadaan tempat kerja yang lebih kondusif melalui penyelidikan dan intervensi berterusan.

Kata kunci: persekitaran kerja psikososial, keadilan organisasi, tekanan, kepuasan kerja, guru-guru sekolah awam Malaysia

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LIST OF SYMBOLS AND ABBREVIATIONS

CVD	:	Cardiovascular Disease
DASS 21	:	Depression, Anxiety Stress Scale 21
DI	:	Distributive Justice
DL	:	Decision Latitude
DOSH	:	Department of Occupational Safety and Health
EFA	:	Exploratory Factor Analysis
EFA	:	Exploratory Factor Analysis
HPA	:	Hypothalamus-Pituitary-Adrenal
IgA	:	Immunoglobulin A
IJ	:	Interactional Justice
JC	:	Job Control
JCQ	:	Job Content Questionnaire
JD	:	Job Demand
JDC	:	Job Demand-Control
JDCS	:	Job Demand-Control-Support
JSS	:	Job Satisfaction Survey Questionnaire
MOE	:	Ministry of Education, Malaysia
MOH	:	Ministry Of Health, Malaysia
OJ	:	Organizational Justice
OJSQ	:	Organizational Justice Scale Questionnaire
OR	:	Odds Ratio
OSH	:	Occupational Safety and Health
PAF	:	Principal Axis Factoring
PJ	:	Procedural Justice

PPP	:	Postgraduate Research Grant
PWE	:	Psychosocial Working Environment
SD	:	Standard Deviation
SS	:	Social Support
UK	:	United Kingdom
USA	:	United States of America
WHO	:	World Health Organization

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CHAPTER 1: INTRODUCTION

1.1 Study overview

Stress has been given different definitions over time. It was originally perceived as environmentally-induced pressure or strain within a person. Recent definitions describe stress “as an interaction between a person towards a situation.” which encompasses physical and psychological conditions that result in an individual’s inability to handle the pressures and demands of a certain situation, thus, stress is experienced more by a group of individuals as compared to others. It can undermine the achievement of both the individual and an organization (Michie, 2002). Signs of acute stress can be seen in the change of one’s behaviour, feelings and even physical symptoms. Chronic stress, however, has been proven to cause cardiovascular, neuroendocrine, autonomic and even immunologic changes causing physical and mental consequences (Michie, 2002).

1.1.1 Occupational stress

Teaching is a stressful profession, and teacher-stress leading to burnout is fast becoming a global epidemic. Teacher attrition has been linked to stress, burnout and job dissatisfaction, and it is estimated that between 40-50% of teachers in the United States quit teaching within their first five years of service (R. Ingersoll, Merrill, & Stuckey, 2014). A recent survey conducted among teachers in the United States was reported to be at a 25-year low, with approximately 39% of the respondents claiming to be unhappy at their jobs (McCarthy, Lambert, & Fitchett, 2018). This scenario is similar to Asia and Europe as well. In India, nearly 50% of teachers have reported suffering from burnout (Shukla & Trivedi, 2008), and 83% of teachers in the United Kingdom have reported occupational-related stress, whilst 67% of them claim that their work has impaired their physical and mental wellbeing (Precey, 2015). Studies have also reported a strong linkage between teacher stress with self-efficacy and job satisfaction. Using structural

equation modelling, Nathaniel et al., (2016) reported a significant association between classroom efficacy with manifestations of stress and job dissatisfaction.

As compared to other professions, teachers have been shown to have higher levels of exhaustion, cynicism and burnout (Hakanen, Bakker, & Demerouti, 2005; Maslach, Schaufeli, & Leiter, 2001). Research has also reported a strong association between physical, psychological and behavioural health problems amongst teachers, which include more medical consultations (Jarvis & Woodrow, 2005) and medication usage (Wilson, 2002). Teachers' working conditions and their health needs have thus been recognised, resulting in increasing amount of studies conducted in Europe and North America the past few decades (Flak, Jankord, Solomon, Krause, & Herman, 2011). Illnesses, early retirement and absenteeism amongst teachers and their impact on teacher's health have become important areas of study. Most frequent stressors include teaching, role conflict or ambiguity, contradictory objectives and expectations, high workload, time pressure, prolonged periods of peak workload and multiple playing multiple roles at schools (S. Bradley, Green, & Leeves, 2007).

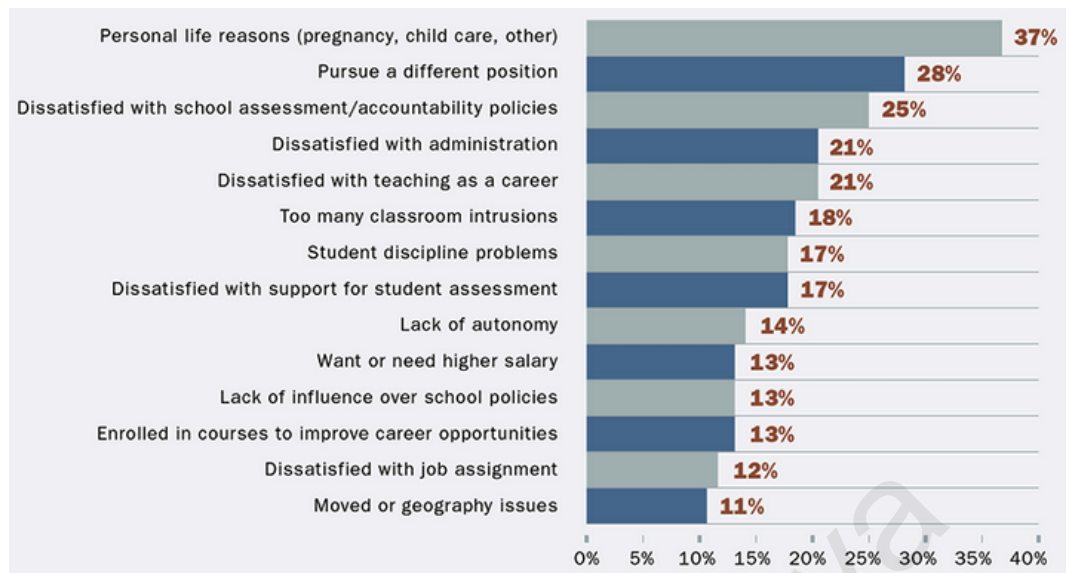
This research intends to investigate whether psychosocial working environment which comprises job demand, job control and social support factors; and organizational justice which comprises procedural, interactional and distributive justice factors, have any implication on the psychological well-being of teachers. Wellbeing does not necessarily relate solely to tangible factors such as promotion, increment or recognition, but also having positive feelings and perceptions at the workplace which results in a more dynamic and progressive workforce.

1.1.2 Psychosocial working environment, stress symptoms and teachers

Teachers have been observed to be experiencing an increased incidence of work-related stress worldwide (Abel & Sewell, 1999; Pithers & Soden, 1998; Zurlo, Pes, &

Siegrist, 2010). The approximated burden of occupational stress in teachers has not only been substantial in absolute terms but also relative in comparison to other professions. A study conducted comprising twenty-six occupational groups and 25,000 workers ranked teaching as the second most stressful occupation (Feuerhahn, Kühnel, & Kudielka, 2012). If work stress is not adequately addressed, teachers are at higher risk of developing physical & mental health issues which include emotional exhaustion, depersonalization, reduced sense of personal accomplishment and even burnout (Burke, 1997; Maslach et al., 2001).

From a public health perspective, specific psychosocial working characteristics of the teaching profession such as the environment and factors pertinent to it should be explored to address the sequelae of work-related stress. Insights such as these are needed to ensure targeted intervention development to improve the psychosocial working environment and subsequently reduce the risk of ill health and poor organizational outcome. Psychosocial working environment and organizational justice models are widely used work-stress models and have been found to be consistent in predicting physical, mental and psychological health outcomes in varying occupational groups (Colquitt, 2001; Siegrist, 2001) focusing on demand-control and fairness perception at the workplace (Colquitt, 2001).



Source: LPI analysis of the Teacher Follow-up Survey (TFS), 2013, School and staffing surveys, National Centre for Education Statistics (USA)

Figure 1.1: Why teachers leave teaching

1.1.3 Psychosocial working environment of teachers in Malaysia

Teachers in Malaysia appear to be having increased stress due to mounting work pressures concomitant with other stressors at work. Greater demands and pressures of constantly varying government initiatives, for example the inter-changing decision to teach in either English or Malay language, introduction of new subjects, the introduction of the good conduct agreement which the monitoring of teachers' performance, problems of social inclusion, disruptive pupils, lack of respect for the profession, teachers held in low esteem and public expectation that teachers be responsible for solving social and moral problems, and the constant upgrading of an expanding knowledge base are amongst the many issues that have caused stress and tension within the teaching profession in Malaysia today. This has in one way or the other caused teachers to doubt themselves and with the addition of role ambiguity, leading to decreased personal and professional satisfaction. Over time, there has been growing disillusionment of the teaching profession and lack of support and due recognition of teachers' contributions to society in Malaysia. The psychosocial impact has caused the gradual manifestation of various somatic symptoms. A recent study has revealed the

prevalence of stress amongst teachers in Malaysia at 20.2% (Masilamani et al., 2012). Tables below show the breakdown of teachers in Malaysian public primary and secondary schools by teacher's qualification, gender and age group and the number of teachers by gender from 2015 till 2017 (Table 1.1 to Table 1.6).

This study offers an insight into understanding a teacher's psychological well-being in the collectivistic culture of Malaysia which comprises different ethnicities and socio-cultural background. The research will also reveal the possible similarities between Malaysia and western research findings to allow generalization despite the varying cultural differences by looking into the effectiveness of dominant wellbeings prediction models such as the Job-Demand-Control-Support (JDCS) models and Organizational Justice (OJ) models.

Table 1.1: Number of Malaysian public secondary school teachers according to the type of schools and qualification (2017)

Type of schools	Graduate	Non-graduate	Untrained	Total
Regular	152,527	4905	382	157,814
Fully residential	4,131	33	65	4,229
Religious	3,628	84	130	3,842
Technical	551	7	5	563
Vocational college	7,089	686	301	8,076
Special education	383	8	7	398
Special model	1,004	46	3	1,053
Sports	345	13	4	362
Art	142	3	26	171
Government-aided religious schools (GARS)	4,939	704	985	6,628
Bimbingan jalinan kasih	16	0	0	16
Total	174,755	6,489	1,908	183,152

- Note: 1. Graduates: – Teachers who have a degree
 2. Non – graduates: – Teachers who have a teaching certificate/diploma
 3. Untrained: – include contract teachers
 4. Data do not include :
 (i) Teachers seconded to semi-government agencies, state religious schools and other agencies
 (ii) Teachers on study leave with full – pay or half pay; and
 (iii) Teachers in common posts pending redeployment

Table 1.2: Number and percentage of Malaysian public secondary school teachers by gender (2015-2017)

Gender	2015*	%	2016*	%	2017*	%
Male	54,858	30.06	54,527	30.03	54,454	29.73
Female	127,616	69.94	127,071	69.97	128,698	70.27
Total	182,474	100.00	181,598	100.00	183,152	100.00

Table 1.3: Number of Malaysian public secondary school teachers by gender and age group (2017)

Age group	<25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	≥60	Total
Male	114	4,964	8,170	7,669	8,027	10,044	10,242	5,159	65	54,454
Female	443	14,242	28,141	23,471	20,482	20,879	15,829	5,190	21	128,698
Total	557	19,206	36,311	31,140	28,509	30,923	26,071	10,349	86	183,152

(Source: Educational Data Sector, Division of Planning & Research, Ministry of Education Malaysia, Putrajaya)

**Data as of 31st January 2017

Table 1.4: Number of Malaysian public primary school teachers according to the type of schools and qualification (2017)

Type of schools	Graduate	Non-graduate	Untrained	Total
National	122,012	67,497	337	189,846
National Chinese vernacular	20,944	16,272	658	37,874
National Tamil vernacular	5,031	4,174	40	9,245
Special education	582	239	13	834
Government-aided religious schools - Primary (GARS)	635	546	98	1,279
Special model (Primary)	210	62	3	275
Total	149,414	88,790	1,149	239,353

Table 1.5: Number and percentage of Malaysian public primary school teachers by gender (2015-2017)

Gender	2015*	%	2016*	%	2017*	%
Male	72,198	29.90	71,826	29.88	71,349	29.81
Female	169,339	70.10	168,593	70.12	168,004	70.19
Total	241,537	100.00	240,419	100.00	239,353	100.00

Table 1.6: Number of Malaysian public secondary school teachers by gender and age group (2017)

Age group	<25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	≥ 60	Total
Male	1,633	7,938	10,800	15,315	10,848	10,754	9,287	4,762	12	71,349
Female	2,524	16,342	30,398	38,921	28,382	24,769	20,207	6,455	6	168,004
Total	4,157	24,280	41,198	54,236	39,230	35,523	29,494	11,217	18	239,353

(Source: Educational Data Sector, Division of Planning & Research, Ministry of Education Malaysia, Putrajaya)

**Data as of 31st January 2017

1.2 Problem statement

Following the explanations above and gaps identified from previous studies, this study will answer the question “Does psychosocial working environment and organizational justice have an impact on stress and job satisfaction among public school teachers?” The focus is to assess cause and the magnitude of stress and job satisfaction experienced by public school teachers in the state of Selangor Darul Ehsan.

The breakdown of PICO element is as follows:

- P – School Teachers In Selangor
- I / C (Exposure) – Psychosocial work environment and organizational justice factors
- O – Stress and job satisfaction

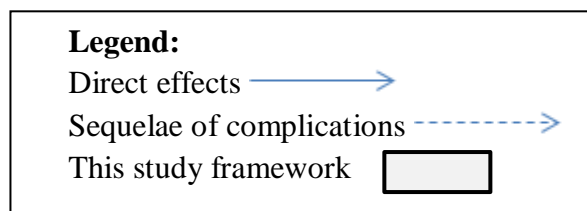
Stressfulness of the teaching profession has been widely recognized, and literature has shown that the steady increase in research on stress amongst educators over the past two decades has not dwindled. However, little is known about occupational stress in developing nations such as ours due to the preponderance of studies done in developed countries where conditions are dissimilar and not generalizable.

Numerous researchers have supported the association between stress and the teaching profession (Austin, Shah, & Muncer, 2005; Billehøj, 2007; Gluschkoff et al., 2016; Hassard, Teoh, & Cox, 2016; Kinnunen & Salo, 1994; Kyriacou & Chien, 2009;

Nathaniel et al., 2016), and this increase has been related to social change and the complexity of education (Kyriacou, 1987). As a result, there is an increased parental, communal, supervisory and personal expectation for outcomes and standards of education, with relevance to the ever-changing curriculum. Concerns regarding a teacher's stress levels stem from mounting evidence that prolonged stress affects both physical and mental health which consequently impairs teaching quality, reduce a teacher's job satisfaction, causes absenteeism and reduce their effectiveness with pupils (Kyriacou, 1987). Teachers suffering from chronic stress and low energy levels eventually run the risk of burnout (Antoniou, Polychroni, & Vlachakis, 2006; Blase, 1985; Oberle & Schonert-Reichl, 2016; Steinhardt, Smith Jaggars, Faulk, & Gloria, 2011).

1.3 Conceptual framework

This study investigates the association between factors of psychosocial working environment, organizational justice, socio-demographic characteristics and working characteristics of public school teachers; and their implications on stress and job satisfaction, in addition to the correlation between perceived stress and salivary stress biomarkers (Figure 1.2).



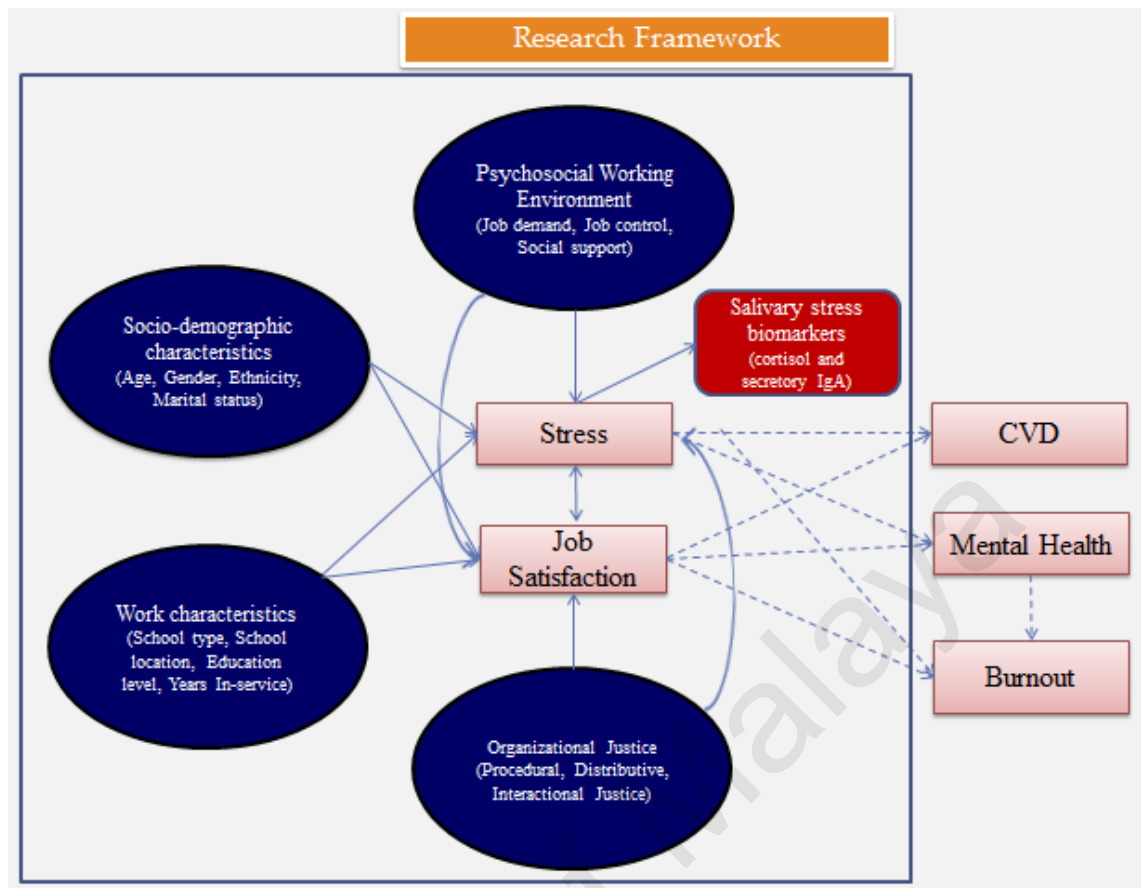


Figure 1.2: Conceptual framework of this study

1.4 Rationale of study

Teachers form one of the largest occupational groups in Malaysia, as with other developing and first world countries (Ministry of Education Malaysia, 2017a). Studies have indicated that schools in current times have very stressful environments stemming from various exposures (Austin et al., 2005; Jepson & Forrest, 2006). Teachers experience higher stress levels as compared to other professional groups due to their unique operating circumstances and multiple responsibilities (Klassen & Chiu, 2010). In addition to educating students, they are also expected to ensure safe and healthy surroundings for students; communicate and work in-line with parents and other stakeholders, data logging and document administration, organize and oversee co-curricular activities and many others (Comber & Nixon, 2009) This inevitably causes role ambiguity resulting in high stress with job dissatisfaction, which then leads to

negative psychological outcome such as depression and burnout (Gluschkoff et al., 2016; Steinhardt et al., 2011). According to the WHO, depression is the leading causes of disability worldwide, with an estimated 350 million people affected by it (Marcus, Yasamy, Van Ommeren, Chisholm, & Saxena, 2012). In a large multinational survey conducted in 27 European countries in 2010, one in twenty employees is reported to have some form of stress-induced mental illness, with depression being one of them (Marcus et al., 2012). Such comprehensive studies on mental health are lacking in Asian settings, even among vulnerable occupations such as teaching (Idris & Dollard, 2011; Sadhra, Beach, Aw, & Sheikh-Ahmed, 2001).

Issues pertaining to psychological wellbeing are often linked to productivity. Schools have reported teachers' dissatisfaction with their job and stress-induced illness often affects work performance, job commitment and dedication. Teachers work hand in hand with children – the future generation of our nation. As such, it is imperative that they pass on good values, positivity, encouragement and all other good practices expected of educators. Teachers have a heavy bearing on young minds. They ought to inspire, instil ingenuity and act as role models for their students. Stressful working conditions hamper this immensely. In the education sector, teachers are pressed hard to meet society's ever-growing expectations. Yet, the health of teachers are often neglected, especially mental health and psychological well-being (Seibt, Matz, Hegewald, & Spitzer, 2012). As such, issues relating to occupational stress are highlighted as it is construed as a threat to both good quality of life and teaching quality (Buckley, Schneider, & Shang, 2005).

Psychological wellbeing at work is viewed in-tandem with various aspects of work such as job scope and work-load, coworkers and employee expectations. Stress has been proven to correlate closely with working environment (Idris & Dollard, 2011; Voltmer, Kieschke, Schwappach, Wirsching, & Spahn, 2008). Teachers spend approximately

one-third of their time daily at the workplace (approximately 7-8 hours/day), hence psychosocial working environment is regarded as a major factor affecting occupational stress amongst teachers. A supportive psychosocial environment is crucial to ensure that educators feel comfortable, motivated and altruistic. From an epidemiological aspect, psychosocial working environment has been associated with psychological well-being. Studies among various occupational groups have proven this association and established that high levels of job demands, low job control and poor social support are associated with poor psychological well-being, which in turn leads to stress, anxiety and depression (Aust, Rugulies, Skakon, Scherzer, & Jensen, 2007; Hidaka, 2012). In addition to that, recent studies have also shown a positive correlation between hypertension, cardiovascular diseases and other metabolic syndromes to stress (Dewa, Lin, Koehoorn, & Goldner, 2007; Ziemka, Klimberg, & Marcinkowski, 2013). As such, more in-depth research is warranted to gauge the influence of stress at the workplace especially among teachers in Malaysian schools.

1.5 Research questions

- i. Are psychosocial work environment factors (job demand, job control and social support) associated with stress and/or job satisfaction amongst public school teachers?
- ii. Are organizational justice factors (procedural, interactional and distributive justice) associated with stress and/or job satisfaction amongst public school teachers?
- iii. Does socio-demographic and/or working characteristics influence stress and/or job satisfaction amongst public school teachers?
- iv. Are there any correlations between salivary cortisol and salivary secretory IgA with stress amongst school teachers?

1.6 Research hypothesis

1.6.1 Null hypothesis

There are no associations between psychosocial working environment and organizational justice with stress and job satisfaction among public school teachers.

1.6.2 Alternative hypothesis

There is an association between psychosocial working environment and organizational justice with stress and job satisfaction among public school teachers.

1.7 Study objectives

1.7.1 General objective

To determine the associations between psychosocial working environment and organizational justice with stress and job satisfaction among public school teachers.

1.7.2 Specific Objectives

- a) **Phase I: Psychometric and Reliability Testing of the translated Malay language version of the OJSQ and JSS.**

To assess the psychometric properties of the translated self-reported Malay language version of the Organizational Justice Scale Questionnaire (OJSQ) and the Job Satisfaction Survey Questionnaire (JSS) among school teachers.

- b) **Phase II: Association of psychosocial working environment and organizational justice with stress and job satisfaction among public school teachers.**

- i. To determine the level of perceived psychosocial working environment and organizational justice exposures among public school teachers.
- ii. To determine the level of perceived stress and job satisfaction factors among public school teachers.
- iii. To determine the association of psychosocial working environment and organizational justice exposures on stress among public school teachers.

- iv. To determine the association of psychosocial working environment and organizational justice exposures on job satisfaction among public school teachers.

c) Phase III: Analysis of salivary stress biomarkers

To determine the correlation between perceived stress with salivary stress biomarkers (salivary cortisol and salivary secretory IgA) among public school teachers.

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CHAPTER 2: LITERATURE REVIEW

A literature review was conducted from materials collected from journals, articles, newspaper clips and research findings taken from the University of Malaya library databases, Ministry of Health and Ministry of Education Malaysia website and published papers, as well as from private researchers.

2.1 Research background and overview

Understanding a teacher's psychological wellbeing completely is an arduous task since the quantum of influence is vast. This research investigates two perspectives of the working environment at schools, which is the psychosocial aspects of the working environment, and fairness at the workplace. Using relevant literature and empirical studies on this subject matter, all the mentioned factors will be studied in combination to see its effect on teacher's psychological well-being.

Occupational safety has been an essential element since the 1960's in the world and in Malaysia. Its importance has since been elevated when the United Nations general assembly designated 28th April as World Day for Safety and Health at Work in 2015.

The International Labour Organization (ILO) states that 'a national occupational safety and health culture is one in which the right to a safe and healthy working environment is respected at all levels, where governments, employers and workers actively participate in securing a safe and healthy working environment through a system of defined rights, responsibilities and

duties, and where the highest priority is accorded to the principle of prevention' (International Labour Organization, 2015).

The key element in this statement is 'promoting a culture of prevention' within various organizations. As most studies continue showing links between working conditions and health status, findings have also arisen regarding psychosocial risk hazards such as poor work-life balance and high work pressure exposures with both physical and mental wellbeing. The emergence of laws pertaining to occupational safety in this country such as the Factories and Machinery Act 1967 (Act 139), Factories and Machinery Act 1967 (Amendment 2006) (Act A1268) and Occupational Safety and Health Act 1994 (Act 154) in Malaysia are proof of this. However, all these laws, legislation, regulation and even guidelines were solely concentrated towards physical safety.

Psychological needs have always played second fiddle to physical needs, but this has taken a different role over time. Global evolution into modernization has brought about a new pattern of illnesses with psychological bearing such as stress, depression and anxiety as life becomes more hectic, challenging and competitive. A recent study conducted in Europe reported strong associations between stressful psychosocial working environment with depressive symptoms among primary school teachers (Gluschkoff et al., 2016), in line with other studies which have shown positive association between psychosocial working environment with mental health problems among teachers (Hakanen, Bakker, & Schaufeli, 2006; Steinhardt et al., 2011).

Studies looking into psychosocial hazards started to take centre stage from the 20th and 21st century with the inception of researches by Joseph Zohar and Maureen Dollard. These studies investigate in-depth the psychosocial factors of stress, including psychosocial working environments (An et al., 2016; M. Dollard, Skinner, Tuckey, & Bailey, 2007; Maureen F Dollard & Bakker, 2010; Gluschkoff et al., 2016; Jacobs, Hellman, Markowitz, & Wuest, 2013b; Marmot, Siegrist, Theorell, & Feeney, 2006; Zohar, 1995) and organizational justice (Cohen-Charash & Spector, 2001; Colquitt, Greenberg, & Zapata-Phelan, 2005; Russell Cropanzano, Rupp, Mohler, & Schminke, 2001; Elovainio, Kivimäki, & Vahtera, 2002; Fatimah, Amiraa, & Halim, 2011; Greenberg & Colquitt, 2013) and its combinations (Ibrahim & Ohtsuka, 2013).

The vast majority of studies on psychosocial risk hazards and psychological work factors are based on the theoretical backbone of the Job Demand-Control (JDC) model (Karasek Jr, 1979) and the Job-Demand-Control-Support (JDCS) models (Karasek & Theorell, 1992). Other models which examine other varying angles of psychosocial risk hazards are the Job Demand-Resources model by Demerouti et al., (2007) and Effort-Reward Imbalance by Siegrist (2005). Of late, however, studies which have been expanding the range of risk factors beyond the commonly studied models stated are currently being incorporated. This includes emphasizing both risk and protective factors at work to preserve physical and mental wellbeing (Finne, Christensen, & Knardahl, 2014).

In this study, perceived fairness at the workplace is examined using the organizational justice model developed by Robert Moorman (1991)

comprising interactional, distributive and procedural justice components (Moorman, 1991) to assess unjust practices at the workplace, and worker's psychological bearing, when combined with the conventional JDCS model.

Psychological well-being adversely affects an employee and their workplace when left neglected, and researchers in Europe have taken precedence over it (Behson, Eddy, & Lorenzet, 2000; Engeland et al., 2016; Gilbreath & Benson, 2004; Kline, 2013; N. P. Podsakoff, Whiting, Podsakoff, & Blume, 2009; Thibaut & Walker, 1975). Findings may, however, differ depending on the type of target population in individualistic societies such as Eastern Europe or Scandinavian nations, or pluralistic nations, for example, the United States, United Kingdom and Australia (Liu, Spector, & Shi, 2008).

Some authors have argued that satisfaction or strain in life is indicated by the sense of general wellbeing (Burns, Butterworth, & Anstey, 2016; Hakanen & Schaufeli, 2012). In this context, it is assumed that job satisfaction equates to happiness at work with the absence of negative effects such as emotional exhaustion. A study by Rijswijk et al. reported that occupational wellbeing has higher weightage as compared to social, psychosomatic and cognitive wellbeing (Van Rijswijk, Bekker, Rutte, & Croon, 2004). Parasuraman and Simmers (2001) defined job satisfaction as an individual's affection towards their job. It is the pleasurable state of emotion, arising from achievement at the workplace, with positive feelings towards work. Job satisfaction has also been found to correlate positively with psychological well-being (Brough, O'Driscoll, & Kalliath, 2005).

2.2 Psychosocial working environment (PWE)

2.2.1 Definition of psychosocial working environment

Psychosocial working environment (PWE) is defined as the interpersonal and social interaction that influences a person's behaviour and development at their workplace (Jacobs et al., 2013b). It refers to the working climate which emphasizes respect for work-life balance, effort-reward balance and employee feedback encouragement, with no tolerance for harassment or discrimination. Research has shown detrimental effects of stress and its effects on psychological health due to a non-conducive psychosocial working environment (Gluschkoff et al., 2016). A meta-analysis has reported a strong association between psychosocial work environment and sickness absence, and an increase in job control and support levels has had favourable outcomes in improving health status, general well-being, and improving productivity (North, Syme, Feeney, Shipley, & Marmot, 1996). Another meta-analysis has reported significant findings linking high job demands and low job control (high strain job) as risk factors for mental disorders (Stephen Stansfeld & Candy, 2006).

Extensive researches undertaken in the European Union on occupational stress have shown that psychosocial hazards severely damages working environment at schools and the main stressors are those grouped together as mentioned in the previous paragraph (Billehøj, 2007). These stressors lead to depressive symptoms, burnout, stress, job dissatisfaction, absenteeism and even diseases of metabolic syndromes (Marmot et al., 2006).

When exposed to psychosocial hazards at the workplace, stress reactions appear and these reactions of physiological and psychological in nature are termed stress indicators. Although an integral part of human life, prolonged reactions to stress which are not intervened over long periods of time can lead to permanent irreversible consequences with dire effects to a workers health (Billehøj, 2007; Maniam, Antoniadis, & Morris, 2014; Staufenbiel, Penninx, Spijker, Elzinga, & van Rossum, 2013). The damage could affect the structure and chemical composition of the body till the cellular level, however, some of the changes are known to be manifestations of defence adaptation response (Selye, 1974, 1982, 2013).

During the Ninth Session of the joint International Labour Organization (ILO) and World Health Organization (WHO) committee on Occupational Health, the definition of psychosocial factors at work was referred to as ‘the interaction between and among working environment, organizational conditions, job content and worker’s capacities, needs, culture, personal extra-job considerations that, through perceptions and experience, influences health, work performance and job satisfaction’ (International Labour Organization, 1986). Siegrist defines it as a socio-structural range of opportunities that are available to an individual person to meet his or her needs of wellbeing, productivity and positive self-experience (Siegrist, 2001). The importance of studies on psychosocial working environment is due to the undisputed broad recognition on the detrimental effects it has on physical and mental wellbeing, as with work performance and efficiency (An et al., 2016; Aust et al., 2007; M. Dollard et al., 2007; Elovainio et al., 2002; Gluschkoff et al., 2016; Hwang & Lee, 2014).

With the emanation of positive psychology this decade, researchers have started paying more attention to better working environments. This comprises different work dimensions such as an employee's satisfaction with their work scope and load, their colleagues and other job-related aspects (Cooper & Marshall, 2013). Satisfaction should essentially not neglect crucial life domains such as family, intangible spiritual elements and both physical & psychological health (Siegrist, 2001).

Ample studies have linked job strain to physical and mental illnesses, and the economic burden due to productivity losses due to sickness absence, health-related costs, turnovers and absenteeism (McTernan, Dollard, & LaMontagne, 2013; Miraglia & Johns, 2016). Although difficult to estimate, losses due to the disease burden have been reported to reach into billions of dollars. A report by an Australian health promotion foundation stated that the societal cost of depression among the Australian workforce due to job strain was approximately AUD\$ 11.8 billion over a lifetime, or AUD\$730 million in one year (LaMontagne, Sanderson, & Cocker, 2010). A recent study by the same authors reported a rise in the annual societal cost to AUD\$890 million due to depression attributed to job strain (Cocker, Sanderson, & LaMontagne, 2017). Although the psychosocial risk factors in the domains defined by occupational health researchers typically use psychological job demand, job control and social support, psychosocial work climates such as fairness at workplace, equal and equitable treatment, and discrimination however also plays a big role in stress, job satisfaction and physical and mental well-being of employees. Guided by the Job Demand-Control (JDC) and Job-Demand-Control-Support (JDCS) models which encompasses job strain, this study aims

to investigate significant predictors of psychological wellbeing which includes psychosocial working environment exposures and organizational justice exposures among Malaysian public school teachers. The two main segments examined are:

- i. Psychosocial working environment exposures (job demand, job control and social support) and
- ii. Organizational justice exposures (procedural, interactional and distributive justice)

These two main sectors of the psychosocial working environment are now being integrated into one research model of psychological well-being, an approach which has not been applied in Malaysia and rarely done abroad as well. Furthermore, the moderating role of job resources such as job control and social support in buffering the negative outlook of high job demands and perceived low justice was examined.

2.2.1.1 Psychosocial working environment exposures and the Job Demand-Control-Support (JD-CS) theoretical framework

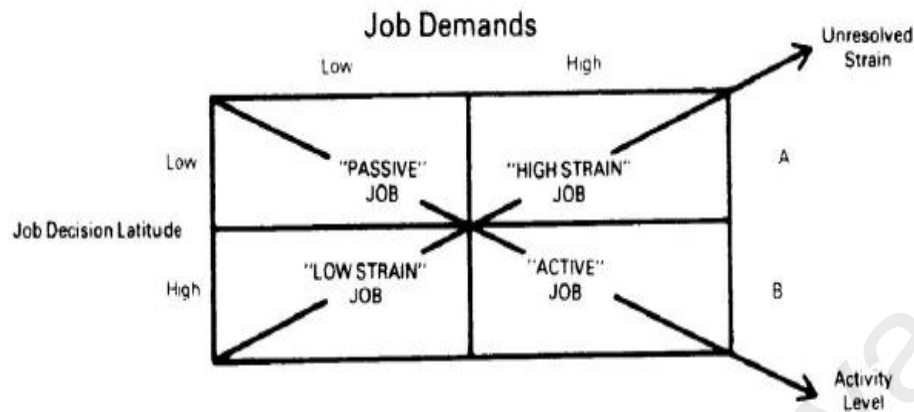
This model explains the theoretical framework that relates job characteristics to a worker's health & psychological wellbeing (Kain & Jex, 2010; Karasek Jr, 1979; Karasek et al., 1998). It provides critical determinants of health in relation to occupational-psychological wellbeing. It is the most dominant occupational stress and health psychology being referenced to many studies in Malaysia and abroad (Billehøj, 2007; Van Rijswijk et al., 2004). In this model, two essential aspects of working environment are identified, which is job demand and job control.

According to Karasek, job demands are psychological stressors which involve with workload relating to unexpected tasks and personal conflicts (Kain & Jex, 2010). Job control, also known as decision latitude (DL), is a workers control over his job task and conduct during work hours. In Karasek's framework, DL is composed of two elements, which are decision authority and skill discretion. Decision authority is defined as a worker's ability to make job-related decisions, whereas skill discretion is the degree of skill used in a particular work. Rafferty, Friend, and Landsbergis (2001) had however proposed separate usage of skill discretion and decision authority as they measure different dimensions of job control. The study found that emotional burnout was only significantly associated with low skill discretion, but not of low decision authority. It also suggested that job strain be assessed separately due to its different dimensions of job control as low personal accomplishment was only associated with lower job control, and emotional exhaustion was only associated with higher job demand as compared to both (Rafferty et al., 2001). Although various recommendations have on job strain have been proposed, Karasek's framework is still largely used as a base for strain studies.

There are four job types as the result of the dichotomous relationship between job demand (JD) & job control (JC) which are :

- i. Low-strain job: Low JD and High JC
- ii. High-strain job: High JD and Low JC
- iii. Active job: High JD and High JC
- iv. Passive job: Low JD and Low JC

The figure below explains Karasek's framework on the four main job types



:

Figure 2.1: Job-Demand-Control Model by Karasek (1979)

Karasek's hypothesis was that the combination of high job demands and low job control produces 'high job strain' which has negative impacts on both physical and psychological well-being. This hypothesis was later known as the 'Strain Hypothesis' (Van der Doef & Maes, 1998, 1999). According to the strain hypothesis of the JDC model, employees working in high-strain jobs experience lowest well-being, while those with low-strain jobs experience a higher level of well-being. Employees with low strain jobs have also been found to have better strain-related outcomes as compared to those with high strain jobs (De Lange, 2005). This hypothesis implies that in order to reduce job strain, job demands and job control parameters in the workplace need to be addressed (Kain & Jex, 2010). In another study testing the strain hypothesis with job satisfaction, the lowest level of job satisfaction was found among respondents with 'high strain' jobs (Witte, Verhofstadt, & Omey, 2007).

Another outcome of this framework was labelled the ‘buffer hypothesis’ which explains the distinct characteristics of active and passive job types (high job demand with high job control and vice versa) (Van der Doef & Maes, 1999). It predicts that the multiplicative combination of job demands with job control is able to mitigate and conciliate psychological well-being of an employee, especially the amelioration of the negative effects of high job demands (Karasek Jr, 1979). According to Karasek’s research, persons with ‘active job’ has the potential to obtain intrinsic motivation and acquire new skills, as compared with persons with ‘passive job’ who would most likely have difficulty tackling challenges and problem solving (Kain & Jex, 2010; Karasek Jr, 1979) and even linked to the concept of helplessness (Seligman, 1975). The ‘buffer hypothesis’ also implies that improvement in physical and psychological well-being can be attained by increasing job control without reducing job demands, as concurred by Wall, Jackson, Mullarkey, and Parker (1996). Although prior literature has provided consistent findings on the strain hypothesis, narrative meta-analysis by Van der Doef and Maes (1999) and other work-psychology researchers generally support the ‘strain hypothesis’, but not so of the ‘buffer hypothesis’ (Pelfrene et al., 2002; Verhoeven, Maes, Kraaij, & Joeke, 2003).

Some arguments have risen regarding JDC not utilizing ‘social support’ as a potential psychosocial moderator have been mentioned, as iso-strain was considered the highest risk of developing occupational stress. Thus, J. M. Johnson and Hall (1988) extended Karasek’s model to include ‘social support’ into the existing model which adds an interactive predictor effect. Similar to JDC, this addition shows that high job control with high social support is

associated with lower job strain/higher psychological well-being and vice versa. According to the study by G. Bradley (2004), interactive predictor effects need to be examined for models with multiple predictors. For example, a worker's psychological wellbeing with additive effects can be evaluated by combining them as such if predictors act cumulatively: job demands + job control + social support. Early researchers adopted the JDC/JDCS models as predictors of psychosomatic and cardiovascular outcomes, however, study by Panatik (2010) have expanded the framework to include psychological strain/well-being as a better-explained model. This was concurred with studies by De Lange, Taris, Kompier, Houtman, and Bongers (2004); DeFrain, Millspaugh, and Xie (1996); Van der Doef and Maes (1998). Low job control and high job demand were associated with physical outcomes such as coronary heart disease (Eller et al., 2009; Kristensen, 1995), hypertension (Gilbert-Ouimet, Trudel, Brisson, Milot, & Vézina, 2014), Type II diabetes mellitus (Huth et al., 2014; Nyberg et al., 2014), musculoskeletal disorders (Bernal et al., 2015), poor psychological outcome (Theorell et al., 2015; Van der Doef & Maes, 1999), job dissatisfaction and burnout (Demerouti, Bakker, De Jonge, Janssen, & Schaufeli, 2001), turnover (Saijo et al., 2016; Verhofstadt, De Witte, & Omeij, 2009) and even smoking (Ottens, Bosma, & Swinkles, 1999; Slopen et al., 2013). Social support was not found to be an effect modifier for this association (Kuper & Marmot, 2003).

Analyzing additive effects of the JDCS variables which postulates the iso-strain hypothesis, social support was highly associated with increased absenteeism in a study conducted in London by Rael et al. comprising nearly 10,000 civil servants (SA Stansfeld, Rael, Head, Shipley, & Marmot, 1997).

Recent studies on Finnish secondary school teachers (Rasku & Kinnunen, 2003) and Greek teachers (Pomaki & Anagnostopoulou, 2003) concurred with this. Although research on the hypotheses of iso-strain has shown less consistent results, high iso-strain was still found to be a risk factor of poor well-being among varying subpopulations (Van der Doef & Maes, 1998) including teachers (Van der Doef & Verhoeven, 2017).

Predicament arises in studies in establishing a high or low cut off points among variables. In this study, the weighted mean value for job demand and job control was taken to dichotomously quantify 'high and low job demand', 'high and low job control' and 'high and low social support' among the study subjects.

2.2.1.2 Two and three-way interactions between job demands, job control and social support in the JDCS model

Although past literature and study findings have reported strong evidence of the main effects of the JDCS model variables, its moderating effects and influence on other exposures have been somewhat weak. J. M. Johnson and Hall (1988) had previously postulated buffering hypothesis on two-way interactions between job demands with job control, and job demands with social support; as well as three-way interactional effects between job demand, job control and social support. Contrasting findings have however been reported by the many studies conducted on the JDCS model. For example, a study by Van Yperen and Hagedoorn (2003) among nurses in the United States found a correlation between job demand and job control with fatigue; while a study by Chambel and Cural (2005) among university students in

Portugal reported significance in the interaction between job demands and depression. An Australian study had similarly reported moderated the interactive effect of job control with job demands in developing psychological distress (Macklin, Smith, & Dollard, 2006). In terms of early retirement thoughts, Elovainio et al. had reported interesting findings. In addition to job demands and job control being independent predictors of 'early retirement thoughts' after adjusting for age, gender and educational level, regression analyses had shown positive findings on the interactional effects of job demand with job control too. Respondents aged 45 and above had shown even stronger association as compared with the entire sample population (Elovainio et al., 2005). Meier, Semmer, Elfering, and Jacobshagen (2008) in their study reported a weak interaction between job demand and job control, which conceivably only effects respondents with an internal locus of control. Job control actually predicted poorer well-being and health status of respondents with an external locus of control as stress factors increased. A meta-analysis which included general and occupational related locus of control as variables did not reveal substantial associations with other variables of interest (T. W. H. Ng, Sorensen, & Eby, 2006). In simpler terms, if working environment offers control opportunities, and if an employee's personal beliefs are conducive towards using the control opportunities, the employee will then perceive their own efforts to control the environment as promising thus inducing positive emotion. In the 'strain hypothesis' perspective the JDCA model specifies, this becomes a special case because although there is some support for such interaction, it is far from being equivocal.

Contrary to the main effects of the aforementioned exposures, a systematic review by Van der Doef and Maes (1999) has however found inconsistencies regarding moderating effects of job control, social support, stress and wellbeing. Only modest support was found in most of these interactions. Only fifteen out of a total of 31 studies supported the buffering hypothesis of the JDCS model in the systematic review. A study by Pelfrene et al. (2002) did not find any evidence of buffering effect between job demands and psychological distress, while a study by Marshall, Barnett, and Sayer (1997) only found minimal association. Studies of moderating effects of JDCS variables among teachers also did not reveal any positive findings (Pomaki & Anagnostopoulou, 2003; Rasku & Kinnunen, 2003). Similar findings were also found among French workers with regards to work injury, sickness absence and health (Niedhammer, Chastang, David, & Kelleher, 2008). As for the two-way effects of job demands and social support, Chen et al. (2009) reported only partial moderated correlation between job stress and depression. Additionally, the study by Parasuraman and Simmers (2001) established that social support did not mitigate any correlation between various stressors and wellbeing. This is in agreement with similar studies by Rasku and Kinnunen (2003), Pomaki and Anagnostopoulou (2003) and (Pelfrene et al., 2002) where social support was found to neither buffer positive correlation between job strain and psychological distress, nor the negative effect of job characteristics with wellbeing. A study among Asian respondents revealed similar findings where social support did not provide any moderating effect between job strain and psychological well-being (Fujishiro, 2005).

Similar to the two-way interactions explained above, three-way interactions between PWE exposures too had mixed findings, although it leaned more towards minor or nil correlations. Although Van Yperen and Hagedoorn (2003) reported a positive correlation between job demand, job control and social support in three-way interactions, a study by Rodríguez, Bravo, Peiró, and Schaufeli (2001) reported opposing findings. The multi-national longitudinal study of five countries in Europe did not uphold the assumption of interaction between the three PWE exposures' buffering effect on job satisfaction. It instead, reported the damaging effect of excess job control, especially in high social support situations. Similar findings were also reported by Macklin et al. (2006) where no significance was found on the three-way interaction between job demand, job control and social support with job satisfaction and psychological distress. Cultural differences could have been the contributing factor in the inconsistencies of findings in these studies. Structures of social support networks may vary between cultures on dimensions of cultural differences, socio-economic background, religious beliefs, ingrained fearfulness of authority and individualism-collectivism way of thinking (Sue, Rasheed, & Rasheed, 2015). This study, however, does not examine two- and three-way interaction due to the complexity of analysis with two outcomes of interest and three other organizational justice variables.

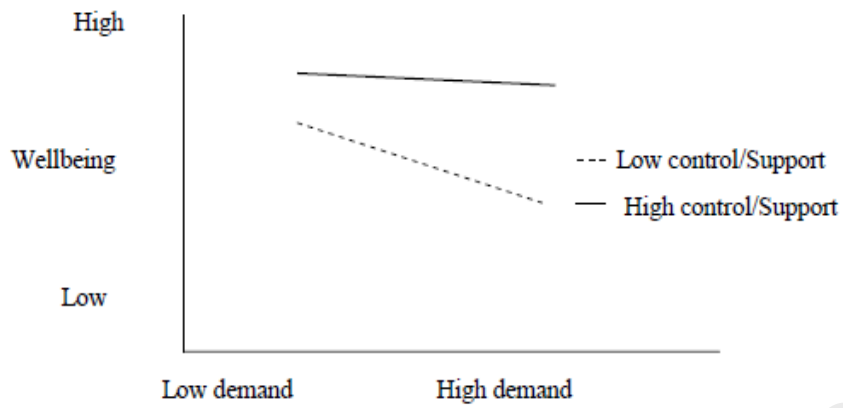


Figure 2.2 : Expected two-way interaction between job demand and job control / social support

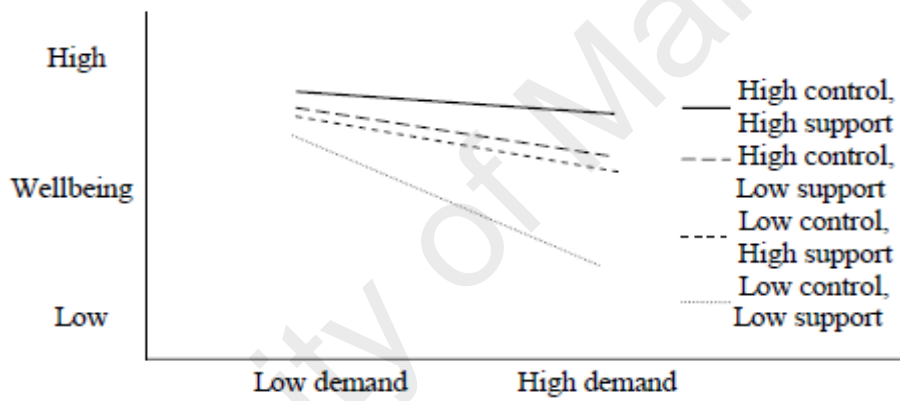


Figure 2.3 : Expected three-way interaction between job demand, job control and social support

Table 2.1: List of previous researches on psychosocial working environment

Author	Country of literature	Indicators	Sample Population
Noor et al. 2004	United Kingdom	✓ Job satisfaction ✓ Psychological distress	From Oxford City Council and Oxford University
Lu, Gilmour, Kao and Huang et al. 2006	The United Kingdom and Taiwan	✓ Job satisfaction	British and Taiwanese managers
Gallagher & Vella-Broderick et al. 2008	Australia	✓ Job and life Satisfaction	Respondents who have completed university under- and postgraduate studies from the general population
Lawson et al. 2009	Australia	✓ Job satisfaction ✓ Psychological health	Police force
Jehad Muhammad et al. 2011	Malaysia	✓ Job Satisfaction ✓ Organizational Citizenship	Non-academic Staff of a Public University
Tang et al. 2012	Hong Kong and the United Kingdom	✓ Effort-reward Imbalance/Stresses ✓ Mental health	Secondary school teachers from both Hong Kong and Great Britain
Ibrahim et al. 2015	Malaysia	✓ Work-related stress ✓ Role ambiguity	University staff
Khamisa et al. 2016	Australia	✓ Burnout ✓ Job stress ✓ Job satisfaction	Nurses

Table 2.2: Literature review on psychosocial working environment

Author, year of publication	Country of literature, occupation	Study design, follow up period	Number of respondents	Factors studied	Results / Outcomes
Van der Doef and Verhoeven (2017)	Netherlands, teachers	Book chapter	-	Strain and buffer hypotheses which include various stress responses such as burnout, somatic complaints and low job satisfaction	More support is obtained for strain hypothesis in comparison with the buffer hypothesis. Emotions at work, job tenure and time management are contributing factors towards job strain.
Cocker et al. (2017)	Australia, various occupations	Cohort-simulation using state-transition Markov modelling	-	Depression attributable to job strain	Depression attributable to job strain incurs approximately AUD\$890 million/year of societal costs. Improving psychosocial risk management is able to reduce the financial burden of employers.

Table 2.2, continued

Author, year of publication	Country of literature, occupation	Study design, follow up period	Number of respondents	Factors studied	Results / Outcomes
Gluschkoff et al. (2016)	Finland, school teachers	Cross-sectional	76	Work stress, burnout, effort-reward imbalance	High Effort-Reward Imbalance is associated with exhaustion, cynicism, reduced efficacy.
Khamisa, Peltzer, Ilic, and Oldenburg (2016)	South Africa, nurses	Longitudinal	1200	Work-related stress association with burnout, job satisfaction and general health	OR Job demand: Burnout 4.18,(95% CI 0.97-3.32), Job satisfaction 1.20 (1.02, 4.09), General health 2.83 (1.63, 4.90). Lack of support: Burnout 4.37(2.89, 6.62), Job Satisfaction 1.7 (1.41, 2.03), General health 1.83 (1.33, 2.53).

Table 2.2, continued

Author, year of publication	Country of literature, occupation	Study design, follow up period	Number of respondents	Factors studied	Results / Outcomes
An et al. (2016)	United States of America	Systematic Review	40 research articles	Biological impact of chronic psychosocial stress and its associations with CVD risk using salivary stress biomarkers	Sources of psychosocial stress such as job strain, low socio-economic status and working environment are associated with CVD risks such as hypertension, carotid artery plaque and metabolic factors (dyslipidaemia, impaired glucose tolerance and elevated cardiac enzymes).
Miraglia and Johns (2016)	United Kingdom and Canada	Meta-analysis	109 research articles, n=175,965	Presenteeism and organizational productivity with ill health, elevated job demands, stress, low support, discrimination and satisfaction	Supportive working environment is proven buffer against strain, work-related health problems, lowers presenteeism risk, and is able to provide employees with positive emotions, satisfaction and improved health outcomes.

Table 2.2, continued

Author, year of publication	Country of literature, occupation	Study design, follow up period	Number of respondents	Factors studied	Results / Outcomes
Hwang and Lee (2014)	South Korea, blue-collared workers	Cross-sectional	154 men, 80 women	Correlation between psychosocial factors and metabolic syndrome among male and female workers	Prevalence of metabolic syndrome was 24% for males and 7.5% for females. After adjusting for age, marital status, shift work, overtime, smoking status and physical exercise, job stress (OR= 3.10, p=0.005) and risk perception (OR=1.12, p=0.016) for males; low job stress (OR=0.005, p=0.04), low social support (OR=1.51, p=0.009), risk perception (OR=1.27, p=0.023) for women, thus metabolic syndrome is closely related to psychosocial factors with job stress a point difference between the sexes.

Table 2.2, continued

Author, year of publication	Country of literature, occupation	Study design, follow up period	Number of respondents	Factors studied	Results / Outcomes
Saijo et al. (2016)	Japan, nurses	Cross-sectional	1063	Job demands, job control and supervisor support with depression and intention to leave	60 hours working hours /week have significant higher OR for depressive symptoms. Low supervisor support has most association with intention to leave as compared with co-worker support. Low job control has more correlation with depressive symptoms.
McTernan, Dollard, and LaMontagne (2013)	Australia, a population-based telephone survey	Longitudinal	2074	Depressive symptoms and productivity with job strain and bullying	Loss of productivity due to depression is estimated at \$AUD 8billion per year due to mild depression. Population attributable risk (PAR) estimated at 8.7% for depression due to job strain and bullying, equating to \$AUD 693million preventable productivity lost.

Table 2.2, continued

Author, year of publication	Country of literature, occupation	Study design, follow up period	Number of respondents	Factors studied	Results / Outcomes
Cooper and Marshall (2013)	The United Kingdom and the United States	Systematic review		Occupational stress, cardiovascular diseases, migraine, mental and personality disorders	Work-related stress causing mental and psychoneurotic disorders and headache account for the loss of 22.8million work days in a year.
Stephen Stansfeld and Candy (2006)	Seven databases from 1994-2005	Meta-analysis	11 research papers	Job strain, low job control, high job demands, effort-reward imbalances, mental disorders	Combination of high job demands and low job control and high effort with low rewards are risk factors for common mental disorders. Impact of work stressors affect both men and women.

Table 2.2, continued

Author, year of publication	Country of literature, occupation	Study design, follow up period	Number of respondents	Factors studied	Results / Outcomes
Billehøj (2007)	Book report, 27 European countries	Survey	38 unions from 27 European countries	Work-related stress and stress factors	-
Rasku and Kinnunen (2003)	Finland and 10 European countries teachers	Cross-sectional	Finland-232, ten European countries-1950	Job demands, job control, job satisfaction, somatic complaints and de-personalization	High demands explained low job satisfaction, lower levels of depersonalization, higher emotional exhaustion and somatic complaints; high job control explained high job satisfaction and high personal accomplishment among Finnish teachers in comparison with their European counterparts. Coping strategies are able to improve somatic complaints, emotional exhaustion and personal accomplishment.

Table 2.2, continued

Author, year of publication	Country of literature, occupation	Study design, follow up period	Number of respondents	Factors studied	Results / Outcomes
Pomaki and Anagnostopoulou (2003)	Greece, secondary school teachers	Cross-sectional	215	Job characteristics, job satisfaction, burnout, somatic complaints and coping strategies	Job demand, job control and social support are associated with job satisfaction, burnout and somatic complaints. Moderating effects of job control and social support are not supported. Meaningfulness is the most important predictor of job characteristics. In comparison with data with teachers from other European countries, Greek teachers differ considerably in most study variables.
Demerouti, Bakker, De Jonge, Janssen, and Schaufeli (2001)	Denmark, insurance company employees	Cross-sectional	381	Job demand, job control, perceived health status, active learning	Job demands had a strong correlation with health impairment while job control had a strong association with active learning. Job demand and job control are essentially in silo processes, consistent with job demands-resources model.

2.2.2 Stress

Stress has been given different definitions over time. It was originally perceived as environmentally-induced pressure/ strain within a person. Stress is defined by the Oxford English dictionary as the “state of mental or emotional strain or tension, resulting from adverse or demanding circumstances” (Oxford, 2009). It is the non-specific response of the body due to the demand made unto it, be it internal, environmental or both (Selye, 1974). The physiological arousal is a protective mechanism of the body (sympathetic response) known as the ‘fight-or-flight’ response (Selye, 1974). Under duress, the body responds the similar way it responds to danger. Lazarus et al. define stress as ‘the internal process which occurs when faced with a certain demand which is perceived to exceed available resources to effectively respond to it, and the failure to effectively deal with this demand has undesirable consequences’ (Lazarus & Folkman, 1984). The level of stress is however dependent on the coping ability or mechanism to adapt and tolerate stressors which are exposed. Since stress is experienced more in a particular group of individuals, as compared to others, it can undermine the achievement of both the individual and an organization (Michie, 2002). Signs of acute stress can be seen in the changes in one’s behaviour, feelings and even physical symptoms. Chronic stress, however, has been proven to cause changes in cardiovascular, neuroendocrine, autonomic and even immunologic causing to physical and mental consequences (Michie, 2002).

2.2.2.1 Types of stress

Psychologists have categorized stress into three distinct categories, which are acute stress, episodic stress and chronic stress (Miller, Smith, & Rothstein, 1994). Acute stress is the most common, caused by the anticipated demands and pressures encountered by a person. While it connotes negativity, it may actually bring thrill and excitement. A prolonged exposure to acute stress could, however, bring about

psychological or physiological symptoms. Episodic acute stress is the prolonged exposure to acute stress i.e. in perpetual clutches of acute stress, or in ceaseless worrisome. People with prolonged exposures to stress tend to be over aroused, hostile and irritable and the workplace is commonly associated with a major source of stress. Symptoms of episodic acute stress are similar to those with acute stress, but at an accentuated level (Miller et al., 1994). Stress is termed chronic when acute and episodic stress is prolonged and eventually wear's a person out. Chronic stress is usually due to unrelenting demands and pressures until an individual gives up hope and becomes miserable. These may stem from post-traumatic experiences which becomes internalized and remains' constant. If chronic stress is not managed adequately at its early onset, treatment may require a lengthy and profound multidisciplinary approach. Once the threshold level has been exceeded, the burden of a motivational factor is then known as distress (Seward, 2004). Stress can also have a positive effect if the stressful situation is perceived as an opportunity that could lead to a favourable outcome. It motivates to deal with a challenge or accomplish a task. This is termed eustress, and that in fact, some stress is good depending on how one respond's to it (Selye, 1975). Some have argued that the concept of good stress is defective and more accurate concept is preferred (Le Fevre, Matheny, & Kolt, 2003).

2.2.2.2 Symptoms of stress

Symptoms vary depending on the type of stress experienced. These include emotional distress (e.g. anger, irritability and/or anxiety), physical (e.g. tension headache, back and jaw pain and/or muscular cramps) or somatic (e.g. hypertension, tachycardia, cardiac manifestations and/or shortness of breath) due to acute or episodic acute stress (Miller et al., 1994). Other symptoms include gastrointestinal tract disturbances such as diarrhoea, constipation, abdominal pain, gastritis and even vomiting. Chronic stress, however, is more severe and may lead to severe pathological

consequences such as depression, suicide, violence, malignancy, coronary syndromes and even neurological ischemic and/or haemorrhagic insults (Miller et al., 1994; Montoro et al., 2009). In such cases, urgent intervention is warranted, including referral to a psychiatrist as prognosis is much better with early detection and intervention.

2.2.2.3 Theories of stress

The term 'stress' was first used among physicists in reference to a structure's resistance ability to withhold external force to a certain extent, be it for weight-bearing or otherwise, while 'strain' implies internal distortion as a result of the said force (Krohne, 2002). Over time, the terminology was adapted into behavioural sciences due to its similarities with the human body. The external force is called 'stressor', and 'strain' in this context is the impact of physical or psychological demand on a person in a certain situation. The bodily process involved is 'stress' (Krohne, 2002).

Stress researchers and theorists have differing views and classifications of stress, but the most commonly used are the approaches to the 'Stimulus-based Model of Stress' by Holmes et al., (Holmes & Rahe, 1967), 'Response-based Model of Stress' by Hans Selye (Selye, 1982) and 'The Transactional Model of Stress' by Lazarus et al., (Lazarus & Folkman, 1984). The 'Stimulus-based model' looks at stress as a stimulus with focus on the impact of 'stressors' (environment) which causes the stressful situation. The 'Response-based model' examines the physiological consequences and 'strain' caused by 'stressors' (reaction to stress), whereas the 'Transactional model' views stress as a continuous interaction and adjustment (cognitive) between a person and the surrounding environment.

(a) The Stimulus-Based Model of Stress Theory

This model view's stress as an independent variable. It can be of any stimulus, life event or group circumstances. Holmes et al., stated that there are 43 types of lifestyle

changes or events which may cause stress, both positive and negative ones (Holmes, 1978). It states that a disruption or change in life events (eg. loss of a family member/birth of a child/divorce/financial matters) is a stressor which impact's the adaptation capacity of a person, thus causes psychological and physiological strain which leads to the vulnerability of an individual to a disease. Holmes et al., developed the Social Readjustment Rating Scale (SRRS) as a method of quantifying levels of stress (Holmes & Rahe, 1967). The assumption is people with bigger life-changing events and higher scores are more likely to experience physical or mental diseases over time. There has been criticism of this theory as it ignores the cognitive aspects of stress effects. The extent of stress embodied by life events depends on the interpretation of an individual and cannot be generalized for all.

(b) Response-based Model of Stress Theory

Hans Selye, widely known as the father of stress research, gave a scientific explanation via a model based on physiology and psychobiology called the General Adaptation Syndrome (GAS). He defines stress as a non-specific response and demand made unto the body which emphasizes the physiological consequences of a stressful situation. Since stress is a state of the body, it can only be observed within changes occurring in it (Selye, 1978). He explained that different types of stimuli result in similar physiological responses where the sympathetic nervous system is aroused causing somatic and physiological changes, and homeostasis disruption. In the model, he explained the three main stages of stress called the alarm stage, the resistance stage and the exhaustion stage.

In the alarm stage, acute stress stimuli activated by the sympathetic nervous system will react to the 'flight-or-fight' response, which is the physiological response to stress. Two sub-phases within the stage deals with the impact of the stress called 'shock phase'

characterized by outward signs of distress such as hypotonia, hypothermia and hypotension; and 'counter-shock' which is followed immediately with the release of adrenaline, noradrenaline and cortisol. Adaptive physiological changes are characterized by tachycardia, increased blood pressure, pupils' dilation, stimulation of the central nervous system (CNS) and the release of the hormones into the circulatory system to mobilize the body to meet a threat, as in acute stress (McCarty, 2016).

At the resistance stage, the parasympathetic nervous system returns normal physiological functions via homeostasis gradually, as most changes occur when the alarm stage has reversed. Serum glucose levels remain high and cortisol and adrenaline are still at elevated levels in the circulatory system, but lower than in the alarm stage. Although viewed as the coping and adaptation stage, the capacity to resist stressors is still limited. Coping compensatory mechanism gradually depletes energy stores and the body returns to norm adaptively. The resistance stage is also associated with psychosomatic disorders such as migraine, colitis and ulcer eruptions (McCarty, 2016; Selye, 1978).

At the exhaustion stage, energy stores which are completely depleted lead to autonomic nervous stimulation symptoms such as rigour, diaphoresis and palpitations. The toll caused by the physical, mental, emotional and adrenal exhaustion causes decreased stress tolerance, progressive mental and physical exhaustion, and eventually to collapse. Persistent stress stimuli increase vulnerability to decompensation such as cardiovascular complications, fatigue, burnout, compromised immune system and even death (Selye, 1982). These threats of disease onset are known as 'diseases of adaptation.' A stress response which only affects certain organs is termed 'Local Adaptation Syndrome' (Selye, 1978).

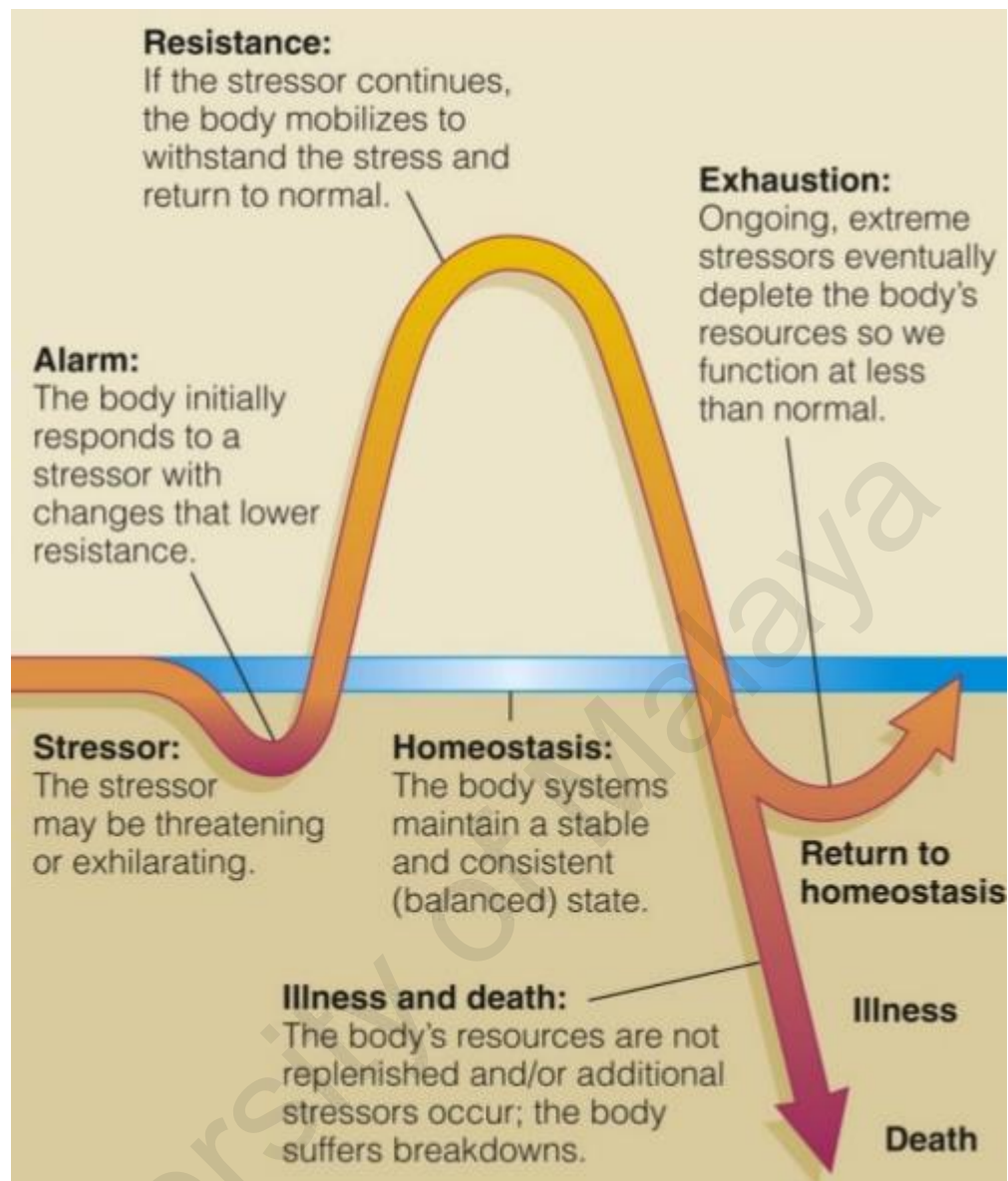


Figure 2.4: The General Adaptation Syndrome Model by Hans Selye

(c) The Transactional Model of Stress Theory

This theory was proposed by Lazarus and Folkman who stated that there are distinct differences among people in interpreting stress as a response or stimuli (Lazarus, 1998). Criticism arose for the first two theories since humans have the capacity to think, evaluate and react, which could either improve or worsen stress. In addition to that, previous theories could not explain which factors lead to proper stress management as compared to others that could aid in adjusting for longer periods of time (Lazarus, 1966). Although certain environmental conditions do cause stress for individuals,

Lazarus states that humans differ in sensitivity and vulnerability to certain events, and respond to the interpretation of those events (Lazarus & Launier, 1978). This theory proposes interaction which emphasizes the role of cognitive processes which mediates between stimuli, response, and factors which affect these processes which focus on the individual, environment and cognitive evaluation of stimulus, environmental demands and response to stimuli simultaneously (F. Cohen & Lazarus, 1983). External and internal information are processed at the neurocognitive level by identifying available resources and options which helps in evaluating potential and actual demands (Folkman & Lazarus, 1988; Monat & Lazarus, 1991).

Psychological stress theory has two main segments known as cognitive appraisals and coping strategy. An appraisal is the self-evaluation on the significance of an outcome of a specific encounter (Campos & Stenberg, 1981), whereas coping is the thought and action process in encountering the specific demand (Folkman, Lazarus, Gruen, & DeLongis, 1986). The relational concept of the transactional model of stress theory describes stress as the 'relationship' between an individual and the environment, and not just any specific external stimuli or reaction (Monat & Lazarus, 1991). It is the relationship with the external environment an individual appraises while evaluating demands and coping resources (Folkman et al., 1986).

The concept of appraisal is based on the idea that any emotional process which includes stress, is dependent on anticipation and feelings which manifests thereafter, in regard to the outcome of a response. Since this theory explains that stress is dependent on the assumption and expectancy of an outcome of a specific encounter, it is therefore also influenced by intensity, quality and duration of an encounter for each individual (Lazarus & Launier, 1978). Lazarus explained that there are two stages of appraisals based on sources of information, termed primary and secondary appraisal.

In primary appraisal, an event or stimuli is determined as to whether a certain threat is present. The three possible outcomes are:

- i) Regarded as irrelevant
- ii) Regarded as a positive stimuli
- iii) Regarded as a negative stimuli

In the secondary appraisal process, coping resources are assessed. These include environmental factors, support system, knowledge and skills to avert a threat.

Harm, challenge and threat are different kinds of stressors which then impose different kinds of stress due to patterns of primary and secondary appraisal (Lazarus & Folkman, 1984). Harm is the psychological damage that had happened, threat is the anticipation of an imminent harm, and challenge is the demand to overcome the threat and harm. It explains the intensity, quality and duration of an elicited emotion in an environment which are objectively equal for different individuals. The resulting state is generally maintained and appropriate changes made by a pattern of appraisals based on a number of situational and personal factors which include goals, values and motivational dispositions, controllability, predictability and consequence of a stress response. Since some people are more prone to stress than others, appraisal of a potentially stressful event is influenced by the predictability and controllability of an event. An event is considered more stressful if an event is deemed unpredictable and/or uncontrollable.

Coping is the innate cognitive mechanism to tolerate and reduce external and internal conflicts and demands (Folkman & Lazarus, 1980). They are classified according to distinct characteristics, and not by effects which encompass both behavioural and cognitive reactions. Lazarus further explains that psychological adjustment with

adaptation takes place when a coping outcome is positive, however, it could lead to poor psychological outcomes such as depression and anxiety and exacerbation of an underlying mental illness if the coping mechanism is unsuccessful (Folkman & Lazarus, 1990). If the primary or secondary appraisals are however unable to identify further action, maladaptation occurs with feelings of uncertainty, unpredictability and uncontrollability.

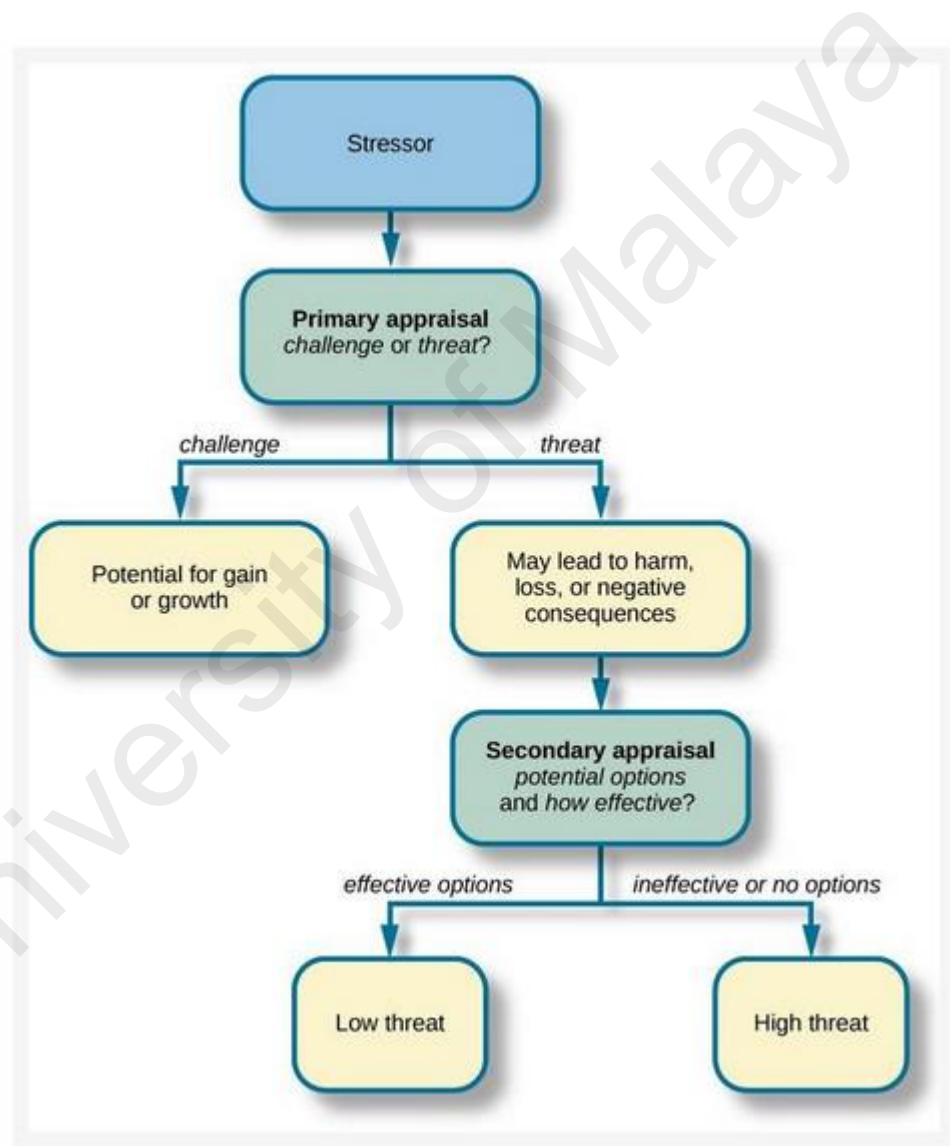


Figure 2.5: Lazarus' Transactional/Cognitive-Mediational Theory (Primary and secondary appraisal)

There have been other theories of psychological stress proposed by respected psychologists such as the James-Lange Theory of Emotion (Lange & James, 1922), The

Cannon-Bard Emergency Theory (Bard, 1929; Cannon, 1928) and The Schacter-Singer Theory (Schachter & Singer, 1962). The James-Lange theory was an idea stating that emotions do not immediately succeed in the perception of the stressor, but rather after the response to the stress stimuli. It means that an emotion only begins after bodily changes happen, and emotional behaviour occurs only if connected to the brain. The Cannon-Bard theory is somehow a refutation of the James-Lange theory. Cannon et al, explained that internal physiological response is recognized slowly by the brain as compared to its emotional response. Using decorticated cats, he explained that these cats still showed the emotion of aggression and rage when encountered stressful stimuli although its neural connections were separated from the cortex in the brain. Bard further added that the thalamus located at lower brain stem is responsible for emotional responses and that emotional response to stress occurs simultaneously, and not just a product of physiologic response. The Schacter-Singer theory argues that an individual requires emotional arousal and cognitive activity to experience an emotion. It further explained that an individual will start looking for environmental signs for proper interpretation of an emotion once the reason behind the emotional response becomes obvious.

Although there are many theories of stress to date, the biopsychosocial model by Lazarus et al, is one of the most comprehensive ones as it incorporates previous models into the framework and provides explanations to other theory's shortfalls, especially in cognitive processing. Lazarus also explains that appraisal precedes cognitive labelling and simultaneously stimulates emotional and physiological arousal, differing from the Schacter-Singer Theory which states that emotion is the outcome when cognition and physiological arousal interacts.

2.2.2.4 Stress in general population

Stress, or more so chronic stress, is fast becoming a public health crisis. A survey conducted in the United States found most Americans suffer from moderate to severe stress levels (American Psychological Association, 2017). Reasons include finances, economy, work, political landscape, work-family conflict, health and work-related stress. Nearly 44% of the respondents reported increased stress levels past five years. The survey also found that source of stress significantly increased due to concerns about safety (American Psychological Association, 2017). There was also a statistically significant increase in stress in the poll conducted over ten years. Financial and work factors were cited as the most significant stressors as reported by 61% and 58% of the respondents respectively. Despite the myriad of stressors, many are struggling with stress management with nearly 51% of respondents feel they would have been better off with a stronger support system. As for gender differences, women tend to report higher levels of stress as compared to men (American Psychological Association, 2017).

Similar statistics are also found in Europe. Latest estimates by the Labour Force Study (LFS) in the United Kingdom showed that stress accounted for 37% of all work-related illnesses, and 45% of all working days lost due to poor health. Main factors include lack of managerial support and workload pressures, which include tight deadlines and high responsibility (Health and Safety Executive, 2016).

The situation in Malaysia is not very different from abroad. In a survey conducted among 5369 Malaysian employees from 47 organizations, close to 53% of the respondents reported at least one dimension of work-related stress. In addition to that, 84% of these employees reported at least one type of musculoskeletal disorder due to high work stress in combination with a sedentary lifestyle (FMT Reporters, 2017). Due to burnout from overwhelming stress and failure in coping mechanisms, the Malaysian

Psychiatric Association revealed a 50% increase in the prevalence of depression among Malaysians from 2011 to 2015 (Menon, 2016). The National Health and Morbidity Survey (NHMS 2015) had also reported a rise in poor mental health of up to 29% in comparison to preceding years (Institute for Public Health, 2015). It reported that the number of mental health patients has more than doubled from ten years ago (from 10.7% to 29.2%), and 4.2 out of 14.4 million respondents aged 16 years and above were struggling with mental health issues. The three most common causes identified in the NHMS were financial issues, environmental pressures and stress (Institute for Public Health, 2015). This uptrend is however not exclusive to Malaysia and is consistent with the global trend. Depression, which commonly stems from accumulated stress, has already surpassed disability caused by cardiovascular diseases and is now the leading cause of disability worldwide (World Health Organisation, 2017).

2.2.2.5 Occupational stress

Occupational stress is a growing concern among the workforce globally. It is one of the major challenges faced by occupational safety and health researchers and one of the main causes of work-related illnesses. It arises when job demands exceed a worker's ability and needs, and when there are workplace stressors which provoke an individual. In terms of ability, a worker finds most stress if unable to cope due to perceived lack of skill, knowledge, educational background, and even imbalance in job demands, expectations and fairness at the workplace (Fujishiro & Heaney, 2007; Jones, Bright, Searle, & Cooper, 1998). In the United Kingdom, occupational stress accounts for nearly 40% of all work-related illness, mostly in public service occupations. Jobs that show higher levels of stress compared to other professions include healthcare workers, teaching professionals and public administration officials (Health and Safety Executive, 2016).

Causes of workplace stressors can be divided into three major groups, which are organizational factors, task inability and role ambiguity. Examples of organizational stressors include job insecurity, management changes, organization culture and poor management practices. Task inability stressors include poor decision-making authority, high levels of responsibility, job content and demands, physical working environment and relationships at work. Role ambiguity stressors include role conflicts at the workplace (Finne et al., 2014), conflicts with colleagues or/and with organizational goals, fairness at the workplace and inadequate authority in accomplishing work (Colligan & Higgins, 2006; Michie, 2002). Occupational stress is determined by psychosocial hazards mainly in work organization and its design, working conditions and labour relations.

In these challenging times of advancement in information technology, economic growth and high expectations of increased productivity, occupational stress has become most prominent of stressors as compared to other sources of stress such as finance, health, personal relationships and family issues. The labour force participation rate in Malaysia stood at 67.7% with an unemployment rate of 3.4% (Department of Statistics Malaysia, 2017c). As such, a vast majority of Malaysians are at risk of exposure to occupational stress as an occupational hazard. As the workforce expands, so does workload, and many either start to work from home, or even continue working hours at home to meet deadlines. The dichotomous relationship between home and workplace start to wear off, and stressors begin to combine synergistically. The home is less seen as a place of solitude and relaxation with lesser time spent on family bonding and entertainment (Mallow, 2016).

2.2.2.6 Stress among teachers

The teaching profession has been found to be amongst the most stressful professions globally (Cherniss, 2003; S. Johnson et al., 2005). Teachers with stress leading to burnout are fast becoming a global epidemic. It has been estimated that approximately 500,000 teachers from the United States leave the teaching profession each year, an attrition which costs nearly \$USD2.2 billion annually due to inadequate support, isolated working conditions and other variety of reasons (Haynes, 2014), and close to 41% of teachers in the United States quit teaching within five years in service (R. Ingersoll et al., 2014). The scenario is similar in Asia and Europe as well. In India, nearly 50% of teachers have reported suffering from burnout (Shukla & Trivedi, 2008) and 83% of teachers in the United Kingdom reported occupational-related stress, and 67% claim that their work is impairing their physical and mental wellbeing (Precey, 2015). Studies have also reported strong linkage between teacher stress, self-efficacy and job satisfaction. Using structural equation modelling, Nathaniel et al., (2016) reported a significant association between classroom efficacy with manifestations of stress and job satisfaction.

As compared to other professions, teachers have been shown to have higher levels of exhaustion, cynicism and burnout (Hakanen et al., 2005; Maslach et al., 2001). Research has also reported strong associations between physical, psychological and behavioural health problems among teachers, which include more medical consultations (Jarvis & Woodrow, 2005) and increased medication usage (The National Association of Schoolmasters Union of Women Teachers, 2016). This calls for teachers working conditions and their health needs to be recognised, and countless researches have been carried out over decades in Europe and North America (Flak et al., 2011). Illnesses, early retirement and absenteeism among teachers have become an important study area looking into their negative impacts on teacher's health. Most frequent stressors include

teaching, role conflict or ambiguity, contradictory objectives & expectations, high workload, time pressure, prolonged periods of peak workload and multiple role-playing at schools (S. Bradley et al., 2007).

Teachers today are finding themselves to be under greater pressure due to demands, expectations and varied responsibilities. The balance between being educators and role models in addition to paperwork and report preparation has led to a steady increase of stress levels among teachers which is supported by numerous studies conducted over decades in both developed and developing nations (Ahmad, 2017; Austin et al., 2005; Greenglass & Burke, 2003; Salahudin, Abdullah, Hitam, & Idrus, 2007).

Kyriacou (1987) paved the way for stress studies among teachers with subsequent research conducted in certain niche areas. Kyriacou also proposed a model of teacher stress which defines potential stressors as physical and psychological. It also explains variables such as recognition and inadequate resources as potential additional stressors. A study conducted in Scandinavia reported that psychiatric and psychosomatic disorders are the leading causes of early retirement among teachers due to burnout and exhaustion as a result of continuous stress exposure (Sveinsdottir, Gunnarsdóttir, & Friðriksdóttir, 2007). Another notable study among different professions found that nearly 67% of teachers reported having work-related stress in comparison with 35% on non-teachers (Cox & Brockley, 1984). In the United Kingdom, education recorded the highest prevalence of work-related stress in the broader industry category with 1780 cases per 100,000 teachers a year (Health and Safety Executive, 2016).

Teachers mostly suffer from similar workplace stressors. One study reported that stress and strain similarities between two nationalities of teachers far outweighed their differences (Pithers & Soden, 1998). These stressors can be categorized into two main groups, namely individual and organizational stressors (Cherniss, 2003; Jepson &

Forrest, 2006; Nahavandi, 1999). Although teacher stress is relatively widespread, they have shown marked differences in their reactions towards stressors (Milstein & Farkas, 1988). Despite these differences, teachers generally report symptoms of psychological distress (Le Fevre et al., 2003) due to demand-associated stressors/psychosocial climate factors such as poor time management, high workload, student behaviours, parental pressures and lack of support from supervisors and colleagues (Abel & Sewell, 1999; Ahmad, 2017; Billehøj, 2007). Other stressors include organizational factors (fairness, lack of resources) (Hassard et al., 2016; Yilmaz, 2010), environmental (noise, overcrowding and poor indoor air quality) (Å. M. Hansen, Meyer, & Gyntelberg, 2008; Sveinsdottir et al., 2007) and intrapersonal factors (personality, personal vulnerability and coping styles) (Austin et al., 2005; Billehøj, 2007; Greenglass & Burke, 2003; Hassard et al., 2016). Left unchecked, the negative effects associated with teachers include psychological, behavioural, physiological and finally exhaustion and burnout. This in turn leads teachers to early retirement, having both physiological and mental illnesses, interpersonal problems, irritability and lacking efficiency & productivity (Abel & Sewell, 1999; Ahmad, 2017; Feuerhahn, Stamov-Roßnagel, Wolfram, Bellingrath, & Kudielka, 2013; Hassard et al., 2016; Hong, Tan, & Bujang, 2012; Jepson & Forrest, 2006).

Some teachers have been able to cope with stress well by applying a process called 'experiential avoidance.' It acts as a mediator and moderator between internal and external experiences with behavioural and psychological complications. It is a kind of coping mechanism that mediates stress and negative outcomes among teachers (Hayes, Luoma, Bond, Masuda, & Lillis, 2006).

Some studies have shown slightly different findings. A study in Italy has found that although psychosocial climate stressors are not associated with stress, it, however, leads

to depersonalization, emotional exhaustion and intensifies symptoms (Tschiesner, Tauber, Martina, & Farneti, 2014). Another has shown that there may be distinct differences on sources of stress and its degree, depending on locality and developed status of the country of origin (Bhagat, Steverson, & Segovis, 2007).

2.2.2.7 Stress among teachers in Malaysia

As of 2017, there are an estimated 422,505 teachers in the public sector in Malaysia under the purview of the Malaysian Ministry of Education. The total number of teachers increased by approximately 0.36% from the previous two years (Ministry of Education Malaysia, 2017b). From this estimate, approximately 49% of these teachers are from regular secondary and primary vernacular schools. It is projected that the number of teachers in the country will increase in tandem with the population increase. With the ever-changing landscape of demands and pressures by the ministry and government in terms of introduction of new subjects, Key Performance Index (KPI) set standards, government initiatives, change of medium of instruction and role ambiguity, teachers in Malaysia have been complaining of low esteem, tension-stress and burnout (Faisal Khan, Yusoff, & Khan, 2014; Muniandy, 2016). However, no intervention or solution has been proposed to solve this matter despite growing evidence of stress among teachers. A recent study conducted in Malaysia found the prevalence of stress among teachers at 20.2% (Masilamani et al., 2012).

Although much has changed in the dynamics of education in Malaysia, the one thing that has not changed are the expectations of the teaching community. In an article in The Star newspaper, a teacher explained the many reasons why teachers in Malaysia are being burdened with stress (Muniandy, 2016). Teachers are required to practice latest teaching techniques in order to facilitate student's freedom, growth and enhance critical thinking. In addition to teaching and imparting knowledge, they are also required to be

equipped with the latest teaching methods, skills and knowledge. The introduction of HOTS (Higher Order Thinking Skills) to encourage students to think outside the box is used to generate creative and critical thinkers. However, most teachers who are expected to expose HOTS questions should be trained on the pedagogical knowledge of HOTS and not just how to develop those questions. Most teachers are unclear on the significance of HOTS. In addition to that, teachers are also expected to be involved in Professional Learning Community (PLC) which requires teachers to meet on a regular basis to discuss and share best teaching practices with other teachers while instituting action research. As demands become more evident which includes being immersed in clerical work on a daily basis, teachers are also required to conduct programmes, oversee co-curricular activities, attend meetings and later work on documentation; and prepare students at events and competitions at the zone, district and state levels. Besides multiple roles as caretakers, educators, disciplinarians, counsellors, confidante, and carrying out non-teaching chores, teachers are also required to ensure lesson plans are in place the next day. To top it off, they must put up with overprotective and difficult parents when they try to reprimand naughty students. Sudden checks from officers from the inspectorate to observe teaching in classrooms does not help a teacher's situation either. Despite all the gripe and frustration, many teachers still take their work home for marking books and examination papers.

The ability to measure stress among teachers is important as it can help understand the causative reasons and methods to overcome the negative outcomes, especially stress and burnout. Burnout in this context, is defined as the inability to perform functionally and optimally due to extensive exposure of occupational stress (Friedman & Farber, 1992; Hakanen et al., 2006). A local study by Samad et. al, reported that nearly 72% of teachers in the Klang valley experienced moderate stress and about 12% had low mental health status. The significant contributing factor to stress was reported to be heavy

workload (Samad, Hashim, Moin, & Abdullah, 2010). Teachers from the state of Selangor and Federal Territory of Kuala Lumpur (WPKL) have also been reported to be most stressful as they have been found to spend approximately 74 hours per week for teaching and extra-curricular activities as compared to other parts of Malaysia (Sapidin, 2005).

2.2.2.8 Effects and the physiology of stress on the human body

Stress studies are vast and deep. It covers various types of stresses, its association with certain factors, and effects. Studies on the effects of stress have been ongoing for decades, and its impact on the human body have been proven by both clinicians in many fields and research bodies. Its effects on the cardiovascular, endocrine and sympathetic & parasympathetic nervous systems have enormous empirical evidence to date. Even though some stress is considered healthy or good to achieve necessary goals and an integral part of the 'fight-or-flight' sympathetic response, excessive amounts have detrimental consequences which cause systemic damages.

In biological terminology, stress occurs when an organism fails to appropriately respond to a certain threat (Randall, 2010). Although stresses today are far more benign compared to during the palaeolithic era, its effects are equally detrimental to the human body. When stress reaches a harmful level, its negative impact due to high amounts of glucocorticoid release causes weight gain, decreased immune function and developmental impairment (Randall, 2010). The endocrine system which regulates glucocorticoid release correlates with physiology and neurochemistry of stress. The three main glands which respond to stress response are the pituitary and hypothalamus gland (in the brain) and the adrenal glands (above the kidneys) which releases adrenaline, noradrenaline and cortisol.

In a stressful situation, the hypothalamus first secretes the corticotropin-releasing-hormone which then stimulates the release of the adrenocorticotrophic hormone by the pituitary gland. The adrenocorticotrophic hormone will then stimulate the adrenals which releases glucocorticoids (including cortisol), which then initiates a metabolic sequence. Once the stressful situation has resolved, the cycle stops (Peters, Kubera, Hubold, & Langemann, 2013).

In highly stressful situations however, the endocrine system will undergo an over-drive sequence, thus excessive release of these hormones will initiate the negative adaptive lifestyle of a person such as smoking and alcohol intake to suppress the emotion caused by the elevated levels of the secreted hormones (Aardal-Eriksson, Eriksson, Holm, & Lundin, 1999; An et al., 2016; Bergmann, Gyntelberg, & Faber, 2014). When stress levels remain persistent, the elevated glucocorticoids in the system causes hypertension, elevated glucose in serum, compromised immunity and even cardiovascular risks (Everly Jr & Lating, 2012; O'leary, 1990; Rosmond, 2005). Umpteen stress research have also reported poor psychological and mental health, fatigue and psychosomatic symptoms due to the effects of prolonged exposure to stress, also known as chronic stress (Bergmann et al., 2014; Bosch, Ring, de Geus, Veerman, & Amerongen, 2002; Chandola, Brunner, & Marmot, 2006; Colligan & Higgins, 2006; De Lange et al., 2004; Dewa et al., 2007; Flak et al., 2011; Gluschkoff et al., 2016).

Montoro in 2009 described the effects of stress on allergies. The excessive secretion of stress hormones causes an imbalance in the T-helper Cell 1 and T-helper Cell 2 responses. This is because the activated hypothalamo-pituitary axis which is continuously secreting glucocorticoids reduces Interleukin 12 (IL-12) proteins, which in turn reduces the T-helper Cell 1 mediated response. This would cause the disruption in the T-helper Cell 1 and T-helper Cell 2 balance triggering an allergic reaction (Montoro

et al., 2009). Researches have also found strong associations between stress and tension-headaches (due to its hyperalgesic effects) (Houle & Nash, 2008), peptic ulceration (including bleeding ulcers) (Levenstein, Rosenstock, Jacobsen, & Jorgensen, 2015) and musculoskeletal disorders (Gerr et al., 2014). According to Levenstein et al. in a Danish prospective study, the incidence of peptic ulceration was significantly higher among subjects with the highest tertile of stress scores (adjusted odds ratio 2.2, 95% CI 1.2-3.9, $p < 0.01$). The risk of getting peptic ulcers was higher regardless of *Helicobacter pylori* infection or nonsteroidal anti-inflammatory drugs (NSAIDs) abuse (Levenstein et al., 2015). Using the 'Strain Hypothesis' by Karasek et al. (Karasek Jr, 1979), on manufacturing workers, Gerr et al. in a prospective study reported high risk of hand/arm disorders in both high demand/high control (Active)[Hazard Ratio, HR = 4.49, 95% CI 1.23, 16.4] and high demand/low control (High Strain)[HR = 5.18, 95% CI 1.39, 19.4] job categories when compared to low demand/high control (Low Strain) job category. A strong association was also found between neck and shoulder disorders among those in the low demand/low control (Passive) job categories [HR = 6.46, 95% CI=1.46, 28.6] (Gerr et al., 2014).

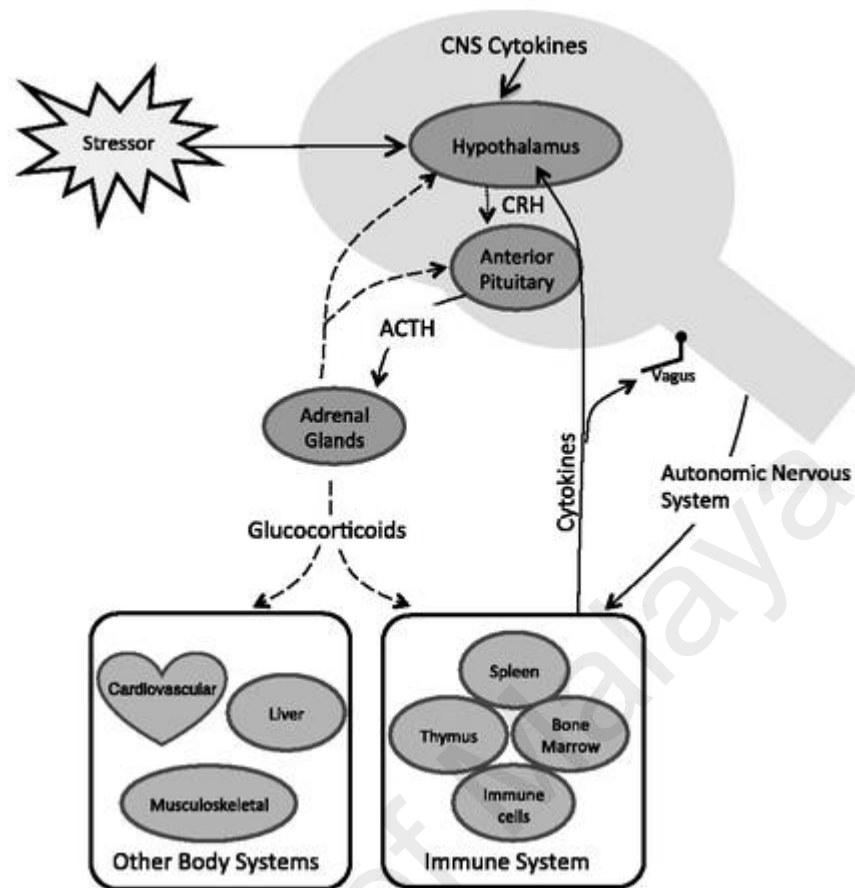


Figure 2.6 : Stress and the hypothalamic-pituitary-adrenal (HPA) axis

2.2.3 Job satisfaction

Job satisfaction has been cited as one of the most researched topics among organizational and industrial psychologist globally. It has particularly achieved prominence among researchers the past 65 years and is typically associated with psychosocial matters dealing with job design and leadership concerns. Job satisfaction is defined as the “pleasurable or positive emotional state resulting from the appraisal of one’s job or job experience” (Locke, 1969, 1975). It is deemed important as it measures the level of contentment employees feel about work, which eventually affects performance. Job satisfaction measures chronic mood state and shows a predictive path to altruism, but not necessarily as a generalized compliance. As the feeling of

satisfaction is subjective, it is heavily influenced by an employee's ability to complete required tasks, level of support from the organization, communication and fairness at the workplace. Prior research has revealed two main types of job satisfaction; which are affective job satisfaction, and cognitive job satisfaction. Affective job satisfaction is a worker's emotional feeling about their work on the whole, whereas cognitive job satisfaction is how satisfied workers feel on some aspects of their job, for example of pay or benefits (Moorman, 1993).

Organizations and employers in this time and age understand the need for workers to be satisfied with their jobs as it directly, and indirectly impacts job performance and efficiency (Huang et al., 2016). It is therefore crucial to be able to measure job satisfaction in determining resilience among workers. Studies have shown that contrary to widespread belief, high-paying jobs or positions does not necessarily entail the satisfaction of one's job. This is of significant concern as positive human resource practices in an organization has been reported to proportionately increase shareholder value (Attridge, 2009).

Although measuring job satisfaction is difficult as it's a very subjective perception, factors have been known to quantify job satisfaction include salary, workload, promotion, supervisor & co-worker support and communication (Spector, 1985, 1997). Poor job satisfaction has been associated higher job turnover rates, decreased organizational commitment and performance levels, absenteeism, stress and even burnout and poor mental well-being (Jahangir, Akbar, & Begum, 2006; Spector, 1997).

Improving job satisfaction essentially depends on organizational commitment to improving the working conditions of employees. This includes providing a safe and healthy working environment, having a fair effort-rewards balance, good supervisor and co-worker relationships and conducting job enrichment programs such as job training,

surveys, team building exercises and incentive programs (Fatimah et al., 2011). When an employee or worker performs optimally at work; and further goes above and beyond their job scope which is not part of their contractual task to achieve or complete their work/assignment, this feat is known as Organizational Citizenship Behaviour. Bommer et al., stated that “the notion of people forming ideas predicated by social information processing drawn from the working environment and the behaviour of co-workers, are very salient to an employee’s environment. Frequent citizenship episodes will likely lead to attitudes where organizational citizenship behaviour is deemed appropriate and normal, thus influencing other individuals to replicate this ‘normal’ behaviour” (Bommer, Miles, & Grover, 2003). Such positive changes prove that employees learn from their workplace environments, and corporate culture is essential in creating job satisfaction.

Job satisfaction can also be classified based on a worker’s feelings about their jobs, termed ‘Global Job Satisfaction’ and ‘Job Facet Satisfaction’. Global job satisfaction refers to a worker’s overall feelings about their job or job tasks; whereas job facet satisfaction focusses on specific job aspects such as growth opportunities, working environment, salary, work support and others (Mueller & Kim, 2008). Specific aspects of job improvement that may require improvement could be identified by measuring tenets from job facet satisfaction. This, in turn, will be able to improve overall job satisfaction among employees as organizational and other issues experienced by them could be addressed pertinently (Kerber & Campbell, 1987).

In conclusion, the level of job satisfaction is predominantly determined by the extent to which job tasks meet or exceeds expectations. However, it is not always about just how much an employee or worker enjoys their work, but also on how much they relish individual tasks within their role (Taber & Alliger, 1995).

2.2.3.1 Theories of job satisfaction

Theories of job satisfaction correspond typically with motivation. Many theories by researchers attempt to explain causation for job satisfaction, among which are most prominent are Maslow's Hierarchy of Needs Theory, Herzberg's Two-factor Theory, The Dispositional Approach Theory and The Job Characteristics Model Theory.

(a) *Maslow's Hierarchy of Needs Theory*

Maslow's Hierarchy of Needs Theory forms the basis of many researchers' assessments and discussions on job satisfaction. The theory states that human needs have a five-level hierarchical system which consists of physiological needs such as adequate food, water and good shelter at the lowest level; followed by safety such as security and stability; then, by sense of belonging such as affection, affiliation and acceptance; followed by self-esteem boost which seeks recognition, respect and approval; and finally of self-actualization (Maslow, 1943, 1954). The theory states that essential needs (those lower in the hierarchy) must be met first, before progressing towards more complex needs located higher up on the hierarchy. Although this theory is more common among the motivation literature circa, its tenants can be applied in work settings to examine job satisfaction. For example, finance (salary, bonus, health benefits) are among basic physiological needs in an organization. Once satisfied, safety concerns in a working environment which include feeling physically safe and/or having job security within the company and supporting policies. Next, is the sense of belonging at the workplace; if an employee feels comfortable as a part of a team by having positive relationships with their colleagues, supervisors and subordinates. When this is satisfied, they will seek value, recognition and appreciation from the organization on the whole. Finally, an employee will seek self-actualization, where they are examining the prospects of growth in order to become something worth becoming. The progression from one level/state to the other contributes to the overall process of self-actualization.

Some opposing views have expressed that this theory does not consider cognitive processes on an employee, and therefore lacks evidence for usage in job satisfaction elucidations (Spector, 1997). In addition to that, the conceptual understanding of self-actualization is difficult, paired with a meagre measurement technique or realization of its final goal (Dwyer & Ganster, 1991).

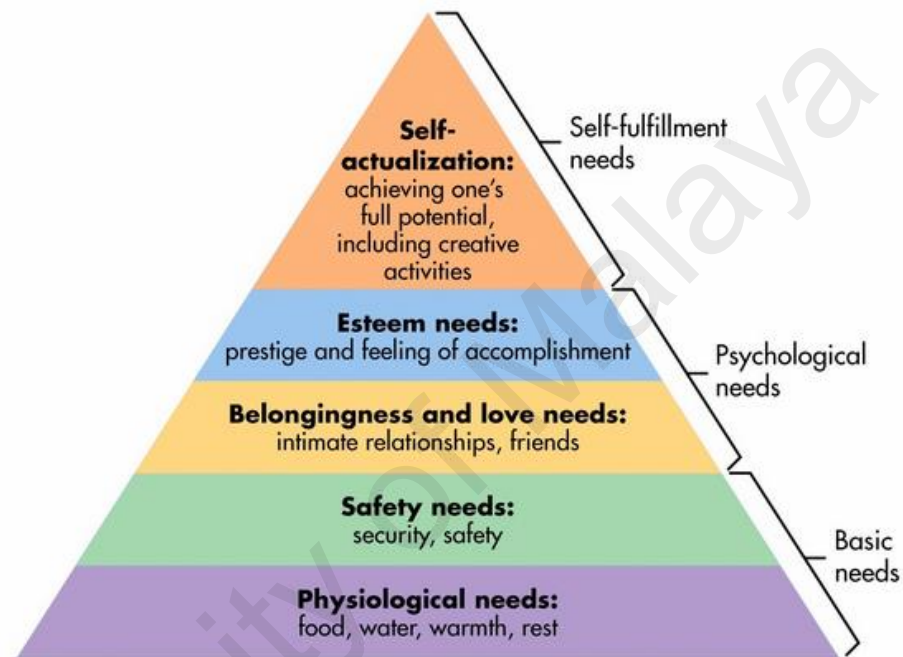


Figure 2.7 : Maslow's Hierarchy of Needs

(b) Herzberg's Two-Factor Theory

Herzberg's Two-Factor Theory, or also known as the Motivator-Hygiene theory, states that certain characteristics of a job influences satisfaction, while a different set of factors may cause dissatisfaction. Factors that may cause satisfaction (intrinsic or motivating factors) include recognition, achievement, advancement, growth, and other factors related to actual performance of work; whereas factors that may cause dissatisfaction (extrinsic or hygiene factors) include security, salary, working conditions, relationships at work and organizational policies. Herzberg also states that satisfaction and dissatisfaction are not opposites of a continuum, but rather independent of each other (Herzberg, 1986; Herzberg, Mausner, & Snyderman, 2011). In addition to

that, Herzberg also explains that in order to improve satisfaction and attitudes, employers need to enhance both factors simultaneously. When hygiene factors are low, an employee is deemed dissatisfied; however, when these factors improve/become high, it does not necessarily mean the employee is satisfied, but rather is not dissatisfied. This is because employee satisfaction is dependent on motivational factors. This complexity in accounting for employee feelings is subjective, as an employee can feel neither dissatisfied or satisfied, or both satisfied and dissatisfied at the same time depending on the influencing factors.

Herzberg's Two-Factor Theory has four possible combinations:

- i. High Motivation + High Hygiene : Employees highly motivated and have few complaints (Best situation)
- ii. High Motivation + Low Hygiene : Employees motivated, however have many complaints (Job is thriving, but salary and working conditions are below expectations)
- iii. High Hygiene + Low Motivation : Employees have few complaints, but not motivated (Monotonous working attitude)
- iv. Low Hygiene + Low Motivation : Employees not motivated and many complaints (Worst situation)

Herzberg's Two-Factor Theory faced both supportive and opposing views from researchers. Opposing researchers criticized the theory due to alleged weakness on the initial study methodology. Others, however, such as Hill and Manisera et al., were able to prove Herzberg's theory in their research (Hill, 1986; Manisera, Dusseldorp, & Van der Kooij, 2005). For example, Manisera et al., investigated component structures of job satisfaction as to whether they were independent, or consisted of extrinsic factors. The study found that the two subscales which were examined had, in fact, different aspects

of job satisfaction, yet interdependent, in line with Herzberg's Two Factor theory (Manisera et al., 2005).



Figure 2.8 : Herzberg's Two-Factor Theory

(c) *The Dispositional Approach Theory*

Theorists have long claimed that personalities are developed via traits known as dispositions. Trait measurements are defined as habitual patterns of emotions, thoughts and behaviour. As such, the dispositional approach explains that job satisfaction is correlated with personality, and can be used to examine the level of satisfaction as it remains stable and constant over time (Judge, Locke, & Durham, 1997). Studies have shown that job satisfaction remains stable up to 5-year periods even with substantial workplace changes (Staw & Ross, 1985). Another study which investigated genetic factors reported that nearly 30% of job satisfaction levels differed among monozygotic twins who were raised apart in different environments (Arvey, Bouchard, Segal, & Abraham, 1989). Other findings using this theoretical approach revealed that openness, agreeableness, conscientiousness, extraversion and neuroticism (also known as the 5-factor model of personality) have only simple correlation with job satisfaction (Judge, Heller, & Mount, 2002).



Figure 2.9 : The Dispositional Approach Theory

(d) The Job Characteristics Model Theory (JCM)

The Job Characteristics Model Theory by Hackman and Oldham (1976) states that the five fundamental job characteristics of autonomy, skill variety, task significance, task identity and feedback mechanism influences three critical psychological states (work meaningfulness, outcome responsibility and knowledge of results), which subsequently lead to potential personal and work outcomes which includes job satisfaction. Higher levels of skill variety, task significance and task identity would contribute towards increased meaningfulness of work, whereas increased autonomy and feedback would, in turn, increase work outcome responsibility and value outcome of their efforts respectively. The JCM theory has good empirical support including a meta-analysis which found that critical psychological states play a crucial theoretical role within the JCM (Behson et al., 2000).

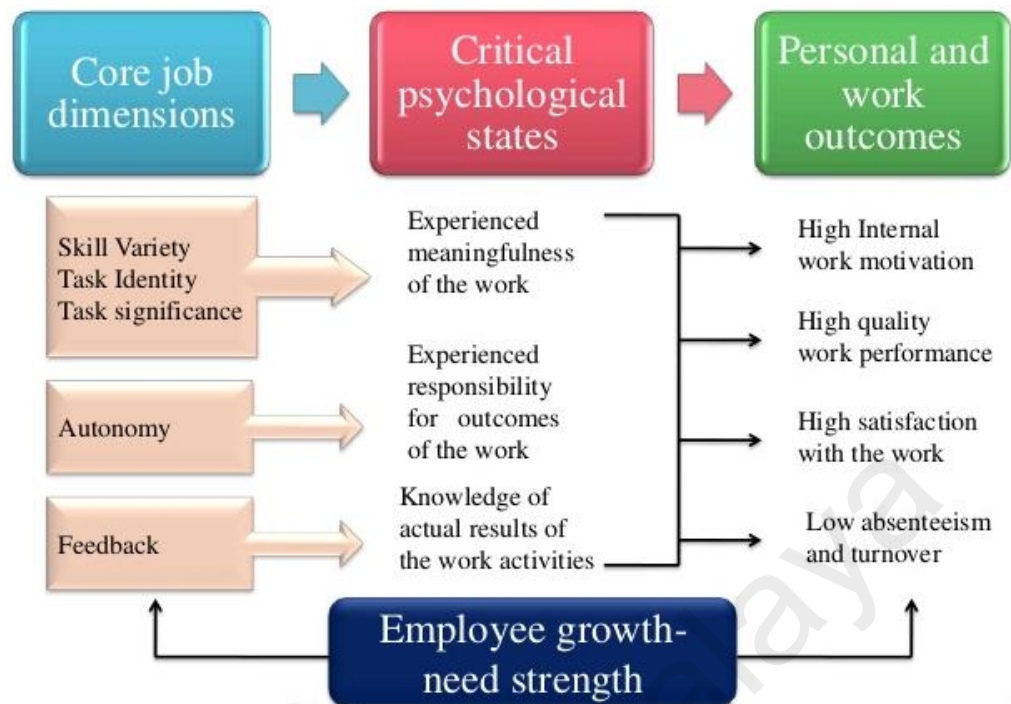


Figure 2.10 : The Job Characteristics Model (JCM) Theory

The above-mentioned theories are considered the main theories of job satisfaction with literature suggesting other factors and theories. This includes the expectancy theory proposed by Tolman and Lewin (1951) and applied to the workforce by Vroom (1964). The theory explains how employees choose among available options, ones they perceive as means of obtaining goals by perceiving the probability that the mentioned effort will also lead to good performance. Studies by Baron and Greenberg (1990) have concurred with this theory. Others such as Locke's value theory (Locke, 1969) of belief, experience and commitment in attaining job satisfaction offers insight to what constitutes satisfaction at the workplace either among individuals, or groups of people.

All these theories on job satisfaction have in some way proven variables which influence job satisfaction, either with or without adequate empirical evidence. It cannot be denied that some factors have more impact than others, such as socio-demographic

and cultural factors. Thus, the integration of these entire possible variables could eventually explain the true significance of job satisfaction.

2.2.3.2 Importance of job satisfaction

Job satisfaction is important as it can affect an employee's attitude, beliefs and behaviour. Attitude, belief system and behaviour will make an employee to either work harder or lesser as they spend at least a third of their time daily at their workplace. In addition to that, job satisfaction has been associated with performance levels, absenteeism, higher turnover rate and even physical and mental wellbeing. Studies have also shown that dissatisfaction at work could also possibly lead to dissatisfaction in other areas of life (Lindfors et al., 2007).

The correlation between job performance and job satisfaction has been debatable over many years. Some researchers have found positive association between job performance and job satisfaction (Elovainio, Kivimäki, Steen, & Kalliomäki-Levanto, 2000; Huda et al., 2004; Moorman, 1993), while others have found negative association, or weak to moderate association between the two (Christen, Iyer, & Soberman, 2006; Iaffaldano & Muchinsky, 1985). Research by Organ et al., on organizational citizenship behaviour (OCB) concluded that attitude with the interjection of OCB could improve job satisfaction (Organ, 1988).

In addition to performance, job dissatisfaction has also been associated with higher levels of employee absenteeism. Employees who are unhappy with their jobs would naturally not come to work citing excuses such as calling in sick or even truancy at work. Even if an employee has a mild illness such as the flu, he/she may take the opportunity to miss work if they feel unhappy or unmotivated at their workplace. Satisfied and happy workers, however, are motivated to come to work to meet deadlines and face positive challenges at work (Fatimah et al., 2011).

Another important issue affecting organizations when employees are dissatisfied with their workplace are high turnover rates. Employees who are unhappy would continue looking for opportunities elsewhere as they seek more contentment at their new place of work. A recent study on turnover intention and turnover rates revealed that these two factors had a strong inverse correlation with satisfaction mediated by workplace culture (Medina, 2012). Human resource most difficult tasks at any organization are figuring out ways of employee retention when often faced with high turnover rates. Finally, studies have also shown association between low job satisfaction with early retirement, mostly among teachers (Klassen & Chiu, 2010; Ooi & Abdullah, 2016; Ramsey & Liu, 2008).

2.2.3.3 Job satisfaction among teachers

Research pertaining to job satisfaction among teachers started to gain prominence due to the gradual decrease in popularity and status of the teaching profession (Gendin & Sergeev, 2002), associated with increased attrition rate globally over the past two decades (Buckley et al., 2005; Skaalvik & Skaalvik, 2016; Sutchter, Darling-Hammond, & Carver-Thomas, 2016). Changes in policies, legislation and increased demand and expectations are cited among the main factors of decreased job satisfaction (Iaffaldano & Muchinsky, 1985; Michaelowa & Wittmann, 2014). Investigating experience in respect to work situation is a necessity if adequate intervention is to be instituted to tackle this problem.

The most fundamental factor determining students' performance is the quality being taught. Teachers play an essential role in developing student's both academically and socially, in addition to being an influential factor in determining student progress throughout their developing years. Over the years, teacher's roles have increased from just solely teaching, to doing administrative work, counselling, coaching and

disciplining. This role ambiguity has put on tremendous strain on teachers, leading to exhaustion, burnout and increased job dissatisfaction (Elovainio et al., 2000; Lee & Wilbur, 1985). Piling on factors of security, student's attitude and even relationships with supervisor and co-workers in relation to the above-mentioned theories of job satisfaction, teacher's expectations which are not met translates into physical and mental exhaustion and burnout. Stress from poor working conditions has been cited as one of the biggest factors of job dissatisfaction among teachers (Ramsey & Liu, 2008). Dissatisfied teachers have been known to have lower levels of commitment and at higher risk of absenteeism, leaving the teaching profession for other career options and opting for early retirement (Evans, 2001; R. M. Ingersoll, 2001).

Teachers, especially in primary and secondary schools, are perceived as the backbone of Malaysia's development. They play an important role in nurturing harmonization and oneness in a multi-ethnic country that will carry the nations' aspirations towards becoming a fully developed country. A teacher's contribution in disseminating knowledge and cultivating the core tenets of research and innovation among students has always been emboldened. Virtues instilled mould students into becoming useful and productive citizens of the nation, socially interactive with unity amongst all races while building national identity within them (Roslan, Ho, Ng, & Sambasivan, 2015). In addition to this, teachers instil virtues amongst their students to face the ever-growing challenges of globalization. As education is the pillar to a nation's success, growth and evolution; so are teachers the pillars towards achieving this goal. Key policy decisions with the liberalization of the education system have shown evidence of academic achievement as the cornerstone from where national growth is constructed (Knight & Morshidi, 2011).

Every employee desires high levels of job satisfaction, and teachers vie the same thing. Teachers who are less stressed and more satisfied are more motivated, productive, committed and inspired to work harder and better at their schools (Billehøj, 2007). However, studies have shown that teachers have been having declining levels of commitment and motivation (Canrinus, Helms-Lorenz, Beijaard, Buitink, & Hofman, 2012). Amongst factors cited are role ambiguity, increased workload, lack of support system and stress. These factors eventually lead to job dissatisfaction and affect both physical and mental wellbeing. A study among physical education teachers in India found a significant association between work-related stress and job dissatisfaction, ($r=0.48$, $p<0.05$) (Shivendra & Kumar, 2016). Literature has also shown that years of service, classroom and student management, job stress and job satisfaction have strong associations with each other. In a study by Klassen and Chiu (2010) which had examined correlations between the three domains of self-efficacy with two types of job stress (workload and classroom stress), teachers with higher workload stress were found to have better classroom management self-efficacy, whereas teachers with higher classroom stress had lower levels of job satisfaction and self-efficacy. Self-efficacy in this context is the teacher's belief of their own capability to impact student learning.

In a survey conducted among academicians globally, 88% have said that teaching is a source of personal and job satisfaction, and is the reason they chose the profession as a career (Grove, 2017). This sentiment is shared by many educators worldwide. However, the teaching profession has also brought about stress due to demand from supervisors, co-workers, students and lack of recognition when performed well (Greenglass & Burke, 2003). Although teachers have been found to gain satisfaction from their work, factors such as low job control and autonomy, role ambiguity and conflict with colleagues, supervisors and students have greatly overshadowed the gains (Greenglass & Burke, 2003). Liu et al., has reported that gender too plays a role in job satisfaction,

where female teachers have reported less job satisfaction as compared to their male counterparts (Ramsey & Liu, 2008).

2.2.3.4 Factors and effects of job dissatisfaction among teachers

Job satisfaction among teachers were mostly related to three main factors according to numerous literature, which are factors pertaining to salary, working conditions and surrounding, and job demands or workload (Carson, Hemphill, Richards, & Templin, 2016; Crossman & Harris, 2006; Klassen & Chiu, 2010; Mtyuda & Okeke, 2016; Nathaniel et al., 2016; Reilly, Dhingra, & Boduszek, 2014; Skaalvik & Skaalvik, 2015). Factors of job satisfaction, however, differ among countries depending on the level of income. Teachers from high income and western countries have been found to have more affinity towards intrinsic factors in ascertaining job satisfaction. In a study conducted in Australia, most teachers reported respect & recognition, teaching & leadership expertise, autonomy and decision-making ability as major factors in influencing job satisfaction (Cameron & Lovett, 2015). Similarly, in the United Kingdom, job satisfaction of teachers were mostly influenced by student learning and their achievements, relationships with superiors and co-workers, professional development and workload manageability (Gazioglu & Tansel, 2006; Klassen & Chiu, 2010). Teachers in middle and lower income nations reported a mixture of both intrinsic and extrinsic factors as the influence of job satisfaction. In a study conducted in China, a vast majority of teachers reported security, salary, working conditions and job demands as factors that influence job satisfaction (Shujie & Onwuegbuzie, 2014). Studies conducted in Namibia (Evy, Louw, & Badenhorst, 2008), India (Shivendra & Kumar, 2016) and Malaysia (Abdullah, Uli, & Parasuraman, 2009) reported similar findings.

Lack of job satisfaction has been found to result in increased teacher absenteeism, aggressive behaviour towards colleagues and students; and early retirement from the teaching profession (S. Bradley et al., 2007; R. M. Ingersoll, 2001; Skaalvik & Skaalvik, 2016). According to Steyn (1992), job satisfaction implications of teachers extend to the whole educational system as well. This is because job satisfaction influences physical and psychological well-being, life expectancy and turnover rates of the teachers. Lack of job satisfaction among teachers has been cited as the possible cause of teaching crisis in the UK (Crossman & Harris, 2006; The National Association of Schoolmasters Union of Women Teachers, 2016). Studies have also reported burnout, exhaustion and cynicism as effects of job dissatisfaction (Billehøj, 2007; Skaalvik & Skaalvik, 2007; Steinhardt et al., 2011). According to Buckley et al. (2005), the manifestation of job satisfaction has implications for the teacher as well as for the educational system in which he or she belonged. The different attitudes of the teacher, physical well-being and life expectancy; absenteeism and turnover; as well as success in the profession, are all dependent on the degree of job satisfaction experienced by the teacher. Buckley adds that even the effectiveness of an educational system depends largely on the job satisfaction of the teachers employed in the system.

Past study findings on teachers have shown that higher job satisfaction, lower stress levels and conducive working environment are the key towards reducing attrition rates and improving retention in the teaching profession. Studies have also shown an inverse correlation between job satisfaction and teacher burnout, where exhaustion and burnout corresponds to lower job satisfaction levels, and vice versa (Abel & Sewell, 1999; Evy et al., 2008; Feuerhahn et al., 2013; Seidel, 2014; Skaalvik & Skaalvik, 2011b, 2015). Some studies revealed that despite teachers being unhappy and wanting to leave, the reason they continue teaching is that they are also satisfied with other aspects at work, and hence indifferent towards it (Bivona, 2002; Ramsey & Liu, 2008).

2.2.3.5 Job satisfaction among teachers in Malaysia

In tandem with the growing population of the nation, the number of schools in Malaysia has had a steady growth as well. The number of public secondary schools in Malaysia has risen from 2340 in 2013 to 2424 in 2017 (Ministry of Education Malaysia, 2013, 2017a). This indirectly has resulted in more secondary school teachers being recruited to meet the growing demand. In the most populous state in Malaysia, Selangor there is a total of 936 schools in 2017, of which 277 are secondary schools (Jabatan Pendidikan Negeri Selangor, 2017). The population of Selangor is approximately 6.29 million with a density of about 674/km² (Department of Statistics Malaysia, 2017a, 2017e). The growth of schools is not uniform throughout the state, but relatively similar in all urban areas. Thus, with the growing number of schools, the number of teachers employed is concurrently rising as well in the state.

Teachers in Malaysia are expected by the education ministry and various stakeholders to uphold the nation's aspirations of achieving globally competitive and comparable education standards by producing competent and critical-thinking students (Hashim, 2012). As outlined in the Malaysian National Education Policy and National Education Blueprint, education is one of the most important organizations in the country as the driver of the national agenda. It also states that: "Education in Malaysia is a continuous effort in developing an individual who is balanced and harmonious physically, emotionally, spiritually and intellectually. This is to produce a Malaysian citizen who is honourable, knowledgeable and competent in contributing towards a harmonious family, society and country" (Bahagian Perancangan Dan Penyelidikan Dasar Pendidikan, 2012). The blueprint has however cited some serious gaps which could impede job satisfaction levels of teachers in the public sector such as such as lack of supervisory and support systems for teachers. Although entrance via merit into training is upheld, there was no mention about the need for ethnic balance in all levels

of teaching be it at schools or administrative positions at every district, state or federal level (Navaratnam, 2012). Closing the education gap and improving the teaching profession in Malaysia by enhancing teacher quality, welfare and career have been suggested (Malakolunthu & Rengasamy, 2017).

Most teachers in Malaysia have complained being burdensome with heavy workload and holding extra positions such as class teachers-in-charge, subject head (*Ketua Panitia*), co-curricular advisors and many others (Abas, Hairul, Masood, & Esa, 2014). They are also obligated to meet the KPI's and expectations from various governmental agencies such as the district education office, state education department and the Ministry of Education itself, in addition to the expectations of stakeholders such as students, parents and society overall. In an abridged report by UNESCO on education in Malaysia, it was reported that teachers lack administrative support within schools and have an overload of administrative work and report preparations (UNESCO, 2013). Prior studies conducted have also shown that many teachers in Malaysia have complained of stressful working conditions (Hadi, Naing, Daud, Nordin, & Sulong, 2009), which leads to decreased level of job satisfaction (Abdullah et al., 2009; Jabnoun & Yen Fook, 2001). The National Union of the Teaching Profession (NUTP) had reported similar findings (Sun, 1999).

A conducive working environment plays a very important role in determining job satisfaction which numerous studies have concurred with (Dwyer & Ganster, 1991; Hakanen et al., 2005; Iaffaldano & Muchinsky, 1985). Similarly in Malaysia, teachers have reported lower job satisfaction due to stress, heavy workloads, role ambiguity, poor support and reduced fairness at workplace (Abas et al., 2014; Abdullah et al., 2009; Fatimah et al., 2011; Huda et al., 2004; Jabnoun & Yen Fook, 2001). Abu Bakar Nordin reported that teachers in Malaysia have expressed unhappiness and displeasure

on the way public school teachers are awarded promotion and the merits accorded to it. This is due to the weakness in the evaluation process and fairness in awarding promotion as teachers who are about to retire, or those teaching examination classes are those who are usually preferred (Nordin, 1986). Malaysian teachers have also cited factors such as additional clerical work, attending seminars and courses, interchangeability on the medium of instruction and school environment as reasons teachers having more stress, retire early and migrate to other professions (Sharif, 1991).

The teaching profession has reached its crossroads in Malaysia. Although remuneration and the financial aspects have improved, other factors have however not evolved with the times, especially in terms of job modification processes, workload, stress-reduction practices, merit-based promotions and many others. In order to produce better leaders in the future, the welfare of the 'shapers' of this future leaders needs to be looked into now. Looking at the Programme for International Student Assessment (PISA), which is ranking of students understanding in various subjects such as mathematics, reading, science and other subjects, Malaysia's ranking has been declining steadily, far beyond our neighbours, and not even among the average centiles. Similar findings were found in the Trends in International Mathematics and Science Study (TISS), where Malaysia's ranking had one of the steepest drops among other participants over a span of ten years (Mozihim, 2014). One has to question as to how this came about. Are there problems with students, teachers, the environment or system? The World Bank had reported that education standards in Malaysia were worsening despite higher government spending on education (twice as compared to other South-East Asian countries) and it explicitly mentioned the need to improve teacher quality than quantity (Malay Mail Online, 2013).

Factors that can improve job satisfaction among Malaysian teachers need to be identified and improved promptly to enhance both the standards of students and quality of working conditions of teachers, in the effort to reach an optimum level of production. Therefore, this study is conducted to identify factors that may cause stress and job satisfaction, and suggestions on methods to overcome them.

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Table 2.3 : Studies on job satisfaction among various occupations

Author, year of publication	Country of literature, occupation	Study design, follow up period	Number of respondents	Factors studied	Results / Outcomes
Iaffaldano and Muchinsky (1985)	United States, various occupations	Meta-analysis	74 studies, sample of 12,192 participants	Job satisfaction, job performance	True population correlation between satisfaction and performance was low ($r=0.17$). Modest correlation was found between the magnitude of satisfaction-performance correlation with nine research design characteristics.
Moorman (1993)	United States	Cross-sectional	270 employees, 225 matched pairs on employee and managers	Job satisfaction facets, organizational citizenship behaviour	Cognition-based satisfaction has more significance when compared with affect-based satisfaction. Job satisfaction with cognitive basis has a stronger correlation with organizational citizenship behaviour than job satisfaction.
Elovainio et al. (2000)	Finland, hospital employees	Cross-sectional	2900 employees from 152 hospital wards	Job control, hostility, trait anxiety, mental health, job satisfaction	Organizational effects and employee characteristics are significant in explaining mental health and job satisfaction among hospital employees. Mental health was mostly explained by hostility and trait anxiety, while job satisfaction had multilevel variation at individual and ward level due to job control.

Table 2.3, continued

Author, year of publication	Country of literature, occupation	Study design, follow up period	Number of respondents	Factors studied	Results / Outcomes
Huda et al. (2004)	Malaysia, medical lecturers	Cross-sectional	73	Occupational stress, job dissatisfaction, job strain	Prevalence of job strain:- 23.3% ; Risk factors: Psychological stressors (Adjusted OR: 1.2, 95% CI 1.0, 1.4), Created skill: (Adjusted OR 0.4, 95% CI 0.2, 0.8), Working in clinical-based departments: (Adjusted OR 18.7, 95% CI 1.6, 22.7). Prevalence of job dissatisfaction:- 42.6%. Associated factors: Decision authority ($p<0.001$), psychological demand ($p<0.001$).
Christen et al. (2006)	Unites States, grocery retailer employees from 200 supermarkets	Cross-sectional	177 observations from 226 stores	Effort, job performance and job satisfaction	Significant positive effect of job performance on job satisfaction. Monetary rewards (profit sharing) have positive effects on job performance and satisfaction.
Lindfors et al. (2007)	Finland, doctors (anaesthesiologists)	Cross-sectional	258 (53% men, 47% women)	Job control, organizational justice, work-related well-being, job satisfaction	Job control and organizational justice factors are correlated with job satisfaction and work well-being. Men more affinity towards work factors while women have more tendencies towards family-related factors.

Table 2.3, continued

Author, year of publication	Country of literature, occupation	Study design, follow up period	Number of respondents	Factors studied	Results / Outcomes
Fatimah et al. (2011)	Malaysia, secondary school teachers	Cross-sectional	169	Job satisfaction, organizational justice, organizational citizenship behaviour	Positive significant association between organizational justice (all three dimensions) with job satisfaction ($r=0.545$, $p<0.05$). Interactional justice contributed most to job satisfaction ($\beta=0.243$, $p<0.005$), followed by distributive justice ($\beta=0.243$, $p<0.05$). Positive correlation found between organizational citizenship behaviour and job satisfaction ($r=0.464$, $p<0.05$).
Klassen and Chiu (2010)	Canada, teachers	Cross-sectional	1430 (69% women, 31% men)	Teacher's self-efficacy, job satisfaction, job stress	Overall teaching stress and self-efficacy are associated with job satisfaction. Teachers with 10% more overall teaching stress have an average of 2% less job satisfaction. 10% more workload is associated with 6% overall teaching stress. Female teachers (average 13%) have more stress than male teachers. Male teachers averaged 5% better classroom self-efficacy; an excess of classroom stress by 10% is associated with 3% less instructional self-efficacy.

Table 2.3, continued

Author, year of publication	Country of literature, occupation	Study design, follow up period	Number of respondents	Factors studied	Results / Outcomes
Skaalvik and Skaalvik (2016)	Norway, high school teachers	Cross-sectional with SEM	523	Self-efficacy, emotional stress, emotional exhaustion, engagement, motivation	Time-pressure predicted emotional stress strongly ($\beta = 0.76$). Self-efficacy was negatively associated with value conflict ($\beta = -0.15$), lack of supervisor support ($\beta = -0.19$) and low student motivation ($\beta = -0.31$). Stress was strongly associated with exhaustion ($\beta = 0.69$) and negatively associated with self-efficacy. Motivation to leave teaching profession is negatively related to engagement ($\beta = -0.45$) and positively to exhaustion ($\beta = 0.33$).
Ooi and Abdullah (2016)	Malaysia, teachers from Chinese independent secondary schools	Cross-sectional	175	Job satisfaction, burnout, emotional exhaustion, personal accomplishment, depersonalization	Teacher burnout for emotional exhaustion ($M=22.93$, $SD= 10.15$) and personal accomplishment ($M=31.26$, $SD=7.47$) was moderate while depersonalization was low ($M=7.74$, $SD=5.68$). All nine facets of job satisfaction reported moderate levels. Negative association between burnout and job satisfaction ($r = -0.32$, $p<0.05$), between emotional exhaustion with some job satisfaction dimensions. Negative association was found between depersonalization with co-workers ($r=-0.20$), and communication ($r=-0.30$), ($p<0.05$).

Table 2.3, continued

Author, year of publication	Country of literature, occupation	Study design, follow up period	Number of respondents	Factors studied	Results / Outcomes
Nathaniel et al. (2016)	United States, teachers	Cross-sectional	1242, from 100 school districts	Stress, job satisfaction, poor student outcomes, negative instructional practices	Self-efficacy and student engagement have a strong association between sources of stress and job satisfaction ($\beta= 0.08$, $B= 0.7$).
Browne, Carr, Fleischmann, Xue, and Stansfeld (2018)	United Kingdom	Systematic review	46 full-text articles (22 cross-sectional, 21 longitudinal, and 3 combinations of both)	Job demands, job resources (i.e. job control), job satisfaction, effort-reward imbalance, job insecurity	High job satisfaction and high job control (positive psychosocial work characteristics) were associated with later retirement, however less evidence was found for the role of job demands, organizational resources, effort-reward imbalance and job insecurity.

2.3 Organizational Justice (OJ)

The practical implications and significance of organizational justice (OJ) in the fields of organizational performance has risen since its inception the past few decades. It was introduced by Adams in the 1960's when the Equity Theory came into play (Adams, 1965). The Equity Theory aims for a balance between an employee's input and output at the workplace. It states that an employee's motivation correlates to their perception of equity, where the higher perception of fairness equates to higher motivation level and vice versa. Organizational justice describes the role of fairness experienced by a worker/employee and their perception of impartiality and fairness at their organization and workplace (Russell Cropanzano et al., 2001). It has also recently been introduced as a new psychosocial determinant of health (Elovainio et al., 2002).

Organizational justice has been shown to correlate strongly with job satisfaction (R Cropanzano, Bowen, & Gilliland, 2007) and organizational citizenship behaviour (Fatimah et al., 2011). Perceptions of low organizational justice were also found to be associated with poor physical and mental outcomes such as depression (M Kivimäki, Elovainio, Vahtera, Virtanen, & Stansfeld, 2003; Ylipaavalniemi et al., 2005), cardiovascular diseases (Elovainio, Leino-Arjas, Vahtera, & Kivimäki, 2006; Mika Kivimäki et al., 2005), hypertension (M Elovainio et al., 2006) and insomnia (Elovainio, Kivimäki, Vahtera, Keltikangas-Järvinen, & Virtanen, 2003). The perception of fair treatment from an organization influences the attitudes and behaviours of individuals in an organization such as having the satisfaction of work (Cole, Bernerth, Walter, & Holt, 2010). This is important as performance will be greatly affected if the perception is negative i.e. injustice (Latham & Pinder, 2005).

In addition to affecting job performance, unfair treatment will also reduce work quality and impair relationship with co-workers (Pfeffer & Langton, 1993). Although

'fairness' is considerably subjective, elements of a social structure with distinct characteristics are captured. Examples of perceived impartiality at workplace include imbalanced salary structure among the same group of employees, performance appraisals not befitting work put in and preferential treatment of subordinates within a certain class or creed. Literature has revealed three main constructs of organizational justice, namely procedural justice (PJ), Distributive Justice (DJ) and interactional justice (IJ) (Russell Cropanzano, Goldman, & Benson III, 2005; Leventhal, 1980; Moorman, 1991). Researches focussing on the correlation between workplace justice and mental health outcomes are commonly reported in organizational justice researches (Cohen-Charash & Spector, 2001; Colquitt et al., 2005; Elovainio et al., 2010; Greenberg & Colquitt, 2013). Longitudinal studies have revealed strong correlations between procedural and interactional justice with mental health (Ndjaboué, Brisson, & Vézina, 2012)

2.3.1 Procedural Justice (PJ)

Procedural justice (PJ) refers to the perceived fairness of workers; in the opportunity to voice arguments with regards to legal procedures (Thibaut & Walker, 1975). It relates to perceived fairness through which decision-making processes are ethical, consistent and accurate (Leventhal, 1980). Employees are even willing to accept undesirable outcomes if the process leading to a certain decision was done according to PJ principles, for e.g. accepting smoking ban at the workplace. There are two main elements of procedural justice, which are the 'self-interest' which refers to an employee voicing out on work-related procedures; and 'group value' where employee's voice opinions to satisfy the desire to be heard. Self-interest element is able to influence the outcomes in a said workplace. PJ also comprises both objective and subjective aspects, wherein the objective aspect; specific procedures are carried out in a certain mode, whereas the subjective aspect is the very manner how a procedure is perceived. The

possibility of incongruity between these factors may influence the perception of PJ to alter.

The six basic rules that conform to procedural justice are:

- i. Bias suppression
- ii. Accuracy
- iii. Consistency
- iv. Correctability
- v. Ethicality
- vi. Representativeness

PJ may also influence how an employee views the organization wholesomely (Tyler & Blader, 2000). Employees tend to show more loyalty, less likely to betray their organization and portray higher organizational citizenship behaviour (OCB) if the process perceived is considered a just one. Perception of PJ can be enhanced if employees are given the opportunity to be heard and voice their concern as it fulfils the need to be heard and influence in the decision-making process as well as being viewed as a valued member of the organization (Storey, 2007). Operating open-door policies, lunching with subordinates or having 'walk-arounds' are among ways to enhance the feeling of being listened to. When implementation of policies is conducted via prior decision-making process, this is known as procedural justice by structural means or termed 'systemic justice' (Greenberg & Cropanzano, 1993).

2.3.2 Distributive Justice (DJ)

This subdivision of OJ explores the psychological process of forming fair judgments' when outcomes are consistent with equity and equality. In distributive justice, employees are concerned on receiving fair, ethical and appropriate output (eg. wages,

promotions, premiums, career opportunities) that is proportionate to their inputs (experience, effort, education) in comparison with the input and output of other co-workers (Russell Cropanzano et al., 2005; Russell Cropanzano et al., 2001). As a result of this comparison, unjust treatment may influence attitude, which in turn may change behaviour. The essence of DJ is the belief of receiving equity of distributed resources. Organ stated that DJ has three important principles (Organ, 1988) :

- i) The principle of Equality – Employees must be given equal opportunities to reach optimization regardless of individual characteristics (gender, ethnicity, religion or social status)
- ii) The principle of Equity – Rewards awarded must equate to its contributions.
- iii) The principle of Need – Resources must be allotted according to need.

Leventhal et al., 1980 (Leventhal, 1980) argued that this emphasis was uni-dimensional focusing primarily on final outcome which over-emphasized importance of justice in social relationships. As such, DJ is predictive of affective, cognitive and behavioural reactions of outcomes (Cohen-Charash & Spector, 2001).

2.3.3 Interactional Justice (IJ)

The third wave of OJ as described by Bies and Moag et al., (Bies & Moag, 1986) is interactional justice (IJ) which looks into interactional factors and communication. Although often not prioritized in justice researches, it requires thorough explanations on the rationale of decisions made, done with respect and dignity. Bies defines IJ as “the quality of interpersonal treatment employees experience when procedures are enacted” (Bies, 2001). Communication is crucial in ensuring all procedures are implemented correctly. IJ deals with the quality of interpersonal treatment of employees in the enactment of organizational procedures (Bies & Moag, 1986). The perfect example to

show the importance of IJ is during the implementation of performance appraisal procedures, focusing on the personality of supervisors.

Some literature further classifies interactional justice (IJ) into interpersonal justice and informational justice (Greenberg & Cropanzano, 1993). Interpersonal justice, also known as the 'social side' of DJ, is the extent to employees is treated with respect, politeness and dignity by the organization. Informational justice however is the concept of sharing relevant information with employees (Colquitt, Conlon, Wesson, Porter, & Ng, 2001; Russell Cropanzano et al., 2001). Bies and Moag also listed the four antecedents of fair treatment; which are truthfulness, justification, respect and propriety (Bies & Moag, 1986).

Some tenets of OJ have similarities with psychosocial working environment factors. Decision latitude (job control) shares some similarities with procedural justice (PJ), whereas interactional justice (IJ) is close to social support. OJ components, however, capture elements of workplace social structure and resources, in contrast to psychosocial working environment factors (Van den Bos & Lind, 2002). Organizational justice is frequently associated with job satisfaction, in line with the numerous prior research findings (Ahmadzadeh Mashinchi, Yaghoubi, Ahmadi, Hadi, & Hamid, 2012; Fatimah et al., 2011; Fatt, Khin, & Heng, 2010; Jahangir et al., 2006; Karimi, Alipour, Pour, & Azizi, 2013; Nojani, Arjmandnia, Afrooz, & Rajabi, 2012).

Critiques of OJ components rely on not just procedural and distributive elements, but focused on depth of interactional justice as well, especially the inter-dependence of IJ from OJ. This was argued by Russell Cropanzano et al. (2001), but Bies and Moag (1986) explained that IJ does not only confine to the treatments in the enactment of OJ. Fujishiro et al., stated that although there were many contradictory views, there are

more benefits in terms of research if its kept separated as the third component of OJ (Fujishiro & Heaney, 2007).

2.3.4 Influence of organizational justice in an organization

The role of employees and their contribution to an organization (either public, private or corporate) has become more critical and of scrutiny in the ever-evolving competitive work-force of the 21st century in the attempt to achieve optimum job performance and maximum productivity, while trying to balance work-life quality, and avoid negative consequences such as exhaustion and burnout. Employee's personal discretion and judgement are being taken into consideration to incorporate informal optional behaviour with organizational justice factors being the precursors of organizational citizenship behaviour (Iqbal, Aziz, & Tasawar, 2012). Prior researches have consistently shown that organizations benefitted when employees exhibit organizational citizenship behaviour (OCB), which is defined as going above and beyond job scope to complete tasks (Organ, 1988; P. M. Podsakoff, MacKenzie, Paine, & Bachrach, 2000).

In-depth studies on OCB's significance in an organization are implied when goals are met and tasks are completed regardless of the obstacles (N. P. Podsakoff et al., 2009). OCB is demonstrated by helping co-workers with their workload, following set rules and regulations, working extra hours altruistically to meet deadlines and respecting the rights of co-workers and subordinates (Azmi, Desai, & Jayakrishnan, 2016). Organ had proposed psychological antecedents of OCB such as cognitive, dispositional and affective factors (Organ, 1988). OCB also highly correlates with employee loyalty and organizational goals, which are products of high organizational justice levels. Since OCB has been reported to facilitate scheduling, planning and problem solving, it improves organizational functioning and productivity (N. P. Podsakoff et al., 2009; P. M. Podsakoff et al., 2000).

Studies have shown the association between perceived organizational justice and work attitude. Employees with a high perception of organizational justice (fairness) report higher job satisfaction (Williams & Anderson, 1991), and are found to exhibit more commitment to their organization, have good relationships with their supervisors and have reduced turnover intention (Loi, Yang, & Diefendorff, 2009). Employees with lower perception of organizational justice, however, have negative perception and attitude towards their employer and organization, and subsequently performs poorly in their daily functions (Bobocel & Hafer, 2007).

The positive association between organizational justice and OCB is in line with the many published prior literature (Colquitt et al., 2001; Moorman, 1991; Moorman & Byrne, 2013; Niehoff & Moorman, 1993). This indicates that higher perception of fairness at workplace manifests into higher OCB as workers who perceive better decision-making participation and implementation benefits from the trickle-down effect of efficiency. A recent study conducted in the Middle East reported a positive relationship between OJ and OCB; indicating that employees with higher perceptions of fairness at workplace also display higher the levels of OCB, and vice versa. Upper-level management who treat employees with respect, fairly and with dignity would, in turn, treat the organization with respect and work towards achieving the organization's goals.

There was, however, an inverse correlation between OCB and stress (Tziner & Sharoni, 2014). Similar findings were also reported among public sector employees in Iran between OCB and OJ ($r = 0.299$) and OCB with three main constructs of OJ (OCB with PJ, $r = 0.308$, OCB with IJ, $r = 0.237$, OCB and DJ, $r = 0.237$) (Meshkati & Bitakandari, 2014). A meta-analysis of 55 studies on the predictors of OCB found that organizational commitment and supportive supervisors correlate with OCB equally with organizational justice and job satisfaction (Organ & Ryan, 1995).

2.3.5 Organizational justice effects in the teaching profession

The studies of organizational justice with organizational citizenship behaviour have not been thoroughly conducted in school settings. Although school teachers are professionals, their job scopes are not fully entailed in their contracts due to its complexity. An improved understanding of organizational justice in school settings would greatly contribute towards a school's efficiency. An important dimension of organizational justice is its evolution to organizational justice behaviour, with particular significance to altruism. Selfless teachers with the passion for teaching would greatly improve efficiency in school settings, although bureaucracy has some negative implications such as imposing limitations (Somech & Oplatka, 2014). The education system relies on these altruistic actions of teachers to achieve aspirations and creating innovative methods of teaching (Mayer, 2006). When teacher's exhibit exceptional organizational citizenship behaviour, its impact on the school and their students can be observed with the reduction of tension and improved overall efficiency in the running of the school (Farooqui, 2012). The constraint of working in a heavily bureaucratic setting is its impact on professional authority (DiPaola & Tschannen-Moran, 2014).

Studies have shown that a positive working climate in schools improves student accomplishment (Hoy, Hannum, & Tschannen-Moran, 1998), school ratings on efficiency (Hoy, Tarter, & Kottkamp, 1991) and satisfaction in the decision-making process (Hoy & Sabo, 1998). Di Paolo reported a strong correlation between organizational citizenship behaviour and school climate using predictors such as principal's leadership and professionalism (DiPaola & Tschannen-Moran, 2014). Another study among 913 primary and secondary school teachers in Iran also revealed a similar significant association between organizational justice and organizational citizenship behaviour ($r = 0.279$, $p = 0.001$) (Heidari, Rajaeepoor, Davoodi, & Bozorgzadeh, 2012). In that study, procedural justice was found to be the best predictor

of organizational justice as compared to the other two constructs. Nojani et al. reported a significant correlation between organizational justice and job satisfaction in general and special education systems (Nojani et al., 2012). Similar positive correlations have also been found in Malaysia on organizational justice researches. One study found a significant correlation between interactional justice and normative commitment and between distributive justice and continued commitment (Paramanandam, 2014). Another found a significant association between organizational justice, organizational commitment and job satisfaction while inversely with turnover intention (Fatt et al., 2010). A study among 200 secondary school teachers in Selangor, Malaysia found a positive association between organizational justice and job satisfaction with organizational citizenship behaviour as a moderator between variables (Fatimah et al., 2011).

2.3.6 Justice at the workplace and its impact

Many studies have already reported the positive significance of organizational justice experience at work (Colquitt, 2001; Colquitt et al., 2005; Fatt et al., 2010; M Kivimäki et al., 2003). Interactional justice is the easiest avenue through which a superior is able to enhance subordinates' perception of justice as procedural and distributive justice are slightly more complex in meeting expectations. There could also be external constraints beyond organizational policy and employer's control. In a meta-analysis performed by Colquitt et al. (Colquitt, 2001; Colquitt, Noe, & Jackson, 2002), organizational justice was found to be fundamental in managerial functioning as it was highly associated with job satisfaction and organizational citizenship and commitment. Successful administration of OJ not only improved psychological well-being, but also worker's health (M Kivimäki et al., 2003).

Of the many outcomes of organizational justice, job satisfaction is the most significant outcome of interest (Colquitt, 2001; Colquitt et al., 2005). Studies in the United States and Finland concurred with Colquitt et al.'s findings (Fujishiro & Heaney, 2007; Lindfors et al., 2007). Although the perceptions of fairness were often associated with worker's job satisfaction, the same cannot be said with psychological well-being. This was because other factors aside fairness needs to be taken into consideration (Fujishiro & Heaney, 2007). Organizational justice and its significance have not only been reported by studies in Europe, but also in other Asian countries including Malaysia (Fatimah et al., 2011; Fatt et al., 2010; Ibrahim, Dagang, & Bakar, 2016; Inoue et al., 2009; Jahangir et al., 2006; Yilmaz, 2010).

Below are some examples of the studies cited:

Table 2.4: List of studies on Organizational Justice

Author	Sample	Subscales of OJ studied		
		PJ	IJ	DJ
Lam et al. (2002)	Bank employees from United States (185 respondents) and Hong Kong (218 respondents)	✓		✓
Elovainio et al. (2002)	4076 respondents from Finland	✓	✓	
Elovainio, Kivimäki, Steen, and Vahtera (2004)	2969 healthcare workers from Finland	✓	✓	
Rioli, Savicki et al. (2006)	103 engineering workers from the United States	✓		
Chu et al. (2006)	392 nurses from Taiwan	✓		✓
Ismail et al. (2008)	190 academic workers from Malaysia	✓		✓
Hemdi, Nasurdin et al. (2008)	380 hotel employees from Malaysia	✓		✓
Strom et al. (2014)	348 random individuals from the United States	✓		✓

Most literature is focused on positive outcomes of organizational justice and the impact of fairness at the workplace. Findings conclude that perceived injustice has a poor outcome on a worker and considered a stressor (Zohar, 1995). Not only can it cause negative emotions, but can also dire effects on psychological well-being (Cole et al., 2010). Higher levels of psychological distress such as minor psychiatric disorders and high absenteeism were found on workers who experienced injustice at work have unfair perceptions (Elovainio et al., 2002; M Kivimäki et al., 2003). Although many of the studies done established the negative consequences of workplace injustice, Greenberg et al. in his observation noted that it is virtually impossible to examine the concerns of all workers at the same workplace, and elimination of injustices is beyond organizational control (Greenberg, 2006). This however can be overcome to a certain extent if the moderating effect, rather than the direct relationship of organizational justice and health is studied (De Wet & Jacobs, 2006).

Considering buffering effects of moderator variables in relation to organizational justice and psychological well-being, two significant work exposures of job control & social support is investigated using the JDC-JDCS models.

2.4 Salivary stress biomarkers (Salivary secretory IgA and salivary cortisol)

Stress studies customarily use self-reports measures of affect and/or stressor exposure and interviews or questionnaires as the method of acquiring data. However, the pitfall of this is that they are usually subject to perception and personal inferences (Hammen, 2016). A more subjective and preferred method in stress studies may add depth and value if a correlation could be established. Latest studies on stress have begun using metabolic and neuroendocrine biomarkers as it has been shown to have a high correlation, sensitivity and specificity. Choice of biomarker is however of umpteen importance in order to assess the appropriate response to stress as the use of any single

biomarker may be associated with multiple determinations. Since teachers experience both acute and chronic stress, neuroendocrine biomarkers such as salivary cortisol and/or salivary secretory Immunoglobulin A (SIgA) are good options. Stress response, which is associated with many illnesses described above, can be characterized by biomarkers objectively.

A biomarker is a substance that has the characteristic to objectively evaluate and indicate the physiological and biological condition of an individual (Zhang, Li, Benedek, Li, & Ursano, 2009). Stress biomarkers are substances within an individual which effectively identifies and quantifies stress (Nater, Skoluda, & Strahler, 2013). It is used to measure physiological response to stress due to stressors, but not of stress appraisal in determining if the said stressor is beneficial, harmful or irrelevant (Wethington, Glanz, & Schwartz, 2015). Stressor exposure, even if subconsciously perceived, measures physiological stress response which is of immense diagnostic significance. Biomarkers of stress are grouped into systemic-based markers, namely neuro-endocrine, immune, morphological and metabolic markers, and biomarkers identified for acute and chronic stress fall into these four main categories (Hellhammer, Wüst, & Kudielka, 2009; Nater et al., 2013).

2.4.1 Salivary cortisol

Saliva is the composition of fluids from the glands located in the oral cavity namely the paired parotid glands (located at the upper posterior area of the oral cavity), submandibular gland (located beneath the floor of the mouth) and sublingual gland (located below the tongue and in front of submandibular gland) (Nanci, 2017). Cortisol, the steroid hormone which is produced in response to stress, has been one of the most dominant biomarker of choice for physiological stress studies among researchers (Hellhammer et al., 2009). Cortisol levels can be measured in all metabolite secretion

such as in blood serum, saliva, urine, and hair (Rodriguez et al., 2015). Measurements of salivary cortisol levels in stress studies have taken precedence in the past few years as the psycho-biological mechanism which activates the hypothalamic-pituitary-adrenal (HPA) axis can only be measured by salivary cortisol (Hellhammer et al., 2009).

The way a certain analyte moves into a specific place before excretion is vital in understanding subtle differences of its components, and its effects towards outcomes of interest (Woodrow, 2016). Most salivary analytes in bio-behavioural studies are serum constituents containing steroid hormones (Folkman, 2013). These analytes move into saliva by either diffusion or filtration through the acinus or duct cells found in the salivary glands (Granger, Johnson, Szanton, Out, & Schumann, 2012). Other analytes such as mucins, histatins and cystatins and humoral antibodies and compounds such as antibodies and cytokines are however synthesized, stored and released from granules found within the secretory cells of salivary glands (Folkman, 2013). The rate of saliva secretion too is important for consideration as it significantly influences levels of salivary analytes produced in the oral cavity such as the secretory IgA; and those which migrate from blood serum via filtration such as conjugated steroids (Granger et al., 2012; Malamud & Tabak, 1993). Secretions are influenced by various factors including the influence of diurnal circadian rhythm, chewing movements, olfactory receptors, certain medications or treatments such as dideoxyinosine for anti-HIV, and even certain illnesses such as Sjögren's syndrome and poorly-controlled Diabetes Mellitus. Therefore, the measured concentration of an analyte should be multiplied by flow rate (mL/min) and the final measure output be characterized with a function of time (Folkman, 2013; Granger et al., 2012).

Cortisol for example, enters the saliva via intracellular mechanism called passive diffusion (Kirschbaum & Hellhammer, 1994). It is lipophilic and transported to cortisol-

binding globulin (CBG) and albumin. However, only a small portion of total serum cortisol remains unbound and in its biologically active form (approximately 10%) (El-Farhan, Rees, & Evans, 2017). Although its level is lower than in blood serum and plasma, it correlates better with free active serum cortisol because it contains the inactive protein-bound cortisol fraction not found in total serum cortisol, and remains unbound to proteins (Guilliams & Edwards, 2010; Hiramatsu, 1981). Serum adrenocorticotropin which reflects secretory activity in the HPA axis correlates well with salivary cortisol, hence depicts better accuracy.

Teachers are among the professional groups that are exposed to both acute and chronic stress responses. Although cortisol is essential in maintaining health, it causes severe morbidity in deficiency or in excess (Rodriguez et al., 2015). Chronic stress response involves persistent stimuli for extended periods of time from the environment, which then causes bio-behavioural responses as coping strategies.

Acute and chronic stress is concomitant to the HPA axis which is accurately measured by salivary cortisol (Randall, 2010). Salivary cortisol measures can also be altered by other factors such as modulators, receptors and binding proteins. It is therefore rare to have a linear relationship between serum cortisol and plasma adrenocorticotropin hormone (ACTH) (Hellhammer et al., 2009). The dissociation between serum cortisol and plasma ACTH could be caused by high salivary cortisol levels which were reported in highly stressful situations and other psycho-biological variables. Salivary cortisol is able to reflect changes in unbound serum, and thus offers a reliable alternative to measuring blood serum cortisol (El-Farhan et al., 2017). Liquid chromatography-tandem mass spectrometry is the method of choice for measuring salivary cortisol due to its improved specificity and sensitivity, but its poorly

standardized assays and lack of solitary validated reference limits its use (El-Farhan et al., 2017).

Cortisol also actively regulates other endocrine functions such as calcium absorption, systolic blood pressure maintenance, anti-inflammatory and immune functions (Rodriguez et al., 2015). Both serum and salivary cortisol exhibits marked circadian rhythm which peak's after waking from sleep, which then undergoes a rapid decline initially, followed by a gradual decline towards nightfall (Edwards, Clow, Evans, & Hucklebridge, 2001). Cortisol however rises independently of circadian rhythm in response to acute stress (Chrousos & Kino, 2007; Marchand, Juster, Durand, & Lupien, 2016).

When acute stress is encountered, the corticotropin-releasing factor (CRF) and the arginine vasopressin (AVP) neurons are activated in the paraventricular nucleus (PVN) due to the HPA axis activation (Chrousos & Kino, 2007). The degree of response and PVN activation varies according to individual's psychological reaction in different situations such as anticipation, uncontrollability, habituation, unpredictability and ego involvement (Kudielka, Buchtal, Uhde, & Wüst, 2007). Stress stimuli would also activate the CRF-mediated HPA axis response that would supply the brain with sufficient glucose for its functioning (Peters et al., 2013). Since the endocrine and psychological stress responses correlate, psycho-endocrine covariance and variability due to the interplay of these factors can be anticipated. Nonetheless, there are still close links between the HPA axis and cortico-limbic structures at a neuro-anatomical level which is a gives a better subjective explanation on stress responses (Hellhammer et al., 2009; Herman, Ostrander, Mueller, & Figueiredo, 2005). Some researches have reported negative findings on psycho-endocrine covariance with different type of stressors (Oswald et al., 2004, Cohen et al., 2000), however this may be explained due

to the time lag between the psychological and endocrine response pathways, which has a small variance (Schlotz et al., 2008, Smyth et al., 1998, Hellhammer and Hellhammer, 2008). Studies have also shown correlation between cortisol levels and job satisfaction/job-reward imbalance in stress and justice researches (Qi et al., 2017).

In a study among ambulance paramedics, high levels of cortisol levels were recorded immediately after an emergency situation (Sluiter, Van der Beek, & Frings-Dresen, 2003). In another study among ambulance dispatchers, significantly higher levels of cortisol levels were recorded from the dispatchers as compared to the control groups (Weibel, Gabrion, Aussedat, & Kreutz, 2003). Salivary cortisol levels was also found to correlate positively with stress and depression screening questionnaires among rescue workers (Aardal-Eriksson et al., 1999). Some evidence has risen on the paradoxical reduction of cortisol in chronic stress. In a study conducted comparing nurses from the emergency department and general wards using both stress questionnaires and salivary cortisol measurement, nurses in the emergency department who reported higher levels of stress on the questionnaire also had lower levels of cortisol in the saliva as compared to the nurses in the general wards (Yong Yang et al., 2001). Low levels of salivary cortisol were also found among teachers (D. S.-Q. Koh & Koh, 2007; Pruessner, Hellhammer, & Kirschbaum, 1999), earthquake trauma victims (Najarian & Fairbanks, 1996) and post-traumatic stress disorder (PTSD) victims (Steudte-Schmiedgen, Kirschbaum, Alexander, & Stalder, 2016) due to exhaustion and burnout. Scientific explanation suggests that in a persistently stressful state, glucocorticoid receptors in the pituitary and hypothalamus becomes down-regulated (Hannibal & Bishop, 2014). Changes in the HPA axis would cause smaller diurnal variation and flatten the diurnal cortisol curve (Adam et al., 2017; Hajat et al., 2015).

2.4.2 Salivary secretory Immunoglobulin A (SIgA)

IgA is an antibody that plays a critical role in mucosal immunity. It is the most dominant immunoglobulin found in mucous secretions from exocrine glands (Herich, 2017). It is resistant to proteolysis in an enzyme-rich environment as its dimer of molecules is linked to polypeptide chains. It is also not synthesized by mucosal epithelial cells in these structures or derived from blood but is instead produced by B-lymphocytes which are transported through cell interiors and released into secretions from these cells (Woof, 2013). In addition to playing a key role in protecting vulnerable areas such as the oral cavity, SIgA exhibits a diurnal rhythm, which varies in response to physical and psychological stress through interactions with the autonomic nervous system (Woof, 2013). Salivary SIgA also has protective effects on the gastrointestinal tract which is however affected by flow rates, with concentrations normally decreasing as flow rates increases (Li & Gleeson, 2004). Since almost 95% of infections predominantly commences at the mucosal surface, they are inertly protected by Immunoglobulin A which are secreted by exocrine glands i.e. salivary glands (Engeland et al., 2016). Since prior research have proven strong associations between upper respiratory tract infection (URTI) with stress (S. Cohen, Tyrrell, & Smith, 1993; Neville, Gleeson, & Folland, 2008), salivary secretory IgA levels are now studied as precursors of physiological and psychological stress.

Recent reassuring evidence on psychological stress have reported that acute stress either naturalistic or artificially contrived is associated with increased secretion and secretory rate of salivary IgA (Bosch et al., 2002; Engeland et al., 2016). Although many studies had reported associative correlation between SIgA and chronic stress, others had instead found an inverse association (Henningsen et al., 1992; D. S.-Q. Koh & Koh, 2007; V. Ng et al., 1999). Thus, evidence favours the assumption that chronic stress does indeed downregulate secretory IgA, although some may argue that these

evidence as portrayed by some studies had some methodical issues such as small sample size, inappropriate measurement tools, methodical errors in sample collection and even failure to control health behaviour (Hucklebridge, Clow, & Evans, 1998; Phillips et al., 2006). Stressful life events have also shown to be associated with reduced or lower secretory IgA levels, as compared to non-stressed situations (Y Yang et al., 2002).

Studies have shown that secretion rates have an inverse correlation with IgA concentration in saliva (Eliasson, Birkhed, Österberg, & Carlén, 2006), and are also influenced by gender and age (Miletic, Schiffman, Miletic, & Sattely-Miller, 1996; Percival, Challacombe, & Marsh, 1994). Low secretion rates of salivary IgA are also found among diabetics (Oikawa et al., 2015), women gender (Fenoli-Palomares et al., 2004; Jafarzadeh, Sadeghi, Karam, & Vazirinejad, 2010) and stressful life events (Phillips et al., 2006), but they are however not affected by collection time or different temperatures of mouth rinse (Samantha K Gill, Price, & Costa, 2016).

Although stress biomarkers are objective measurements of stress, it cannot be used in isolation since stress induces generalized responses from all systems in the body, and these responses are multiply-determined. Thus, a combined method using both self-reporting questionnaires and a biomarker is best to have a comprehensive and holistic study on stress (Kompier, 2005).

As technical innovations have made measuring biological metabolites more effective in terms of mobility, feasibility and cost-efficiency, salivary biomarkers have begun to gain popularity as they are obtained noninvasively, safe (no risk for needle-prick injury), real-time levels, ease of use by self-collection, and high correlation to stress (D. Koh, 2014; D. S.-Q. Koh & Koh, 2007). Salivary assays are also accurate and reliable (Salimetrics, 2009, 2010). Most importantly, it removes the stress from *trypanophobia*

(fear of needles) which may bias results and the need for additional health care workers such as a nurse or phlebotomists.

2.4.3 Dissociation of serum and salivary biomarker analytes

Salivary analytes have become more popular in the past decade due to its ease of use and high specificity & sensitivity. Salivary metabolite levels are accurately portrayed in its biologically active, unbound and hormonal fraction form in the circulatory system (Riad-Fahmy, Read, Walker, Walker, & Griffiths, 1987; Vining, McGinley, & Symons, 1983). For example, strong correlation was shown between unbound free cortisol levels in saliva and serum cortisol levels (Thuma, Gilders, Verdun, & Loucks, 1995), especially during circadian cycles with ACTH stimulation (Levine, Zagoory-Sharon, Feldman, Lewis, & Weller, 2007; Vining, McGinley, Maksvytis, & Ho, 1983; Wedekind, Bandelow, Broocks, Hajak, & R  ther, 2000) and during intense exercises (Port, 1991; Stupnicki & Obminski, 1992). Salivary cortisol measures are considered more accurate and a better measure as compared to serum cortisol since it measures free cortisol which is the biologically active hormone fraction (Vining, McGinley, Maksvytis, et al., 1983).

Nonetheless, some analytes such as cortisol have a non-linear correlation in serum in responses which affect cortisol-binding globulins such as in pregnancy or use of oral contraceptives. The proportions of salivary cortisol to total cortisol is approximately 8-9% in the upper range, and about 1-2% in the lower range (Hellhammer et al., 2009). The correlation between free cortisol and total cortisol in serum however changes once the cortisol-binding globulins are saturated (Vining, McGinley, Maksvytis, et al., 1983). Hellhammer et al. (2009) reported that since sex steroids enhance cortisol-binding globulins, the broader variability of cortisol levels with a much higher proportion of serum cortisol to salivary cortisol levels are found in women on oral contraceptives.

Thus, it is advised to interpret cortisol level readings for respondents under certain circumstances, such as when in use of oral contraceptives, pregnancy, menstruation, on medications or in psychological distress. Salivary cortisol also does not have a linear correlation in response to adrenergic stimulation, for example in ante- and post-natal conditions. This is because the adrenal capacity to mount cortisol response may be impaired due to the impairment of cortisol metabolism in the liver (Klingmann & Hellhammer, 2008; Yehuda et al., 2006).

Levine et al. had reported a summary of studies which showed dissociation between free cortisol levels in serum and saliva, specifically during distress situations, and during the circadian cycle. Data from this summary suggested that about 14% of salivary cortisol is bound to cortisol-binding globulin in saliva, and another 30% of free cortisol is enzymatically converted to cortisone in saliva (Levine et al., 2007). This, they say, could be the reason for the dissociations, and the relatively lower levels of cortisol in saliva.

2.4.4 Methodological issues in sampling salivary biomarkers

Subjects are advised to avoid foods with high acidity or sugars as it lowers salivary pH and increases bacterial growth, thus compromising the assay. Consumption of medications or chronic illnesses, alcohol, caffeine and tobacco usage, as well as the presence of oral diseases, infections or injury are to be documented for a minimum of twelve hours prior to sample collection. Before sample collection, the subject's mouth should not be rinsed for at least ten minutes to avoid sample dilution (Salimetrics & SalivaBio, 2011).

For biomarkers affected by flow rate i.e. salivary secretory IgA, secretion rate measurements are of umpteen importance. Sampling methods are compared with current biomonitoring gold standards as to obtain most accurate results. Samples with

visibly contaminated blood should be discarded and recollected. Time and date of sample collection are recorded when obtained to exclude diurnal variation in levels (e.g. for salivary cortisol).

Samples are refrigerated to avoid bacterial growth within thirty minutes and frozen below or at -70°C within four hours of collection. On the day of running the assay, samples are completely thawed to room temperature and centrifuged to remove mucins and other particulate matters which could interfere with antibody binding. Saliva samples may be re-frozen for further and future assay analysis, however multiple thaw-freeze cycles were not recommended (Salimetrics, 2009, 2010).

2.5 Measurement tools

2.5.1 Job Content Questionnaire (JCQ)

The Job Content Questionnaire (JCQ) is a self-administered questionnaire used as a measurement tool for work task in determining psychosocial factors which contribute to stress. It is based on Karasek's Job Demand-Control Model in job strain development and designed to examine psychosocial stress factors at the workplace. It is the most widely used workplace questionnaire and has been reliably used in JDC/JDCS theoretical models to measure dimensions of job demand (JD), job control (JC) and social support (SS) on psychological job strain and social structure at the workplace. Job strain is demarcated with the combination of high JD, low JC and low SS. There are twenty-two items on the JCQ divided into three main constructs of which JD, JC and SS each consisting of five items, nine items and eight items respectively. Each scale is calculated using Karasek's JCQ centre recommended formula (Karasek, 2013). Scales are recorded using a Likert-type scale from 1 (Strongly Disagree) to 4 (Strongly Agree) (Edimansyah, Rusli, Naing, & Mazalisah, 2006). The JCQ has been validated in more than twenty languages globally. The Malay translated version of the JCQ (M-JCQ) has

been pretested and validated in the Malay language among automotive assembly workers (Edimansyah et al., 2006), secondary school teachers (Hadi, Naing, Daud, & Nordin, 2006) and nurses (Amin, Quek, Oxley, Noah, & Nordin, 2015). All three studies on the M–JCQ had also reported similar findings with Cronbach alpha values for JD, JC and SS ranging from 0.5 to 0.61, 0.71 to 0.75 and 0.79 to 0.84 respectively; and item-total correlation greater than 0.3 indicating good internal consistency. Exploratory factor analysis in the study by Edimansyah et al. (2006) and Hadi et al. (2006) revealed three factors which were associated with JD, JC and SS while study by Amin et al. (2015) reported a KMO value of 0.8, and showed four factors which included physical demands as well. The study by Amin et al. (2015) had also demonstrated a direct correlation between JC and SS (Spearman’s $\rho = 0.29$) and inverse correlation between JC and JD (Spearman’s $\rho = -0.10$). In addition to that, study by Padmanathan, Omar, and Joseph (2016) reported ICC values of 0.96, 0.52 and 0.99 for JD, JC and SS respectively, indicating good reliability and temporal stability for the M–JCQ. For the purpose of this study, the JCQ was used as the exposure measurement of psychosocial work environment exposures of JD, JC and SS, which corresponds accordingly with JCQ’s dimensions.

The formula for JCQ scale scores is described as follows:

	<u>Possible Range</u>
Job skill discretion = $[q1 + q3 + q5 + q7 + q9 + (5-q2)]*2$.	12-48
Decision-making Authority = $[2(q4+q6+q8)]*2$.	12-48
Job demands = $3*(q10+q11) + 2*(15-q12-q13-q14)$.	12-48
Co-workers support = $(q15 + q16 + q17 +q18)$	4-16
Supervisor’s support = $(q19 + q20 + q21 +q22)$	4-16

Job control/Decision latitude = Skill discretion +

Decision-Making authority 24-96

Social support = Co-workers support + Supervisor's support 8-32

When total score for skill discretion and decision making authority were combined, the main construct of 'job control' was created. Social support is the combination of co-workers support and supervisor's support. Psychosocial working environment (PWE) exposure is defined as :

- a) A score above the sample mean on job demand.
- b) A score below the sample mean on job control.
- c) A score below the sample mean on social support.

2.5.2 Organizational Justice Scale Questionnaire (OJSQ)

The Organizational Justice Scale Questionnaire (OJSQ) is the instrument used for measuring perceived fairness at the workplace in this study. This scale was developed by renowned justice researchers Robert Moorman & Brian Nierhoff (Moorman, 1991; Niehoff & Moorman, 1993). It comprises the three main components of organizational justice which are procedural justice (PJ), interactional justice (IJ) and distributive justice (DJ). The scale consists of eighteen items with PJ with seven items, IJ with six items and DJ with five items. PJ subscale measures managerial procedures such as bias suppression and accuracy, correctability and consistency. IJ subscale measures the supervisor's interpersonal behaviour, supervisor's attention to worker's rights and the supervisor's truthfulness in dealing with workers. DJ subscale measures the degree of equal rewards distribution in tandem with workers effort, experience and responsibilities. Scales are recorded on a 5-point Likert-type scale from 1 (Totally Disagree) to 5 (Totally Agree). Higher scores indicate higher perceived organizational

justice. Study by Elovainio et al. (2002) using this scale reported a composite Cronbach's α coefficient value of 0.90. This questionnaire has been translated into the Malay language and has been used to gauge organizational justice factors in Malaysia among stockbrokers (Nasurdin & Ramayah, 2003) and manufacturing workers in Malaysia (Ibrahim & Ohtsuka, 2013). The Cronbach's α coefficient values which were obtained was 0.93 for procedural justice, 0.94 for interactional justice, 0.91 for distributive justice and 0.93 for the composite organizational justice scale (Ibrahim & Ohtsuka, 2013). Since the OJSQ was not validated and pretested among teachers in the Malay language, testing of psychometric properties and test-retest reliability of the OJSQ was conducted as part of Phase I of this study to evaluate internal consistency, reliability and temporal stability of the questionnaire.

The formula to calculate scores for each subscale is as below :

	<u>Possible Range</u>
Procedural Justice (PJ) = Q1 + Q2 + Q3 + Q4 + Q5 + Q6 + Q7	7 – 35
Interactional Justice (IJ) = Q8 + Q9 + Q10 + Q11 + Q12 + Q13	6 – 30
Distributive Justice (DJ) = Q14 + Q15 + Q16 + Q17 + Q18	5 – 25

2.5.3 Depression, Anxiety and Stress Scale 21 (DASS-21)

The DASS-21 questionnaire was used in this study to measure perceived stress levels, which is one of the two outcome variables of this study. It is the concise version of the DASS 42 questionnaire developed by S. H. Lovibond and P. F. Lovibond (1995), and has been used in varying job scopes and workplace settings. It is designed to measure negative the emotional states of depression, anxiety and stress, of which each scale has seven items respectively. The DASS questionnaire has been used in prior researches in combination with the JCQ to report direct effects and correlations between

job stress and psychological distress. One study among automotive assembly workers in Malaysia reported a positive correlation between job demands and stress, and an inverse correlation between social support and stress (Rusli, Edimansyah, & Naing, 2008). Another study revealed the positive association between stress with psychological job demand, and an inverse association between supervisor support and stress (Abidin et al., 2008). Since DASS is based on a dimensional rather than a categorical conception of psychological distress, it is not used as a clinical diagnosis in the ICD classification of diseases systems. It is however able to screen for psychological distress symptoms of stress in a quick and psychometrically sound manner based on clinical symptoms and judgement.

Although DASS 42 provides more accurate scoring with additional information on a specific symptom, DASS 21 is, however, able to provide fairly equal estimated information in half the time. Numerous studies have reported the similarities between DASS 42 and DASS 21 factor structures and results (Henry & Crawford, 2005; P. Lovibond, 2014). In addition to that, DASS 21 will be able to remove the element of respondent fatigue by answering a shorter questionnaire. The DASS 42 is nevertheless preferred in clinical settings, whereas DASS 21 is more commonly used in research as a screening questionnaire. It does not possess diagnostic qualities, yet simple to use without requiring any special training. Nearly all twenty-one items are culturally free without any mention of cultural aspects or religion.

The Malay language version of the DASS 21 has been pretested and validated among the general population in Malaysia (Musa, Fadzil, & Zain, 2007) according to set guidelines. Scales are recorded using a Likert-type scale from 1 (Strongly Disagree) to 4 (Strongly Agree). The Cronbach α values for the Malay language version of the DASS-21 questionnaire was 0.84, 0.74 and 0.79 for depression, anxiety and stress respectively.

It also received good factor loading values ranging from 0.39 to 0.73, and item-total correlation ranged from 0.54 to 0.68 (Musa et al., 2007). The ‘stress’ construct of the DASS-21 questionnaire measures symptoms related to irritability, nervous arousal with fidgety, heckedness, easily upset, tense, intolerance towards interruption and impatience. The score for the DASS-21 questionnaire was calculated and classified by severity in accordance with guidelines by the author (P. Lovibond, 2014; P. F. Lovibond, 1998; P. F. Lovibond & S. H. Lovibond, 1995). The author had also suggested that the DASS scale is better analysed as a continuous variable than categorizing into severity groups (P. F. Lovibond & S. H. Lovibond, 1995). Although all three syndromes in the DASS 21 questionnaire are moderately inter-correlated, the ‘stress’ construct of the questionnaire measures a syndrome that is factorially distinct and independent in factor analysis (P. Lovibond, 2014). The author also mentioned that omitting one or two scales will not have any noticeable effects on the scores of the remaining syndrome in focus (P. Lovibond, 2014). Thus, in this study, only scores from the ‘stress’ scale was used. Similar study design was also performed by renowned work psychology researcher Professor Rusli Nordin among Malaysian secondary school teachers (Hadi et al., 2009). Perceived stress scores were also used as a continuous variable in this study.

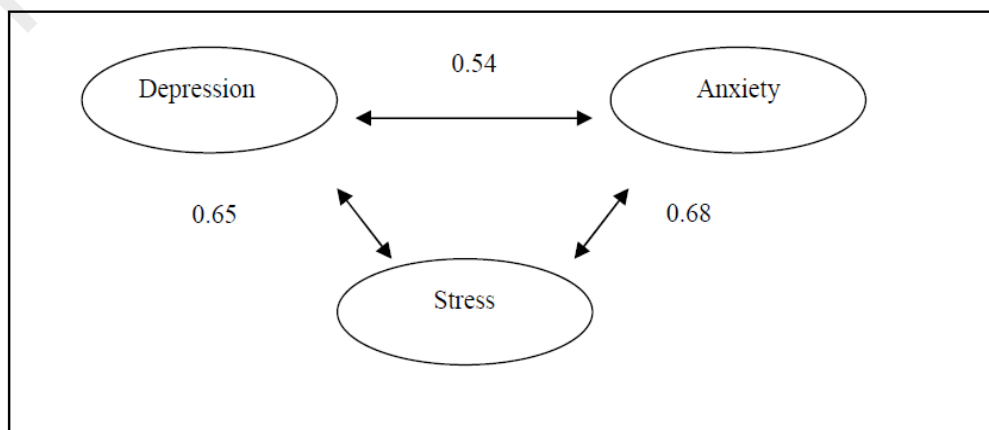


Figure 2.11 : Correlation between scales in the Malay-version of DASS-21 questionnaire

The formula to calculate scores for each of the psychological syndromes from the DASS 21 questionnaire is as below :

	<u>Possible Range</u>
Stress = Q1 + Q6 + Q8 + Q11 + Q12 + Q14 + Q18	(7 – 21)*2
Depression = Q3 + Q5 + Q10 + Q13 + Q16 + Q17 + Q21	(7 – 21)*2
Anxiety = Q2 + Q4 + Q7 + Q9+ Q15 + Q19 + Q20	(7 – 21)*2

2.5.4 Job Satisfaction Survey Questionnaire (JSS)

Besides stress, job satisfaction is another element of psychological wellbeing which is investigated in this study. This study used the job satisfaction survey (JSS) questionnaire as the outcome measurement for job satisfaction. The JSS is a 36 item, nine subscale questionnaire which assesses employee job satisfaction on attitude and certain aspects of their job scope. It was developed by Professor Paul E. Spector from the University of South Florida, United States (Spector, 1985, 1997). It was initially developed for use in public and private human service organizations, but has now been found to be suitable for job satisfaction research among educational and health sectors as well (Liu et al., 2008; Spector, 1997). Each of the nine constructs in the JSS has four items, encompassing scales for pay, promotion, supervision, fringe benefits, contingent rewards, operating procedures, co-workers, nature of work and communication (Spector, 1985, 2011). The constructs are recorded using a Likert-type scale from 1 (Strongly Disagree) to 6 (Strongly Agree). Higher scores on the JSS indicate higher levels of job satisfaction and vice versa.

Besides the JSS, other available tools that measure job satisfaction include Quality Employment Survey by Quinn and Staines (1978), Job Descriptive Index by Smith e al.

(1969), Job Diagnostic Survey by Hackman and Oldham (1974), Job in General Scale by Ironson et al. (1989), Andrew and Withey Job Satisfaction Survey (1992) and the Minnesota Satisfaction Questionnaire by Weiss et al. 1967. Liu, Borg, and Spector (2004) have stated that the JSS is the most extensively used inventory for measuring job satisfaction. The constructs in the JSS is primarily focussed on identifying various dimensions which are both satisfying and not satisfying. The JSS has applicability to different job scopes and cultures (Giri & Pavan Kumar, 2010; Liu et al., 2004). The JSS has also been described as robust in measuring equivalence across countries with high transportability across nations with similar cultural and linguistic backgrounds (Liu et al., 2004).

A systematic review done on job satisfaction established that JSS has adequate construct validity & reliability (Van Saane, Sluiter, Verbeek, & Frings-Dresen, 2003). From a total of 29 instruments identified as job satisfaction measurement tools, only seven had met with validity and reliability benchmark, of which the JSS was found to be the most versatile. The JSS has been translated into the Malay language by Tan Soo Luan (Soo Luan, 2010), and has been used previously in job satisfaction researches in Malaysia among manufacturing workers (Ibrahim, Ohtsuka, Dagang, & Bakar, 2014), Royal Malaysian Navy (*Tentera Laut Diraja Malaysia, TLDM*) personnel (Bokti & Talib, 2009), military and navy personnel (Chin-Siang, Abu Talib, Juhari, & Madon, 2014) and the Royal Malaysian Police (*Polis Diraja Malaysia, PDRM*) (Yusoff, Abdullah, & Adnan, 2017). It has also been used in research to gauge job satisfaction and commitment among primary school teachers in special education programs with learning disabilities in Pontian District, Johor, Malaysia (Sulaiman, 2013) and among academics in public higher education institutions (Noor, 2013). Since the JSS is easily accessible, widely used in Malaysia and free for use for research and education purposes

unlike many other instruments which charges a fee, thus the JSS was used as one of the measurement tools in this study.

This well-established instrument has been investigated and studied for reliability and validity in prior researches and has been translated into more than twenty languages worldwide. All nine constructs correlate moderately with each other. The Cronbach's α coefficient score ranges from 0.60 for co-worker construct, to 0.91 for the total scale. In previously conducted studies, an overall average of 0.70 was obtained for internal consistency in a sample of 3,067 subjects, with similar results reported for smaller sample of subjects (Spector, 2011). In terms of validity, literature using various scales for job satisfaction were supported. A correlation of 0.61 for 'co-workers' to 0.80 for 'supervision' was found between five of the job satisfaction construct's (Spector, 2011). The Malay-language translated version of the JSS also reported similar internal consistency findings in comparison with the original English version with a composite Cronbach's α value of 0.84.

The JSS has negatively worded items in its items, hence the negatively worded items were reverse-scored prior to summing it up with the remaining positively worded facets and accordingly analysed. The negatively worded items are Q2, Q4, Q6, Q8, Q10, Q12, Q14, Q16, Q18, Q19, Q21, Q23, Q24, Q26, Q29, Q31, Q32, Q34 and Q36.

Formula to calculate score for the JSS are as below :

	<u>Possible Range</u>
Pay = Q1 + Q10 + Q19 + Q28	4 – 24
Promotion = Q2 + Q11 + Q20 + Q33	4 – 24
Supervision = Q3 + Q12 + Q21 + Q30	4 – 24

Fringe benefits = Q4 + Q13 + Q22 + Q29	4 – 24
Contingent rewards = Q5 + Q14 + Q23 + Q31	4 – 24
Operating conditions = Q6 + Q15 + Q24 + Q31	4 – 24
Co-workers = Q7 + Q16 + Q25 + Q34	4 – 24
Nature of work = Q8 + Q17 + Q27 + Q35	4 – 24
Communication = Q9 + Q18 + Q26 + Q36	4 – 24
Total job satisfaction score	36 – 216

Like the OJSQ, psychometric properties testing and exploratory factor analysis of the JSS was conducted as part of Phase I of this study to evaluate internal consistency, reliability and temporal stability of the questionnaires in the Malay language.

2.5.5 Psychosocial working environment risks and occupational stress

Although stress at the workplace is readily known as a common occurrence, its conceptual definition, symptoms, effects and causative factors are very complex. Its effects has also been shown in many studies to be the leading cause of poor performance, absenteeism and even taking a toll on physical and mental wellbeing. Though not a disease, its persistent exposure causes damage to the body, sometimes irreversible. Studies have also shown link between stress with immune suppressive conditions, and even cancer (Dhabhar, 2016; Reiche, Nunes, & Morimoto, 2004). Stress consequences are the leading cause for disability and death in both developing and developed nations today (World Health Organisation, 2017).

Psychosocial hazards of occupational stress are namely due to working conditions, design and its organization, and relationship established at work whether conducive with peers, superiors and subordinates. Risk enhances when prolonged coping ability and resources exceeds inner capacity. Solutions for the prevention of psychosocial hazards have been developed by various international organizations, such as the ILO in the effort to improve health, productivity and efficiency and reduce absenteeism, medical and other benefit costs with the introduction of training packages such as the SOLVE initiative (International Labour Organization, 2012). The SOLVE training package which is designed for OSH professionals, trade unions, managers and associations advocates comprehensive OSH management systems to include risk management, assessment and control of psychosocial risks the same way other work hazards are managed, and health promotional activities are inculcated into an organizations policy statement. It also takes into account challenging situations which arises in times of change which contributes to economic stress.

Even in Europe where strong policies are in place for stress reduction strategies, stress is still the second most reported health problem with a large percentage of lost working days attributed to it (Andor, 2014). Its impact in terms of cost for economic performance and mental distress is of epic proportion. Despite the growing concern and emergence of research in these fields, developing nations still lack adequate information that could influence policymakers. Globalization, labour market fragmentation, outsourcing, downsizing, need for flexible skills and functions and inevitable imbalance in work-life quality contributes towards the burden of psychological diseases globally (Institute of Medicine (US), 2000). Only a collective and comprehensive approach by multiple stakeholders such as academics, researchers and policymakers with strong political will could steer the labour force towards meeting challenges faced in the ever-changing world. The core prevention methods include allowing employees in decision making roles, risk assessment and implementing control measures for psychosocial hazards at the workplace, improving communication at the workplace, increasing coping ability by increasing control over work tasks, adopting both collective and individual preventive measures, strengthening support system for all workers and lastly and most importantly, to enhance value placed on safety and health in organizations.

CHAPTER 3: METHODOLOGY

This chapter describes the materials and methods used for this study, which include details of study procedure, objectives of the study project, research design, sampling process applied, instruments utilized, methods used for data collection and the explanation of statistical interims used for data analysis.

To answer the research objectives, this study was divided into three phases. Phase I was conducted to validate the psychometric properties of two questionnaires used, which are the Organizational Justice Scale Questionnaire (OJSQ) by Moorman (Moorman, 1991) and the Job Satisfaction Survey Questionnaire (JSS) by Spector (Liu et al., 2008; Spector, 1997) in the Malay language.

Phase II was the quantitative element of this study which described the associations between psychosocial working environment and organizational justice with stress and job satisfaction among public school teachers.

Phase III was conducted as the subjective method to assess the correlation between perceived stress (DASS 21 questionnaire) and true stress (physiological) using salivary stress biomarkers such as salivary cortisol and salivary secretory IgA.

3.1 Phase I : Psychometric and Reliability Testing of the translated Malay language version of the Organizational Justice Scale Questionnaire (OJSQ) and the Job Satisfaction Survey questionnaire (JSS)

In this study phase, the OJSQ and JSS had been translated by independent translators into the Malay language. However, some cultural adaptation and job-specific amendments were made for purposes of applicability, thus the need for psychometric and reliability testing was conducted.

3.1.1 Study design

A two-stage design was used for this phase of the study. Since the Malay language version of the OJSQ and JSS were available from the instruments' developer and prior studies, only minor amendments were made for cultural adaptation and job-specific purposes. The first stage includes translation, revisions (to eliminate linguistic inaccuracies and conceptual discrepancies), face validity and assessment of clarity and cultural adaptability. In the second stage, a cross-sectional study design was used to assess the revised instrument's internal consistency, dimensionality, temporal stability, content validity and test-retest reliability.

3.1.2 Study location

This study was conducted in the state of Federal Territory of Kuala Lumpur (*Wilayah Persekutuan Kuala Lumpur*). Wilayah Persekutuan Kuala Lumpur (WPKL) is the national capital of Malaysia, and one of three Federal Territories in Malaysia, the other two being Wilayah Persekutuan Putrajaya (Administrative Capital) and Wilayah Persekutuan Labuan. Geographically, WPKL is located in the centre of Selangor state, as it was previously under the administration of the Selangor state government till it seceded to the federal government in 1974 to become a Federal Territory (Figure 3.1 and 3.2). It is the biggest and most populous city in the country with a land mass of 243 km² with population estimated at about 1.791 million (Department of Statistics Malaysia, 2017d).

Since WPKL is a city by its own standing, it does not comprise of any rural districts. Although it has eleven districts which serve as administrative subdivisions under Kuala Lumpur City Hall's (*Dewan Bandaraya Kuala Lumpur*) authority, it was only demarcated as having three Education Offices by the WPKL State Education Department (*Jabatan Pendidikan Wilayah Persekutuan Kuala Lumpur*). All schools

which fall under the purview of these three Education Offices (*Pejabat Pendidikan*) are the Education offices of Bangsar/Pudu, Keramat and Sentul. In total, there are 89 regular public secondary schools in WPKL, of which 47 are under Zone Bangsar/Pudu, 22 in Zone Sentul and 20 in Zone Keramat.



Figure 3.1 : Map of Selangor with reference to Kuala Lumpur

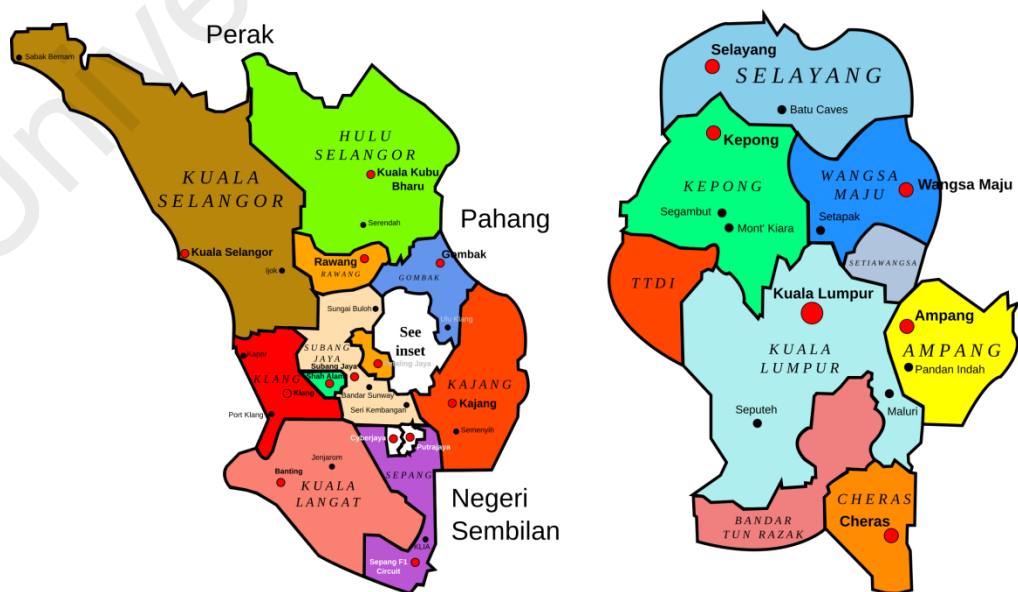


Figure 3.2 : Map of Kuala Lumpur in reference to Selangor

3.1.3 Study population

Participants in this study were teachers from regular public secondary schools from WPKL who participated in the parent cohort study [Clustering of Lifestyle Risk Factors and Understanding Its Association With Stress On Health and Wellbeing Among School Teachers in Malaysia (CLUSTER)] (Moy et al., 2014). It was carried out from February till July 2015. All tenured teachers from consented schools were invited. WPKL teachers were chosen as they shared similar characteristics with their colleagues in Selangor state in terms of socio-demographic characteristics, education level and proportions in gender and ethnic compositions. Data collection consisted of self-administered questionnaires, and a separate set of teachers from different schools were each selected for the OJSQ and JSS.

3.1.4 Inclusion and exclusion criteria

The inclusion criteria for this study are as follows :

i. Malaysian Citizens

Only teachers who are citizens of Malaysia were selected for ease of generalizability and extrapolation with professional groups.

ii. All teachers who are under permanent employment with the Ministry of Education Malaysia.

Permanent regular public secondary school teachers were deemed to have similar socioeconomic status and working demands as compared to teachers with contracts. Furthermore, research has also shown that insecurity associated with non-permanent job status increases stress levels, and affects health condition (Seibt et al., 2012). In addition to that, with the current economic downturn, temporary teachers might have additional stress due to job insecurity, and thus may cause some ambiguity with results.

iii. Voluntary participation

This will ensure unbiased answers as there are no external pressures.

iv. Teachers from Regular Public secondary schools

Teachers from religious schools, vocational colleges, primary schools, special schools or vernacular schools were excluded as they have differing job scope, stressors and viewpoints amongst themselves.

The exclusion criteria for the study is :

Teachers with any form of psychiatric illnesses (Enquired before questionnaire was disseminated).

This is because respondents with psychiatric illnesses will relate to more stressful situations and working conditions, as well as emotional instability.

3.1.5 Sample size calculation

To obtain a reliable result, substantial amount of data is required. The use of a larger sample size would reduce sampling error and produce a more reliable factor structure (MacCallum, Widaman, Preacher, & Hong, 2001). Based on the usage of subject to variable ratio method, some researchers have recommended that the minimum sample size should be represented by five to ten samples for each item (Bernstein & Nunnally, 1994; Garson, 2008; MacCallum et al., 2001), while others have recommended the use of ten cases per item in validation studies (Hair, Black, Babin, Anderson, & Tatham, 2006). There were 181 respondents who participated in the validation study of the OJSQ and 255 for the JSS, hence, the total required respondents for both the OJSQ and JSS were achieved according to MacCallum et al. (2001) and Garson (2008).

3.1.6 Sampling method

Universal sampling was method of sampling among respondents who were invited from consented schools. For the OJSQ, teachers were recruited from twelve different schools, whereas for the JSS, teachers were recruited from thirteen different schools from Wilayah Persekutuan Kuala Lumpur. Respondents who had answered the OJSQ were different from those who had answered the JSS as to not burden them with too many questionnaires. They were also asked to answer the repeat questionnaire for test-retest reliability after two to three weeks. Those who took part in Phase I of this study did not participate in Phase II of this study.

3.1.7 Ethical approval

Ethical approval for this study was obtained from the Medical Ethics Committee of the University of Malaya Medical Centre (UMMC) (Reference Number: MEC 950.1) (Appendix A). The permission to conduct the study was also obtained from the Educational Planning and Research Division, Ministry of Education Malaysia headquarters (Reference Number: KP (BPPDP)/603/5/JLD.08(07)) (Appendix B) and the Federal Territory of Kuala Lumpur Education Department (Reference Number : JPNWP.900-6/1/7 Jld.11) (Appendix C). Informed consent was also obtained from all participants, and ethical principles were preserved with strict adherence to confidentiality (Appendix F, G and H). The grant to conduct this study was provided by the University of Malaya Postgraduate Research Grant (PPP) No. PG173-2015A (Appendix E).

3.1.8 Study instruments

The OJSQ and JSS are widely used globally in organizational justice and job satisfaction researches respectively. In accordance with studies by Robert H. Moorman

on organizational justice (Moorman, 1991; Niehoff & Moorman, 1993), this study adopted all three components of organizational justice which are procedural justice (PJ), interactional justice (IJ) and distributive justice (DJ). Total score ranged from 18 to 90, with higher scores indicating more justice at the workplace. This instrument had been validated in the English language (Colquitt, 2001; Moorman, 1991) and in other languages both in Europe and in Asia (Elovainio et al., 2002; Gurbuz & Mert, 2009; Inoue et al., 2009). Since the Malay Language is the national language of the country and nearly 69% of the country's population (Department of Statistics Malaysia, 2017a) and majority of the teaching population in regular public schools are from the Malay and Bumiputera ethnic groups, thus there was a need for a translated and reliable Malay language version for both the questionnaires. The translated Malay language OJSQ had previously been used among workers in the manufacturing sector in Malaysia (Edimansyah et al., 2006; Ibrahim & Ohtsuka, 2013), with back-to-back translation conducted and its reliability tested. However, some minor amendments were made in the terminology during face content validation due to a different target population; hence its psychometric properties were tested.

Similar to the OJSQ, the JSS too underwent some revisions during face validation and discussions to suit the target population of teachers as some terminology used was deemed unsuitable and inaccurate. Thus, after consulting with experts in the field, it was decided that it would be best to test its psychometric properties among teachers from a different sample population first, and if findings were favourable, to proceed using it for the study. The OJSQ and JSS were face validated by two occupational health physicians cum academicians and an epidemiologist who were fluent in both the English and Malay languages, and then examined for internal consistency, temporal stability and dimensionality as Phase I of this study. In addition to that, steps taken were checked

with the COSMIN study (**C**onsensus-based **S**tandards for the selection of health status **M**easurement **I**nstruments) outcome where the consensus-based checklist was also used to evaluate the methodological quality of these two instruments used in this phase of study (Mokkink et al., 2010).

This study on occupational stress uses Karasek's Job Demand-Control-Support theoretical framework by measuring perceived job demand (also known as psychological demand), job control (also known as decision latitude) and social support. Karasek explained that employees with high job demands and low job control have limited opportunity to use their skill at work, thus resulting in dissent, and causing high job strain or stress (Karasek Jr, 1979). Four different types of job combinations can be summarized using different combinations of job demand and job control, which are high strain (high job demand and low job control) and non-high job strain which comprises low strain (low job demand and high job control), active (high job demand and high job control) and passive (low job demand and low job control). The four said groups have been classified in Figure 2.1 above.

3.1.9 Statistical analysis

Data analyses were conducted using IBM Statistical Package for the Social Sciences version 22.0 64-bit edition (IBM Corp, Armonk, NY, USA) (SPSS, 2013). Face content validity, internal consistency, dimensionality and test-retest reliability were assessed. Face content validity was evaluated using the methodology described by Lynn (1986). Two criteria were examined, which were content applicability and phrasing clarity. Content applicability assessed the level of application of the translated items in terms of expression and content, taking into consideration local culture and research objectives. Phrasing clarity is the assessment of clarity, comprehension and item description.

Descriptive statistics were used in describing mean, standard deviation (SD), and frequency of the socio-demographic scores obtained from the two instruments used. To test for internal consistency, Cronbach α coefficient values were calculated for each item. It gives an indication of the level of inter-relation of items within the tested instrument to justify their combination as a single assessment tool (Bergner & Rothman, 1987). Cronbach's alpha (α) was also obtained as means of comparison with the original and translated versions of the OJSQ and JSS.

Internal consistency is the measure of the extent to which items in a questionnaire are correlated (homogenous), thus measuring the same concept (Tavakol & Dennick, 2011). The importance of establishing an instrument's consistency and reliability is essential since it would then correctly measure and assess the study objective and subsequently convey accurate results. The measure which is commonly used as an assessment for reliability is internal consistency. It evaluates the correlation of an item in the hypothesized instrument to measure similar construct (Kline, 2013). The Cronbach's alpha (α) coefficient value is commonly reported for internal consistency. Cronbach's alpha (α) was calculated for the total scale and each factor to determine the strength of association of an item within the scale. The minimum value recommended by researches for Cronbach's alpha (α) coefficient value is 0.7 which indicates an instrument's reliability is adequate and satisfactory (Bernstein & Nunnally, 1994). They have also recommended that Cronbach's alpha (α) coefficient values higher than 0.8/0.9 undergo clinical application in certain situations. Cronbach's alpha (α) values below 0.5 indicates poor correlation and weak in measuring the same underlying construct (Kline, 2013; Tavakol & Dennick, 2011).

To test for the dimensionality of each subscale, exploratory factor analysis (EFA) was used; correlation, Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity were checked. Bartlett's Test of Sphericity checks the null hypothesis of an identity matrix to the original correlation matrix. For factor analysis to be viable, relationships between variables are required. If the R-matrix was found to be an identity matrix, then all coefficient correlations would be zero. For the test to be significant, the significance value should be less than 0.05. Taking a 95% level of significance ($\alpha = 0.05$), the p -value for Bartlett's Test of Sphericity should have a significance value less than 0.05 to indicate R-matrix is not an identity matrix (Bartlett, 1950; Friel, 2007; Tobias & Carlson, 1969).

The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) statistic value varies between 0 and 1. A value closer to 1 indicates patterns of correlations are relatively compact and thus factor analysis would yield reliable factors. Kaiser (1974) recommended values 0.5 and above as acceptable, whereas other researchers have categorized values between 0.5 and 0.7 as moderate, values from 0.7 to 0.8 as good, values from 0.8 to 0.9 as very good, and values above 0.9 as excellent (Friel, 2007; Hair, Anderson, Babin, & Black, 2010; Hutcheson & Sofroniou, 1999). IBM statistics subscription stated that variables with values closer to 1.0 are considered to have more relevance (IBM Knowledge Center, 2017).

Exploratory factor analysis (EFA) is a form of factorial validity which is used to identify a set of factors not observed in a large set of variables while sharing common characteristics (Watson & Deary, 1997). Two main approaches are identified in EFA which are principal component analysis (PCA) and principal axis factoring (PAF) methods. Statistical theorists have stated that there is no evidence which is preferred

methods for sample sizes or differences in factor patterns (Costello & Osborne, 2005; Fabrigar, Wegener, MacCallum, & Strahan, 1999). PCA is the default method of extraction in statistical software packages such as SPSS and SAS, however, there are some arguments on the restricted use of PCA in favour of true factor analysis (Fabrigar et al., 1999; Floyd & Widaman, 1995; MacCallum et al., 2001).

Analysis using PAF however is focussed on shared variance and not on sources of error that are unique to individual measurements in terms of trying to understand shared variance through a small set of latent variables. Furthermore, it is more convenient and has a simpler mathematical approach, thus is commonly used in social and behavioural sciences (Costello & Osborne, 2005; Fabrigar et al., 1999; Floyd & Widaman, 1995). It is also commonly used when the theory behind index variable is the outcome of the variable and considered an adequate approach by many authors in determining the underlying conceptual structure of an instrument while omitting error variability (Watson & Thompson, 2006).

Once the least number of factors which accounts for common variance of a set of variables were obtained, it is then rotated for analysis. Rotation allows output to be more understandable by creating a pattern of loadings. Items would load most strongly on one factor and lesser on other factors (Polit & Beck, 2012). Rotations could be orthogonal or oblique depending on rotation methods. Rotations which assume factors are not correlated are called varimax (orthogonal) rotations whereas rotations which allow correlation of factors are called Promax (oblique) rotations. Varimax rotation maximizes the variance of the squared loadings of a factor on all items, which has the effect of differentiating the extracted factor. Each item has either large or small loadings which make it easy to identify to which factor an item belongs to. Promax rotation is

inclusive of orthogonal rotation, thus is highly recommended (Floyd & Widaman, 1995). Tabachnick et. al, proposed that the best way to decide which rotation to be used was to use Promax rotation, and then look for correlations among factors in the factor correlation matrix (Tabachnick & Fidell, 2006). Correlations of 0.32 and above are considered sizeable as there would be at least 10% overlapping variance among factors. In this study, EFA with principal axis factoring with Promax rotation method was performed (Floyd & Widaman, 1995). Eigenvalues were set at 1.0 (Kaiser, 1974), and factors with eigenvalues of more than 1.0 were extracted.

Convergent and discriminant validity of the study were determined by the average variance extracted (AVE). It is essentially the sum of squared loadings divided by the number of items in each construct. Minimum range for AVE is 0.5 according to some researches, as it indicates that the construct is well explained by its items (Hair et al., 2010). The shared variance between two constructs (R^2) should be lesser than AVEs for discriminant validity (Fornell & Larcker, 1981). Henseler et al. however stated that these approaches do not reliably detect lack of discriminant validity, and thus alternative approach using multitrait-multimethod matrix could be useful (Henseler, Ringle, & Sarstedt, 2015). The average variance explained should be 50% or more, and the minimum factor loading suggested is 0.5 and above (Hair et al., 2010).

Test-retest reliability was conducted to evaluate temporal stability of a certain instrument over time in a similar environment (Kline, 2013). Literature has suggested an optimum interval period of two weeks from the initial test for best results. This is done to ensure the intended constructs under test would not significantly change, but is however long enough from recollecting the prior tests responses (Kline, 2013). There are a few estimates which can be used to assess test-retest reliability, and in this study,

the Intraclass Correlation Coefficient (ICC) was used. The type of ICC method used depends largely on application appropriateness and the test method performed (Shrout & Fleiss, 1979). Weir (2005) had suggested using a two-way mixed effects model with fixed random people effects and measures, ICC (2,1) or (2,k) for test-retest reliability testing for health-related concepts. An ICC value above 0.7 is deemed acceptable according to De Vet, Terwee, Mokkink, and Knol (2011), however, some researchers have classified a range of ICC values in an ordinal manner. ICC with values 0.61 to 0.80 were considered good, while ICC values ≥ 0.81 were considered excellent (McGraw & Wong, 1996; Nunnally, 1967). Shrout (1998) however argued that unlike Cronbach's alpha coefficient, there is yet any consensus as to what constitutes an adequate ICC value, as long as the obtained value is high enough to insinuate confidence in an instrument's temporal stability.

3.2 Phase II: Association of psychosocial working environment and organizational justice with stress and job satisfaction among public school teachers

The Phase II of this research was the main study component of this thesis dissertation. This study phase aims to determine the psychological outcomes of stress and job satisfaction caused by socio-demographic and working characteristics of teachers along with psychosocial working environment and organizational justice factors.

3.2.1 Study design

An analytical cross-sectional study design was used.

3.2.2 Study location

This study was conducted in the state of Selangor Darul Ehsan. It is located in the west coast of Peninsular Malaysia, bordered by Pahang in the East, Perak to the North, Negeri Sembilan to the South and Straits of Malacca to the west (Figure 3.3 and 3.4). It also completely encapsulates two federal territories, which are the Federal Territories of Kuala Lumpur and Putrajaya, which were previously part of Selangor state. This study area was selected due to its high population density and is currently the most affluent state in Malaysia with the largest economy. Its GDP contribution of 22.7% to the nation's economy is the highest in 2016 (Department of Statistics Malaysia, 2017b). It has approximately 936 public schools, which include Primary National Schools (*Sekolah Kebangsaan*) (449), Primary National-type schools (Chinese & Tamil Vernacular Schools) (*Sekolah Jenis Kebangsaan Cina & Sekolah Jenis Kebangsaan Tamil*) (210), Regular Secondary Schools (*Sekolah Menengah Kebangsaan*) (228), Fully Residential Schools (*Sekolah Menengah Berasrama Penuh*) (9), Religious Schools (*Sekolah Menengah Kebangsaan Agama*) (26), Special Education School (*Sekolah Menengah Khas*) (2) and College and Vocational Colleges (*Kolej dan Kolej*

Vokasional) (12) (Jabatan Pendidikan Negeri Selangor, 2017). This study was however only carried out among regular secondary school and primary national-type school teachers using a multi-stage sampling process.

It was crucial to conduct the study in a location with easy accessibility to correspondents as to be able to gather adequate sample population. Schools in Selangor were demarcated as urban and rural according to its location within its districts. Most schools in Selangor are urban schools (612 schools), with a significant number of rural schools as well (324 schools) (Jabatan Pendidikan Negeri Selangor, 2017). Most rural schools were located at the northern and western parts of Selangor, whereas urban schools were mostly concentrated at the central districts of Selangor, where the population was most dense. This is ideal for this research as teachers from both urban and rural schools were required. The demarcation of urban and rural schools was set by the Selangor State Education Department (*Jabatan Pendidikan Negeri Selangor*) by location of the districts within Selangor.

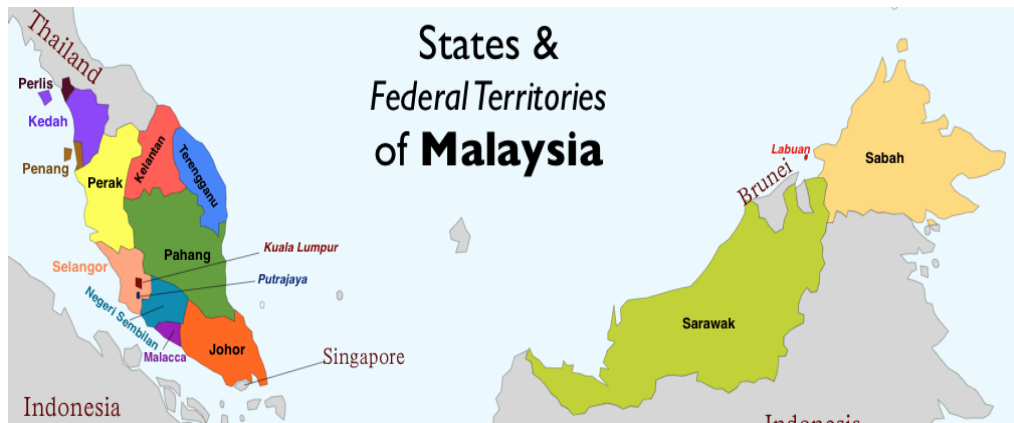


Figure 3.3 : Location of Selangor within Malaysia



Figure 3.4 : Map of Selangor with district's demarcation

3.2.3 Study population

Teachers' from regular public secondary schools and primary vernacular schools from Selangor state under the purview of Ministry of Education, Malaysia. This phase of the study was conducted from August 2015 till March 2016.

3.2.4 Selection of study population

Teachers who have enrolled in the parent CLUSTER cohort study (Moy et al., 2014) in the state of Selangor Darul Ehsan. Since teachers in regular public secondary schools

comprise nearly 87% of all government secondary schools in Malaysia, this group of teachers were selected (Ministry of Education Malaysia, 2017b). During ongoing data collection and preliminary analysis however, it was noted that majority of the teachers who were participating were ethnic Malays, and the number of ethnic Chinese and Indian teachers were very few and disproportionate with the total number of teachers in the ministry, and ethnic composition of the races in Malaysia. As such, it was decided to also include teachers from vernacular schools as means of oversampling more ethnic Chinese and ethnic Indian teachers. As there may be some differences in the working environments between regular and vernacular schools, although both types are in the public sector, the differences pertaining to psychosocial working environment and organizational justice were adjusted for in the multivariate analysis.

3.2.4.1 Inclusion criteria

The inclusion criteria for this study are as follows :

- i. Malaysian Citizens
- ii. All teachers who are under permanent employment with the Ministry of Education.
- iii. Voluntary participation
- iv. Teachers from regular public secondary schools and primary vernacular schools.

3.2.4.2 Exclusion criteria

Teachers with any form of psychiatric illness. (Enquired before questionnaire dissemination)

3.2.5 Sample size

3.2.5.1 Sample size calculation using prevalence

Sample size was calculated using prevalence. The formula used for sample size calculation based on estimates are as below :

$$n = \frac{Z^2 p(1-p)}{e^2} ; \quad \text{where}$$

Z is the confidence level. The confidence level of 95% has a Z value of 1.96

p is the estimated proportion of sample

e is the margin of error. The margin of error selected for this study is 3% (0.03).

Prevalence of stress among secondary school teachers was 20.2% (Masilamani et al., 2012).

Hence, the calculation for sample size :

$$\frac{n = 1.96^2 0.202 (1-0.202)}{(0.03)^2} = 688$$

Taking into consideration the potential attrition rate of 20%, further adjustment was done giving a total sample of 827 participants.

3.2.5.2 Sample size calculation using odds ratio

Sample size calculation is based on the 'PS Power and Sample Size Calculations' version 3.0.43 software (Dupont & Plummer, 1998). Factors from the predictors were used to quantify the sample size of this study, which are job strain, organizational justice and stress with salivary biomarkers. The aim of the study is to achieve power of 80% and a 5% probability of Type I error. Factors used in this method of calculation are depicted below:

- i. Odds Ratio (ψ)
- ii. Power of 80% (**power**)
- iii. Confidence level of 95%

- iv. Type I error probability of 0.05 (α)
- v. The probability of exposure in controls (p_0)
- vi. The ratio of control to the respondent (m)

Table 3.1 : Sample size calculation based on previous literature

	α	Power	p_0	ψ	m	Calculated sample size
Stress and salivary biomarkers (Masilamani et al., 2012)	0.05	0.80	0.35	1.2	1	968
Job strain (Hwang & Lee, 2014)	0.05	0.80	0.05	3.10	1	995
Organizational Justice (Elovainio et al., 2002)	0.05	0.80	0.05	1.7	1	737

Based on these literature, the study by Hwang et al. formulated the highest count for sample size. Accounting for potential non-respondents, a further adjustment of 20% was added, giving a total sample of 1194 participants. As this was the highest count formulated in addition to the potential attrition rate, this sample size calculation was used.

3.2.6 Sampling method

Schools were stratified by the Selangor State Education Department and respective district education offices on the location of each school. Multistage sampling was the method employed for this study. There were a total of 228 regular public secondary schools under the Selangor State Education Department (Jabatan Pendidikan Negeri Selangor, 2017). Upon receiving the full list of schools according to its location in individual districts, 70% of schools were randomly selected (approximately 160 schools). Of that, 103 schools had agreed to participate in the parent CLUSTER cohort and in this study (Figure 3.6).

3.2.7 Ethical approval

Ethical approval for this study was obtained from the Medical Ethics Committee of the University of Malaya Medical Centre (UMMC) (Reference Number : MEC 950.1) (Appendix A). The permission to conduct the study was similarly obtained from the Educational Planning and Research Division, Ministry of Education Malaysia headquarters (Reference Number: KP (BPPDP)/603/5/JLD.08(07)) (Appendix B) and the Selangor State Education Department (Reference Number : JPNS.PPN-600-1/49-JLD.56(52)) (Appendix D). Informed consent was also obtained from all participants (Appendix F, G and H), and ethical principles were preserved with strict adherence to confidentiality. The grant to conduct this study was provided by the University of Malaya Postgraduate Research Grant (PPP) No. PG173-2015A (Appendix E).

3.2.8 Sampling procedure

Upon receiving approval from the Malaysian Ministry of Education headquarters in Putrajaya and the Selangor State Education Department, permission to conduct the study was requested from individual school's principals via fax request letter and follow-up telephone call. A brief explanation regarding the study, its benefits and procedures were explained to each principal in order to get full cooperation during data collection. Once a certain school had agreed on participation, appointment dates were set up, and eligibility was determined using the inclusion and exclusion criteria. Explanation on nature of the study was explained to each participant before data collection, and information sheets and consent forms were then disseminated. Upon returning the consent forms, the teachers were allowed to participate in the study, and were asked to fill in the questionnaires provided to each of them. The study was further expanded to teachers from primary vernacular schools (Chinese and Tamil schools) to target and increase participation of the specific ethnicities.

3.2.9 Data entry and processing

Data for the JCQ and DASS-21 questionnaires were entered by CLUSTER research assistants as the questionnaires were components of the general CLUSTER questionnaire booklet. Data for the OJSQ and JSS were entered by the researcher at the end of data collection. Upon completion of data entry, data merging, second round of data cleaning and manual data entry for data for JCQ from Phase I participants were done by the researcher. All data were entered using the IBM SPSS statistical software version 22.0 64-bit edition (IBM Corp, Armonk, NY, USA) (SPSS, 2013).

3.2.10 Data analysis and interpretation

Since multistage sampling was employed as sampling method, complex sample analysis was carried out as method of data analysis. Samples were each weighted to demonstrate correct representation and to account for unequal probabilities in the interest of accuracy and precision (Yansaneh, 2003). The formula applied to calculate weightage is depicted in Figure 3.5 (Korn & Graubard, 1995).

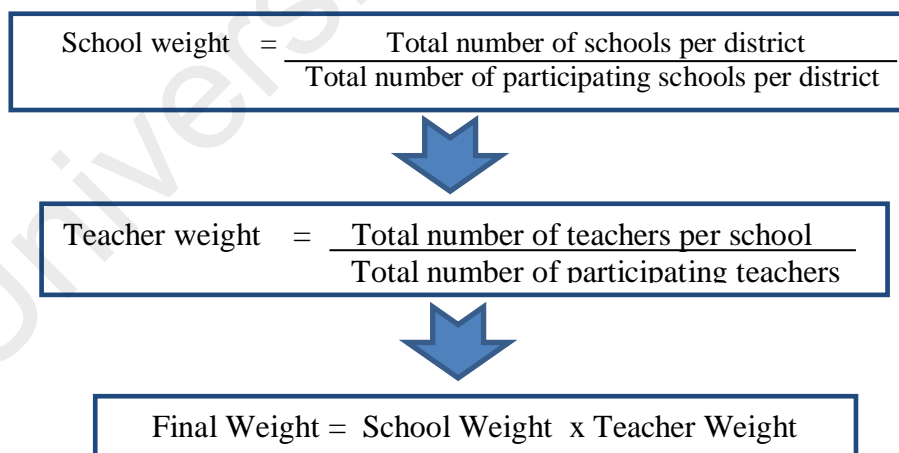


Figure 3.5 : Formula used to calculate weightage

Descriptive analysis was performed to illustrate the distribution of socio-demographic features, frequency of parameters and variables description. Mean and standard deviation was calculated for normally distributed data, whereas median and

interquartile range for non-parametric data sets. Both were calculated via complex sample analysis procedure, including weighted percentage.

Univariate analysis was conducted using complex sample general linear model and complex sample crosstab. Significance level was pre-set at 0.05, and mean (standard error, SE) scores with 95% confidence intervals (95% CI) were estimated using stress and job satisfaction scores. Multivariate analysis was then carried out using complex sample general linear model for variables with p -value <0.25 in the univariate analysis. The 0.05 level has been reported to be too stringent and not able to identify other important variables (Mickey & Greenland, 1989).

The flow diagram for Phase II is illustrated in Figure 3.6.

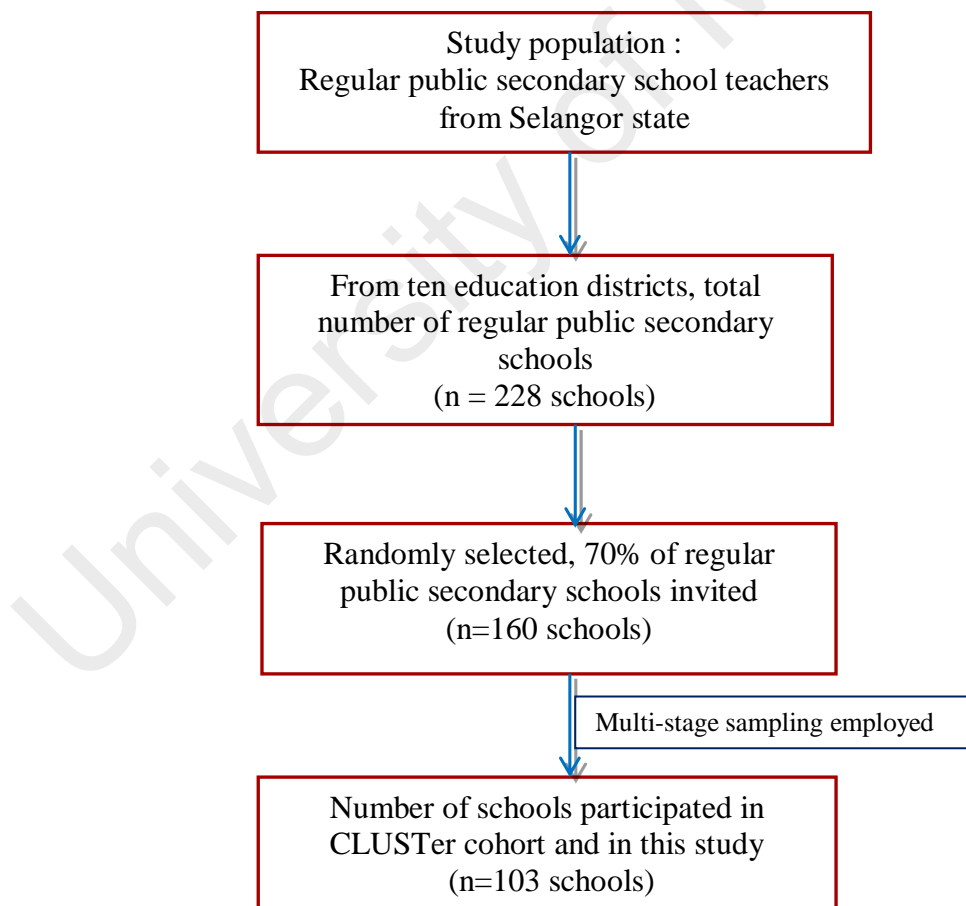


Figure 3.6 : Flow diagram of the sampling procedure for this study

3.3 Phase III : Salivary stress biomarkers

The biomarkers used in this study were salivary biomarkers. The salivary stress biomarkers used in this study were salivary cortisol and salivary secretory IgA. They are competitive immunoassay for the quantitative measurement of cortisol ($\mu\text{g/dL}$) and Immunoglobulin A ($\mu\text{g/min}$) respectively. Both these biomarkers have been used in prior studies for stress researches in Malaysia and abroad (D. S.-Q. Koh & Koh, 2007; Masilamani et al., 2012; V. Ng et al., 1999).

3.3.1 Study population

Only teachers from regular public secondary schools who had fully answered all four questionnaires from Phase II were invited to participate in this phase of the study. This phase was conducted from February 2016 until September 2016.

3.3.2 Selection of study population

Due to budgetary constraints and the high cost of biomarker kits, only a sub-sample from the total sample population was studied. With the allocated funds from the Postgraduate Research Grant (PPP Grant), a maximum of 152 respondents were permissible to participate in this phase. Cluster sampling was the method used as sampling method. Schools with the most number of respondents were first selected. Upon listing the name of schools with twenty and above respondents, schools were randomly selected and teachers who had participated in Phase II of the study were invited till the desired amounts of respondents were achieved.

3.3.2.1 Inclusion criteria

Teachers from regular public secondary schools who had participated in Phase II of this study, and completed all four provided questionnaires.

3.3.2.2 Exclusion criteria

- a) Teachers with any psychiatric illnesses.
- b) Pregnant teachers.
- c) Teachers on regular medication for immune or autoimmune diseases or any chronic disease which has affects the immune system.
- d) Teachers who had been for the past one week prior to collecting the saliva samples known to have any infection i.e. Upper Respiratory Tract Infection (URTI), or on any antibiotic treatment for the infection (Y Yang et al., 2002).
- e) Teachers on steroid treatment for Bronchial Asthma, or had consumed steroids for any acute exacerbation at least 24 hours before sampling (Y Yang et al., 2002).

3.3.3 Sampling procedure

A written protocol on saliva collection was sent to each school via the principal and/or teacher in charge in advance, and briefed on what should and should not be done to obtain the best quality of saliva sample. Respondents were requested to abstain from consuming any food or sweet drinks at least one hour prior to sample collection to minimize possible debris contamination. Those who had however consumed food were asked to rinse their mouth and wait for at least ten minutes prior to samples collection (Masilamani et al., 2012). Sample collection was done in the mornings from 7.00 am till 8.15 am. All teachers were supervised on the method of collection on the day of sample collection, and were requested to passively drool into a conical Falcon test tube for five minutes (300 seconds). After five minutes (300 seconds), all respondents were asked to stop drooling, and return the test tube with their saliva sample to the researcher. Volume collected and ID for each respondent were then recorded (for flow rate calculation). Saliva samples with visible food particles or blood stains were immediately rejected and

discarded. After the saliva collection was completed, each respondent was then asked to answer the DASS-21 questionnaire. All falcon test tubes with collected saliva samples were stored in a *Coleman* ice box with ice packs and transported immediately to the Department of Social and Preventive Medicine, University of Malaya laboratory where they were stored at -70°C till the day of assay analysis.

Prior to conducting the tests and analysis, the researcher underwent laboratory technique training in December 2015 and January 2016 conducted by medical laboratory officers from Julius Centre University of Malaya (JCUM) and Department of Medical Microbiology, Faculty of Medicine, University of Malaya. Proper technique on how to perform the assay and method of sampling were taught and observed. All tests and assay analysis were performed under the supervision of experts from the Medical Microbiology Department. Since the medical microbiology laboratory is an accredited laboratory, all equipment's used were at par with today's technology advancement and regularly calibrated, thus ensuring highest precision and minimal error probability. All tests and assays performed adhered strictly with protocols and guidelines provided by the vendor Salimetrics LLC®,USA (Salimetrics, 2009, 2010; Salimetrics & SalivaBio, 2011). Saliva results were read using the calibrated iMark™ Microplate Absorbance Reader (Bio-Rad,USA) (Bio-Rad Laboratories, 2015).

3.3.4 Ethical approval

Since participants in Phase III were sub – sample respondents from Phase II, and the collection of saliva samples were incorporated as one of the biospecimens under investigation by the parent CLUSTER cohort study, thus no additional ethical approval was obtained from the Medical Ethics Committee, University Malaya Medical Centre. Only verbal permissions were obtained from school heads and principals as permission

from the Ministry of Education and the Selangor State Education Department were still withstanding. Verbal consent from each participant was also taken beforehand from respondents.

3.3.5 Salivary analysis and interpretation

A total of four salivary cortisol and four salivary secretory IgA immunoassay kits were used for this phase of the study. Each kit ran a maximum of 38 samples (dual sampling for each respondent, six differing standards concentrations, zero values, NSB and each Control High and Control Low – all of which were dual sampling as well).

3.3.5.1 Tests and analysis for salivary cortisol

All reagents and samples which were kept in refrigerators after sample collection were thawed and kept under room temperature for at least two hours on the day of testing prior to running the tests. Wash buffers, conjugate dilution and assay diluents were prepared at this time. Plate layout for the standards, controls and samples were prepared as suggested by Salimetrics Salivary Cortisol Enzyme Immunoassay Kit protocol (Salimetrics, 2010). The standards used were at 3.0, 1.0, 0.333, 0.111, 0.037 and 0.012 $\mu\text{g}/\text{dl}$ concentrations. The tests were then conducted according to the provided protocol.

After all assay tests were completed in the laboratory, the raw data values which were obtained from the calibrated microplate reader were entered into the Salimetrics® My Assays website. The Salimetrics® My Assays website is a customized Data Analysis Software Tool provided by Salimetrics® for their patrons to run analysis. After inserting the data, calculations were done by the software tool and the concentrations for the cortisol were obtained. In addition to that, it also plots a graph of concentration vs 4PL and standards each time an analysis is done to show accuracy and

how far values deviate are from the normal graphs. Since the sample was taken in the morning, the normal range used was in accordance with AM (*ante meridiem*) range by Salimetrics® and other literature. All analyses were again performed strictly adhering to the guidelines and recommendations provided by Salimetrics® (Salimetrics, 2010; Salimetrics & SalivaBio, 2011).

3.3.5.2 Tests and analysis of salivary secretory IgA (SIgA)

Similar to salivary cortisol, all reagents and samples which were kept in refrigerators were also thawed and kept at room temperature for at least two hours on the day of testing prior to running tests. Wash buffers, conjugate dilution and assay diluents were prepared during this time. Plate layout for the standards, controls and samples were prepared as suggested by Salimetrics Salivary Secretory IgA Indirect Enzyme Immunoassay Kit protocol (Salimetrics, 2009). The standards used were at 600, 200, 66.7, 22.2, 7.4 and 2.5µg/ml concentrations. Unlike salivary cortisol standards which were pre-diluted, the SIgA standards and saliva samples had to be diluted with SIgA diluent as outlined in the protocol provided. The tests were then performed according to the protocol provided.

After all assay tests were completed in the laboratory, the microtitre plate was inserted into the calibrated microplate reader to obtain raw data readings. The analysis for salivary secretory IgA differs from salivary cortisol as flow rate is also calculated. For salivary secretory IgA, the volume of sample collected and time taken is also of great importance. As such, the calculation and analysis for salivary secretory IgA were done manually using formulas derived from previous studies (D. S.-Q. Koh & Koh, 2007; Y Yang et al., 2002).

The formula used is shown in Figure 3.7:

$$\text{Salivary flow rate} = \frac{\text{Saliva volume (collected from each respondent)}}{\text{Time (5 minutes of saliva collection)}}$$

$$\text{IgA Concentration} = \text{IgA (Readings obtained from Microplate Reader)} \times 5$$

(Phosphate Diluent Factor)

$$\begin{aligned} \text{Secretory IgA} &= \text{IgA concentration} \times \text{Salivary flow rate} \\ &= \mu\text{g/ml} \times \text{ml/min} \\ &= \mu\text{g/min (final unit used)} \end{aligned}$$

Figure 3.7 : Formula used to calculate Salivary Secretory IgA

3.4 Study variables

3.4.1 Independent variables

a) Socio-demographic factors

- i. Age
- ii. Gender
- iii. Ethnicity
- iv. Religion
- v. Marital status
- vi. Employment years
- vii. Education level
- viii. House ownership

b) Working characteristics

- i. Location of schools
- ii. Type of schools

- c) Psychosocial working environment factors
 - i. Job demand
 - ii. Job control
 - iii. Social support
- d) Organizational justice factors
 - i. Procedural justice
 - ii. Interactional justice
 - iii. Distributive justice

3.4.2 Dependent variables

- a) Stress
- b) Job satisfaction

Listed below are the Independent and Dependent variables for each of the assessed specific objectives :

Table 3.2 : Independent and dependent variables with assessed objective

Specific objectives	Independent variable	Dependent variable	Instrument and scale	Interpretation of score
To determine if psychosocial working environment has an influence on stress and job satisfaction levels among school teachers.	Job demands (JD), Job control (JC), Social support (SS)	Stress, job satisfaction	Job Content Questionnaire (JCQ) – 4 point Likert-type scale. DASS-21 and Job Satisfaction Survey questionnaire	Higher score indicates higher level of job demand, increased job control and social support

Table 3.2, continued

Specific objectives	Independent variable	Dependent variable	Instrument and scale	Interpretation of score
To determine if organizational justice factors have an impact on stress and job satisfaction among school teachers.	Procedural justice (PJ), Interactional justice (IJ) and Distributive justice (DJ)	Stress, job satisfaction	Organizational Justice Scale – 5 point Likert-type scale. DASS21 and Job Satisfaction Survey questionnaire	Higher agreement shows higher levels of perceived organizational justice
To determine the correlation between salivary stress biomarkers (salivary cortisol and secretory IgA) with stress among school teachers.	Salivary cortisol and secretory Immunoglobulin A (IgA)	Stress	Salimetrics HS-IgA & HS-Cort Kit (µg/mL)	Higher levels indicate higher levels of stress, however, low levels may indicate burnout/chronic stress

3.4.3 Confounders

There are several confounders in this study which could affect the outcome either directly or indirectly. They include :

- i. External/other sources of stress – personal traits, family conflicts and other environmental factors could also be contributing factors of stress in the respondents, however, the JCQ and OJSQ will attempt to focus on work and working environment factors.
- ii. Age – some correlation was found between ageing and stress as stress levels could increase with added responsibilities at work, home and societal pressures (M Kivimäki et al., 2003; Ylipaavalniemi et al., 2005). Other opposing literature

have however reported better coping mechanism with increased age (Hansson, Robson, & Limas, 2001; Hertel, Rauschenbach, Thielgen, & Krumm, 2015).

- iii. Employment years – Longer years in the teaching profession have shown to cause increased stress levels (M Kivimäki et al., 2003; Ylipaavalniemi et al., 2005) and burnout due to chronic stress (M Kivimäki et al., 2003).

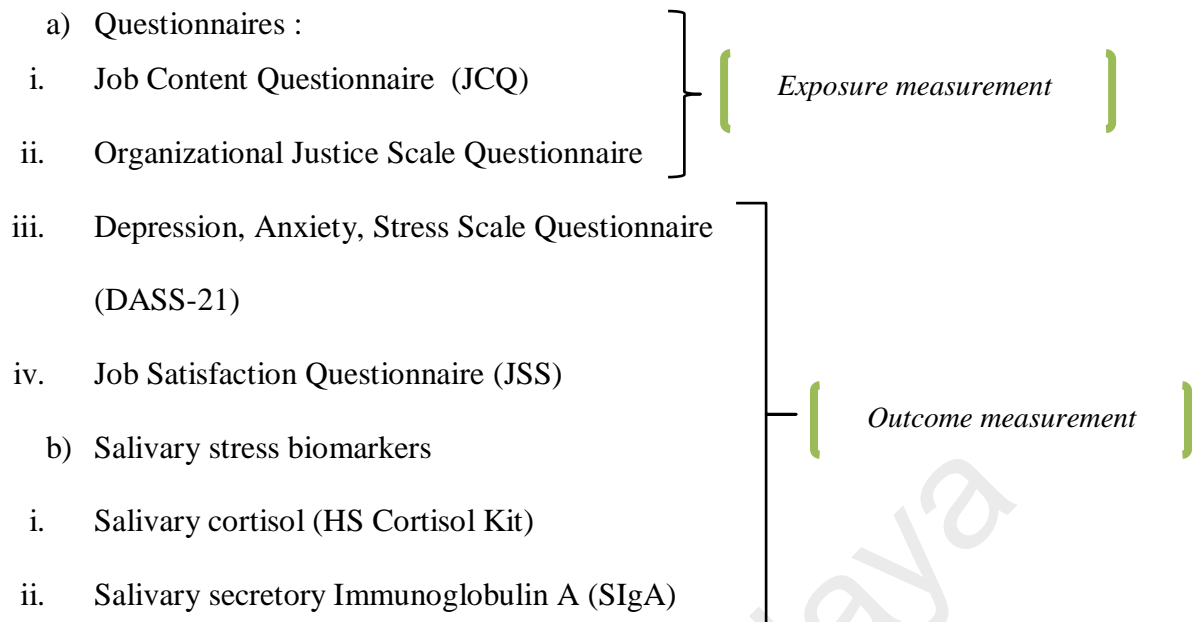
3.4.4 Operational definitions

- i. Stress – Perceived stress by respondents due to psychosocial working environment and organizational justice factors at the workplace.
- ii. Psychosocial working environment (PWE) – Exposures in the psychosocial domain which could incur job strain. The three elements of psychosocial working environment exposures are job demand (JD), job control (JC) and social support (SS).
- iii. Organizational justice (OJ) – Exposures in the organizational justice scale which has potential to cause stress and job dissatisfaction due to perceived fairness at the workplace. The three components which constitute OJ are procedural justice, distributive justice and interactional justice.
- iv. Salivary secretory IgA and salivary cortisol – Salivary stress biomarkers which are the objective measurements of stress levels, both acute and chronic stress.

3.4.5 Study instruments

This study comprised of both subjective and objective variables measurements.

Instruments used in this study are as follows :



3.5 Data collection

Respondents who were interested to participate in all three phases of this study were informed beforehand of the time and place to assemble by communicating through the principal or teacher-in-charge. Data collection was conducted before school session started, which was before 7.30 am. After written consent was obtained, a brief explanation of the purpose of the study was given by the researcher. They were also informed on their right to decline participation, and may withdraw from any stage of the study with no consequences. All questionnaires were self-administered. For Phase I, test-retest reliability questionnaires were administered after an interval of two to three weeks. All questionnaires were thoroughly checked for completeness and respondents were requested to answer completely if any items were unintentionally missed.

Data collection for Phase I was completed in July 2015. Upon completion of data collection, data entry was done in stages. Analysis to assess construct validity, dimensionality, conduct Exploratory Factor Analysis (EFA) and test-retest reliability for the OJSQ and JSS were subsequently performed.

Data collection for Phase II was completed in March 2016; however, a great deal of time was spent on data merging and data entry. Due to the budgetary cut on the parent CLUSTER cohort study, the research proceedings were prematurely halted which led to the delay in questionnaire collection, gathering and organizing raw data sets, as well as performing data entry for remaining respondents.

Sample collection for Phase III of the study was completed in September 2016. Assay testing and analysis and sample collection were conducted concurrently during that span. Complete analyses were accomplished in October 2016.

3.6 Data analysis

All data acquired from the study was entered and processed using the *Statistical Package for Social Science* (SPSS) software version 22.0, 64-bit edition (IBM Corp, Armonk, NY, USA) (SPSS, 2013). Transformation and data coding were done accordingly. For Phase I of the study, psychometric properties testing of the OJSQ and JSS were performed. In Phase II, complex samples analysis using generalized linear model was employed as the main method of data analysis. Assay testing for Phase III of was initially conducted at the Social and Preventive Medicine department's laboratory, however, due to the lack of specialized instruments and equipment, the use of the laboratory was ceased. The researcher then obtained permission from the medical microbiology department and conducted assay analyses in the medical microbiology laboratory.

CHAPTER 4: RESULTS

This chapter presents the results obtained from all three phases of this study. The first part of this chapter involves minor amendments and assessment of psychometric properties in the translated Malay language version of the OJSQ and JSS questionnaire among Malay speaking teachers from Wilayah Persekutuan Kuala Lumpur. In this phase, the original translated Malay versions of the questionnaires were culturally adapted and suited to be used in the teaching profession. This chapter will also describe the demographic characteristics, internal consistency and reliability testing, test-retest reliability and results from Exploratory Factor Analysis of the Organizational Justice Scale Questionnaire (OJSQ) and the Job Satisfaction Survey (JSS) questionnaires.

The second part of this chapter will describe the demographic characteristics, description of the study population, the correlation between the variables studied and the univariate and multivariate analysis of the study. The final part of this chapter will describe the objective component of this study, which is the salivary stress biomarker sampling subgroup analysis and correlations.

4.1 Phase I: Psychometric and Reliability testing of the translated Malay language version of the Organizational Justice Scale Questionnaire (OJSQ) and Job Satisfaction Survey questionnaire (JSS)

4.1.1 Psychometric properties of the translated Malay language version of the Organizational Justice Scale Questionnaire (OJSQ)

4.1.1.1 Demographic characteristics

A total of 181 teachers participated in the first round of questionnaire survey, while the second round of questionnaires was returned by 137 teachers (response rate = 75.7%). Of the 181 respondents, the majority of them were females (86.7%), age ranging from 26 to 58 years, with a mean age of 40.4 ± 8.1 years. Most of the respondents were from the younger age groups (31-50) years old and were predominantly ethnic Malays (71.8%). Table 4.1 shows the demographic characteristics of the teachers involved in this study.

Table 4.1: Demographic characteristics of participants

Characteristics	Mean (SD)*	n (%)
Age (years)	40.4 (8.1)	
Age Group (years)		
Below 30		24 (13.3)
31 – 40		71 (39.2)
41 – 50		63 (34.8)
51 & above		23 (12.7)
Gender		
Male		24 (13.3)
Female		157 (86.7)
Ethnicity		
Malay		130 (71.8)
Chinese		28 (15.5)
Indian		23 (12.8)

*Standard deviation

4.1.1.2 Amendment and adaptation of the OJSQ

In order to obtain an accurate, reliable, stable, concise and appropriate translated Malay language version of the OJSQ, the researcher was advised to abide by the semantic equivalence of the translated version of the questionnaire and improve clarity and readability. Four items of the initial translated Malay version were corrected and amended after discussion and agreement by experts during face validation. Table 4.2 presents the modifications made on the four items upon reaching the finalized version. Although modified, none of the original items were removed.

Table 4.2 : Amendments to the translated version of the OJSQ

Item No.	Original phrase (in English)	Initial translated Malay version	Modified version	Summary
4	Procedures are designed to generate standards so that decisions could be made with consistency.	Prosidur organisasi dibentuk untuk melahirkan satu 'standard' agar keputusan yang dibuat adalah konsisten.	Prosedur organisasi dibentuk untuk menghasilkan piawaian (standard) supaya semua keputusan dibuat secara konsisten.	The word 'standard' was replaced by the Malay word ' <i>piawaian</i> '. The word ' <i>supaya</i> ' was deemed more appropriate in this context as compared to ' <i>agar</i> '.

Table 4.2, continued

Item No.	Original phrase (in English)	Initial translated Malay version	Amended version	Summary
5	Procedures are designed to hear the concerns of all those affected by the decision.	Prosidur organisasi dibentuk untuk mengambil kira pendapat semua pihak yang terlibat dengan keputusan yang dibuat.	Prosedur organisasi dibentuk untuk mengambil kira pendapat semua pihak yang terlibat dalam membuat keputusan.	Rearrangements of the words more accurately represented the original English version.
7	Procedures are designed to allow for requests for clarification or additional information about decisions made.	Prosidur organisasi dibentuk untuk membenarkan permintaan untuk penjelasan atau maklumat tambahan yang diperlukan berikutan keputusan yang dibuat.	Prosedur organisasi dibentuk supaya permintaan untuk penjelasan atau maklumat tambahan bagi keputusan yang dibuat boleh dibenarkan.	Rearrangements of the words more accurately represented the original English version in the predicate part of the sentence.
13	Your supervisor took steps to deal with you in a truthful manner.	Penyelia anda mengambil langkah berdepan dengan anda dengan cara yang betul.	Penyelia saya mengambil langkah untuk berurusan dengan saya dengan cara yang betul.	The word ' <i>anda</i> '(you) was replaced by ' <i>saya</i> ' (I). The word ' <i>berurusan</i> ' was deemed more appropriate than ' <i>berdepan</i> '

In addition to the above-mentioned amendment's, wordings were changed from “*anda*” (you) to “*saya*” (I) in from items 8 to 18 to give respondent's a more personalistic approach and active-voice, which then also gives a better understanding to the questions asked.

4.1.1.3 Internal consistency and Reliability

In this section, results from reliability analysis are reported. This questionnaire was pilot tested among 181 respondents. The mean scores for the OJ subscales are 4.09, 3.85 and 3.63 for procedural justice (PJ), interactional justice (IJ) and distributive justice (DJ) respectively (Table 4.3). The Cronbach's α coefficient and 95% CI for PJ, IJ and DJ subscales were 0.83 (0.78, 0.86) $p < 0.001$, 0.87 (0.81, 0.92) $p < 0.001$ and 0.94 (0.86, 0.97) $p < 0.001$, while the overall composite Cronbach's alpha was 0.92 (0.84, 0.96) $p < 0.001$.

Table 4.3 : Mean scores, Cronbach's α and minimal CITC values for each construct

Construct	No. of items		Mean (SD)	Cronbach α	Minimal CITC ^v
	Initial	Final			
Procedural Justice (PJ) [†]	7	7	4.09 (0.42)	0.83	0.44
Interactional Justice (IJ) [†]	6	6	3.85 (0.5)	0.87	0.53
Distributive Justice (DJ) [†]	5	5	3.63 (0.55)	0.94	0.74

*SD = Standard Deviation

^vCITC = Corrected Item-Total Correlation

[†] Total score for each construct was calculated by the averaging score for each item.

Table 4.4 : Corrected item-total correlations and Cronbach's alpha coefficients if an item is deleted

	OJSQ	Scale mean if item is deleted	Scale variance if item is deleted	Corrected item-total correlation	Cronbach's alpha if item is deleted
Procedural Justice (PJ)	Item 1	65.75	50.12	0.49	0.92
	Item 2	65.96	51.44	0.44	0.92
	Item 3	65.81	46.49	0.61	0.91
	Item 4	65.63	48.85	0.45	0.92
	Item 5	65.87	47.34	0.59	0.91
	Item 6	65.76	46.91	0.56	0.91
	Item 7	65.82	47.91	0.60	0.91
Interactional Justice (IJ)	Item 8	66.12	46.61	0.62	0.91
	Item 9	66.34	46.05	0.66	0.91
	Item 10	66.00	47.96	0.58	0.91
	Item 11	65.88	46.30	0.70	0.91
	Item 12	65.94	45.30	0.79	0.91
Distributive Justice (DJ)	Item 13	65.96	48.08	0.53	0.92
	Item 14	66.17	47.07	0.79	0.92
	Item 15	66.24	45.89	0.75	0.91
	Item 16	66.24	46.26	0.74	0.92
	Item 17	66.24	46.70	0.75	0.92
	Item 18	66.41	47.09	0.78	0.92

4.1.1.4 Test-retest Reliability

In the retest, 137 respondents participated. Intraclass correlation coefficient (ICC) using two-way mixed effects model with absolute agreement definition was used. The test-retest reliability assessed agreement at the individual item level. The test-retest reliability results are presented in Table 4.5. The ICC values for each item ranged between 0.63 and 0.93. ICC's were classified 'Excellent' for values ≥ 0.81 , 'Good' for values between 0.61 and 0.80, 'Moderate' for values between 0.41 and 0.60 and 'Poor' for values ≤ 0.40 (Landis & Koch, 1977; McGraw & Wong, 1996; Nunnally, 1967).

Table 4.5 : Test-retest Reliability results

Item	Intraclass Correlation	95% Confidence Interval
PJ 1	0.71	(0.59, 0.80)
PJ 2	0.63	(0.48, 0.73)
PJ 3	0.83	(0.76, 0.88)
PJ 4	0.86	(0.81, 0.91)
PJ 5	0.86	(0.79, 0.89)
PJ 6	0.89	(0.84, 0.92)
PJ 7	0.82	(0.74, 0.87)
IJ 8	0.87	(0.81, 0.91)
IJ 9	0.86	(0.81, 0.90)
IJ 10	0.85	(0.79, 0.89)
IJ 11	0.87	(0.82, 0.91)
IJ 12	0.92	(0.88, 0.94)
IJ 13	0.84	(0.77, 0.89)
DJ 14	0.89	(0.85, 0.92)
DJ 15	0.93	(0.89, 0.95)
DJ 16	0.92	(0.89, 0.95)
DJ 17	0.92	(0.89, 0.95)
DJ 18	0.91	(0.87, 0.93)

4.1.1.5 Results from Exploratory Factor Analysis

In this section, the results from the Exploratory Factor Analysis (EFA) from the items in each of the three constructs are reported. Tests for assumptions for factor analysis were first performed. Principal Axis Factoring method was used for extraction. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity was used to examine the appropriateness of factor analysis. Ideally, in factor analysis, the KMO values should be more than 0.7 (Friel, 2007; Hair et al., 2010). The range of values is explained in Chapter 3. The average variance explained (AVE) should be 50% or more, and the minimum factor loading should be 0.5 and above (Hair et al., 2010).

(a) **Procedural Justice (PJ)**

There were seven items in this construct. Each item is on a Likert scale 1 to 5, where a response of '1' indicated Disagreement (Totally Disagree / *Sangat Tidak Setuju*) and '5' indicated Agreement (Totally Agree / *Sangat Setuju*) to the construct. In Table 4.6, the highest correlation in each item with at least one other item in the construct is between 0.3 and 0.9, hence the items in this construct correlates adequately. Bartlett's Test of Sphericity approximate chi-square value is 349.113 with 21 degrees of freedom ($\chi^2 = 349.113, p < 0.001$) and the KMO statistic value was 0.84, which is very good. A single factor was extracted which explained 43.82% of the variation in the seven items. The minimum factor loading for this construct was 0.57 (Table 4.9).

Table 4.6 : Correlation matrix for PJ construct

Correlation	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Q1	1.00	.398	.448	.551	.257	.477	.337
Q2	.398	1.00	.396	.329	.398	.352	.299
Q3	.448	.396	1.00	.571	.444	.531	.413
Q4	.551	.329	.571	1.000	.406	.647	.480
Q5	.257	.398	.444	.406	1.00	.604	.394
Q6	.477	.352	.531	.647	.604	1.00	.638
Q7	.337	.299	.413	.480	.394	.638	1.00

(b) **Interactional Justice (IJ)**

There were six items in this construct. In Table 4.7, the highest correlation in each item with at least one other item in the construct is between 0.3 and 0.9, hence the items in this construct correlate adequately. Bartlett's Test of Sphericity approximate chi-square value is 381.834 with 15 degrees of freedom ($\chi^2 = 381.834, p < 0.001$), and the KMO statistic value was 0.81, which is considered very good. A single factor was extracted which explained

53.18% of the variation in the six items. The minimum factor loading for this construct was 0.61 (Table 4.9).

Table 4.7 : Correlation matrix for IJ construct

Correlation	Q8	Q9	Q10	Q11	Q12	Q13
Q8	1.00	.609	.419	.488	.491	.267
Q9	.609	1.00	.534	.529	.575	.348
Q10	.419	.534	1.000	.659	.587	.567
Q11	.488	.529	.659	1.00	.718	.499
Q12	.491	.575	.587	.718	1.000	.528
Q13	.267	.348	.567	.499	.528	1.00

(c) *Distributive Justice (DJ)*

There were five items in this construct. In Table 4.8, the highest correlation in each item with at least one other item in the construct is between 0.3 and 0.9; hence the items in this construct correlate adequately. Bartlett's Test of Sphericity approximate chi-square value is 620.423 with 10 degrees of freedom ($\chi^2 = 620.423, p < 0.001$) Bartlett's Test of Sphericity was <0.001 , and the KMO statistic value was 0.87, which is considered very good. A single factor was extracted which explained 75.13% of the variation in the five items. The minimum factor loading for this construct was 0.81 (Table 4.9).

Table 4.8 : Correlation matrix for DJ construct

Correlation	Q14	Q15	Q16	Q17	Q18
Q14	1.00	.761	.729	.694	.672
Q15	.761	1.00	.829	.760	.664
Q16	.729	.829	1.00	.893	.731
Q17	.694	.760	.893	1.00	.742
Q18	.672	.664	.731	.742	1.00

Table 4.9 : Exploratory factor analysis using principal axis factoring extraction with promax rotation

Variable	Item	Factor loading ^a		
		Factor 1	Factor 2	Factor 3
Procedural Justice (PJ)	Q1	0.61	0.41	
	Q2	0.57	0.43	
	Q3	0.77		
	Q4	0.79		
	Q5	0.71		
	Q6	0.85		
	Q7	0.75		
Interactional Justice (IJ)	Q8		0.69	0.32
	Q9		0.77	
	Q10		0.78	
	Q11		0.86	
	Q12		0.86	
	Q13		0.61	0.37
Distributive Justice (DJ)	Q14			0.81
	Q15			0.91
	Q16			0.94
	Q17			0.92
	Q18			0.83

^a Principal axis factoring with promax rotation
Only items with factor loading > 0.30 are shown

4.1.2 Psychometric properties of the translated Malay language version of the Job Satisfaction Survey (JSS) questionnaire

4.1.2.1 Demographic characteristics

A total of 255 teachers participated in the first round of questionnaire survey, while the second round of questionnaires was returned by 191 teachers (response rate = 74.9%). Out of the 255 respondents, the majority were female teachers (91.8%). Their age ranged from 26 to 60 years, with a mean age of 40.3 ± 8.7 years. Most of the respondents were from the younger age groups (31-40), and were predominantly ethnic Malays (83.9%). Table 4.10 shows the demographic characteristics of the teachers involved in this study.

Table 4.10 : Demographic characteristics of participants

Characteristics	Mean (SD)*	n (%)
Age (years)	40.3 (8.7)	
Age Group (years)		
Below 30		31 (12.2)
31 – 40		114 (44.7)
41 – 50		68 (26.7)
51 & above		42 (16.5)
Gender		
Male		21 (8.2)
Female		234 (91.8)
Ethnicity		
Malay		214 (83.9)
Chinese		20 (7.8)
Indian		21 (8.2)

*Standard deviation

4.1.2.2 Amendment and adaptation of the JSS questionnaire

Similar to the issues faced by OJSQ, the JSS was also amended to improve its clarity and readability. Fifteen items of the initial translated Malay version were corrected and amended after discussion and agreement by experts during face validation. Table 4.11 presents the amendments made on the fifteen items

upon reaching the final version. Although modified, none of the original items were removed, or its meaning changed.

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Table 4.11 : Amendments on the translated Malay language version of the JSS questionnaire

Item No.	Original phrase (in English)	Initial translated Malay version	Amended version	Summary
1	I feel I am being paid a fair amount for the work I do.	Saya rasa saya diberi bayaran yang mencukupi dengan kerja yang saya lakukan.	Saya berasa saya dibayar secara berpatutan dengan kerja yang saya lakukan.	The word ' <i>berpatutan</i> ' is more accurate than ' <i>mencukupi</i> ' in this context.
3	My supervisor is quite competent in doing his/her job.	Penyelia saya agak cekap dalam melakukan kerja beliau.	Penyelia saya cukup berkebolehan dalam melaksanakan kerjanya.	The words ' <i>cukup berkebolehan</i> ' and ' <i>melaksanakan kerjanya</i> ' is more accurate in this context.
6	Many of our rules and procedures make doing a good job difficult.	Kebanyakan peraturan dan prosidur menyebabkan kerja menjadi sukar.	Banyak peraturan dan prosedur kerja menyusahkan saya untuk melakukan kerja dengan baik.	A rearrangement of the sentences illustrates a better meaning when compared with the original English version.
7	I like the people I work with.	Saya menyenangi orang-orang sekerja saya.	Saya suka rakan sekerja saya.	The words ' <i>suka rakan sekerja</i> ' is more accurate in meaning than ' <i>menyenangi orang-orang sekerja</i> ' in this context.

Table 4.11, continued

	Original phrase (in English)	Initial translated Malay version	Amended version	Summary
10	Wage raises are few and far between.	Kenaikkan gaji adalah tidak banyak dan jarang-jarang.	Kenaikkan gaji adalah sedikit dan jarang berlaku.	The words ' <i>sedikit</i> ' and ' <i>jarang</i> ' is more appropriate in meaning than ' <i>tidak banyak</i> ' and ' <i>jarang-jarang</i> ' in this context.
11	Those who do well on the job stand a fair chance of being promoted.	Orang yang menjalankan kerja dengan baik mempunyai peluang adil untuk kenaikan pangkat.	Mereka yang bekerja dengan baik lebih berpeluang mendapat kenaikan pangkat.	A rearrangement of the sentences illustrates a better meaning when compared with the original English version.
13	The benefits we receive are as good as most other organizations offer.	Kemudahan-kemudahan yang di terima adalah sama baik dengan kemudahan yang ditawarkan oleh organisasi lain.	Faedah pekerjaan yang kami terima adalah sebaik yang ditawarkan oleh organisasi lain.	The words ' <i>faedah pekerjaan</i> ' gives a better meaning than ' <i>kemudahan-kemudahan</i> ' in this context.
16	I find I have to work harder at my job because of the incompetence of the people I work with.	Saya mendapati bahawa saya perlu bekerja dengan lebih kuat kerana saya bekerja dengan orang yang tidak cekap.	Saya mesti bekerja lebih keras kerana rakan sekerja saya kurang berkebolehan.	The words ' <i>kurang berkebolehan</i> ' and ' <i>lebih keras</i> ' is more appropriate than ' <i>tidak cekap</i> ' and ' <i>lebih kuat</i> ' in this context.

Table 4.11, continued

Item No.	Original phrase (in English)	Initial translated Malay version	Amended version	Summary
19	I feel unappreciated by the organization when I think about what they pay me.	Saya berasa tidak dihargai oleh organisasi apabila memikirkan gaji yang dibayar kepada saya.	Saya berasa kurang dihargai apabila saya berfikir mengenai gaji yang dibayar kepada saya.	The words ' <i>kurang dihargai</i> ' is more appropriate than ' <i>tidak dihargai</i> ' in this context.
20	People get ahead as fast as they do in other places.	Orang-orang di sini boleh maju ke depan dengan cepat seperti mana di tempat lain.	Pekerja di sini boleh melanjutkan kerjaya mereka sama pantas seperti di organisasi lain.	The words ' <i>melanjutkan kerjaya mereka sama pantas</i> ' is more accurate than ' <i>maju ke depan dengan cepat</i> ' in this context.
25	I enjoy my co-workers.	Saya menyenangi rakan sekerja saya.	Saya suka rakan sekerja saya.	The words ' <i>suka</i> ' is more accurate than ' <i>menyenangi</i> ' in this context.
30	I like my supervisor.	Saya menyenangi penyelia saya.	Saya suka penyelia saya.	The words ' <i>suka</i> ' is more accurate than ' <i>menyenangi</i> ' in this context.

Table 4.11, continued

Item No.	Original phrase (in English)	Initial translated Malay version	Amended version	Summary
31	I have too much paperwork.	Saya mempunyai terlalu banyak kertas kerja.	Saya mempunyai terlalu banyak kerja menulis.	The words ' <i>kerja menulis</i> ' is more accurate than ' <i>kertas kerja</i> ' in this context.
34	There is too much bickering and in-fighting at work.	Terlalu banyak perkelahian dan pergaduhan di tempat kerja saya.	Terlalu banyak pertengkaran dan perselisihan yang berlaku di tempat kerja saya.	The words ' <i>pertengkaran</i> ' and ' <i>perselisihan</i> ' is more accurate than ' <i>perkelahian</i> ' and ' <i>pergaduhan</i> ' in this context.
35	My job is enjoyable.	Kerja saya menyeronokkan.	Saya suka melaksanakan kerja saya.	The wording ' <i>melaksanakan kerja</i> ' gives a better meaning in this context when compared with the original English version.

4.1.2.3 Internal consistency & Reliability

In this section, results from reliability analysis are reported. This questionnaire was pilot tested among 255 respondents. The mean scores, Cronbach's alpha coefficients and minimal corrected item-total correlation (CITC) values of the JSS construct are depicted in Table 4.12.

Table 4.12 : Mean scores, Cronbach's α and minimal CITC values for each construct

Construct	No. of items		Mean (SD)	Cronbach α	Minimal CITC _v
	Initial	Final			
Pay	4	4	19.45 (2.26)	0.72	0.38
Promotion	4	4	19.7 (2.14)	0.71	0.39
Supervision	4	4	19.69 (1.85)	0.79	0.46
Fringe benefits	4	4	18.08 (2.49)	0.69	0.47
Contingent rewards	4	4	19.86 (1.89)	0.73	0.41
Operating conditions	4	4	19.92 (1.97)	0.61	0.38
Co-workers	4	4	20.58 (1.69)	0.62	0.37
Nature of work	4	4	21.18 (1.89)	0.75	0.50
Communication	4	4	19.25 (1.97)	0.72	0.48

Table 4.13 : Corrected item-total correlations and Cronbach's alpha coefficients if an item is deleted

JSS		Scale mean if item is deleted	Scale variance if item is deleted	Corrected item-total correlation	Cronbach's alpha if item is deleted
Pay	Pay 1	121.59	86.22	0.38	0.72
	Pay 2	124.76	88.59	0.64	0.71
	Pay 3	121.55	84.66	0.53	0.69
	Pay 4	124.32	87.19	0.39	0.70
Promotion	Prom. 1	121.90	86.90	0.40	0.70
	Prom. 2	124.79	86.18	0.39	0.69
	Prom. 3	121.13	87.85	0.43	0.71
	Prom. 4	124.56	84.33	0.55	0.72

Table 4.13, continued

	JSS	Scale mean if item is deleted	Scale variance if item is deleted	Corrected item-total correlation	Cronbach's alpha if item is deleted
Supervision	Super. 1	121.58	84.29	0.50	0.67
	Super. 2	124.40	86.63	0.46	0.63
	Super. 3	121.97	82.25	0.52	0.68
	Super. 4	124.51	84.58	0.63	0.69
Fringe benefits	Fr.Ben. 1	122.36	78.24	0.68	0.67
	Fr.Ben. 2	124.43	84.23	0.47	0.69
	Fr.Ben. 3	122.27	81.57	0.61	0.68
	Fr.Ben. 4	124.42	84.67	0.53	0.65
Contingent rewards	Con.rew. 1	121.45	86.54	0.41	0.68
	Con.rew. 2	124.38	83.83	0.53	0.65
	Con.rew. 3	124.45	83.97	0.76	0.69
	Con.rew. 4	122.33	81.43	0.51	0.68
Operating conditions	Op.cond. 1	124.46	84.80	0.43	0.69
	Op.cond. 2	122.35	81.81	0.41	0.66
	Op.cond. 3	124.59	83.77	0.38	0.68
	Op.cond. 4	124.92	87.82	0.46	0.70
Co-worker	Co.wrk. 1	121.23	86.26	0.64	0.66
	Co.wrk. 2	124.44	82.89	0.46	0.68
	Co.wrk. 3	121.17	86.50	0.48	0.69
	Co.wrk. 4	121.82	84.37	0.37	0.67
Nature of work	Nat.wrk. 1	124.47	84.54	0.60	0.68
	Nat.wrk. 2	121.74	85.69	0.50	0.71
	Nat.wrk. 3	124.98	86.77	0.60	0.70
	Nat.wrk. 4	124.47	83.94	0.54	0.69
Communication	Comm. 1	122.14	87.34	0.61	0.71
	Comm. 2	124.51	86.76	0.58	0.71
	Comm. 3	121.26	86.79	0.59	0.70
	Comm. 4	124.50	84.67	0.48	0.69

4.1.2.4 Test-retest Reliability

In the test-retest reliability testing, 191 respondents had participated. Intraclass correlation coefficient (ICC) using two-way mixed effects model with absolute agreement definition was used. The test-retest reliability results for the JSS questionnaire are presented in Table 4.14. All ICC values for every item ranged from 0.93 – 0.98.

Table 4.14 : Test-retest Reliability results

Item	Intraclass Correlation	95% Confidence Interval
Pay 1 (Q1)	0.96	(0.94, 0.97)
Pay 2 (Q10)	0.97	(0.96, 0.98)
Pay 3 (Q19)	0.97	(0.96, 0.98)
Pay 4 (Q28)	0.98	(0.97, 0.98)
Promotion 1 (Q2)	0.95	(0.94, 0.97)
Promotion 2 (Q11)	0.94	(0.93, 0.96)
Promotion 3 (Q20)	0.94	(0.92, 0.96)
Promotion 4 (Q33)	0.96	(0.95, 0.97)
Supervision 1 (Q3)	0.94	(0.92, 0.95)
Supervision 2 (Q12)	0.95	(0.94, 0.96)
Supervision 3 (Q21)	0.97	(0.96, 0.98)
Supervision 4 (Q30)	0.97	(0.97, 0.98)
Fr.Ben 1 (Q4)	0.96	(0.94, 0.97)
Fr.Ben 2 (Q13)	0.96	(0.95, 0.97)
Fr.Ben 3(Q22)	0.97	(0.96, 0.98)
Fr.Ben 4 (Q29)	0.94	(0.92, 0.96)
Cont. Rew. 1 (Q5)	0.97	(0.95, 0.98)
Cont. Rew. 2 (Q14)	0.98	(0.97, 0.98)
Cont. Rew. 3 (Q23)	0.98	(0.97, 0.98)
Cont. Rew. 4 (Q32)	0.96	(0.95, 0.97)
Op. Cond. 1 (Q6)	0.98	(0.97, 0.98)
Op. Cond. 2 (Q15)	0.95	(0.94, 0.96)
Op. Cond. 3 (Q24)	0.98	(0.98, 0.99)
Op. Cond. 4 (Q31)	0.98	(0.97, 0.98)
Co-workers 1 (Q7)	0.93	(0.90, 0.95)
Co-workers 2 (Q16)	0.96	(0.94, 0.97)
Co-workers 3 (Q25)	0.96	(0.95, 0.97)
Co-workers 4 (Q34)	0.97	(0.96, 0.98)
Nat. of work 1 (Q8)	0.95	(0.93, 0.96)

Table 4.14, continued

Item	Intraclass Correlation	95% Confidence Interval
Nat. of work 2 (Q17)	0.91	(0.88, 0.93)
Nat. of work 3 (Q27)	0.96	(0.95, 0.97)
Nat. of work 4 (Q35)	0.95	(0.93, 0.96)
Comm. 1 (Q9)	0.93	(0.91, 0.95)
Comm. 2 (Q18)	0.98	(0.97, 0.98)
Comm. 3 (Q26)	0.96	(0.95, 0.97)
Comm. 4 (Q36)	0.95	(0.93, 0.96)

4.1.2.5 Results from Exploratory Factor Analysis

In this section, the results from the Exploratory Factor Analysis (EFA) from the items in each of the nine constructs are reported. The Principal Axis Factoring method with promax rotation was used for extraction.

(a) *Pay*

There were four items in this construct. Each item is on a Likert scale from 1 to 6, where a response of '1' indicated Disagreement (Disagree Very Much/ *Sangat Tidak Setuju*) and '6' indicated Agreement (Agree Very Much/ *Sangat Setuju*) to the construct. In Table 4.15, the highest correlation in each item with at least one other item in the construct was between 0.3 and 0.9; hence the items in this construct correlate adequately. Bartlett's Test of Sphericity approximate chi-square value is 195.217 with 6 degrees of freedom ($\chi^2 = 195.217$, $p < 0.001$), and the KMO statistic value was 0.73, which is considered good. A single factor was extracted which explained 40.81% variation in the four items. The minimum factor loading for this construct was 0.49.

Table 4.15 : Correlation matrix for ‘Pay’ construct

Correlation	Pay 1	Pay 2	Pay 3	Pay 4
Pay 1	1.000	.463	.310	.506
Pay 2	.463	1.000	.473	.511
Pay 3	.310	.473	1.000	.312
Pay 4	.506	.511	.312	1.000

(b) Promotion

There were four items in this construct. In Table 4.16, the highest correlation in each item with at least one other item in the construct was between 0.3 and 0.9; hence the items in this construct correlate adequately. Bartlett’s Test of Sphericity approximate chi-square value is 90.189 with 6 degrees of freedom ($\chi^2 = 90.189, p < 0.005$), and the KMO statistic value was 0.72, which is considered good. A single factor was extracted which explained 38.62% variation in the four items. The minimum factor loading for this construct was 0.53.

Table 4.16 : Correlation matrix for ‘Promotion’ construct

Correlation	Promotion 1	Promotion 2	Promotion 3	Promotion 4
Promotion 1	1.000	.463	.310	.506
Promotion 2	.463	1.000	.473	.511
Promotion 3	.310	.473	1.000	.312
Promotion 4	.506	.511	.312	1.000

(c) Supervision

There were four items in this construct. In Table 4.17, the highest correlation in each item with at least one other item in the construct is between 0.3 and 0.9; hence the items in this construct correlates adequately. Bartlett’s Test of Sphericity approximate chi-square value is 103.362 with 6 degrees of freedom ($\chi^2 = 103.362, p < 0.001$), and the KMO statistic value was 0.79,

which is considered good. A single factor was extracted which explained 37.81% variation in the four items. The minimum factor loading for this construct was 0.47.

Table 4.17 : Correlation matrix for ‘Supervision’ construct

Correlation	Supervision 1	Supervision 2	Supervision 3	Supervision 4
Supervision 1	1.000	.382	.342	.433
Supervision 2	.382	1.000	.313	.521
Supervision 3	.342	.313	1.000	.501
Supervision 4	.433	.521	.501	1.000

(d) Fringe benefits

There were four items in this construct. In Table 4.18, the highest correlation in each item with at least one other item in the construct is between 0.3 and 0.9; hence the items in this construct correlate adequately. Bartlett’s Test of Sphericity approximate chi-square value is 98.809 with 6 degrees of freedom ($\chi^2 = 98.809, p < 0.001$), and the KMO statistic value was 0.66, which is considered moderate. A single factor was extracted which explained 36.21% variation in the four items. The minimum factor loading for this construct was 0.42.

Table 4.18 : Correlation matrix for ‘Fringe benefits’ construct

Correlation	Fr.Benefits 1	Fr.Benefits 2	Fr.Benefits 3	Fr.Benefits 4
Fr.Benefits 1	1.000	.697	.446	.362
Fr.Benefits 2	.697	1.000	.395	.487
Fr.Benefits 3	.446	.395	1.000	.335
Fr.Benefits 4	.362	.487	.335	1.000

(e) Contingent rewards

There were four items in this construct. In Table 4.19, the highest correlation in each item with at least one other item in the construct is 0.29.

Bartlett's Test of Sphericity approximate chi-square value is 104.176 with 6 degrees of freedom ($\chi^2 = 104.176, p < 0.001$), and the KMO statistic value was 0.63, which is considered moderate. A single factor was extracted which explained 36.21% variation in the four items. The minimum factor loading for this construct was 0.39.

Table 4.19 : Correlation matrix for 'Contingent rewards' construct

Correlation	Cont. Rew. 1	Cont. Rew. 2	Cont. Rew. 3	Cont. Rew. 4
Cont. Rew. 1	1.000	.667	.671	.389
Cont. Rew. 2	.667	1.000	.290	.407
Cont. Rew. 3	.671	.290	1.000	.398
Cont. Rew. 4	.389	.407	.398	1.000

(f) Operating conditions

There were four items in this construct. In Table 4.20, the highest correlation in each item with at least one other item in the construct is 0.29. Bartlett's Test of Sphericity approximate chi-square value is 96.661 with 6 degrees of freedom ($\chi^2 = 96.661, p < 0.001$), and the KMO statistic value was 0.63, which is considered moderate. A single factor was extracted which explained 40.64% variation in the four items. The minimum factor loading for this construct was 0.41.

Table 4.20 : Correlation matrix for 'Operating conditions' construct

Correlation	Op. Cond. 1	Op. Cond. 2	Op. Cond. 3	Op. Cond. 4
Op. Cond. 1	1.000	.400	.318	.292
Op. Cond. 2	.400	1.000	.533	.320
Op. Cond. 3	.318	.533	1.000	.303
Op. Cond. 4	.292	.320	.303	1.000

(g) *Co-workers*

There were four items in this construct. In Table 4.21, the highest correlation in each item with at least one other item in the construct is 0.30. Bartlett's Test of Sphericity approximate chi-square value is 106.879 with 6 degrees of freedom ($\chi^2 = 106.879, p < 0.001$), and the KMO statistic value was 0.68, which is considered moderate. A single factor was extracted which explained 35.75% variation in the four items. The minimum factor loading for this construct was 0.41.

Table 4.21 : Correlation matrix for 'Co-workers' construct

Correlation	Co-workers 1	Co-workers 2	Co-workers 3	Co-workers 4
Co-workers. 1	1.000	.302	.390	.407
Co-workers 2	.302	1.000	.420	.474
Co-workers 3	.390	.420	1.000	.495
Co-workers 4	.407	.474	.495	1.000

(h) *Nature of work*

There were four items in this construct. In Table 4.22, the highest correlation in each item with at least one other item in the construct is 0.41. Bartlett's Test of Sphericity approximate chi-square value is 142.140 with 6 degrees of freedom ($\chi^2 = 142.140, p < 0.001$), and the KMO statistic value was 0.75, which is considered good. A single factor was extracted which explained 47.67% variation in the four items. The minimum factor loading for this construct was 0.49.

Table 4.22 : Correlation matrix for ‘Nature of work ’ construct

Correlation	Nat.wor k 1	Nat.wor k 2	Nat.wor k 3	Nat.wor k 4
Nat.work 1	1.000	.449	.454	.407
Nat.work 2	.449	1.000	.452	.411
Nat.work 3	.454	.452	1.000	.736
Nat.work 4	.407	.411	.736	1.000

(i) Communication

There were four items in this construct. In Table 4.23, the highest correlation in each item with at least one other item in the construct is 0.42. Bartlett’s Test of Sphericity approximate chi-square value is 102.326 with 6 degrees of freedom ($\chi^2 = 102.326, p < 0.001$), and the KMO statistic value was 0.70, which is considered good. A single factor was extracted which explained 40.93% variation in the four items. The minimum factor loading for this construct was 0.46.

Table 4.23 : Correlation matrix for ‘Communication’ construct

Correlation	Comm.1	Comm.2	Comm.3	Comm.4
Comm. 1	1.000	.591	.353	.448
Comm.2	.591	1.000	.358	.323
Comm.3	.353	.358	1.000	.355
Comm.4	.448	.323	.355	1.000

4.1.2.6 Summary

In this phase of study, the OJSQ and JSS underwent content face validation and discussion to ascertain the amended version’s internal consistency and reliability. The amended version of both the OJSQ and JSS had more clarity and adaptability as compared to the previous translated Malay language version, and more compatible in comparison with the original English version.

4.2 Phase II : Association of psychosocial working environment and organizational justice with stress and job satisfaction among public school teachers

4.2.1 Sample weights and response rate

There are a total of 228 regular public secondary schools (*Sekolah Menengah Kebangsaan*) in the state of Selangor Darul Ehsan. Regular public secondary schools were stratified by districts and randomly selected by computer (70% from total number of schools). From this, 160 schools were invited for the parent CLUSTER cohort study, of which 103 schools agreed participation (Response rate = 64.4%), and 51 schools participated in this study (Response rate = 49.5%). There are approximately 210 primary vernacular schools (*Sekolah Jenis Kebangsaan*) in Selangor state.

Weightage was applied to the samples to construe non-respondents and uneven selection. List of schools which participated, and its respective weightage are as below (Table 4.24 and Table 4.25). These weighted values were included in complex sample analysis to ascertain representation to the total number of secondary public-school teachers in Selangor. Final weight for respondents by each school is described in Table 4.26 and 4.27.

Table 4.24 : Number of participating regular public secondary school and its weight

Districts	Total schools	Participating schools	School weights
Gombak	30	9	3.33
Hulu Langat	36	8	4.5
Klang	32	1	32
Petaling Perdana	44	12	3.67

Table 4.24, continued

Districts	Total schools	Participating schools	School weights
Petaling Utama	27	10	2.7
Sabak Bernam	7	2	3.5
Sepang	9	2	4.5
Kuala Langat	13	4	3.25
Kuala Selangor	16	3	5.33

Table 4.25 : Number of participating vernacular schools and its weight

Districts	Total schools	Participating schools	School weights
Gombak	15	7	2.14
Hulu Langat	23	3	7.66
Klang	34	9	3.77
Petaling Perdana	25	8	3.13
Petaling Utama	14	5	2.80

Table 4.26 : Number of participants and final weight for regular public secondary schools

No.	District	Total teachers	Total respondents	Teacher weight	School weight	Final weight
GOMBAK						
1.	SMK Darul Ehsan	158	6	26.33	3.33	87.7
2.	SMK Gombak Setia	174	11	15.82	3.33	52.7
3.	SMK Hillcrest	114	7	16.29	3.33	54.2
4.	SMK Hulu Kelang	45	5	9.00	3.33	30.0
5.	SMK Selayang Bharu	127	2	63.50	3.33	211.5
6.	SMK Sierramas	64	10	6.40	3.33	21.3
7.	SMK Taman Keramat	71	3	23.67	3.33	78.8
8.	SMK Taman Selayang	103	1	103.00	3.33	343.0
9.	SMK Bukit Rahman Putra	132	2	66.00	3.33	219.8
KLANG						
10.	SMK (P) Bukit Kuda	85	16	5.31	32	170.0

Table 4.26, continued

No.	District	Total teachers	Total respondents	Teacher weight	School weight	Final weight
KUALA LANGAT						
11.	SMK Banting	95	13	7.31	3.25	23.8
12.	SMK Bukit Changgang	110	10	11.00	3.25	35.8
13.	SMK Sungai Manggis	86	21	4.10	3.25	13.3
14.	SMK Tanjung Sepat	62	19	3.26	3.25	12.2
HULU LANGAT						
15.	SMK Taman Jasmin 2	150	39	3.85	4.5	17.3
16.	SMK Bandar Baru Ampang	85	8	10.63	4.5	47.8
17.	SMK Dusun Nanding	133	3	44.33	4.5	199.5
18.	SMK Pandan Jaya	127	1	127.0	4.5	571.5
19.	SMK Saujana Impian	171	32	5.34	4.5	24.0
20.	SMK Tinggi Kajang	133	17	7.82	4.5	35.2
21.	SMK Bandar Rinching	150	39	3.85	4.5	17.3
22.	SMK Bandar Tasik Kesuma	98	11	8.91	4.5	40.1
KUALA SELANGOR						
23.	SMK Seri Tanjong	114	13	8.77	5.67	46.7
24.	SMK Pengkalan Permatang	101	28	3.61	5.67	19.2
25.	SMK Sungai Burong	53	15	3.53	5.67	18.8
PETALING PERDANA						
26.	SMK Bandar Puchong Jaya (A)	65	15	4.33	3.67	15.9
27.	SMK Bandar Puchong Jaya (B)	71	6	11.83	3.67	43.4
28.	SMK Bukit Jelutong	104	11	9.45	3.67	34.7
29.	SMK Seksyen 1 Bandar Kinrara	56	3	18.67	3.67	68.5
30.	SMK Seksyen 24	75	4	18.75	3.67	68.8
31.	SMK Seri Kembangan	170	19	8.95	3.67	32.8
32.	SMK Seri Serdang	164	24	6.83	3.67	25.1
33.	SMK Subang	161	36	4.47	3.67	16.4
34.	SMK Sultan Salahuddin Abdul Aziz Shah	78	7	11.14	3.67	40.9
35.	SMK Taman Desaminium	88	12	7.33	3.67	26.9
36.	SMK USJ 12	109	3	36.33	3.67	133.3
37.	SMK Subang Jaya	76	16	4.75	3.67	17.4

Table 4.26, continued

No.	District	Total teachers	Total respondents	Teacher weight	School weight	Final weight
PETALING UTAMA						
38.	SMK (P) Sri Aman	65	5	13.00	2.7	35.1
39.	SMK Assunta	101	10	10.10	2.7	27.3
40.	SMK Bandar Sri Damansara 1	91	10	9.10	2.7	24.6
41.	SMK Bandar Utama Damansara (4)	65	10	6.50	2.7	17.6
42.	SMK Katholik (M)	157	27	5.81	2.7	15.7
43.	SMK La Salle,PJ	99	18	5.50	2.7	14.9
44.	SMK Seksyen 10 Kota Damansara	87	20	4.35	2.7	11.7
45.	SMK Seksyen 4 Kota Damansara	107	16	6.69	2.7	18.1
46.	SMK Taman Sea	116	3	38.67	2.7	104.4
47.	SMK Bandar Utama	72	6	12.00	2.7	32.4
SABAK BERNAM						
48.	SMK Bagan Terap	77	8	9.63	3.5	33.71
49.	SMK Munshi Abdullah	79	11	7.18	3.5	25.13
SEPANG						
50.	SMK Cyberjaya	62	10	6.20	4.5	27.9
51.	SMK Putra Perdana	145	2	72.50	4.5	326.3

Table 4.27 : Number of participants and final weightage for vernacular school teachers

No.	District	Total teachers	Total respondents	Teacher weight	School weight	Final weight
GOMBAK						
1.	SJKT Batu Arang	25	8	3.13	2.14	6.7
2.	SJKT Bukit Darah	23	4	5.75	2.14	12.3
3.	SJKT Saraswathy	42	1	42.0	2.14	89.9
4.	SJKT Rawang	56	11	5.09	2.14	10.9
5.	SJKC Kota Emerald	35	19	1.84	2.14	3.9
6.	SJKC Chap Khuan	27	10	2.70	2.14	5.8
7.	SJKC Kundang	42	13	3.23	2.14	6.9

Table 4.27, continued

No	District	Total teachers	Total respondents	Teacher weight	School weight	Final weight
KLANG						
8.	SJKC Wu Teck	31	17	1.82	3.77	6.9
9.	SJKC Ying Wah	27	17	1.59	3.77	6.0
10.	SJKC Chung Hua	94	28	3.36	3.77	12.7
11.	SJKC Pin Hwa	84	8	10.5	3.77	39.6
12.	SJKC Tiong Hua Kok Bin	24	2	12.0	3.77	45.2
13.	SJKC Tshing Nian	67	31	2.16	3.77	8.1
14.	SJKT Ladang Emerald	40	8	5.0	3.77	18.9
15.	SJKT Ladang Highlands	51	10	5.1	3.77	19.2
16.	SJKT Persiaran Raja Muda Musa	58	17	3.41	3.77	12.9
HULU LANGAT						
17.	SJKC Sungai Chua	73	21	3.48	7.66	26.7
18.	SJKT Ampang	35	9	3.89	7.66	29.8
19.	SJKC Choon Hwa	12	1	12.0	7.66	91.9
PETALING PERDANA						
20.	SJKC Han Ming	150	38	3.95	3.13	12.4
21.	SJKC Serdang Baru 2	135	23	5.87	3.13	18.4
22.	SJKC Subang	92	52	1.77	3.13	5.4
23.	SJKC Yak Chee	150	51	2.94	3.13	9.0
24.	SJKT Tun Sambanthan	40	19	2.11	3.13	6.6
25.	SJKT Sg Renggam	58	17	3.41	3.13	10.7
26.	SJKC Lick Hung	106	42	2.52	3.13	7.7
27.	SJKT Glenmarie	15	7	2.14	3.13	6.7
PETALING UTAMA						
28.	SJKC Chen Moh	72	22	3.27	2.8	9.2
29.	SJKC Sungai Buloh	74	19	3.89	2.8	10.9
30.	SJKC Desa Jaya 2	82	24	3.42	2.8	9.6
31.	SJKT RRI Sungai Buloh	26	11	2.36	2.8	6.6
32.	SJKT Vivekananda	48	23	2.09	2.8	5.8

The summary of study flow for Phase II of this study is shown below in Figure 4.1 :

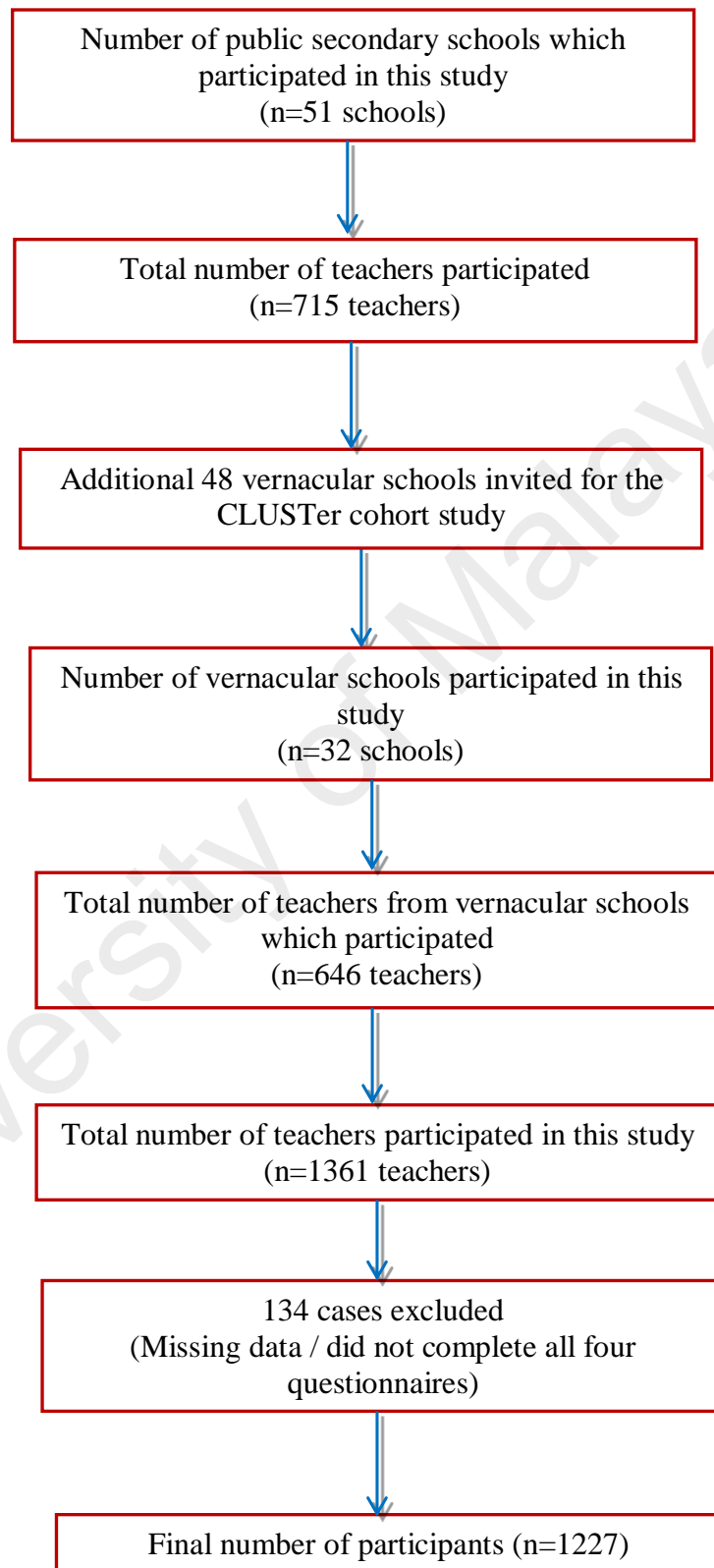


Figure 4.1 : Flow diagram of total number of schools and participants in Phase II

4.2.2 Characteristics of respondents with non-respondents

Although a total of 1361 teachers participated in this study, a total of 134 respondents had to be excluded due to a variety of reasons, mostly due to incomplete data/questionnaire reply. The percentage of non-respondents is about 9.8 % (n=134). Baseline characteristics between respondents and non-respondents were compared to avoid elements of voluntary bias. Variables which were analysed include mean age (years), age groups, ethnicity, school location, marital status, and type of housing. The proportions of non-respondents were significantly higher among teachers from Malay ethnicity and rural schools (Table 4.28).

Table 4.28 : Characteristics of respondents and non-respondents

Characteristics	Respondents (n = 1227)	Non-respondents (n = 134)	<i>p</i> value
	n (weighted %)	n (weighted %)	
Mean age (years)	42.6	42.02	
Age group, years			
Below 30	137 (11.2)	15 (11.1)	0.53
31 – 40	421 (34.3)	48 (35.8)	
41 – 50	449 (36.6)	47 (35.2)	
≥ 51	220 (17.9)	24 (17.9)	
Gender			
Male	120 (9.8)	15 (11.2)	0.065
Female	1107 (90.2)	119 (88.8)	
Ethnicity			
Malay	571 (46.5)	92 (68.7)	<0.05
Chinese	460 (37.5)	33 (24.6)	
India	189 (15.4)	9 (6.7)	
Others	7 (0.6)	-	

Table 4.28, continued

Characteristics	Respondents (n = 1227)	Non-respondents (n = 134)	p value
Location of schools			
Urban	999 (81.4)	52 (38.8)	<0.05
Rural	228 (18.6)	82 (61.2)	
Marital status *			
Unmarried	138 (12.8)	15 (11.8)	0.21
Married	917 (84.8)	107 (84.3)	
Divorced	17 (1.6)	3 (2.3)	
Widow/Widower	9 (0.8)	2 (1.6)	
House ownership*			
Govt. quarters	43 (4.1)	5 (4.5)	0.85
Own house	864 (82.1)	89 (79.5)	
Rental house	145 (13.8)	18 (16.0)	

*numbers do not add up to 1227 (for respondents) and 134 (for non-respondents) due to insufficient data

4.2.3 Demographic characteristics of participants

The mean age of teachers in this study was 42.6 years and the majority (71.9%) were aged between 31 to 50 years old. Majority of the participants were ethnic Malays, married, teaching for 11-20 years, own their own home and from regular public secondary schools. As for the location of schools, 82.8% of teachers are currently teaching in urban schools as shown in Table 4.29.

Table 4.29 : Socio-demographic characteristics of respondents

Socio-demographic profile	Items	<i>n</i>	Weighted %
Gender (n = 1227)	Male	120	9.6
	Female	1107	90.4
Age group, years (n = 1227)	Below 30	137	8.8
	31 – 40	421	33.2
	41 – 50	449	38.7
	≥ 51	220	19.2
Ethnicity (n = 1227)	Malay	571	68.3
	Chinese	460	20.5
	India	189	10.8
	Others	7	0.5
*Religion (n = 1137)	Islam	526	68.5
	Buddhism	368	17.1
	Hinduism	155	9.2
	Christianity	80	4.8
	Others	8	0.4
*Employment years (n = 256)	≤ 10 years	76	10.5
	11 – 20 years	104	15.7
	21 – 30 years	61	11.5
	≥ 31 years	15	1.4
Location of schools (n = 1227)	Urban	999	82.8
	Rural	228	17.2
Type of schools (n = 1227)	Regular Public	642	77.7
	Chinese Vernacular	438	16.3
	Tamil Vernacular	147	6.0
*Marital status (n = 1081)	Unmarried	138	6.8
	Married	917	91.1
	Divorced	17	1.5
	Widow/Widower	9	0.6
*Education Level (n = 258)	Secondary School	9	1.5
	Diploma	3	2.1
	Degree	221	89.6
	Postgraduate	25	6.8
*House ownership (n = 1054)	Government Quarters	43	5.0
	Own House	864	83.1
	Rental House	145	11.9

*numbers do not add up to 1227 due to missing data

4.2.4 Psychosocial working environment (PWE) and Organizational Justice (OJ)

4.2.4.1 Mean PWE and OJ scores

Table 4.30 and 4.31 illustrates the mean and standard error (SE) scores for the psychosocial working environment and organizational justice subscales (exposure variables). The mean score for job demand, job control and social support are 34.6, 67.8 and 24.3 respectively, and the mean score for procedural justice, interactional justice and distributive justice is 27.1, 23.0 and 17.8 respectively.

Table 4.30 : Mean (SE) scores for psychosocial working environment

Psychosocial working environment	Mean (SE)	95% CI
Job demand	34.6 (0.24)	34.1, 35.1
Job control	67.8 (0.65)	66.5, 69.1
Social support	24.3 (0.12)	24.1, 24.6

Table 4.31 : Mean (SE) scores for Organizational Justice

Organizational Justice	Mean (SE)	95% CI
Procedural Justice	27.1 (0.23)	26.7, 27.6
Interactional Justice	23.0 (0.16)	22.7, 23.3
Distributive Justice	17.8 (0.21)	17.4, 18.2

4.2.4.2 The proportion of perceived severity of psychosocial working environment and organizational justice

More than 51% of participants reported having high strain work task, which is having the combination of high job demands, low job control and low social support. (Table 4.32) As for perceived workplace justice, however, more than 60% of respondents reported high Procedural, Interactional and Distributive

Justice. Table 4.33 illustrates the distribution of the three organizational justice subscales for this group of teachers.

Table 4.32 : Distribution of psychosocial working environment subscales

PWE subscales	<i>n</i> (weighted %)
High Job demand	617 (51.9%)
Low Job demand	610 (48.1%)
High Job control	566 (48.7%)
Low Job control	661 (51.3%)
High Social support	358 (31.8%)
Low Social support	869 (68.2%)

Table 4.33 : Distribution of Organizational Justice subscales

OJ subscales	High <i>n</i> (weighted %)	Low <i>n</i> (weighted %)
Procedural Justice (PJ)	785 (67.5)	442 (32.5)
Interactional Justice (IJ)	760 (66.7)	467 (33.3)
Distributive Justice (DJ)	694 (63.6)	533 (36.4)

4.2.4.3 Job strain dimensions

As explained in Chapter 3, Karasek's classification of job strain is done by measuring perceived job demand and job control. High job strain is the combination of high job demand and low job control, and vice versa for non-high job strain. Non-high job strain is further subdivided into active, passive and low strain job. In this study, 38.6% of participants reported having high job strain. Table 4.34 illustrates respondent's classification into Karasek's Job-Demand-Control Model.

Table 4.34 : Job strain tabulation according to Karasek’s Job Demand-Control model

Job strain	<i>n</i>	Weighted % (95% CI)
High job strain	290	38.6 (32.6, 45.0)
Non-high job strain		
Low strain	239	35.0 (27.4, 43.4)
Active	327	61.4 (55.0, 67.4)
Passive	371	65.0 (56.6, 72.6)

4.2.5 Stress and job satisfaction

4.2.5.1 Mean stress and job satisfaction scores

Table 4.32 illustrates the mean and standard error (SE) scores for the stress and job satisfaction subscales (outcome variables). The mean score for stress is 9.4, while the mean scores for job satisfaction subscales and total satisfaction is depicted in Table 4.35.

Table 4.35 : Mean scores for stress and job satisfaction

Stress and job satisfaction	Mean	95% CI
Stress	9.4	(8.8, 10.1)
Job satisfaction		
Pay	16.8	(16.4, 17.2)
Promotion	16.0	(15.7, 16.2)
Supervision	18.1	(17.6, 18.5)
Fringe benefits	14.9	(14.6, 15.2)
Contingent rewards	15.1	(14.6, 15.6)
Operating procedures	10.9	(10.6, 11.2)
Co-workers	18.7	(18.2, 19.1)
Nature of work	20.1	(19.8, 20.3)
Communication	15.8	(15.4, 16.3)
Total satisfaction	146.4	(143.8, 148.9)

4.2.5.2 The proportion of perceived stress and job satisfaction

Majority of the respondents reported to have normal stress scores (85.6%) (Table 4.36); however, a number of respondents reported mild to moderate severity and approximately 2.5% of these respondents reported severe and

extremely severe severity of stress as well. The participant's response towards job satisfaction was analogous with psychological outcomes with an even bigger percentage. More than 95% of the respondents felt either satisfied or ambivalent with their current job tasks at their workplace. Table 4.37 illustrates a breakdown of job satisfaction of the teachers within the subscales of the JSS.

Table 4.36 : Stress severity of respondents

Severity	Normal <i>n</i> (weighted %)	Mild <i>n</i> (weighted %)	Moderate <i>n</i> (weighted %)	Severe <i>n</i> (weighted %)	Extremely Severe <i>n</i> (weighted %)
Stress	1022 (85.6)	112 (7.9)	53 (4.0)	34 (2.3)	6 (0.2)

Table 4.37 : Participants response towards job satisfaction

Job satisfaction subscales	Satisfied <i>n</i> (weighted %)	Ambivalent <i>n</i> (weighted %)	Dissatisfied <i>n</i> (weighted %)
Pay	558 (51.6)	528 (38.9)	141 (9.5)
Promotion	555 (46.1)	539 (44.6)	133 (9.3)
Supervision	787 (63.3)	407 (34.3)	33 (2.3)
Fringe benefits	315 (28.3)	630 (50.0)	282 (21.7)
Contingent rewards	338 (31.3)	535 (40.0)	354 (28.7)
Operating conditions	53 (4.6)	215 (18.2)	959 (77.2)
Co-workers	986 (77.7)	238 (22.1)	3 (0.2)
Nature of work	1115 (93.3)	102 (6.1)	10 (0.6)
Communication	420 (35.3)	6134(47.4)	193 (17.3)
Total satisfaction	533 (47.7)	676 (51.2)	18 (1.1)

4.2.6 Factors associated with stress

4.2.6.1 Association between stress with socio-demographic and working characteristics

Stress was found to be highest among the younger age group, and gradually decreased with age. Stress was also higher among the female gender, teachers from Chinese vernacular schools and urban school teachers. Highest stress was also reported from the others ethnic groups, unmarried teachers, teachers with diploma education levels and been teachers for 21-30 years (Table 4.38). Statistically significant factors are age group, ethnicity and marital status.

Table 4.38 : Association between stress with socio-demographic and working characteristics

	Stress			
	weighted %	Mean (SE)	95% CI	<i>p</i> value
Age Group				0.043
Below 30	8.8	10.76 (0.61)	(9.57, 11.95)	
31 – 40	33.2	9.64 (0.56)	(8.54, 10.74)	
41 – 50	38.7	9.59 (0.59)	(8.43, 10.75)	
51 – 60	19.2	8.10 (0.70)	(6.72, 9.48)	
Gender				0.061
Male	9.6	8.0 (0.76)	(6.50, 9.49)	
Female	90.4	9.58 (0.36)	(8.87, 10.28)	
Ethnicity				0.008
Malay	68.3	8.95 (0.48)	(8.01, 9.88)	
Chinese	20.5	11.0 (0.43)	(10.15, 11.84)	
Indian	10.8	9.31 (0.63)	(8.08, 10.55)	
Others	0.5	12.78 (3.83)	(5.27, 20.3)	
School Type				0.057
Regular Public	77.7	9.15 (0.43)	(8.3, 9.99)	
Chinese Vernacular	16.3	10.43 (0.33)	(9.77, 11.08)	
Tamil Vernacular	6.0	10.32 (0.77)	(8.81, 11.82)	
School Location				0.056
Urban	82.8	9.64 (0.39)	(8.89, 10.40)	
Rural	17.2	8.37 (0.54)	(7.30, 9.43)	
Marital Status				<0.001
Unmarried	6.8	12.82 (0.87)	(11.12, 14.52)	
Married	91.1	9.26 (0.34)	(8.49, 10.04)	
Divorced	1.5	8.10 (0.74)	(6.65, 9.56)	
Widow/Widower	0.6	9.54 (1.76)	(6.10, 12.99)	

Table 4.38, continued

	weighted %	Mean (SE)	95% CI	p value
Education Level				0.174
Secondary School	1.5	6.70 (1.49)	(3.77, 9.62)	
Diploma	2.1	11.48 (2.45)	(6.66, 16.30)	
Degree	89.6	9.17 (0.82)	(7.57, 10.78)	
Postgraduate	6.8	10.72 (1.31)	(8.14, 13.30)	
Years In Service				0.096
Lesser than 10 years	10.5	9.60 (0.8)	(8.03, 11.17)	
11-20 years	15.7	8.94 (0.96)	(7.01, 10.88)	
21-30 years	11.5	9.63 (1.94)	(5.83, 13.42)	
More than 30 years	1.4	5.91 (1.29)	(3.38, 8.44)	
Not Specified	60.9	-	-	

4.2.6.2 Association between stress and psychosocial working environment factors

Higher mean stress scores were found among respondents who reported higher job demand, lower job control and lower social support, however no statistical significance was found between psychosocial working environment factors and stress scores in all subscales as shown in Table 4.39.

Table 4.39 : Association between stress with psychosocial working environment factors

Psychosocial working environment	Mean	95% CI	p value
Job demand			0.476
High	9.62	(8.55, 10.28)	
Low	9.44	(8.43, 10.45)	
Job control			0.179
High	8.97	(8.08, 9.97)	
Low	9.85	(8.94, 10.77)	
Social support			0.39
High	9.02	(7.88, 10.16)	
Low	9.62	(8.82, 10.41)	

4.2.6.3 Association between stress with organizational justice factors

Higher stress scores were reported among respondents with lower PJ, IJ and DJ, however no statistical significance was found between organizational justice factors and stress scores in all three subscales as shown in Table 4.40.

Table 4.40 : Association between stress with organizational justice factors

Organizational justice	Mean	95% CI	<i>p</i> value
Procedural justice			0.343
High	9.22	(8.34, 10.09)	
Low	9.85	(8.88, 10.83)	
Interactional justice			0.401
High	9.24	(8.35, 10.13)	
Low	9.79	(8.87, 10.72)	
Distributive justice			0.499
High	9.30	(8.39, 10.21)	
Low	11.02	(8.73, 10.56)	

4.2.6.4 Association between stress and risk factors adjusted for socio-demographic and working characteristics, psychosocial working environment and organizational justice factors

Based on the cut-off points used in past literature (P. Lovibond, 2014; S. H. Lovibond & P. F. Lovibond, 1995) complex sample general linear model analysis was performed using β -estimates, and p -value as the test of significance. A multivariate analysis was conducted for the variables which had p -value less than 0.25 in the univariate analysis of socio-demographic, psychosocial working environment factors and organizational justice factors. β -estimates are standardized coefficients which effects are centred at 0, thus relative importance can be mediated (Keith, 2015). The β -estimates and results for tests of significance are presented in Table 4.41.

The following models were analysed:

Model 1 = Adjusted for demographic characteristics

Model 2 = Model 1 + (School type and School location)

Model 3 = Model 2 + Psychosocial working environment factors

Model 4 = Model 3 + Organizational justice factors

In Model 1, marital status was the only factor which was statistically significant. In Model 2, school type and school location were statistically not significant, however, marital status remained significant. In Model 3 after adjusting with PWE factors, the PWE factors were statistically not significant, whereas marital status remained marginally significant. In Model 4, marital

status remained marginally significant, whereas all other factors were statistically not significant. Total R^2 value till Model 4 was 15.1%.

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Table 4.41 : Association between stress with socio-demographic and working characteristics, psychosocial working environment and organizational justice factors

Items	Model 1		Model 2		Model 3		Model 4	
	β -estimate	<i>p</i> -value	β -estimate	<i>p</i> -value	β -estimate	<i>p</i> -value	β - estimate	<i>p</i> -value
Age group (years)		0.38		0.36		0.34		0.28
Below 30	Ref		Ref		Ref		Ref	
31 – 40	-0.026 (-3.05, 2.99)		-0.61 (-3.85, 2.65)		-0.56 (-3.98, 2.86)		-0.51 (-3.97, 2.95)	
41 – 50	-0.032 (-3.78, 3.72)		-0.76 (-4.49, 2.97)		-1.04 (-4.51, 2.44)		-1.06 (-4.59, 2.47)	
51 – 60	-3.18 (-7.274, 0.91)		-3.73 (-8.01, 0.55)		-3.15 (-6.88, 0.57)		-3.25 (-6.98, 0.47)	
Gender		0.29		0.33		0.62		0.69
Male	-1.340 (-3.85, 1.17)		-1.32 (-3.98, 1.35)		-0.68 (-3.40, 2.04)		-0.53 (-3.16, 2.09)	
Female	Ref		Ref		Ref		Ref	
Ethnicity		0.13		0.27		0.45		0.56
Chinese	3.78 (-6.38, 11.23)		3.56 (-5.24, 11.75)		4.85 (-6.67, 13.47)		4.16 (-8.87, 12.10)	
Indian	2.27 (-4.47, 13.11)		2.15 (-4.16, 13.89)		1.19 (-4.40, 14.62)		1.02 (-6.78, 15.77)	
Others	5.89 (-5.33, 12.68)		5.76 (-4.72, 11.22)		4.97 (-5.87, 12.76)		4.88 (-6.52, 13.50)	
Malay	Ref		Ref		Ref		Ref	
Marital status		0.014		0.035		0.039		0.048
Unmarried	7.78 (4.84, 12.67)		6.71 (1.47, 11.38)		6.89 (1.86, 12.22)		6.42 (1.91, 13.86)	
Divorced	2.98 (1.673, 5.98)		2.65 (1.78, 8.83)		2.37 (-3.75, 5.94)		1.43 (-3.85, 5.57)	
Widow/widower	1.81 (1.15, 7.07)		1.69 (1.26, 7.90)		1.49 (1.13, 10.76)		1.22 (1.08, 9.92)	
Married	Ref		Ref		Ref		Ref	

Table 4.41, continued

Items	Model 1		Model 2		Model 3		Model 4	
	β -estimate	<i>p</i> -value	β -estimate	<i>p</i> -value	β -estimate	<i>p</i> -value	β - estimate	<i>p</i> -value
Education level		0.257		0.21		0.14		0.11
Sec. school	-3.25 (-7.79, 1.28)		-2.95 (-7.62, 1.73)		-3.12 (-7.77, 1.54)		-3.03 (-7.66, 1.61)	
Diploma	2.45 (-2.81, 7.71)		2.69 (-1.98, 7.38)		3.24 (-1.77, 8.25)		3.47 (-1.39, 8.34)	
Degree	-1.414 (-4.18, 1.35)		-1.31 (-4.10, 1.49)		-1.22 (-4.21, 1.77)		-1.18 (-4.12, 1.76)	
Postgraduate	Ref		Ref		Ref		Ref	
School Type				0.23		0.17		0.13
Chinese vernac			2.60 (0.54, 8.66)		2.59 (-1.09, 7.92)		2.73 (-1.11, 7.65)	
Tamil vernac.			1.19 (-3.36, 6.74)		1.68 (-3.78, 7.15)		1.83 (-3.67, 7.42)	
Regular public			Ref		Ref		Ref	
School location				0.11		0.06		0.09
Urban			2.02 (-0.45, 4.49)		2.33 (-0.18, 4.85)		2.18 (-0.37, 4.75)	
Rural			Ref		Ref		Ref	

Table 4.41, continued

Items	Model 1		Model 2		Model 3		Model 4	
	β -estimate	<i>p</i> -value	β -estimate	<i>p</i> -value	β -estimate	<i>p</i> -value	β - estimate	<i>p</i> -value
Psychosocial Working Environment						0.52		0.46
Job Demand								
High					2.33 (-0.19, 4.85)		0-.78 (-2.88, 1.32)	
Low					Ref	0.21	Ref	0.18
Job Control								
High					-1.37 (-3.48, 1.74)		-1.48 (-3.67, 1.69)	
Low					Ref	0.11	Ref	0.15
Social Support								
High					-1.95 (-4.34, 1.45)		-1.73 (-4.08, 1.63)	
Low					Ref		Ref	
Organizational Justice								
Procedural Justice								0.49
High							0.96 (-1.81, 3.74)	
Low							Ref	
Interactional Justice								0.44
High							-0.09 (-3.48, 1.51)	
Low							Ref	
Distributive Justice								0.85
High							-0.025 (-2.85, 2.35)	
Low							Ref	
R² (%)	9.7		11.2		14.6		15.1	

4.2.7 Factors associated with job satisfaction

4.2.7.1 Association between job satisfaction with socio-demographic and working characteristics

Job satisfaction was highest among teachers from the 31–40 age groups. Male teachers also reported to have higher job satisfaction compared to their female counterparts, and teachers from other ethnic groups are found to be most satisfied with their jobs. Teachers from Tamil vernacular schools, rural schools, married, most employment years and with secondary school academic levels also reported highest job satisfaction (Table 4.42).

Table 4.42 : Association between job satisfaction with socio-demographic and working characteristics

	Job satisfaction			
	weighted %	Mean (SE)	95% CI	<i>p</i> value
Age group (years)				0.142
Below 30	8.8	143.56 (1.42)	(145.20, 151.10)	
31 – 40	33.2	148.15 (1.50)	(139.95, 149.54)	
41 – 50	38.7	144.75 (2.45)	(141.15, 154.35)	
51 – 60	19.2	147.75 (3.37)	(140.77, 146.35)	
Gender				0.23
Male	9.6	150.49 (3.64)	(143.35, 157.63)	
Female	90.4	145.91 (1.38)	(143.21, 148.61)	
Ethnicity				0.001
Malay	68.3	148.32 (1.86)	(116.32, 132.31)	
Chinese	20.5	140.71 (1.07)	(114.12, 133.55)	
Indian	10.8	144.14 (2.87)	(99.65, 135.28)	
Others	0.5	152.31 (4.71)	(143.07, 161.56)	
School type				0.003
Regular Public	77.7	147.11 (1.66)	(143.86, 150.37)	
Chinese Vernacular	16.3	141.65 (1.08)	(139.53, 143.77)	
Tamil Vernacular	6.0	149.1 (2.62)	(143.94, 154.23)	
School location				0.055
Urban	82.8	145.60 (1.52)	(142.63, 148.58)	
Rural	17.2	149.92 (1.65)	(146.68, 153.16)	

Table 4.42, continued

Job satisfaction				
	weighted %	Mean (SE)	95% CI	<i>p</i> value
Marital status				0.056
Unmarried	6.8	141.52 (2.31)	(136.98, 146.05)	
Married	91.1	147.06 (1.53)	(144.07, 150.05)	
Divorced	1.5	139.42 (3.19)	(133.16, 145.67)	
Widow/Widower	0.6	150.97 (8.24)	(134.80, 167.13)	
Education level				0.82
Secondary School	1.5	147.17 (5.22)	(136.90, 157.44)	
Diploma	2.1	134.91 (11.80)	(111.66, 158.16)	
Degree	89.6	145.44 (2.88)	(139.77, 151.12)	
Postgraduate	6.8	144.70 (4.79)	(135.26, 154.14)	
Employment years				0.78
Lesser than 10 years	10.5	146.68 (2.43)	(141.91, 151.45)	
11-20 years	15.7	148.06 (1.87)	(144.39, 151.72)	
21-30 years	11.5	140.35 (7.12)	(126.37, 154.32)	
More than 30 years	1.4	151.69 (6.63)	(139.28, 164.10)	
Not Specified	60.9	-	-	

4.2.7.2 Association between job satisfaction with psychosocial working environment factors

Higher mean job satisfaction scores were found among respondents with lower job demand, higher job control and higher social support. All domains were also statistically significant with *p*-values for all subscales lesser than 0.05 (Table 4.43).

Table 4.43 : Association between job satisfaction with psychosocial working environment factors

Psychosocial working environment	Mean	95% CI	<i>p</i> value
Job demand			0.017
High	141.19	(137.92, 145.45)	
Low	146.53	(142.53, 150.53)	
Job control			0.03
High	148.68	(145.41, 151.94)	
Low	144.14	(140.49, 147.79)	
Social support			<0.001
High	155.51	(151.61, 159.42)	
Low	142.06	(139.44, 144.68)	

4.2.7.3 Association between job satisfaction and organizational justice factors

Higher mean job satisfaction scores were reported among respondents with high procedural justice, high interactional justice and high distributive justice groups. In addition to that, there was a statistically significant association between organizational justice factors and job satisfaction scores in all subscales ($p < 0.05$), as shown in Table 4.44.

Table 4.44 : Association between job satisfaction with organizational justice

Organizational Justice	Mean	95% CI	<i>p</i> value
Procedural justice			0.002
High	148.84	(145.28, 152.40)	
Low	141.16	(137.77, 144.54)	
Interactional Justice			<0.001
High	150.75	(147.0, 154.50)	
Low	137.51	(134.72, 140.29)	
Distributive Justice			<0.001
High	152.05	(148.05, 156.06)	
Low	136.29	(133.99, 138.59)	

4.2.7.4 Association between job satisfaction and risk factors adjusted for socio-demographic factors, psychosocial working environment and organizational justice factors

Since the outcome classification of the JSS are divided into three main groups of 'satisfied', 'ambivalent', and 'dissatisfied', complex sample general linear model analysis was used using β -estimate and p -value as test of significance. Similar to the previous multivariate analysis, variables which had p -values lesser than 0.25 in the univariate analysis of socio-demographic, psychosocial working environment factors and organizational justice factors were imputed into models. The β -estimate and results of test of significance are presented in Table 4.45.

The following models were analyzed:

Model 1 = Adjusted demographic characteristics

Model 2 = Model 1 + School type and School location

Model 3 = Model 2 + Psychosocial working environment factors

Model 4 = Model 3 + Organizational justice factors

In Model 1, all significant demographic characteristics from the univariate analysis were used. When adjusted for each other, only ethnicity remained significant. In Model 2, after adjusting for school type and school location, both of the additional factors were not significant, however ethnicity remained marginally significant. In Model 3, ethnicity still remained significant among the demographic factors, while job control and social support from the PWE

factors were found to be significant. In Model 4, all demographic factors were no longer statistically significant, however, job control and social support from PWE factors and all of the OJ factors of procedural, interactional and distributive justice were statistically significant (Table 4.45).

The total R^2 value for the final model was 26.1%.

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Table 4.45 : Association between job satisfaction with socio-demographic and working characteristics, psychosocial working environment and organizational justice factors

Items	Model 1		Model 2		Model 3		Model 4	
	β -estimate	<i>p</i> -value	β -estimate	<i>p</i> -value	β -estimate	<i>p</i> -value	β - estimate	<i>p</i> -value
Age group (years)		0.42		0.37		0.42		0.34
Below 30	Ref		Ref		Ref		Ref	
31 – 40	2.66 (-1.5, 6.81)		2.95 (-1.41, 7.31)		1.89 (-2.67, 6.46)		1.17 (-3.28, 5.63)	
41 – 50	-0.34 (-6.59, 5.91)		0.44 (-5.61, 6.49)		-1.11 (-6.35, 4.14)		-2.59 (-8.09, 2.92)	
51 – 60	4.44 (-2.8, 11.69)		5.35 (-1.86, 12.55)		3.46 (-2.34, 9.26)		2.68 (-2.78, 8.15)	
Gender		0.35		0.34		0.89		0.96
Male	3.86 (-4.15, 11.87)		3.93 (-4.14, 11.9)		0.44 (-6.31, 7.19)		-0.18 (-6.96, 6.61)	
Female	Ref		Ref		Ref		Ref	
Ethnicity		0.015		0.03		0.04		0.16
Chinese	-2.64 (-12.54, -1.13)		-1.66 (-7.88, -1.18)		-3.90 (-11.34, -1.05)		4.31 (-9.86, 18.47)	
Indian	5.28 (1.17, 13.54)		3.13 (2.35, 9.83)		2.26 (1.31, 11.79)		-1.43 (-16.26, 13.4)	
Others	7.90 (2.68, 12.79)		5.72 (2.67, 10.24)		5.87 (3.23, 8.72)		3.10 (1.17, 9.98)	
Malay	Ref		Ref		Ref		Ref	
Marital status		0.24		0.29		0.21		0.65
Unmarried	-6.68 (-25.17, 11.81)		-6.27 (-25.62, 13.09)		-11.51 (-29.35, 6.33)		-9.38 (-26.27, 7.51)	
Divorced	-4.16 (-21.73, 13.4)				-8.87 (-25.75, 7.99)		-8.14 (-23.98, 7.73)	
Widow/widower	-11.26 (-29.78, 7.26)		-3.92 (-22.43, 14.59)		-14.62 (-32.51, 3.28)		-10.23 (-27.05, 6.59)	
Married	Ref		Ref		Ref		Ref	
			-10.82 (-30.39, 8.76)					
			Ref					

Table 4.45, continued

Items	Model 1		Model 2		Model 3		Model 4	
	β -estimate	<i>p</i> -value	β -estimate	<i>p</i> -value	β -estimate	<i>p</i> -value	β -estimate	<i>p</i> -value
				0.40		0.21		0.18
School type		-7.95 (-19.61, 3.70)			-6.41 (-15.73, 2.92)		-5.14 (-13.06, 2.78)	
Regular public		-8.224 (-20.54, 4.1)			-2.84 (-13.54, 7.87)		-0.74 (-10.32, 8.84)	
Chinese vernac.		Ref			Ref		Ref	
Tamil vernac.								
				0.22		0.25		0.53
School location		-2.85 (-7.47, 1.77)			-2.59 (-6.97, 1.80)		-1.39 (-5.78, 2.99)	
Urban		Ref			Ref		Ref	
Rural								
Psychosocial Working Environment						0.47		0.85
Job Demand					-1.40 (-5.22, 2.42)		-0.37 (-4.38, 3.6)	
High					Ref		Ref	
Low						<0.00		0.004
Job Control					7.38 (3.51, 11.24)	1	6.16 (1.82, 10.5)	
High					Ref		Ref	
Low								<0.001
Social Support					14.90 (10.23, 19.57)	<0.00	13.22 (8.45, 17.9)	
High					Ref	1	Ref	
Low								

Table 4.45, continued

Items	Model 1		Model 2		Model 3		Model 4	
	β -estimate	<i>p</i> -value	β -estimate	<i>p</i> -value	β -estimate	<i>p</i> -value	β - estimate	<i>p</i> -value
Organizational Justice								
Procedural Justice								0.02
High							2.21 (1.79, 4.21)	
Low							Ref	
Interactional Justice								0.033
High							3.85 (2.32, 7.38)	
Low							Ref	
Distributive Justice								<0.001
High							10.14 (6.5, 13.74)	
Low							Ref	
R² (%)	4.3		5.0		18		26.1	

4.3 Phase III : Analysis of salivary stress biomarkers

4.3.1 Demographic characteristics of participants

A total of 152 respondents from ten public secondary schools in Selangor participated in Phase III. Method of school and respondent selection are explained in Chapter 3. Demographic characteristics of participants are presented in Table 4.46.

Table 4.46 : Demographic characteristics of Phase III respondents

Characteristics	<i>n</i>	(%)
Gender		
Male	16	10.5
Female	136	89.5
Age group (years)		
21 – 30	4	2.6
31 – 50	117	77
≥ 51	31	20.4
Mean Age (SD, Min-Max)	44.4 (6.8, 28 – 58)	
Ethnicity		
Malay	116	76.3
Chinese	25	16.5
Indian	11	7.2
Locality of schools		
Urban	114	75
Rural	38	25

† Percent (%) is from total number. of respondents

4.3.2 Mean scores

The mean stress score for this sub-sample of respondents was 6.47, and the mean \pm SD of salivary cortisol and secretory IgA were $0.203 \pm 0.17\mu\text{g/dL}$ and $39.83 \pm 25.6\mu\text{g/min}$ respectively. All four immunoassay kits used had no outliers and values fell close to 4PL line, indicating good precision (Table 4.47).

Table 4.47 : Mean (SD) stress score, cortisol and IgA levels

	Mean (SD)
DASS stress score	6.47 (3.49)
Salivary cortisol	0.203 (0.168)
Salivary secretory IgA	39.83(25.64)

When subdivided to normal and abnormal stress severity groups (abnormal: mild to extremely severe stress severity), the mean and standard deviation (SD) values are presented in Table 4.48.

Table 4.48 : Mean (SD) values for cortisol and secretory IgA for normal and abnormal stress levels

Stress	Mean (SD)	
	Salivary cortisol	Salivary secretory IgA
Normal	0.18 (0.15)	0.20 (0.17)
Abnormal	0.25 (0.19)	0.21 (0.065)

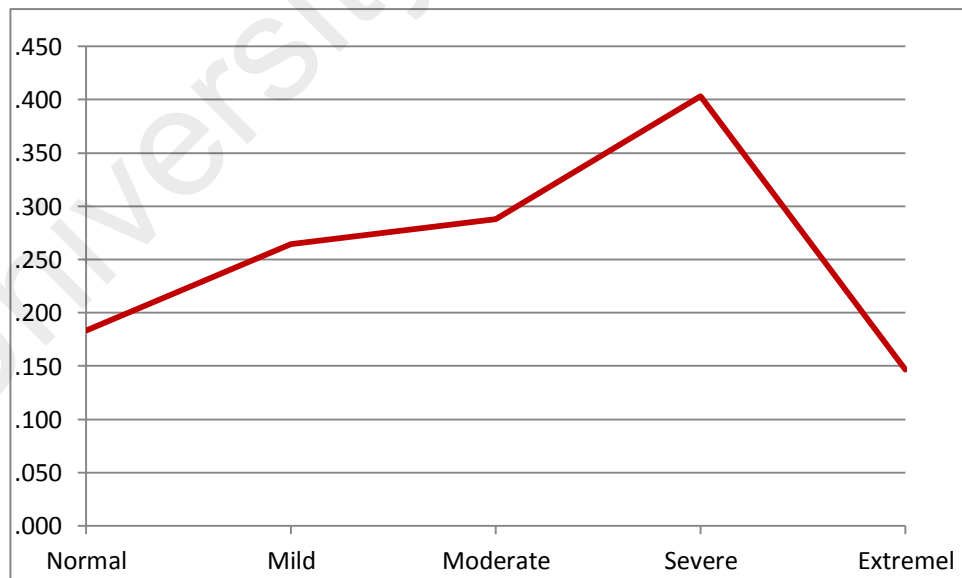


Figure 4.2 : Graph depicting mean cortisol values with stress severity

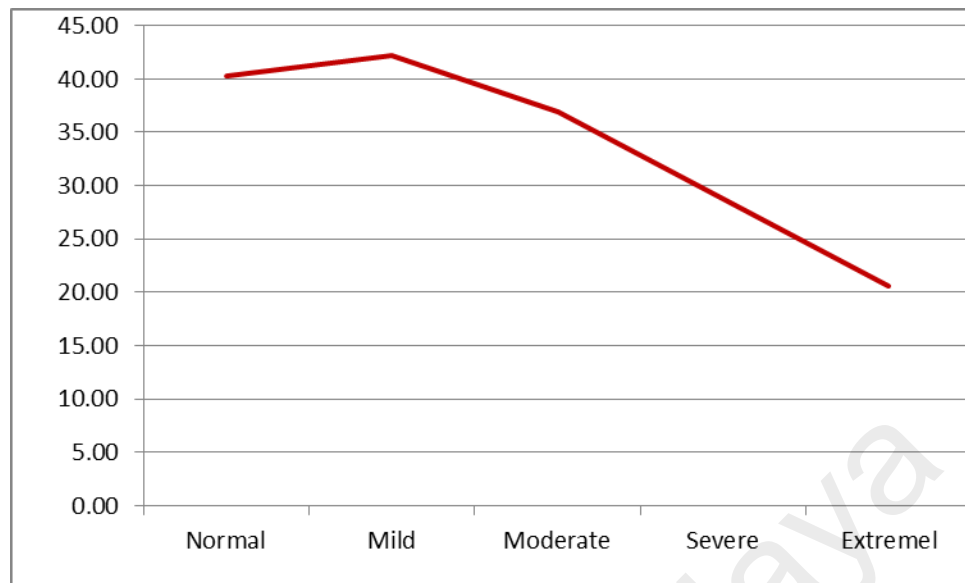


Figure 4.3 : Graph depicting mean secretory IgA values with stress severity

4.3.3 Stress scores with salivary cortisol levels

From 152 respondents, 71.1% (n=108) reported perceived stress severity within normal range, 11.8% (n=18) reported mild stress, 13.8% (n=21) reported moderate stress, 2% (n=3) reported severe stress and 1.3% (n=2) reported to be extremely stressed. A total of 62.5% (n=95) of respondents had normal cortisol levels whereas 37.5% (n=57) had low cortisol levels. No respondent had high cortisol levels.

For ease and simplification of analysis, respondents with mild stress severity were merged together with respondents with normal stress levels as the numbers of respondents with mild stress were small, and clinically similar with those with normal stress levels. Furthermore, people with mild stress severity levels do not need intervention as compared to those with higher severity.

A crosstab illustrating stress severity with salivary cortisol values is shown in Table 4.49.

Table 4.49 : Stress severity with salivary cortisol levels

Perceived stress (Stress severity)	Salivary cortisol (n = 152)		p value
	Normal	Low	
Normal and mild stress	78 (51.3%)	48 (31.6%)	0.97
Moderate, severe & extremely severe stress	17 (11.2)	9 (5.9%)	
Total	95 (62.5%)	57 (37.5%)	

4.3.4 Stress scores with salivary secretory IgA levels

For salivary secretory IgA, 98% (n=149) of respondents had normal salivary secretory IgA, whereas only 2% (n=3) had low salivary secretory IgA levels. No respondent recorded high salivary secretory IgA levels (Table 4.50). This result supports previous studies which showed most teachers suffered from chronic stress as compared to acute stress (Austin et al., 2005; Billehøj, 2007; Kinnunen & Salo, 1994; Kyriacou, 1987).

Table 4.50 : Stress severity with salivary secretory IgA levels

Perceived stress (Stress severity)	Salivary secretory IgA (n = 152)		p value
	Normal	Low	
Normal and mild stress	124 (81.6%)	2 (1.3%)	0.89
Moderate, severe and extremely severe stress	25 (16.4%)	1 (0.7%)	
Total	149 (98%)	3 (2.0%)	

4.3.5 Association of stress severity with salivary cortisol and secretory IgA

Using the Bivariate Correlation Analysis, the Pearson's correlation value (r -value) was 0.168 between stress severity score and salivary cortisol, and 0.039 between stress and salivary secretory IgA. The p -value for both the correlations were 0.068 and 0.073 respectively. Since both the p -values were more than 0.05, and the r -values were lesser than 0.3, thus it can be concluded that there is no association between perceived stress and salivary stress biomarkers (salivary cortisol and salivary secretory IgA) in this study (Table 4.51).

Table 4.51 : Correlation between stress score with salivary cortisol and secretory IgA

Pearson correlation, r	Stress score	Salivary cortisol	Secretory IgA
Stress Score	1	0.168	0.039
Cortisol	0.168	1	0.162
Secretory IgA	0.039	0.162	1
p - value	-	0.068	0.073

CHAPTER 5: DISCUSSION

5.1 Introduction

In this chapter, discussions of findings are divided into three main sections pertaining to all three phases of this study. The first section discusses on findings from Phase I, which is the psychometric properties testing of the Malay language version of the organizational justice scale questionnaire (OJSQ) and job satisfaction survey questionnaire (JSS), focussing on consistency, reliability, and factor analysis among school teachers. The second section discusses the findings of Phase II which focuses on the association of psychosocial work environment and organizational justice factors with stress and job satisfaction among school teachers in Selangor. The influences of socio-demographic and working characteristics on stress and job satisfaction among teachers are also discussed. The third part will discuss the findings on analyses of salivary stress biomarkers using salivary cortisol and salivary secretory IgA, and its correlation with stress.

Finally, discussion on the limitations and strengths of all the three phases of this study will be done at the end of this chapter, including study implications and future directions of current research.

5.2 Phase I : Psychometric properties of the translated Malay language version of the Organizational Justice Scale Questionnaire (OJSQ) and Job Satisfaction Survey questionnaire (JSS)

5.2.1 Amendments and cultural adaptation of the OJSQ and JSS

The English language is known as the leading language in the field of science and health (Gordin, 2015). Most research, publications and advances in science today are commonly found in the English language (Lobachev, 2008). As such, a vast majority of novel instruments and literature used by researchers globally are in the English language, but versions of it can be found in other languages, albeit a few to attest cross-cultural comparability within certain populations.

To ensure a certain instrument or tool is suitable and accurate in measuring health-related concepts in a certain population not using the English language as medium of instruction, translated versions of a certain instrument is used. Prior literature have however shown that direct translation of a certain tool into another language without due deliberation poorly conveys the true meaning of the original tool (Cha, Kim, & Erlen, 2007; Sperber, 2004). It is therefore a dire necessity for a translated instrument to undergo certain processes to obtain its true meaning from the original, while conforming to cultural adaptations of a certain community. Certain guidelines have been generated for this purpose to assess features such as consistency and reliability (Sousa & Rojjanasrirat, 2011).

In this study, since the OJSQ and JSS have already been translated via set guidelines such as forward and back-to-back translation and pilot tested, as well had its consistency and reliability assessed in previous researches, there was no concrete need for full validation for these instruments. However, when the original and translated versions

were compared, some subtle differences were identified. Study population, socio-demographic and work characteristics differed as well. Some items which had vague meanings were amended. In order to maintain semantic and content equivalence for both language versions, psychometric testing for the questionnaires was conducted. Inaccurate and inappropriate words and phrases were amended to suit Malay-speaking population while staying on course to meet its objective.

As mentioned earlier, the Malay-translated versions of the OJSQ and JSS questionnaire were acquired from previously published studies. Since they were both readily available, repeat tests on psychometric properties would ensure even stronger comparability among Malay speaking respondents.

5.2.2 Psychometric properties of the translated Malay language version of the Organizational Justice Scale Questionnaire (OJSQ)

The OJSQ was developed by Moorman et al. (1991), and subsequently been modified over time by justice researchers (Bies, 2001; Colquitt, 2001; Farooqui, 2012) to produce an instrument which is holistic in measuring perceived fairness at work. This Malay-translated version of the OJSQ had been previously used in Malaysia among different working populations such as manufacturing workers (Ibrahim & Ohtsuka, 2013). Since the socio-demographic and working characteristics of manufacturing workers differ from that of teachers, it was therefore necessary to test the psychometric properties of the OJSQ for reasons of adaptability, readability, comparability and precision (Xu et al., 2013).

5.2.2.1 Demographic characteristics

The participants who were recruited for psychometric properties testing of the OJSQ were mostly females, ethnic Malays, married and from age group of 31-40. This

demographic breakdown is similar to the composition of the teaching profession in public schools in Malaysia (Ministry of Education Malaysia, 2017b).

5.2.2.2 Internal consistency and Reliability

In every research study, it is essential to establish a level of reliability of an instrument as it is a necessary step in the subsequent assessment of an instrument's validity (Aiken & Groth-Marnat, 2006). Internal consistency, which is the measure of the extent to which items in a questionnaire are correlated, is crucial in assessing the study objective and conveying accurate results (Tavakol & Dennick, 2011). As explained in Chapter 3, the Cronbach's alpha (α) coefficient value which is reported for internal consistency, is recommended to be 0.7 and above to indicate an instrument's reliability (Bernstein & Nunnally, 1994).

In this study, the Cronbach's alpha (α) coefficients value for PJ, IJ and DJ were 0.83, 0.87 and 0.94, and the composite Cronbach's alpha (α) coefficient value was 0.92. This shows this instrument has good to excellent internal consistency and reliable in population-level assessment (Bland & Altman, 1997). This findings are consistent with findings from other translated and tested versions in the Japanese language studies (composite Cronbach's alpha (α) = 0.96 and 0.91 for PJ, 0.96 for DJ and 0.93 for IJ) (Shibaoka et al., 2010), 0.91 for PJ, 0.96 for DJ and 0.93 for IJ) in the Spanish language (composite Cronbach's alpha (α) = 0.88 and 0.95 for PJ, 0.91 for DJ and 0.95 for IJ) (Díaz-Gracia, Barbaranelli, & Moreno Jiménez, 2014), Turkish language (composite Cronbach's alpha (α) = 0.905) (Gurbuz & Mert, 2009), Finnish language (composite Cronbach's alpha (α) = 0.90 (Elovainio et al., 2002) and 0.81 respectively (Elovainio, Kivimäki, & Helkama, 2001) and in Malaysia in the Malay language (Cronbach's alpha (α) coefficient ranged from 0.84 to 0.93 in all three constructs (Ibrahim et al., 2016). In a study among secondary school teachers in Malaysia investigating relationships

between OJ and job satisfaction using the OJSQ, composite Cronbach's alpha value was 0.93 (Fatimah et al., 2011).

Another study also conducted in the Japanese language comparing OJ between genders found similar findings with the other studies, and equal readings between both genders (in men : Cronbach's alpha (α) 0.86 for PJ and 0.94 for IJ; in women : Cronbach's alpha (α) 0.85 for PJ and 0.94 for IJ respectively) (Inoue et al., 2009). When running reliability analysis, no item was dropped from the construct and the initial and final number of items for all three constructs remained the same. The minimal corrected item-total correlation (CITC) values were more than 0.3 in each subscale, as suggested by Brzoska et al. Brzoska and Razum (2010) and Pallant (2007) to ensure no issue of multicollinearity. Item analysis of the OJSQ found consistency with recommendations and can be assumed to measure its respective single constructs with no embedded multiplicity within it. Thus, it can be concluded that the OJSQ in the Malay language is reliable in assessing organizational justice factors in cross-cultural comparisons in the Malay language.

5.2.2.3 Validity analysis of the OJSQ

The validity of an instrument depends on its ability to measure what it is intended to measure. Of the various types of validity analysis, the main types include face content validity, concurrent validity and construct validity (Bannigan & Watson, 2009; Keith, 2015). Content face validity is the quickest method of determining validity as it assesses the relevance of a measurement scale without using any statistical procedures (Dempsey & Dempsey, 1992). The instrument in question should however be understandable and relevant in the expert's opinion for consideration. Content face validity were tested by two consultant occupational health physicians and epidemiologist cum academicians who are experts in both Malay and English languages.

Although concurrent validity of the OJSQ was tested in previous studies using the English language version (A. M. Hansen, Byrne, & Kiersch, 2013) and in the Italian language (Spagnoli, Farnese, D'Olimpio, Millefiorini, & Scafuri, 2017), there was a lack of published reports on concurrent validity assessment of the Malay language version of the OJSQ. This may be due to some researcher's opinion that concurrent validity evaluation is not as important as other types of validity methods. This is however in contrary to the opinion of Berk (1990) who had argued that concurrent validity ensures items are adapted properly and adequately and thus should not be seen as less important. Berk stated that concurrent validity evaluation ensures each translated item is relevant, have clarity in its meaning and adaptable to targeted populations which could be interpreted differently if items had literal translations. Similar analysis was not carried out in this study as it was advisable to perform concurrent validity based on a gold standard instrument (McDowell, 2006; Polit & Beck, 2004). To the best of our knowledge, there is no gold standard instrument to measure perceived fairness at work, which is in agreement with Cropanzano et al. (2015) and Kouvonen et al. (2006).

5.2.2.4 Test-retest reliability

Test-retest reliability is conducted to evaluate the stability of a certain instrument over time in a similar environment (Kline, 2013). Literature has suggested an optimum interval period of two weeks from the initial test for best results. This is done to ensure the intended constructs under test would not significantly change, but is however long enough from recollecting the prior tests responses (Kline, 2013). There are a few estimates which can be used to assess test-retest reliability, and one of the most commonly used tests is the Intraclass Correlation Coefficient (ICC). The type of ICC method used depends largely on application appropriateness and the test method performed (Shrout & Fleiss, 1979). Weir et al. had suggested using two-way mixed

effects model with fixed random people effects and measures, ICC (2,1) or (2,k) for test-retest reliability testing for health-related concepts (Weir, 2005).

In Phase I of this present study, the test-retest reliability of the OJSQ was conducted after a two-to-three week interval as suggested by Kline (2013). The Intraclass Correlation Coefficient (ICC) values for the OJSQ ranged from 0.63 to 0.93 for every item of the OJSQ. Similar ICC results were found in the test-retest reliability testing of the Japanese version of the OJSQ (ICC = 0.91) (Shibaoka et al., 2010). Thus, the OJSQ demonstrated good temporal stability by having adequate magnitude of correlation between initial test response and the two-to-three week re-administration in this group of respondents.

5.2.2.5 Exploratory Factor Analysis (EFA) of the OJSQ

In this section, results from Exploratory Factor Analysis (EFA) using Principal Axis Factoring method for extraction from items in each of the three constructs are discussed.

(a) *Procedural Justice (PJ)*

The KMO value for the seven items for this construct was 0.84 which is considered excellent, and the Bartlett's Test of Sphericity was <0.001 , indicating identity matrix can be ruled out. A single factor was extracted which explained 43.82% variation in this construct. Ideally, minimal factor loading in a construct should be ≥ 0.7 , however Hair et. al, (2010) explained that factor loading of ≥ 0.5 is adequate enough in contributing towards measuring the construct, and it is difficult to obtain ≥ 0.7 . The minimum factor loading in this construct was 0.57, which is considered adequate in quantifying convergent validity (Hair et al., 2010; Hair, Anderson, Babin, Black, & Tatham, 2006). In addition to that, the highest correlation in each item with at least one other item in the construct is between 0.3 and 0.9, thus indicating that this construct correlates adequately.

(b) Interactional Justice (IJ)

The KMO value for the six items this construct was 0.81 which is considered excellent, and the Bartlett's Test of Sphericity was <0.001 , indicating identity matrix can be ruled out. A single factor was extracted which explained 53.18% in this construct. The minimum factor loading in this construct was 0.61, which is adequate in quantifying convergent validity. The highest correlation in each item with at least one other item in the construct is between 0.3 and 0.9, thus indicating that this construct correlates adequately.

(c) Distributive Justice (DJ)

The KMO value for five items in this construct was 0.87 which is considered excellent, and the Bartlett's Test of Sphericity was <0.001 , indicating identity matrix can be ruled out. A single factor was extracted which explained 75.13% variation in this construct. The minimum factor loading in this construct was 0.63, which is considered adequate in quantifying convergent validity. The highest correlation in each item with at least one other item in the construct is between 0.3 and 0.9, thus indicating that this construct correlates adequately.

Similar results were obtained in a study among the Turkish population in a validation and reliability testing of the Turkish version of the OJSQ (KMO value : 0.837, Bartlett's test of sphericity : <0.001 , Total variance explained = 61.97%, factor loading : 0.59 – 0.87) (Gurbuz & Mert, 2009). In a similar study conducted among students in a Malaysian public university using the English OJSQ, the factor loading values obtained was slightly higher (Factor loading range 0.75-0.81) (Hassan & Noor, 2008).

5.2.3 Psychometric properties of the translated Malay language version of the Job Satisfaction Survey (JSS) questionnaire

The JSS is a 36 item, nine subscale questionnaire which assesses employee job satisfaction on attitude and aspects of their job. As mentioned in Chapter 3, the Malay-translated versions of the JSS have been used in prior job satisfaction studies in Malaysia (Ibrahim et al., 2014; Sulaiman, 2013; Yusoff et al., 2017). Similar to the OJSQ, for cultural adaptability, readability and precision purposes, certain amendments were made, and thus psychometric properties of the questionnaire were tested among this population of teachers to assess reliability and consistency of the constructs in the JSS.

5.2.3.1 Demographic characteristics

Of the 255 participants, most of the participants were females (91.8%) age group 31-40 years and predominantly ethnic Malays (83.9%). This demographic composition in terms of ethnicity and gender is higher than the composition of the teaching profession in public schools in Malaysia (Ministry of Education Malaysia, 2017b).

5.2.3.2 Internal consistency & Reliability

The Cronbach's alpha (α) coefficients for the nine subscales ranged from 0.61 to 0.79 and the composite Cronbach's alpha (α) value was 0.88. Although most of the construct's Cronbach's alpha values were more than 0.7 as recommended by Bernstein and Nunnally (1994) and Tavakol and Dennick (2011), two of the constructs in the JSS had lower Cronbach's alpha (α) values, which was 0.58 for 'operating conditions' and 0.62 for 'co-workers'. These values were however similar to the original English version obtained by the JSS author (Spector, 1985, 1997). Lambert and Paoline (2008) had however suggested that Cronbach alpha value more than 0.6 is also widely accepted and proven to be reliable, and is concurred by Tu et al. (2005). Similar findings were

also found in the Turkish translated version of the JSS (overall Cronbach's alpha (α) coefficient = 0.78, other constructs range from 0.63 to 0.88) (Yelboga & Gokalp Cad, 2009) and the previous Malay translated version (Cronbach's alpha (α) coefficient = 0.76) (Ibrahim et al., 2014). Lower Cronbach alpha (α) coefficient was found in a study among teacher population in Uganda using the English JSS (Cronbach's (α) coefficient ranging from 0.45 to 0.74) (Abaasi, 2016). Similar lower alpha coefficient values were also found in the Vietnamese version of the JSS ranging from 0.43 to 0.82 despite having a composite alpha coefficient value of 0.91 (Pham, 2016).

A lower Cronbach's alpha coefficient value may indicate lesser internal consistency, and hence cause potential problems with reliability. The two subscales of 'Operating conditions' and 'Co-workers' which measures satisfaction with procedures and rules at work and satisfaction among working colleagues were found to have more negatively worded items. This might be a possible reason for a lower Cronbach's alpha value as the respondents could have answered in the same manner as the positively worded items. Lower Cronbach's alpha values were also found in the same two subscales in a study among Malaysian military personnel using the Malay version of the JSS where Cronbach alpha for 'Operating conditions' and 'Co-workers' was 0.22 and 0.35 respectively despite having an overall Cronbach's alpha value of 0.86 (Chin-Siang et al., 2014). Bokti and Talib reported similar range of Cronbach's alpha value ($\alpha=0.85$) in research among Malaysian navy personnel using the Malay language version of the JSS (Bokti & Talib, 2009).

In a study among Lithuanian teachers however, the translated Lithuanian language version had Cronbach's alpha (α) coefficient ranging from 0.45 to 0.74, and the confirmatory factor analysis (CFA) performed did not fit the data well (Astrauskaite, Vaitkevicius, & Perminas, 2011). A study conducted among Nepali healthcare workers

using a translated version of the JSS in the Nepali language had an overall Cronbach's alpha (α) coefficient value of 0.78, however two dimensions had Cronbach's alpha (α) values lesser than 0.65 (Batura, Skordis-Worrall, Thapa, Basnyat, & Morrison, 2016). Cho et al. however stated that a higher alpha coefficient does not necessarily indicate better internal consistency, nor should it be equal or greater than 0.7 or 0.8, but rather have the assumptions of unidimensionality and tau-equivalency examined with structural equation modelling (Cho & Kim, 2015). As multiple aspects have to be considered in interpreting alpha coefficient value such as uncorrelated errors and identical covariances between items (Green & Hershberger, 2000), the use of a fixed alpha coefficient value has also been criticized by Cortina (1993) and Streiner (2003).

When running reliability analysis, the initial number of items remained the same and no items were dropped in the construct as per the original English version and the previous translated Malay versions. Since the minimal corrected item-total correlation (CITC) values were more than 0.3 in each construct, and the Cronbach alpha coefficient values were good, thus it can be concluded that the JSS in the Malay language is a reliable tool in assessing job satisfaction (Brzoska & Razum, 2010; Pallant, 2007).

5.2.3.3 Validity analysis of the JSS

As with the OJSQ, the content face validity was tested by the same consultant occupational health physicians and epidemiologist, all of whom are also academicians and experts in both the English and Malay languages. Since the concurrent validity of the JSS was done in the English language via a systematic review by Van Saane et al. (2003), and in the Persian version by Gholami et al. (2012), similar analysis was not carried out in this study as it was advisable to perform concurrent validity based on a gold standard instrument (McDowell, 2006; Polit & Beck, 2004). To the best of our

knowledge, there is no gold standard instrument to measure job satisfaction, which is in agreement with Van Saane et al. (2003) and Batura et al. (2016).

5.2.3.4 Test-retest reliability

In the rest-retest reliability of the JSS (ICC (2,1), the Intraclass Correlation Coefficient (ICC) values ranged from 0.91 till 0.98 for each item of the JSS, which is considered to have excellent stability across the two to three week interval (Landis & Koch, 1977; McGraw & Wong, 1996; Nunnally, 1967). It signifies a good correlation between initial test responses with the re-administration of the instrument post interval. As discussed earlier, even though some literature have suggested that no cut-off point be used to estimate level, it is deemed adequate to indicate stability across the two to three week period due to its high ICC values of > 0.90 . In addition to that, these results were significantly higher in comparison with the test-retest reliability performed on the translated Turkish language version of the JSS (ICC range 0.63-0.88) (Yelboga & Gokalp Cad, 2009). Thus, the JSS is considered a reliable instrument in examining job satisfaction factors among school teachers in this study.

5.2.3.5 Results from Exploratory Factor Analysis

In this section, results from Exploratory Factor Analysis (EFA) from the items in each of the nine constructs are discussed. Similar to the OJSQ, Principal Axis Factoring method was used for extraction. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy which measures the suitability of data for factor analysis and Bartlett's test of sphericity which measures of sampling adequacy was also used.

(a) Pay

The KMO value for the four items this construct was 0.73 which is considered acceptable, and Bartlett's Test of Sphericity was < 0.001 , indicating identity matrix can be ruled out. A single factor was extracted which explained 40.81% variation in the four

items in this construct. The highest correlation in each item with at least one other item in the construct is between 0.3 and 0.9, thus indicating that this construct correlates adequately.

(b) Promotion

The KMO value for the four items in this construct was 0.72 which is considered good, and Bartlett's Test of Sphericity was <0.001 . A single factor was extracted which explained 38.62% variation in the four items in this construct. The minimum factor loading in this construct was 0.53, which is considered adequate in quantifying convergent validity. The highest correlation in each item with at least one other item in the construct is between 0.3 and 0.9, thus indicating that this construct correlates adequately.

(c) Supervision

The KMO value for four items in this construct was 0.79 which is considered good, and Bartlett's Test of Sphericity was <0.001 . A single factor was extracted which explained 37.81% variation in the four items in this construct. The minimum factor loading in this construct was 0.47, which is considered adequate in quantifying convergent validity. The highest correlation in each item with at least one other item in the construct is between 0.3 and 0.9, thus indicating that this construct correlates adequately.

(d) Fringe benefits

The KMO value for the four items in this construct was 0.66 which is considered acceptable, and Bartlett's Test of Sphericity was <0.001 . A single factor was extracted which explained 36.21% variation in the four items in this construct. The minimum factor loading in this construct was 0.42, which is considered adequate in quantifying convergent validity. The highest correlation in each item with at least one other item in

the construct is between 0.3 and 0.9, thus indicating that this construct correlates adequately.

(e) Contingent rewards

The KMO value for four items in this construct was 0.63 which is considered acceptable, and Bartlett's Test of Sphericity was <0.001 , indicating identity matrix can be ruled out. A single factor was extracted which explained 36.21% variation in the four items in this construct. The minimum factor loading in this construct was 0.39, which is considered adequate in quantifying convergent validity. The highest correlation in each item with at least one other item in the construct is 0.29, which is close to 0.3.

(f) Operating conditions

The KMO value for the four items in this construct was 0.63 which is considered acceptable, and Bartlett's Test of Sphericity was <0.001 . A single factor was extracted which explained 37.48% variation in the four items in this construct. The minimum factor loading in this construct was 0.41, which is considered adequate in quantifying convergent validity. The highest correlation in each item with at least one other item in the construct is 0.29, which is close to 0.3.

(g) Co-workers

The KMO value for the four items in this construct was 0.68 which is considered acceptable, and Bartlett's Test of Sphericity was <0.001 . A single factor was extracted which explained 35.75% variation in the four items in this construct. The minimum factor loading in this construct was 0.41, which is considered adequate in quantifying convergent validity. The highest correlation in each item with at least one other item in the construct is between 0.3 and 0.9, thus indicating that this construct correlates adequately.

(h) Nature of work

The KMO value for the four items in this construct was 0.75 which is considered good, and Bartlett's Test of Sphericity was <0.001 . A single factor was extracted which explained 47.67% variation in the four items in this construct. The minimum factor loading in this construct was 0.49, which is considered adequate in quantifying convergent validity. The highest correlation in each item with at least one other item in the construct is between 0.3 and 0.9, thus indicating that this construct correlates adequately.

(i) Communication

The KMO value for the four items in this construct was 0.70 which is considered acceptable, and Bartlett's Test of Sphericity was <0.001 . A single factor was extracted which explained 40.93% variation in the four items in this construct. The minimum factor loading in this construct was 0.46, which is considered adequate in quantifying convergent validity. The highest correlation in each item with at least one other item in the construct is between 0.3 and 0.9, thus indicating that this construct correlates adequately.

Findings on the EFA which obtained Bartlett's Test of Sphericity < 0.001 indicate that the sample intercorrelation matrix did not originate from a population in which the intercorrelation matrix is an identity matrix. In addition to that, since the KMO statistic value was > 0.50 , thus sample is adequate and is reaffirmed that factor analysis is the appropriate technique for further analysis. The percentage variance explained was much higher in comparison with the Turkish translated version of the JSS (more than 38.62%), however the factor loadings were lower in this study (Yelboga & Gokalp Cad, 2009). EFA findings on the Vietnamese language version (Pham, 2016), Persian version (Akbaritabar, Mokarami, Nazifi, Rahi, & Hosseinpouri, 2013) and another Malay

language version of the JSS (Chin-Siang et al., 2014) were comparable with the findings in this study. The same quantity of underlying dimensions (9 constructs) were also reported in the original English version by the JSS developer (Spector, 1985, 1997), which is very encouraging and fulfilling.

University of Malaya

5.3 Phase II : Association of psychosocial working environment and organizational justice with stress and job satisfaction among public school teachers

5.3.1 Missing data analysis

Missing data were found in the both the OJSQ and JSS, notably in the IJ subscale of OJ and in the 'Nature of work', 'Operating conditions' and 'Contingent rewards' subscale of the JSS. The missing values were missing completely at random (MCAR) which demonstrates no systematic relationship between the missing and observed values in question. This would make values more likely to be missing than others (Bhaskaran & Smeeth, 2014). Missing data analysis via imputations is therefore not needed as there is unlikely any element of bias (Humphries, 2013). Participants who had omitted large parts of questionnaires both intentionally or unintentionally were excluded from analysis and treated as non-respondents. The p -value for Little's chi-square test was 0.91, thus MCAR was assumed. Complete case analysis which assumed listwise deletion was conducted subsequently for this study.

5.3.2 Response rate and sample weights of study

The response rate from participating schools were adequate to meet the required number of schools and respondents for the study. The response rate from the schools which were initially invited and participated in the parent study was 64.4%, and from this number of schools, the participatory response rate of schools for this study was 49.5%. The response rate is considered satisfactory as the response rate by districts was comparable by teacher-population composition, and an adequate number of teachers were obtained for sufficient power and strength for the study. Some literature have stated that an acceptable response rate for social research surveys is 50% (Richardson, 2005) and the overall average response rate for published studies and surveys was 55.6% (Baruch, 1999). Face-to-face administration is reported to have higher response

rates (Nulty, 2008; Sitzia & Wood, 1998), however low response rates does not necessarily lead to biased results (accounting for non-response bias) (Rindfuss, Choe, Tsuya, Bumpass, & Tamaki, 2015). Response rates were also reported to be not related to the length of the questionnaire, type of instrument used for data collection, and most importantly, the sample must be useful in estimating the amount of methodological rigour in examining the concept of 'acceptable' response rate (Sitzia & Wood, 1998).

The response rate from participants from each school was lower at the beginning of the study, however it picked up pace as the duration of the study progressed. Information from non-respondents was not available as the Ministry of Education did not allow the release of information on non-participants on grounds of privacy & confidentiality. Amongst the reasons for not participating in the CLUSTER cohort study include :

- i. Many of the teachers are already on follow up for their medical conditions at government health clinics or private general practitioners, thus participating in this study would not be beneficial.
- ii. Total lack of interest/lack of awareness on the importance of health screening (too busy with teaching workload, lengthy questionnaires to answer).
- iii. Teachers felt they had too much work, and some were on examination invigilation duty, thus participating in the study was troublesome.
- iv. Loss of questionnaire (left at home, lost the questionnaire).
- v. Disqualification in participating in the parent study in view of pregnancy, on treatment/medications for some medical ailment i.e. Upper Respiratory Tract Infection or having underlying psychiatric illnesses.

Nearly 9.8% (n=134) of respondents who had participated in the parent study did not complete all four questionnaires needed to participate in this study component, some of

which only submitted one or two of the questionnaires, and others had > 50% missing data on the returned questionnaires. As such, they were excluded from this study's sample population.

School weights were calculated using data on the number of total schools in each district and total participating schools. Participant weights were then calculated upon obtaining the total number of teachers who have participated in each school. These weights were then imputed into statistical analyses to account for non-respondents, unequal selection probabilities and to give a probable idea of generalizability and representation among the teaching profession in Malaysia.

5.2.3 Demographic characteristics of participants

There were a higher number of female participants in this study (90.4%) which produced a skewed gender distribution, however this is largely due to the fact that there are more female teachers in Malaysia under the Ministry of Education as compared to male teachers (Ministry of Education Malaysia, 2017b). Similar demographic gender proportion has also been reported in other studies (Goldring, Gray, & Bitterman, 2013; O' Bannon & Thomas, 2014). Women also tend to more health conscious and demonstrate willingness towards health screening and health awareness (Blazer, 2016).

As for age group, most of the teachers who had participated in this study were from the age group 41-50 years. This is similar to the age composition of teachers in the Ministry of Education (Ministry of Education Malaysia, 2017b). This could be due to the fact that teachers in these age groups feel more susceptible to having diseases, or onset of illnesses, thus the need to undergo some form of screening, and to participate in questionnaires to assess stress levels.

Malaysia comprises of three main ethnic groups, of which 68.6% are ethnic Malay and indigenous people (also collectively known as Bumiputera), 23.4% ethnic Chinese and 7.0% ethnic Indians. Majority of the population (69.5%) are from ages 15-64 years, which are considered the bulk of the working population in Malaysia (Department of Statistics Malaysia, 2017a). In this study, teachers from the Malay ethnic group are overrepresented while teachers from ethnic Chinese & Indians groups are underrepresented as the teachers in the public sector are predominantly ethnic Malays (Masilamani et al., 2012; Ministry of Education Malaysia, 2017b). The higher number of Muslims corresponds to the higher number of ethnic Malays in this study as Malay's are predominantly Muslims as per the Federal Constitution of Malaysia (Muslim, Ibrahim, Buang, Hassan, & Samian, 2012).

Majority of the schools which had participated in this study (82.8%) is urban schools due to the location in which this study had been carried out. Selangor state which is located in central Peninsular Malaysia, is the richest and most developed state in the country, and thus, most districts in Selangor are urban districts (Department of Statistics Malaysia, 2017b). Urban school teachers have been found to significantly experience more stress and lesser job satisfaction as compared to their colleagues in rural schools (Abel & Sewell, 1999; Carson et al., 2016; Evy et al., 2008), thus it is befitting that most of the participants in this study come from urban schools.

There are a few streams of public schools in Malaysia; however, a big majority of public school teachers are from regular public schools, Chinese vernacular schools and Tamil vernacular schools. This study attempts to examine if types of schools are determinants towards job stress and job satisfaction. Most public schools in the country are regular public schools with predominantly ethnic Malay teachers, whereas Chinese and Tamil vernacular schools have a skewed ethnic distribution of teachers according to

the type of schools. Chinese vernacular schools have more ethnic Chinese teachers and Tamil vernacular schools have more ethnic Indian teachers as per their mother tongue and language proficiency.

A big majority of our participants are married (91.1%) as most of the teachers who had participated in this study are from reproductive age groups and working age-group. This is beneficial as a spouse provides companionship and is able to be a supportive character in one's life (physically, mentally and socially), influencing behavioural health, thus able to reduce stress and other possible mental ailments (Lewis & Butterfield, 2007).

Teachers in public schools are advocated to obtain degree-level academic qualification as to improve the quality and knowledge of teachers. Teachers with higher qualifications are more likely to be promoted and have a better career progression as compared to their colleagues with lower academic qualification. Teachers are often offered scholarships to pursue postgraduate degrees from the Ministry of Education (Jamil, 2014). Nearly 95.5% of public secondary school teachers have at least a degree-level academic qualification (Ministry of Education Malaysia, 2016).

5.3.3 Psychosocial working environment (PWE) and organizational justice (OJ)

5.3.3.1 Mean PWE and OJ scores

The mean and standard error values obtained in this study are to classify the dichotomous 'high' or 'low' levels for job demand, job control and social support (Karasek et al., 1998; Karasek, Choi, Ostergren, Ferrario, & Smet, 2007) and for procedural justice, interactional justice and distributive justice (Moorman, 1991; Moorman & Byrne, 2013). The calculated scores are in accordance with the formulas set by the JCQ centre for PWE and previous literature for OJ (Ibrahim et al., 2016; Moorman, 1991).

5.3.3.2 The proportion of perceived severity of psychosocial working environment and organizational justice

Teachers have often complained to have highly stressful working conditions in Malaysia (Hong et al., 2012; Masilamani et al., 2012; Samad et al., 2010) and abroad (Austin et al., 2005; Billehøj, 2007; Kyriacou & Chien, 2009; Pithers & Soden, 1998), which have been supported by various prior studies. This study aims to examine perceived stress looking into workplace stressors in Malaysia, namely psychosocial working environment factors (job demand, job control and social support) and perceived fairness at the workplace (OJ factors). Karasek's 'Strain hypothesis' model is used as the quantifying tool (Kain & Jex, 2010; Karasek et al., 1998; Karasek et al., 2007), and this study conforms to the hypothesis as most of the participants reported higher levels of job demand, lower levels of job control, and lower levels of social support, which indicates that participants in this study have high strain or high-stress jobs. However, more than 60% of these respondents also reported to have higher PJ, IJ and DJ scores, which means majority of them perceived higher levels of fairness at their workplace, which has been similarly reported in studies of OJ among public school teachers in western countries (Hassard et al., 2016; Yilmaz, 2010). A recent prospective study had reported that the most consistent protective factor for psychological and social work factors are support from superiors (lowest OR 0.56, 99% CI : 0.43 – 0.72) and fair leadership (lowest OR 0.52, 99% CI : 0.40 – 0.68) (Finne et al., 2014).

5.3.3.3 Job strain dimensions

In accordance with Karasek's job strain hypothesis, two groups were classified, which are 'high job strain' and 'non-high job strain.' Those in high job strain are participants who reported both high job demands and low job control. Since study variable of interest is high job strain, the other three sub-groups of active, passive and low job strain was grouped together as non-high job strain for ease of analysis. A

staggering 38.6% of the participants reported high job strain, which was higher in a study conducted among secondary school teachers (Masilamani et al., 2012) and lecturers (Azizah, Rozainee, Nada, & Norhafizah, 2016; Huda et al., 2004) in Malaysia, however similar findings were found among lab technicians and crane operators (Aziah, Rusli, Winn, Tengku, & Nain, 2004; Yakub & Mohd Sidik, 2014). The possible reason as to why more teachers in this study reported high job strain is the recent change of medium of instruction from English to the Malay language (Saran Kaur Gill, 2014) and the increase of workload among teachers, role ambiguity, increased clerical work using computers, and the change of teaching methods (modern methods) over time (Ahmad, 2017; Muniandy, 2016). High job strain has also been reported to be risk factors for developing endocrine diseases such as Type II Diabetes (Nyberg et al., 2014).

Karasek's definition of high job strain is due to the imbalance of job demand and job control at the workplace. It is therefore crucial to empower workers by increasing job control by improving decision-making processes and improve skills. High job strain with the combination of the three risk factors explained in PWE are risk factors of stress and depression (Maureen F Dollard & Bakker, 2010; Eller et al., 2009; Gluschkoff et al., 2016). More than half of the respondents reported low job control (51.3%) and high job demands (51.9%).

5.3.4 Stress and job satisfaction

5.3.4.1 Stress and job satisfaction scores

Poor, unhealthy and non-conducive working conditions have been attributed to the development of bad psychological outcomes such as stress, anxiety and depression (Jennings, 2008; Kramer, 1999). The DASS 21 questionnaire is designed to measure the psychological outcomes of stress, depression and anxiety accurately, however, only the stress scores were calculated and used for this study as stress was the only outcome of

interest. It is comparable between populations, easily understood and easy to administer (P. Lovibond, 2014). The stress scores for psychological outcomes using the DASS-21 questionnaire was scored and the severity classification was categorized in accordance with the guidelines provided by the DASS website and previous literature by the DASS author (P. Lovibond, 2014; P. F. Lovibond & S. H. Lovibond, 1995). This classification and method were also used in prior studies using the DASS questionnaire in Malaysia (Hadi et al., 2009). In turn, the scores for job satisfaction using the JSS questionnaire were scored and the severity classification was categorized in accordance with the guidelines provided by the JSS website and previous literature by the JSS author (Spector, 1985, 1997, 2011). The mean scores for both stress (Musa et al., 2007) and job satisfaction (Bokti & Talib, 2009) were comparable with prior studies. The mean stress score was marginally higher as compared to the validated Malay translated DASS-21 questionnaire (Musa et al., 2007), whereas the mean job satisfaction subscale and total score were similar but mixed when compared to the original English version of the JSS questionnaire when tested among teachers and non US samples (Spector, 2011).

5.3.4.2 The proportion of perceived stress and job satisfaction

Majority of the respondents reported normal stress level, however 14.4% of them reported to have some form of stress, ranging from mild to extremely severe. This concurs with previous studies in Malaysia that teachers do have stressful working conditions (Hadi et al., 2009), but the severity is lesser in this study. An alarming fact about this is nearly 2.5% of these teachers have 'severe' to 'extremely severe' stress levels, which is worth noting and the problem needs to be addressed. If no intervention is conducted for this group of teachers, the stress levels could worsen with time and manifest into psychological and physiological problems, impairing the health of the teachers (Selye, 2013; Shalev & Belsky, 2016). Looking at job satisfaction however, the majority of the respondents reported either being 'satisfied' or 'ambivalent' with their

job tasks. Most of the teachers reported being 'dissatisfied' in the areas of 'Fringe Benefits', 'contingent rewards', 'operating conditions' and 'communication', with a very big number especially dissatisfied with operating conditions at their schools (77.2%). This could be due to the fact that public schools which are fully funded and subsidized by the government do not have amenities, equipment's or infrastructures which are updated or new as compared to private schools, thus causing dissatisfaction among the teachers (Farah Khan, Fauzee, & Daud, 2016; Kingdon, 1996). This is also apparent between urban and rural schools. As for 'fringe benefits', 'contingent rewards' and 'communication', teachers in public schools are more dissatisfied because civil servants do not receive fringe benefits be in monetary or non-monetary ones. Other than a 'once yearly' certificate of appreciation/recognition for civil servants with good appraisal marks, no other 'contingent rewards' are awarded to public school teachers. Finally, being in a hierarchical society of 'boss' and 'subordinate', even more in a public sector, there is a higher tendency for teachers to have lesser communication between the teachers and the principal. Nonetheless, the total satisfaction score shows that a very big majority of the participants (98.9%) are either satisfied or ambivalent with their working condition and tasks.

In Malaysia, survey conducted by M. Mazlan (1992) among 43 primary school headmasters in the state of Malacca found a significant association between job satisfaction with intrinsic factors such as accountability, responsibility, salary and good relationship with subordinates. Study by Noor (2004) among secondary school teachers in Johor state also found similar associations between satisfaction with 'nature of work' and 'supervision'. They were ambivalent towards 'pay', 'promotion' and 'fringe benefits', and dissatisfied with 'communication'. Santhapparaj and Alam (2005) study on private university lecturers found a positive association between job satisfaction with 'promotion', 'pay', 'working conditions' and managerial support. The respondents

however reported dissatisfaction with 'fringe benefits'. Ch'ng, Chong, and Nakesvari (2010) study among private college lecturers concurred with the findings of Santhapparaj et al., (2005).

5.3.5 Association of stress and determinants

5.3.5.1 Association between stress and socio-demographic characteristics

The age group variable was marginally statistically significant. Highest mean stress scores were found among a younger group of teachers, with a gradual decrease in stress scores as age increased. These findings are similar to a prior study conducted among teachers in Kelantan, Malaysia (Hadi et al., 2009). The possible reasons for this could be because participants in this age group who have just started family and their career, have additional requirements and need to balance family life and financial obligations. As time progresses, people learn to cope and thus lead to decreased stress over time. Studies have also shown that younger teachers feel that they rather spend more time with family and friends, as well as hobbies and personal interest rather than spending time at work. Age has also shown to be a significant predictor of emotional exhaustion (Maslach, Jackson, & Leiter, 1997; Maslach et al., 2001) and younger and older teachers perceive work-stress differently, as younger teachers experience higher levels of burnout, whereas older teachers perceive stress as a lack of support from employers/government. Younger teachers specifically experience emotional exhaustion and profession disengagement as compared to older teachers (Antoniou et al., 2006; Klassen & Chiu, 2010).

The 'gender' variable was marginally statistically non-significant. This study shows that female teachers experience more stress as compared to their male counterparts. Although this variable is statistically not significant, it has similar findings with prior studies (Antoniou et al., 2006; Klassen & Chiu, 2010). Another study reported that the

probable reason for this is due to their dual commitment to their family and work simultaneously (Salahudin et al., 2007). Gender differences in quantifying psychological distress were also reported in a study conducted among 7484 Canadian employees (Vermeulen & Mustard, 2000).

The 'ethnicity' variable was also statistically significant. In this study, ethnic Chinese teachers scored higher mean stress scores compared to the other races. A possible explanation of this could be because most of the ethnic Chinese teachers in this study were from Chinese vernacular schools, and Chinese vernacular schools have a different working environment as compared to regular public schools, and is known to have more stressful working conditions as compared to other types of schools (Ooi & Abdullah, 2016). Type of schools is also marginally not significant, with Chinese vernacular schools showing a higher level of stress scores as compared to Tamil vernacular and regular public schools, consistent with 'ethnicity' variable findings.

The 'school location' variable is marginally not significant, however this study shows that teachers in urban schools have higher mean stress scores as compared to their counterparts in rural schools. This is consistent with previous research conducted both abroad, and in Malaysia (Abel & Sewell, 1999; Aftab & Khatoon, 2012; Hadi et al., 2009) where higher stress was reported among urban school teachers compared to their rural school counterparts.

5.3.5.2 Association between stress and psychosocial working environment (PWE) factors

Higher stress scores were found with teachers with high job demand, low job control and low social support consistent with findings from previous literature (Billehøj, 2007; Hadi et al., 2009; Hong et al., 2012; Salahudin et al., 2007; Samad et al., 2010). Higher levels of stress have been reported to cause symptoms of exhaustion and burnout (Abel

& Sewell, 1999; Kyriacou, 1987; Steinhardt et al., 2011) and higher attrition rate (Billehøj, 2007; Pithers & Soden, 1998). Teacher's stress levels and attrition rates are also associated with personal characteristics, in addition to working conditions (Sammons et al., 2007; Skaalvik & Skaalvik, 2007). Supportive school environments are positively associated with lesser stress and higher motivation in remaining in the teaching profession (Skaalvik & Skaalvik, 2011a). Skaalvik et al. had reported that a combination of heavy workload (higher job demands) is itself a precursor for stress and burnout (Skaalvik & Skaalvik, 2011a, 2011b). However, these variables are statistically not significant in this study.

5.3.5.3 Association between stress and organizational justice (OJ) factors

Literature have reported that organizational justice is an antecedent of stress, where a favourable organizational justice climate would invariably lead to lower stress levels and work pressure (Hemingway & Smith, 1999). In this study, higher stress scores were also found with teachers who reported low procedural justice, low interactional justice and low distributive justice. This is in line with previous studies which reported similar findings (Russell Cropanzano et al., 2005; Maureen F Dollard & Bakker, 2010; Elovainio et al., 2000; Elovainio et al., 2002; Fatt et al., 2010; Hassard et al., 2016; Ibrahim et al., 2016; Moorman, 1991; Yilmaz, 2010). Wong and Wong et al. had also reported the role played by organizational climate as a stressor source especially in terms of poor communication and support, and extreme competition (Wong, Ngo, & Wong, 2002). These variables were however found not statistically significant in this study.

5.3.5.4 Association between stress with socio-demographic, working characteristics, PWE and OJ factors

As explained in Chapter 3, variables with p -values < 0.25 in the univariate analysis were selected and analysed by creating different models and imputing different variables. In Model 1, only significant demographic univariate variables were included and adjusted for each other. Stress levels were adjusted for age, gender, ethnicity and marital status. Of this, only marital status remained significant post adjustment. This is in contrary with other studies where not only marital status but gender, ethnicity and education levels influence stress levels (Aftab & Khatoon, 2012; Antoniou et al., 2006; Hadi et al., 2009; Klassen & Chiu, 2010). In these studies, male's lower education levels reported higher stress levels among their respondents. The significantly higher proportion of female teachers and degree holders may have played a vital part in these findings. The R^2 value for Model 1 was 9.7%.

In Model 2, school type and location variable were included into Model 1, however was found to be statistically not significant post adjustment. In this study, school type and location does not affect stress levels. This is in contrary with other studies where teachers in urban schools are found to have higher stress levels as compared with teachers in rural schools (Abel & Sewell, 1999; Aftab & Khatoon, 2012). All other variables remained non-significant except marital status.

In Model 3, PWE factors were included into Model 2. In this Model, all PWE factors were statistically not significant in influencing stress levels. These findings were unlike previous studies findings where job demands, job control and social support affects stress levels amongst teachers (Masilamani et al., 2012; Salahudin et al., 2007; Samad et al., 2010). In this adjusted model, school location became marginally statistically not

significant, whereas marital status remained marginally statistically significant. The R^2 value for this model was 14.6%.

In the final model of Model 4, OJ factors were included into Model 3 and all variables were adjusted for each other. In this model, only marital status remained marginally statistically significant. The R^2 value for this final model was 15.1%. The R^2 is the percentage of variance explained; fraction by which variance of error is less than the variance of the dependent variables. R^2 of 15.1% means the errors are only about 7.8% smaller on average than of a contrast-only model, which is relatively good.

As explained above, teacher's stress levels are not exclusively due to working conditions and climate, but rather other contextual factors as well such as personal characteristics, students behaviour, role ambiguity, discipline problems and life situation (Sammons et al., 2007; Skaalvik & Skaalvik, 2007, 2015). Perceived stress does not actually relate to physiological stress supported by empirical evidence. In a study among teachers in Malaysia, Masilamani et al., reported that although teachers had reported high perceived stress, salivary stress biomarkers such as cortisol did not correlate the reported perceived stress. This phenomenon may have occurred in this study as well. Skaalvik had also suggested that studies on stress, burnout and job satisfaction are usually carried out based on survey methodology, however a qualitative approach with open-ended interviews may produce different outcomes (Skaalvik & Skaalvik, 2015). Two sources of work-related stress which rarely studied and given little attention in stress studies include value consonance and adaptation to an individual student's need (Skaalvik & Skaalvik, 2015). Value consonance which has been associated with satisfaction and the feeling of belonging; is the degree to which teacher's feel the shared values of the schools and its prevailing norms. Lack of it is due to the propensity to micromanage by supervisors. Inclusivity and collegial discussions

may improve this perception (Skaalvik & Skaalvik, 2011a, 2011b). In conclusion, in this study, PWE and OJ factors were not significant predictors of job stress among teachers. An additional qualitative approach may have differing outcomes. Teachers may have been able to develop coping mechanisms of stress such as religious and cultural activities, which have been proven to reduce overall stress levels.

5.3.6 Association between job satisfaction and determinants

5.3.6.1 Association between job satisfaction with socio-demographic and working characteristics

Highest mean job satisfaction scores were found among teachers age group from 31-40 years, however the lowest job satisfaction scores were from age group below 30. Conflicting results have emerged regarding age and job satisfaction, where a positive correlation was found by Lee and Wilbur (1985), but study by Crossman et al. reported no statistical significance between age and job satisfaction (Crossman & Harris, 2006).

Gender has however been shown to be a predictor of job satisfaction (Crossman & Harris, 2006; Michaelowa & Wittmann, 2014), however contradictory evidence regarding association of job satisfaction and age exist, where some have reported that female teachers are more satisfied than their male colleagues (De Nobile & McCormick, 2010) and others vice versa (Abdullah et al., 2009; Mwamwenda, 1997). The possible reasons for this could be that males reported having better classroom management self-efficacy and more satisfaction from work conditions compared to females (Klassen & Chiu, 2010; Ramsey & Liu, 2008).

In this study, ethnic Chinese teachers scored the lowest mean job satisfaction scores compared to the other races and ethnic Malay teachers and 'other' ethnic group scores highest job satisfaction scores. A possible explanation of this could be because most of the ethnic Chinese teachers in this study were from Chinese vernacular schools, and

Chinese vernacular schools have a different working environment as compared to regular public schools, and is known to have more stressful working conditions, thus resulting in lower job satisfaction (Ooi & Abdullah, 2016). Another probable reason related to this is ethnic Malay teachers which make up the majority of the teaching profession in Malaysia may have more association at the workplace compared to other races (Salahudin et al., 2007). Type of schools also correlates with ethnicity variable, where teachers from Chinese vernacular schools reported least job satisfaction compared to their colleagues in Tamil vernacular and regular public schools.

Respondents from rural schools also reported higher job satisfaction scores compared to their counterparts in urban schools. This is consistent with findings from prior studies (DiPaola & Tschannen-Moran, 2014; Shann, 1998). As for marital status, unmarried teachers reported lowest job satisfaction whereas widowed teachers reported highest job satisfaction scores.

Teachers with the least academic qualification (secondary school) reported highest job satisfaction scores, whereas teachers with diploma academic qualification reported least job satisfaction. Lastly, teachers with the most years in service (30 years and above) reported most job satisfaction as compared to teachers with lesser teaching years.

5.3.6.2 Association between job satisfaction with psychosocial working environment (PWE) factors

Teachers in this study reported an inverse association with job satisfaction, where teachers with lower job demands reported higher job satisfaction scores in line with stress studies conducted (Dwyer & Ganster, 1991; Fox, Dwyer, & Ganster, 1993). This is consistent with other PWE factors where higher job satisfaction scores were found among teachers with higher job control and higher social support (Dwyer & Ganster,

1991; Huda et al., 2004; Jabnoun & Yen Fook, 2001). Nevertheless, in this study, only social support factor had statistical significance; whereas job demand and job control factors did not.

5.3.6.3 Association between job satisfaction with organizational justice (OJ) factors

Consistent with previous justice researches, all OJ constructs in this study have shown positive correlation and statistical significance with job satisfaction. Respondents who reported higher PJ, IJ and DJ scored higher mean job satisfaction scores. This is consistent with previous studies conducted in Malaysia and abroad (Elovainio et al., 2000; Fatimah et al., 2011; Fatt et al., 2010; Lund, 2003; Moorman, 1991). Job satisfaction has been shown to be univocally correlated upon an employee's perception of fairness (Cohen-Charash & Spector, 2001; Russell Cropanzano et al., 2005; Elovainio et al., 2000; Lund, 2003; Moorman, 1991). This has also been reported among school teachers (Fatimah et al., 2011; Yilmaz, 2010). Fairness and justice comparisons made by an employee are usually based on the frame of reference within a certain organization concerning what to expect as a consequence of behaviour, interaction or achievement. An unsatisfactory consequence from an arbitrary act that failed to meet a certain preconceived notion will result in resentment, and therefore perceived unfairness, which leads to dissatisfaction. Although perceptions of OJ are empirically associated with satisfaction, they are not sole determinants. Working conditions, workload, control over job tasks and supervisor/leader support likewise play an important role (M. Dollard et al., 2007; Maureen F Dollard & Bakker, 2010; Elovainio et al., 2002; Idris, Dollard, Coward, & Dormann, 2012; Jimmieson, Hobman, Tucker, & Bordia, 2016). OJ has been shown to have an impact on perceived employee unfair treatment/injustice; as it begets negative emotion and poor work performance and work quality. PJ and DJ have a significant positive association with job satisfaction

(Tremblay & Roussel, 2001). DJ relates to equity perceived regarding contribution to the organization, thus when employees perceive fairness in rewards distribution, job satisfaction would be met. Research has also shown that perceived injustice at work may decrease job satisfaction levels which may lead to unhappiness, stress and even psychosomatic distress (Jahangir et al., 2006; Skarlicki & Folger, 1997). Other factors which have shown to improve job satisfaction and maximize organizational efficiency include altruism (within colleagues/subordinates), courtesy, civic virtue, conscientiousness and sportsmanship (Organ, 1988; Pohl, Vonthron, & Closon, 2017). Prior literature have demonstrated organizational justice with organizational citizenship behaviours improves organizational effectiveness and group level performance (DiPaola & Tschannen-Moran, 2014; George & Bettenhausen, 1990).

5.3.6.4 Association between job satisfaction with socio-demographic and working characteristics, PWE and OJ factors

Similar to the multivariate analysis done for the association of stress with contributing factors, different models were created according to the associated relevant variables. In Model 1, only significant demographic univariate variables were included and adjusted for each other. Of this, only ethnicity remained significant post adjustment. Meanwhile consistent with previous studies on ethnicity as a significant variable which influences job satisfaction (Ooi & Abdullah, 2016; Salahudin et al., 2007), this study findings show that age group, gender and marital status post adjustment does not have statistical significance with job satisfaction, conflicting with other research findings (Abdullah et al., 2009; Crossman & Harris, 2006; Fatimah et al., 2011; Jabnoun & Yen Fook, 2001; Lee & Wilbur, 1985; Mustapha, 2016). The R^2 value for Model 1 was 4.3%.

In Model 2, the 'school type' and 'school location' variables were added into Model 1, however post adjustment, the variables reported no statistical significance. This means 'school type' and 'school location' does not affect job satisfaction levels in this group of teachers. This is in contrary with another published study which highlighted the significance of job satisfaction among teachers in urban schools (Evy et al., 2008). All other variables remained statistically not-significant except ethnicity, which was marginally significant. The R^2 value rose very marginally by 0.7% to 5.0%, which indicates the additional two variables does not explain much of the variance (Murphy, Myors, & Wolach, 2014).

In Model 3, PWE factors were added into Model 2. In this Model, the 'job demand' variable was statistically not significant; however, 'job control' and 'social support' were significant. This indicated these two variables influence job satisfaction levels greatly, consistent with previous research (Dwyer & Ganster, 1991; Hakanen et al., 2005), however in this study, 'job demand' did not play much part in influencing job satisfaction levels. The 'ethnicity' variable remained marginally significant, whereas the others remained not significant. The R^2 value for this model increased by 13%, to 18.1%, which indicates that PWE factors explain a good amount of the variance in this model (Murphy et al., 2014).

In the final model of Model 4, OJ factors were added into Model 3 and all variables were adjusted for each other. In this model, only IJ and DJ were statistically significant. The PWE variables of 'job control' and 'social support' also still remained significant; however, ethnicity was no longer statistically significant. This indicates that PWE and OJ factors greatly influence job satisfaction, superseding all socio-demographic factors. The R^2 value for this final model increased by 8% to 26.1%, indicating OJ factors play a vital role in influencing job satisfaction among teachers. The R^2 is the percentage of

variance explained; fraction by which variance of error is less than the variance of dependent variables. R^2 of 26.1% means the errors are only about 13.1% smaller on average than of a contrast-only model, which is good.

In conclusion, in this study, PWE and OJ factors were significant predictors of job satisfaction among school teachers. This is in agreement with previous literature on job satisfaction both in Malaysia (Abdullah et al., 2009; Ibrahim et al., 2014; Mustapha, 2016; Noor, 2013; Ooi & Abdullah, 2016) and abroad (Ahmadzadeh Mashinchi et al., 2012; Crossman & Harris, 2006; Evy et al., 2008; Jahangir et al., 2006; Reilly et al., 2014; Shivendra & Kumar, 2016; Skaalvik & Skaalvik, 2014).

University of Malaya

5.4 Phase III : Analysis of salivary stress biomarkers

5.4.1 Demographic characteristics of participants

Of the subsample of 152 respondents from Phase II who participated in Phase III of this study to ascertain the correlation between stress levels and salivary stress biomarkers, majority of the teachers were female gender (89.5%), age groups from 31 – 50 years (77%) , predominantly Malays (76.3%) and from urban schools (75%). This reflects the general national demographic distribution of teachers in public schools in Malaysia.

5.4.2 Mean scores

The mean stress score for this subsample was 6.47, which is within the ‘normal’ range for stress score (P. Lovibond, 2014). The mean salivary cortisol level of 0.203 also falls within the normal range (Normal : 0.127-0.979 µg/dL) (Aardal & Holm, 1995) as with the secretory salivary IgA 39.836µg/min (Normal : 5-150 µg/min) (D. S.-Q. Koh & Koh, 2007).

5.4.3 Stress scores with salivary cortisol levels

In this study, more than half of the respondents (62.5%) had normal salivary cortisol levels, and 37.5% of them had low cortisol levels. None of the respondents had high cortisol levels. Respondents with ‘mild’ stress were grouped together with respondents with ‘normal’ stress as their score classification is just marginally higher, their boundaries closer with each other, and their symptoms and features were more similar, as compared to higher severity levels (P. Lovibond, 2014; P. F. Lovibond & S. H. Lovibond, 1995). Of this, only 5.9% of respondents had both ‘moderate to extremely severe’ stress, and low cortisol levels. Salivary cortisol has been used in stress studies over many years, and most studies concur that elevated salivary cortisol levels are positively correlated with acute stress, be it occupational, emotional or post-traumatic

(Aardal-Eriksson et al., 1999; Sluiter et al., 2003; Weibel et al., 2003). Other studies have shown that chronic stress reacts differently, where low levels of cortisol is found instead, due to the HPA axis being subjected to prolonged high levels of cortisol (Oosterholt, Maes, Van der Linden, Verbraak, & Kompier, 2015; Pruessner et al., 1999) resulting in down-regulation of glucocorticoid receptors in the hypothalamus and pituitary gland (Marchand et al., 2016; Uno et al., 1994). This altered HPA axis then results in smaller diurnal variation and flattened and diurnal cortisol (Dallman, 1993; Marchand et al., 2016) typically found among teachers (D. S.-Q. Koh & Koh, 2007; Oberle & Schonert-Reichl, 2016; Pruessner et al., 1999), as shown in this study.

5.4.4 Stress scores with salivary secretory IgA levels

As for secretory IgA, 98% of the respondents had normal levels, and the rest had low secretory IgA levels (2%). None of the respondents had high secretory IgA levels. Of the group of teachers reporting moderate till extremely severe stress, only 1 (0.7%) had low SIgA levels. As with salivary cortisol classification, teachers in the 'mild' stress group was combined with 'normal' as explained above. Salivary secretory IgA (SIgA) has also been used as a stress biomarker just as cortisol, however the mechanism of action differ significantly. Since SIgA is dependent on the concentration of SIgA and salivary flow, findings are reported in secretion rates or $\mu\text{g}/\text{min}$. Several studies have shown an inverse correlation between perceived occupational stress and SIgA (Eddy, Heckenberg, Wertheim, Kent, & Wright, 2016; Hucklebridge et al., 1998; V. Ng et al., 1999), while others have found increase in SIgA with chronic stress (Bosch, Ring, & Amerongen, 2004; Bosch et al., 2002; Campos-Rodríguez et al., 2013). In this study, however, teachers with perceived moderate to extremely severe stress did not obtain low SIgA levels and the majority of respondents had normal salivary SIgA levels.

5.4.5 Association between stress score with salivary cortisol and salivary secretory IgA

Since the Pearson's correlation r -value between perceived stress score and cortisol and SIgA was 0.168 and 0.039 respectively, it can be concluded that there is no correlation between the perceived stress score and both the salivary biomarkers. In addition to that, the p -value for both the correlations was 0.068 and 0.073 respectively. As both the p -values were more than 0.05, and the r -values were lesser than 0.3, thus it can be concluded that there is no association between perceived stress and salivary stress biomarkers in this group of respondents. This is consistent with the findings of a recent study conducted in Malaysia among urban school teachers (Masilamani et al., 2012). Another study conducted in Malaysia among Assistant Medical officers revealed similar findings. In that study, no correlation was found between stress scores using the DASS-42 questionnaire and salivary cortisol ($p=0.393$, Spearman correlation=0.066) (Azman, Aziah, Norhayati, & Zahiruddin, 2011). This non-correlation between stress biomarkers and perceived stress has been found to be more common among Asian populations. Possible reasons cited are the inability of Asians to quantify and label negative emotions due to ingrained cultural barriers and sensitivities as compared to their western counterparts (Han, 2017; Holland, Thompson, Tzuang, & Gallagher-Thompson, 2010). Additionally, a collection of data on a single day may contribute towards lower reliability of measurements, and may bias towards state rather than trait measures. Most large-scale studies are however currently conducted in this manner (Adam & Kumari, 2009).

5.5 Research strengths and limitations

5.5.1 Limitations

5.5.1.1 Phase I : Psychometric and Reliability Testing of the translated Malay language version of the Organizational Justice Scale Questionnaire (OJSQ) and the Job Satisfaction Survey questionnaire (JSS)

Although the psychometric properties of the OJSQ and JSS reported good properties and stability, there are however some limitations that need to be highlighted. Firstly, concurrent validity which tests an instrument against other measurement or tools was not performed. To date and to the best of our knowledge, there are no known gold standard instrument to measure organizational justice and job satisfaction. It also did not go through a complete validation process using confirmatory factor analysis which could improve quantification and strengthen psychometric property and validation findings.

Secondly, the majority of participants were ethnic Malays and female gender which does not represent the national and state ethnic composition and gender distribution (Department of Statistics Malaysia, 2017a, 2017d). These factors could have led to skewed findings, however since the findings were comparable with other studies done in Malaysia on the OJSQ and JSS, it may be applied in other settings deemed appropriate (Chin-Siang et al., 2014; Fatimah et al., 2011; Hassan & Noor, 2008; Ibrahim & Ohtsuka, 2013; Ibrahim et al., 2014; Noor, 2013).

Thirdly, it would have seemed better if the test-retest reliability testing were administered to a different group of participants who were not involved in other parts of the validation process such as in psychometric properties testing. One group of respondents who were involved exclusively for test-retest reliability testing would have

been more ideal. In addition to that, since the questionnaires were only specified to the teaching population, its findings are therefore not generalizable to other job contexts.

5.5.1.2 Phase II : Association of psychosocial working environment and organizational justice with stress and job satisfaction among public school teachers

Some limitations in Phase II warrant discussion. The study design was cross-sectional in nature, thus limits its capacity to demonstrate a cause-effect relationship and causal inferences between PWE and OJ factors with stress and job satisfaction. Cross-sectional studies are however useful in guiding future studies by developing hypotheses.

Similar to Phase I, the study population too had a significantly higher proportion of ethnic Malays and female gender in comparison with the national population census (Department of Statistics Malaysia, 2017a). In addition to this, the participants were also from a single occupational group with distinct working characteristics. Hence, we are unable to infer our findings to the general Malaysian population. Future studies should incorporate a more diverse population which includes occupations with univocal national ethnic and gender representation for the findings to be inferential.

As with all studies, missing data is a major problem which contributes to a weakened statistical power and confidence interval, resulting in biased findings (Soley-Bori, 2013). In this study, a significant number of incomplete questionnaires reduced the total number of respondents. Nevertheless, since the missing data were missing completely at random (MCAR), there was no systematic correlation between the observed and missing values which then makes some values more likely missing than others (Bhaskaran & Smeeth, 2014). Since missing data was MCAR, the results are likely not biased and imputations were not warranted. Complete case analysis which assumed

listwise deletion was conducted for this study. In this phase, although the response rate was deemed adequate, a higher response rate would have inevitably reduced the non-response bias element and increase the power of the study.

Every study would nonetheless be at risk of bias irrespective of the predetermined standards. Similarly, for this study, there may be some level of possible recall bias in terms of recalling symptoms experienced, satisfaction facets and job-related questions over certain periods of time. Non-differential misclassification of outcomes in this study could have only reduced the strength of association to the null. In addition to that, there would have been some element of social desirability bias and apprehension when answering questions pertaining to symptoms and feelings experienced, pertaining to superior officers and other work-related and environment questions. Respondents were beforehand informed that all details were strictly confidential to avoid possible personal inflictions which could bias results. Self-administered questionnaires could only reduce this bias, but not eliminate it. Other possible biases include respondent bias due to respondent fatigue as the CLUSTER questionnaire booklet comprised a number of questionnaires with it, and respondent's possible unfamiliarity to the items in the OJSQ and JSS. Although the selection of schools from each district employed multi-stage sampling, the eventual participation of teachers in the CLUSTER cohort study was voluntary. Thus, there may be some element of healthy worker effect bias as well.

Observational studies such as this are also vulnerable to methodological issues such as confounding. Multistage random sampling during the study design phase and multivariable modelling with complex sample analysis in statistical analyses were among the ways we limited confounding effects. Residual confounding was however unable to be excluded.

Lastly, the DASS–21 questionnaire was used since it has already been validated in the Malay language and proven a reliable tool in measuring stress among Malay speaking population. Besides measuring stress levels, the DASS–21 questionnaire has other constructs which measure other psychological distress outcomes such as depression and anxiety. Although the stress scale is factorially distinct and distinguishable from the other two syndromes in characterizing irritability, nervous tension and difficulty in relaxing, they are however moderately intercorrelated. The intercorrelations, however, do not indicate conceptual overlap between the constructs but are rather shared causes (P. Lovibond, 2014). Another instrument which provides ‘pure’ measures of stress could yield different results.

5.5.1.3 Phase III : Analysis of salivary stress biomarkers

This component is the objective component of this study, which is able to report objectively the presence of stress within the participants. Due to financial constraint and a limited research grant, only a small sample size was permissible (sub-sample of the population). A larger sample size would have been able to provide a stronger association between the physiological and psychological components of the study. In addition, laboratory technicians could have been employed to aid in sample collection and running assay tests and analysis, thus saving invaluable time. We were also unable to perform multi–point testing of the biomarkers due to the overwhelming cost of kits, reagents and consumables in addition to time constraint.

5.5.2 Strengths

5.5.2.1 Phase I : Psychometric and Reliability Testing of the translated Malay language version of the Organizational Justice Scale Questionnaire (OJSQ) and the Job Satisfaction Survey questionnaire (JSS)

This study has some notable strengths. Firstly, before undertaking the main study, the tools used were vigorously tested before usage. Although the DASS -21 and JCQ questionnaires were tested and validated in the Malay language, the OJSQ and JSS were not. Thus, there was a need for psychometric testing to ensure the validity and reliability of the tools, and subsequently produce accurate, valid and reliable findings for this target population. The OJSQ and JSS had good psychometric properties after checking for internal consistency, temporal stability via test-retest reliability and running exploratory factor analysis (EFA). In organizational justice researches, the novelty of the OJSQ, arose from one author, Robert Moorman (Moorman, 1991, 1993; Niehoff & Moorman, 1993). Over time, certain modifications were made to suit the expanding field of justice researches, but the core elements remained. The OJSQ version used in this study is by Moorman et al., which have had many translations in other languages as well.

In evaluating job satisfaction, there have been a few instruments in question, however, the JSS has been extensively researched, tested and validated in many languages. Other instruments used in job satisfaction studies include the job descriptive index (JDI), job diagnostic survey (JDS) and job stress questionnaire (JSQ). Although the JDI and JDS have been used in studies worldwide for job satisfaction and individual dimensions, its facets only cover certain facets of job satisfaction which would not be applicable to all types of employees. The JSS, however, covers nine facets of job satisfaction, is more universal and inclusive, and comparable with different job types and cultures.

To the best of our knowledge, no other study has carried out psychometric testing on the adapted OJSQ and JSS in the Malay language which includes reliability testing, retest reliability testing and exploratory factor analysis among the teaching population. Furthermore, steps in performing psychometric testing were checked with the COSMIN checklist (Mokkink et al., 2010) to evaluate the methodological quality of the two instruments used. Performing psychometric testing strengthens the study design and enhances relevance.

5.5.2.2 Phase II : Association of psychosocial working environment and organizational justice with stress and job satisfaction among public school teachers

This main component of the study has several strengths worth mentioning. Firstly, the instruments used have been extensively developed, tested and utilized in similar studies globally, thus allowing comparison of results. Secondly, the selection of the study population was random with multistage sampling employed as the sampling method. This would instantaneously remove the element of selection bias and voluntary response bias. Findings produced could then be more comparable and generalizable across populations. Although experimental studies are best to evaluate cause and effect, practicality and ethicality issues may arise. This is because the random assignment of psychosocial exposures is impossible as these traits are inherent within the respondents in the study. In addition to that, psychosocial traits and dispositions may interact with other factors such as age, gender, ethnicity and education income levels. Observational studies differ in this manner as exposures have straightforward effects which do not have much variability across populations.

This study had approvals from the ethics committee from a reputable research centre, and the sample size was calculated based on previously published literature. An

adequate sample size gives power to the study, and its outcomes have higher significance. In addition to that, the results and findings were reported according to the **Strengthening The Reporting of OBservational studies in Epidemiology (STROBE)** guidelines (Vandenbroucke et al., 2014). As most studies only have psychosocial working environment or organizational justice factors in stress and job satisfaction studies, a combination of both gives much strength, inclusiveness and wholeness to the research in terms of targeted interventions and improvements in policy and planning.

In addition to that, participants of the main study were randomly selected from public schools from around Selangor using multi-stage random sampling. The application of weightage accounts for the unequal probabilities of selection and lower response rates. Targeted intervention could be performed to improve psychological well-being for the targeted population.

5.5.2.3 Phase III : Analysis of salivary stress biomarkers

Salivary biomarkers were able to provide an objective point of view in the study, in addition to the usual subjective component (questionnaires). The salivary biomarkers were able to prove the existence of stress physiologically, and not merely using perception. A combination of these two components give strength to the findings as an objective component has a much smaller error margin as compared to analysis of a respondent's perception.

CHAPTER 6: CONCLUSIONS, RECOMMENDATIONS AND PUBLIC HEALTH IMPLICATIONS

6.1 Conclusion

6.1.1 Introduction

The negative ramifications of job-related stress and job dissatisfaction have been studied by researchers for many years. Even so, job-related stress and job dissatisfaction are still prevalent in the workforce to this day. Unchecked levels will affect both individuals and the organization causing psychosomatic problems such as headaches, irritable bowel syndrome, insomnia, immune depressant and even cardiac syndromes. It can also cause relationships to suffer and reduced productivity in the workplace.

Although many risk factors exacerbate stress and job dissatisfaction, this study focuses on psychosocial working environment and organizational justice factors in the workplace. Furthermore, the stigma associated with job-related stress and dissatisfaction is profound in our society, especially within the Malaysian civil service, specifically teachers. Timely intervention is essential to reduce the severity of stress and job dissatisfaction. This chapter will summarize the key findings of all three phases in this study.

6.1.2 Psychometric and Reliability testing of the Organizational Justice Scale Questionnaire (OJSQ) and the Job Satisfaction Survey questionnaire (JSS)

The amended and adapted Malay language version of the OJSQ and JSS demonstrated adequate internal consistency, test-retest reliability and construct validity via exploratory factor analysis. They are both reliable and stable instruments which can be effectively used to measure perceived fairness at work and job satisfaction respectively among working Malaysians the majority of which are females and literate in the Malay language.

The results obtained were comparable with psychometric properties of the translated versions in other languages and other studies in the Malay language itself. Psychometric properties for both questionnaires were tested using established guidelines. Validity was demonstrated using face content validity and convergent validity was measured using exploratory factor analysis. All the results obtained were satisfactory and adequate. Good internal consistency and test-retest reliability estimates were also obtained. Although the questionnaires did not undergo the full translation process since the Malay language versions for both questionnaires were available, they were amended and modified to fit the population in question while maintaining semantic equivalence. All the items were simple, easy to understand, relatively short and easily administered. There is certainty that these instruments measure their respective constructs based on the good psychometric properties obtained during the evaluations conducted in this phase of the study. Thus, this study is able to provide researchers, academicians and health care providers' useful tools to measure perceived fairness at work and job satisfaction in the effort to improve psychological and mental wellbeing at the workplace.

6.1.3 Phase II : Association of psychosocial working environment and organizational justice with stress and job satisfaction among public school teachers

The combination of psychosocial working environment and organizational justice both have an impact on stress and job satisfaction among school teachers. These findings support the claims by some researchers that Karasek's model is too simple as there are other work and non-work variables which also contribute towards work-related stress and job dissatisfaction (Janssen, Bakker, & De Jong, 2001; Jones et al., 1998). This study also expands findings that psychosocial working environment is not only able to gauge work-related stress, but job satisfaction as well. This indicates that

principals of schools as supervisors for these teachers, need to monitor work characteristics as to not undermine the wellbeing of their subordinates, and to ensure better working conditions. The main effects of job demand, job control and social support were largely confirmed in this study by the associations seen between psychosocial working environment (PWE) and organizational justice (OJ) with stress, and PWE and OJ with job satisfaction (mean scores, β -estimates and *p*-values). There was clear evidence supporting the negative impact of increased job demands, and the positive impact of increased job control and social support. The same can be said for OJ where evidence showed the positive effect of increased PJ, IJ and DJ. These findings concur with literature in both western and Asian societies. In this study, although PWE and OJ factors were not significant predictors of stress among teachers, they greatly influenced job satisfaction, superseding all socio-demographic factors. The R^2 value for the multivariate model increased significantly, thus indicating that OJ factors play a vital role in influencing job satisfaction among teachers.

In terms of theoretical implications, results from this study support evidence on the suitability of Herzberg's Two Factor theory in describing aspects of job satisfaction among employees in the field of education. Since PWE and OJ factors have shown statistical significance as factors influencing job satisfaction, this study concurs with findings of previous studies conducted in Malaysia (Abdullah et al., 2009; Jabnoun & Yen Fook, 2001; Mustapha, 2016; Ooi & Abdullah, 2016) and abroad (Crossman & Harris, 2006; Evy et al., 2008; Klassen & Chiu, 2010; Mwamwenda, 1997; Ramsey & Liu, 2008) with some minor differences in the final findings. Many of these past studies found that job satisfaction has a significant impact on an educator's improved performance, showing higher commitment and lower attrition rates. In addition to that, job satisfaction directly and indirectly contributes towards achieving set strategic goals in the development and sustainability of the educational sector. A happy, more satisfied

and less stressed teacher will invariably perform better and be more committed to the task, thus benefitting schools in terms of having better quality educators.

6.1.4 Phase III : Analysis of stress salivary biomarkers

Salivary cortisol and salivary secretory IgA are competitive immunoassays for the quantitative measurement of cortisol ($\mu\text{g/dL}$) and Immunoglobulin A ($\mu\text{g/min}$) respectively. Both these biomarkers have been used in prior studies for stress research, both in Malaysia and abroad. In this study, no association was found between perceived stress and salivary stress biomarkers consistent with findings of a study among urban school teachers (Masilamani et al., 2012). Negative correlations were often found among Asian populations as compared to Western countries. A possible reason could be the inability for Asians to quantify and label negative emotions due to ingrained cultural barriers and sensitivities (Han, 2017; Holland et al., 2010).

6.2 Recommendations

To the best of our knowledge, this is a novel study done to date in Malaysia and the Asia Pacific region that assesses two main outcomes of work-related psychological wellbeing that incorporate psychosocial working environment and organizational justice with both objective and subjective measurements (questionnaires and biomarkers). This study was able to provide immensely valuable information on factors that influence Malaysian public-school teachers' stress levels and job satisfaction, an aspect which has been fundamentally overlooked for many years. Specifically, this study highlights important influences on the perception of stress and job satisfaction by psychosocial working environment and perceived fairness at work. As perceived stress and job satisfaction are modifiable variables, effective programmes can be instituted to improve exposures at an individual or organizational levels, such as having stress management

programmes, training programmes, counselling sessions, job redesigning, organizational restructuring and team-building exercises.

6.2.1 Employee Assistance Programmes (EAPs)

Among the most effective of interventional regimes to reduce stress and improve job satisfaction in the workplace is to conduct Employee Assistance Programmes (EAPs). EAPs are a confidential assessment, comprising of counselling and treatment services for employees with personal, psychosocial and/or work-related problems that impact their work performance, emotional and mental well-being (Maureen F. Dollard, Tuckey, & Dormann, 2012). EAPs are not confined to an employee alone but can also be provided for family members as well. It also comprises referrals and follow-ups for the affected employee and addresses organizational challenges and needs by rectifying policies and procedures. Although EAPs are mainly focussed on work-related problems, there are also a variety of support programs offered with it (Jacobs, Hellman, Markowitz, & Wuest, 2013a). The programme is becoming popular as it is socially and economically accepted in managing psychosocial problems, emotional issues, stress, legal concerns, relationships and many other contemporary problems. Although recognised as one of the main work-related stress interventions in developed nations, it is not widespread in Malaysia as many employers are not willing to invest in such programmes, more so in the public sector. Most EAPs in Malaysia are conducted at multinational companies (MNCs) where provisions of such services are part of their work culture. The lackadaisical attitude among employers and the stigma faced by employees to seek aid when in need are among the major factors EAPs are not expansive in Malaysia.

6.2.2 Malaysian Education Blueprint

Identified gaps in the education blueprint have become evident, and the Ministry of Education has been urged to improve consultative processes to review findings of research and incorporate public views with various stakeholders. Although much of the Malaysia Education Blueprint 2013–2025 and vision is viable, such as strengthening language proficiency in both the English and Malay languages, and the improvements of quality of education through better training and recruitment of teachers, the supervisory and support system for teachers are not addressed (Navaratnam, 2012). Therefore, addressing these policy gaps could be rectified by examining systematic reviews which suggest the best interventions and solutions used globally, adjusted to local settings. A national committee should be set up in order to build proper consensus and form a standardized policy to be implemented for all teachers and ministerial administrators which must be reviewed routinely to adjust for any changes over time (Malakolunthu & Rengasamy, 2017). While requirements of teachers by merit has been highlighted, no proposition was made to have an ethnic balance in teaching staff including administrative positions at schools or education departments at the district, state or federal level (Navaratnam, 2012). Although this issue may seem trivial to many, it is nevertheless essential in ensuring national character and values are maintained in every educational stream and choice. If the best minds are teaching, then the best is produced. Quality begets quality.

Results of this study also provide a clear and important direction for future research in terms of policy-making and re-evaluation. Since other studies have shown that self-efficacy does not influence stress and job satisfaction much, it is highly recommended that policymakers target stress and job satisfaction and incorporate intervention methods. This is because studies have proven the negative effects of stress and job satisfaction on mental, biological and cognitive functioning. Findings from this study

are able to provide data to highlight the problems faced by teachers, and possible solutions to push for reforms in terms of policy and at high-level management. Strategies that have been recommended prior to this have been lacking in efficacy. A report by UNESCO on the Malaysian education system states that although teachers generally have a high commitment to their students, they lack administrative support; and the overload of administrative work hinders their ability to devote more time to their students. The report had also suggested that school principals, administrators and mid-to high- level management should promote leadership and be empowered as 'leaders' rather than as 'managers' (UNESCO, 2013). This study concurs with this statement very strongly. A multi-pronged approach may be advised, especially the combination of primary (stress reduction), secondary (stress management) and tertiary (counselling) to reduce stress and improve job satisfaction. Development opportunities which can enhance self-efficacy and subsequently lower stress and improve job satisfaction should be considered. It is therefore recommended that higher authorities and policymakers engage promptly and focus to reduce stress and improve job satisfaction among public school teachers in Malaysia. This in return will improve their physical and mental wellbeing. As policymaking and regulation is highly centralized in Malaysia (UNESCO, 2013), this approach in evaluating teachers' stress and job satisfaction levels could be targeted to district, state and federal education department officers, by other policymakers. Apart from that, a deep understanding on the fundamental challenges and assessment methodologies is required across all levels. A clear understanding of the nature of current reform in regard to administrative and management practices includes coordination between various departments. This is needed to implement change with inclusivity in dissemination, communication, training and support. In addition to that, capacity building and teacher empowerment is the parallel and complementary approach to policy changes since systemic demands impede

them. The Malaysian Public Service Department (PSD) and Ministry of Education (MOE) should also look into increasing critical mass of trained teachers to cope with stress as it has been proven to have a positive influence on job satisfaction levels.

The causes of stress and reduced job satisfaction in this study should be further explored to identify specific aspects which could be rectified. It should be investigated to ascertain whether cultural diversity in a multiracial society such as in Malaysia influences stress and/or job dissatisfaction. Intercultural and multinational studies on validation should be performed to assess measurement properties and the practicality of the instruments used. Since the testing of instruments and the main study was conducted among the teaching profession, findings may not be generalizable to all Malaysians from different job scopes or socio-economic backgrounds, although similar findings may be postulated. This research strongly encourages future studies using longitudinal study design to establish temporal relationships in identifying stress and job satisfaction at different time periods. It is also encouraged for future research to expand findings from this study in the hopes it may be beneficial to help identify varying degrees to which teachers experience stress and/or job satisfaction or otherwise.

Lastly, this study has mainly focused on the quantitative research approach, however, a qualitative aspect such as conducting focus group discussions, semi-structured interviews and open-ended questions in questionnaires could help consolidate and supplement findings in a more holistic manner whilst shedding light on different aspects of stress and job satisfaction among teachers.

6.3 Future studies

In regard to Phase I of this study, future studies on psychometric properties testing, validity and reliability of the OJSQ and JSS questionnaires should be conducted among different target populations from different range of occupations as to represent working

populations or national representative population. This would make the study generalizable since it would ideally represent the general national population in terms of ethnic composition, gender distribution and socio-economic status. Population-based studies are highly recommended. In addition to that, the test-retest analysis could be given to a new set of respondents who are not involved in other parts of validation analysis as to improve ambiguity in item analysis. Lastly, performing confirmatory factor analysis (CFA) enables confirmation of the factor structure between observed variables with their underlying latent constructs.

Similar to Phase I, Phase II should be conducted among a more diverse population and occupations with a better national representation of ethnic and gender distribution for generalizability and inferential purposes. To improve problems due to missing data which can dampen the sample and effect size of the study, completeness of the distributed questionnaires should be thoroughly checked during data collection. In regards to study design, longitudinal studies would be able to capture developmental issues on the incidence of stress and job satisfaction in addition to addressing issues of cause-effect relationship with PWE and OJ factors. This is because data collected will be able to describe patterns of change, magnitude and direction of causal relationships between variables of interest. These findings will be very valuable in the field of work psychology in developing targeted interventions, solutions and even coping strategies in various occupations. In addition to that, other theoretical constructs of stress and job satisfaction such as role overload, role ambiguity and role conflict too need consideration as they have been reported to have association with other aspects of employee attitude and behaviour such as commitment, organizational citizenship behaviour, work efficiency, work productivity and physical and mental wellbeing (Antoniou et al., 2006; Lambert & Paoline, 2008; Reilly et al., 2014).

Lastly, for Phase III, a larger study sample would enable a stronger association between the objective measurements of stress (salivary stress biomarkers) with perceived stress (questionnaires), thus providing findings which could provide evidence supporting theoretical models in stress studies.

6.4 Public health implication

i. Policies and programmes

Findings from this study are able to contribute to the advancement of a teacher's physical, mental and psychological well-being. Its contribution to the body of knowledge and evidence will hopefully improve teacher's psychological well-being in the Malaysian public service, and trickle down to other public service sectors and/or private sector teachers. The issue of stress and psychological well-being is important and deserves a prominent stand. Although there have been numerous studies done on teachers in regards to stress and job satisfaction in Malaysia and abroad, most of them are from individualistic cultural settings and not from a multicultural society like Malaysia.

This study will be able to provide a comprehensive research framework in occupational stress and psychological wellbeing by testing the JDC and JDCS models. The unique feature in this study is that, not only are these models tested amongst teachers using the key dimensions of JDCS variables of job demands, job control and social support, but also with perceived fairness at work using OJ dimensions. This study is an extension of previous studies by Fatt et al. (2010), Ibrahim and Ohtsuka (2013) and Masilamani et al. (2012) by moderating effects of job demands, job control and social support on psychosocial work environment, organizational justice and salivary stress biomarkers, simultaneously predicting the psychological wellbeing prediction of teachers in Malaysia.

Numerous studies have reported the consequences of stress, burnout and job dissatisfaction in the teaching community, both in public and private sectors. It not only impacts the teacher by affecting their health (both physical and mental health), but also the organization overall in terms of work performance, productivity and efficiency. To the best of our knowledge, there are currently no policies and programmes in place to address the increased incidence of stress/burnout and complaints of job dissatisfaction among teachers in Malaysia. This is a step back in terms of looking after the welfare of teachers. The Ministry of Education and the National Union of the Teaching Profession, Malaysia (NUTP) should emulate the risk assessment and stress audit systems conducted by the British National Union of Teachers. The risk assessment is governed by British law which requires all employers to perform an assessment to identify health and safety risks, including the risk of stress. Stress audits complement the risk assessment by examining risk factors and levels of stress amongst employees. Although Malaysian employee's needs are enshrined under the Occupational Safety and Health Act 1994 (OSHA 1994) (Act 514) Section 15(1) which states that employers are responsible for the safety, health and welfare of their employees by providing a secure and suitable working environment, it is, however, poorly enforced. Although some employers do conduct health screening and other healthy workplace initiatives, mental health and psychological well-being of employees are rarely given priority and even omitted. This is also the case for all civil servants which include public sector teachers.

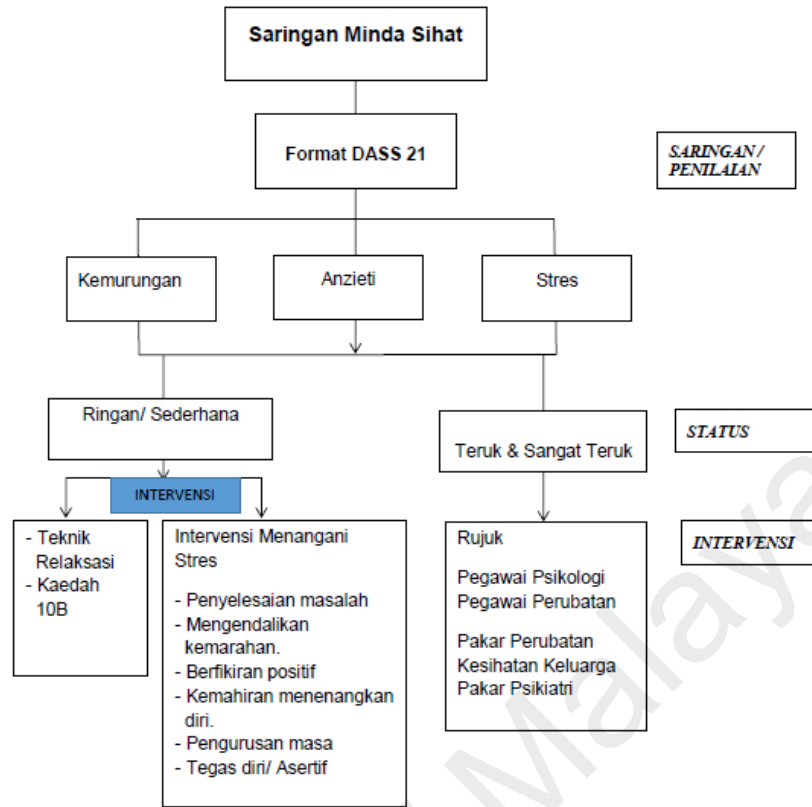
Although the government has urged civil servants to undergo mandatory health screening for employees aged 40 and above under the directive of the Chief Secretary to the Government (*Ketua Setiausaha Negara*) in its aim is to tackle the growing prevalence of Non-Communicable Diseases (NCDs), psychological and mental health screening has not been part of it. Lack of policy, guidelines and political will are among the main reasons stress and job satisfaction has not been dealt thoroughly among civil

servants. Unlike the British Safety at Work Act or Safety At Work Regulations in Western countries, there is no provision for the management of psychosocial hazards. The OSHA 1994 is solely focused on physical safety in relation to accident notification, occupational poisoning, occupational diseases, air quality and other physical, chemical and biological hazards.

The only initiative by the government thus far in providing guidelines for screening and improving mental health among employees is the KOSPEN Plus programme, which is the extension of the 'Healthy Community Empowers the Nation' (*KOmuniti Sihat PEmbina Negara*) programme (KOSPEN). The KOSPEN *komuniti* programme was introduced in 2013 in line with launching of the 'National Strategic Plan for Non-Communicable Diseases' (NSP-NSD) (Ministry of Health Malaysia, 2013) to combat non-communicable diseases within the community, by using inter-sectorial collaboration to perform health screening activities, referral of risk cases to health clinics and conducting weight loss management regimes. Due to the success of the KOSPEN *komuniti* programme, the Ministry of Health Malaysia paved the way to expand KOSPEN Plus at the workplace. The MOH understood that investing towards a healthy workplace is the best way to safeguard employees and enhance human capital for the future of an organization and the nation. The KOSPEN Plus programme uses the same concept as KOSPEN *komuniti* but is modifiable to suit implementation in any organization. It suggests specific scopes pertaining to health and wellbeing such as healthy eating, no-smoking initiatives, active lifestyles, weight loss management, health screening and healthy mind sustenance. In the 'Healthy Mind' scope (*Skop 6: Minda Sihat*), DASS-21 is used as the screening tool, and the screening and intervention methods are explained in detail on its implementation (Kementerian Kesihatan Malaysia, 2017). This programme is a novel and the only programme used for mental health screening nationwide, which is being implemented in stages at all government

sectors including the Ministry of Education (Flowchart for screening and intervention is depicted in Figure 6.1 and 6.2).

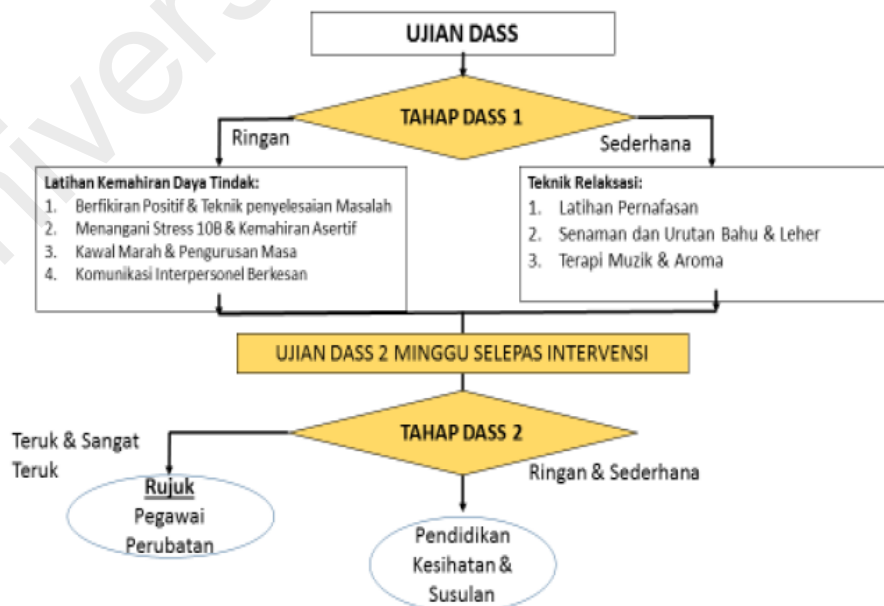
Lastly, the findings from this study will help the Malaysian Ministry of Education in understanding behavioural aspects of teachers and assist in identifying factors conducive to reducing stress whilst improving job satisfaction. It will also aid in highlighting the consequences of unfavourable factors at work which can affect a teacher's physical and psychological well-being. Identification of these potentially harmful effects on teachers will enable all levels of the education management from school heads till the administrative officers at the federal level to adopt precautionary measures, and prevent negative outcomes by instituting appropriate interventions for the targeted population. It will also serve as a guide for policymakers and top management at the MOE, state education departments and principals to understand via the teacher's perspective and their needs (Huhtala & Parzefall, 2007). With available knowledge, both teachers and policymakers will be prepared to react positively and be prepared for appropriate interventions such as counselling and seeking therapy when deemed necessary. From an organizational perspective, low levels of co-worker support can be enhanced by propagating increased advocacy.



Carta Alir Saringan Minda Sehat

Figure 6.1 : Flowchart of KOSPEN Plus mental health screening

CARTA ALIR INTERVENSI



Carta Alir Intervensi Minda Sehat

Figure 6.2 : Flowchart of KOSPEN Plus mental health intervention

ii. Public health implications

There is a lack of policy, guidelines and regulations to coerce employers to perform mental health screening among employees in Malaysia. The KOSPEN Plus programme which was recently developed and implemented in 2016/2017 is still in its infant stage. Lack of vision, awareness, resources and political will are the most probable causes. Only if enforced by authorities directly or indirectly, would screening and intervention produce some positive results. Mandatory mental health screening should be performed regularly so that symptoms could be detected early and appropriate interventions instituted timely. Mental health in Malaysia is still not looked at on par with other illnesses, and the fear of stigmatization by those suffering from mental health issues hinders them from seeking help. Workplace-based programmes are important as it empowers employees to develop self-care responsibilities and become resourceful in detecting, preventing and managing mental illnesses. Organizations should take a leading role in improving psychological well-being from within. Engaging family and friends will be able to provide some support for those with high-stress levels or suffering from other psychological disorders such as anxiety and depression.

More health promotion activities using mass media, social media and notable spokespersons such as celebrities and persons of authority which can act as a role model would be able to promote awareness on the dangers of mental health neglect and psychological diseases. Community and political leaders, as well as various stakeholders, should be engaged to take action on this matter. Noting the increased incidence of stress and aggression among teachers, the Ministry of Education has urged teachers to be more proactive in identifying signs and symptoms of stress among their peers, and the necessity for early counselling, assistance and treatment (Bernama, 2017). Teachers' are encouraged to report any issue to the district education office or

state education director for immediate action if principals or headmasters were the sources of stress.

Creating a safe, healthy, happy and conducive working environment is a challenge as it involves collaboration from various stakeholders such as the Ministry of Education, Ministry of Health, Department of Occupational Safety and Health (DOSH) and various groups that engage with individual teachers. Mental health screening and intervention methods should be included with other action plans and initiatives under the NSP-NCD 2016-2025 (Ministry of Health Malaysia, 2016) as to have an integrated approach and effective implementation. Its inclusion with other NCD action plans would give importance to mental health screening initiatives while taking precedence as it will fall under the jurisdiction of the cabinet-level committee known as 'Cabinet Committee for A healthy Promoting Environment' (*Jawatankuasa Kabinet bagi Persekitaran Hidup yang Sihat*) chaired by the Deputy Prime Minister, and comprising eleven other federal ministers. This would be an important step in having a coordinated implementation of policies in an effective manner which inherently will be successful. Psychological wellbeing should be a strategic and mainstream issue routinely considered by all sectors.

Teachers should be coached to manage their emotions effectively. Küçüköglü (2014) had suggested a few strategies. Finding opportunities for educational and career development and in-service training abroad which include social purpose is one way. In addition to that, teachers should identify problems faced personally, academically or otherwise and take remedial steps towards rectifying them while avoiding confrontations. They should also invest time, at least a few hours a week, to do something for themselves i.e. hobby/practice yoga. Teachers are also advised to express their feelings to family members, friends, associates and counsellors. Teachers are also

advised to have a clear job description and devote time to a particular task to eliminate elements of role ambiguity, and to seek administrative support whenever necessary. Since financial troubles also contribute towards stress and burnout, they are advised to have financial problems resolved, and to seek help if needed. For example, teachers with financial issues, debt and poor money management should seek services from *Agensi Kaunseling dan Pengurusan Kredit (AKPK)*. AKPK is an agency set up by the Central Bank of Malaysia (*Bank Negara Malaysia*) to provide free services such as financial education, financial counselling and debt management programme to those who need control of their financial situation. This could ensure peace of mind and a healthy home life. Most importantly, teachers should learn to relax after work, and recognize their limitations. Work life should be kept separated from family life, and this is achievable with proper planning and prioritization.

Kyriacou (2001) has provided some suggestions for school administrators and management staff in his review on methods to improve job satisfaction and reduce work-related stress among teachers. They include :

- a) To consult with teachers on matters pertaining to instructional planning or curriculum development as it impacts their classrooms.
- b) To provide sufficient facilities and resources to support teachers in instructional practice.
- c) To provide clear expectations and job descriptions to address role ambiguity and role conflict.
- d) To establish and maintain open lines of communication between teachers and administrators in providing performance feedback mechanisms and administrative support which acts as stress buffers.

- e) To encourage professional development activities which include networking and mentoring which induces a sense of accomplishment and a developed professional identity for teachers.
- f) Directions for future research on teacher stress and job satisfaction levels should encompass monitoring the extent to which educational reforms generate high levels of stress; reasons teachers are unable to successfully negotiate career appraisal and retain commitment to work; clarify nature of stress process in terms of trigger factors; assess the efficacy of stress intervention strategies amongst teachers and to explore the impact of classroom climate and teacher-pupil interaction on teacher's stress levels.

The Ministry of Education is also recommended to provide training and educational programmes to facilitate stress alleviation in the teaching profession (Salahudin et al., 2007). This includes reducing workload as this has been reported as the most affirmative action taken by schools in reducing stress. Day to day functioning of school programmes and complexity of demands also need to be considered (Ahmad, 2017). Continuous motivational programmes and activities are encouraged to sustain high morale and job satisfaction amongst teachers. These include attractive remuneration and incentive schemes as it may encourage teachers to be more dedicated and passionate in their jobs. Increasing compensation, gratuity payment, and monetary rewards for high achievers have been reported as an effective retention method while reducing turnover intentions (Chinyio, Suresh, & Salisu, 2017).

Teachers are the educators of the young; hence it is imperative to ensure their well-being is looked after. As teachers spend nearly one-quarter of a day (approximately 6 hours in school) with students, they are likely emulated and become role models. Teacher's mould today is the product of tomorrow, and subsequent generations to come.

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LIST OF PUBLICATIONS AND PAPERS PRESENTED

The following papers have been presented and submitted from this thesis :

Conference presentations :

1. Psychometric Properties of the Malay version of the Organizational Justice Scale Questionnaire, 4th Asia Pacific Conference on Public Health, Kuantan, Malaysia. Presented on 8th September 2015.
2. Physiological vs. Psychological Assessment of Stress Among School Teachers in Selangor, 8th National Public Health Conference 2016, Melaka, Malaysia. Presented on 3rd August 2016.

Publications :

Psychometric properties of the translated Malay language version of the Organizational Justice Scale Questionnaire (M-OJSQ) : An exploratory factor and reliability analysis. Submitted to the Pertanika Journal of Social Science and Humanities (26th May 2018, currently under review)

Abstract proceedings :

1. Harish Raj Narandaran, Moy Foong Ming, Marzuki Isahak. Psychometric properties of the Malay version of the Organizational Justice Scale Questionnaire. The Medical Journal of Malaysia (MJM), 2015, Vol.70; Supp.1:81; ISSN: 0300-5283.
2. Harish Raj Narandaran, Moy Foong Ming, Marzuki Isahak. Psychological vs Physiological Assessment of Stress. Mal J Public Health Med (MJPHM), 2016; Vol.16; Supp.4;119-20, ISSN: 1675-0306.