THE EFFECT OF PHYSICAL AND PSYCHOSOCIAL SAFETY CLIMATE ON THE HEALTH OF MALAYSIAN HEALTHCARE WORKERS

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INSITITUTE OF GRADUATE STUDIES
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KUALA LUMPUR

2017

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DISSERTATION SUBMITTED IN FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PHILOSPHY

INSTITUTE OF GRADUATE STUDIES
UNIVERSITY OF MALAYA
KUALA LUMPUR

2017

UNIVERSITY OF MALAYA

ORIGINAL LITERARY WORK DECLARATION

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Name of Degree: **Master of Philosophy**

Title of Dissertation:

The Effect of Physical and Psychosocial Safety Climate on the Health of Malaysian Healthcare Workers

Field of Study: **Social and Cultural Studies (Psychology)**

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ABSTRACT

Research showed that healthcare workers are prone to be involved in workplace illnesses, injuries and accidents. Unfortunately, while safety climate has been documented as one of the most influential factors in preventing workplace injuries and illnesses, little study has been done in Malaysia. This study aims to understand the impact of both physical and psychosocial safety climate on the general health among Malaysian frontline healthcare workers, via the Job Demands and Resources model. So far, there is no study has examined both physical and psychosocial safety climate, as the antecedents of organizational job designs and workers' physical and psychological health, simultaneously to date. Current study innovates by integrating both physical and psychosocial aspect of safety climate, testing their relationship with the job designs and workers' individual outcome variables, including emotional exhaustion and general health. This study purported to explore how these two facet-specific organizational climates might work together in influencing a healthcare organization's work conditions. This study can be best described as a cross-sectional quantitative multilevel study. The sample consists of 951 healthcare workers nested in 74 workgroups from a Malaysian hospital. A self-reported questionnaire was used in this study. The present findings confirmed that psychosocial safety climate is better than physical safety climate in predicting some working conditions (i.e. emotional demands [γ = -.28, SE = .12, p< .05; γ = -.05, SE = .15, not significant (ns)] and rewards [γ = .25, SE = .12, p < .05; γ = .27, SE = .14, ns], but not cognitive demands) and individual health outcomes (i.e. emotional exhaustion and general health complaints). Current study has also tested the between-group effect of working conditions on individual health outcomes, finding that only group-level of emotional demands but not rewards were related to emotional exhaustion (γ = .50, SE = .11, p < .001) and general health complaints (γ = .39, SE = .13, p < .005). Monte Carlo stimulation analysis was conducted to confirm that emotional demands

mediated the relationship of PSC and both emotional exhaustion (95% Confidence Interval [CI], Lower Level [LL] = -.2731, Upper Level [UL] = -.0189) and general health outcomes (95% CI, LL = -.2127, UL = -.0073). As predicted, psychosocial safety climate has a greater impact on job design and individual outcomes when compared to safety climate. In other words, psychosocial safety climate is important to ensure a favourable working conditions and maintain workers' health. Generally, the findings support that psychosocial safety climate as the target for occupational health intervention and a major emphasis for reducing workplaces hazards. As a final note, this study will be able to extend the existing knowledge on the occupational health of Malaysian healthcare setting by examining safety climate and its effect on health outcome variables among the workers. The results are expected to be useful for intervention design and policy makings by practitioners.

ABSTRAK

Kajian-kajian lepas telah menunjukkan bahawa pekerja-pekerja industri kesihatan sering mengalami isu keselamatan dan kesihatan di tempat kerja, umumnya kecederaan dan kemalangan. Walaupun iklim keselamatan (*safety climate*) telah dikatakan sebagai faktor utama dalam pencegahan kecederaan dan penyakit di tempat kerja, kajian yang berkaitan dengan iklim keselamatan kurang dijalankan di Malaysia. Oleh itu, kajian ini bertujuan untuk memahami kesan kedua-dua iklim keselamatan iaitu fizikal dan psikososial terhadap kesihatan umum di kalangan pekerja industri kesihatan Malaysia. Sejauh ini, tiada kajian yang telah mengkaji iklim keselamatan fizikal dan psikososial bersama kesihatan fizikal dan psikologi pekerja pada masa yang sama. Kajian ini mengabungkan kedua-dua aspek fizikal dan psikososial iklim keselamatan, menguji hubungan kedua-duanya dengan reka bentuk kerja (*job design*) dan pembolehubah individu pekerja, termasuk keletihan emosi dan aduan kesihatan umum. Dengan ini, kajian ini dapat mengetahui bagaimana kedua-dua iklim organisasi berkerjasama dalam mempengaruhi keadaan kerja organisasi kesihatan ini. Kajian ini adalah kajian kuantitatif *cross-sectional multilevel*. Sampel kajian ini terdiri daripada 951 pekerja kesihatan yang bekerja di 74 kumpulan kerja dari sebuah hospital di Malaysia. Soal selidik telah diguna pakai dalam kajian ini. Dapatan kajian mengesahkan bahawa iklim keselamatan psikososial adalah lebih baik daripada iklim keselamatan fizikal dalam meramalkan beberapa reka bentuk kerja (iaitu tuntutan emosi [γ = - 28, SE = .12, p <. 05; γ = - 05, SE = .15, tidak signifikan (ns)] dan ganjaran [γ = .25, SE = .12, p <.05; γ = .27, SE = .14, ns], tetapi tuntutan kognitif tidak signifikan) dan kesihatan individu (iaitu keletihan emosi dan aduan kesihatan umum). Kajian ini juga telah menguji kesan antara kumpulan reka bentuk kerja terhadap kesihatan individu dan mendapati bahawa hanya tuntuan emosi pada peringkat kumpulan sahaja berkaitan dengan keletihan emosi (γ = 0,50, SE = .11, p <.001) dan aduan kesihatan (γ = .39, SE = .13, p <.005). *Monte Carlo Stimulation* telah

dijalankan untuk mengesahkan signikasi tuntutan emosi sebagai pengantara PSC dan keletihan emosi (95% CI, LL = -.2731, UL = -.0189) serta aduan kesihatan (95% CI, LL = -. 2127, UL = -.0073). Seperti yang diramalkan, iklim keselamatan psikososial mempunyai kesan yang lebih besar kepada reka bentuk kerja dan kesihatan individu berbanding dengan iklim keselamatan. Dengan kata yang lain, iklim keselamatan psikososial adalah penting untuk memastikan keadaan kerja yang memuaskan dan kesihatan pekerja. Secara umumnya, dapatan kajian ini menyokong bahawa iklim keselamatan psikososial sebagai sasaran utama untuk intervensi kesihatan di tempat kerja. Akhir kata, kajian ini akan dapat memperluaskan pengetahuan yang tersedia ada pada kesihatan pekerja di bidang kesihatan Malaysia dengan mengkaji bagaimana iklim keselamatan memberi kesan di kalangan pekerja. Dapatan kajian ini juga dijangka akan digunakan untuk menggubal polisi dan membentuk intervensi di tempat kerja.

ACKNOWLEDGEMENTS

"The horse is made ready for the day of battle, but victory rests with the LORD."

~Proverbs 21:31 NIV Bible

Above all, may glory to the Lord, the Almighty God. For without Him, I can achieve nothing.

First and foremost, I wish to express my deepest gratitude to my supervisor, Dr. Mohd Awang Idris for his unconditional patience and trust on me, who tell me to "be brave" and "you can do it", who gives me a dream that I'd never dare to dream. Beyond a brilliant, humour, and warmth gentleman, Dr. Awang teaches me the knowledge, skills, and right attitudes required both as an academic researcher and a responsible adult. And from him, I learn to never stop striving for the best.

The same appreciation goes to my co-supervisor, Dr Marzuki Isahak, whom I learn about humble and kind, hardworking and organised. Thanks for always give me confidence and useful advices. As whom I will go to when I am in confused and know nothing to do, his patience in listening and giving feedbacks refills my motivation.

Not to forget Prof Maureen Dollard who gives me a golden chance to learn from her. As an honourable expert in this field, she is always generous to teach and share her knowledge and experience. Her unstoppable energy and enthusiasm inspire me a lot. I would like to extend my thanks to Dr. Yulita and Kak Fieza, who taught me the fundamental data analysis skills which help me throughout the journey.

I will always remember my dear parents, Mama and Baba (my nanny and her hubby) and my sisters, HuiLoo and Vanessy, for never cease to love and support me. Thanks to my Uncle Kwee Sin who helps in proofreading and editing, who gives me a big hug and

encourage me to go on; Uncle Cheah who taught me the art of English during my bachelor time and it is helpful until now. Thanks to my lovely friends who are too many to be listed.

Last but not least, my gratitude goes to all the participants involved in this study and all who make this a success. May blessings be with you.

This study is sponsored by the Australian Research Council Linkage Grant, SafeWork SA; University of Malaya, and; SA Health as part of the research project (RU027-2014) entitled "The dynamic interplay of physical and psychosocial safety in frontline healthcare workplaces in Australia and Malaysia", investigated by Prof. Maureen Dollard; Dr. Michelle Tuckey; Prof. Peter Chen; Prof. Bill Runciman; Dr. Sharon Morton; Ms. Mardi Webber, and; Dr. Awang Idris.

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α	: Cronbach's Alpha
γ	: parameter estimate (cross-level effects)
β	: parameter estimate (lower-level effects)
χ^2	: chi-square
*	: $p < .05$
**	: $p < .01$
***	: $p < .001$
AEC	: ASEAN economic community
ANOVA	: analysis of variance
CFA	: confirmatory factor analysis
CFI	: comparative fit index
CI	: confidence interval
COPSOQ	: Copenhagen psychosocial questionnaire
COR	: conservation of resources (theory)
DASS	: depression, anxiety and stress schedule
DISC	: demand–induced strain compensation (model)
ERI	: effort–reward imbalance (model)
EUROFOUND	: European foundation for the improvement of living and working conditions
EU-OSHA	: European agency for safety and health at work
F_{III}	: F-value
FIML	: full information maximum likelihood (estimation)
GEE	: general estimating equations
GFI	: goodness-of-fit index
HLM	: hierarchical linear modeling
ICC (1)	: intra-class coefficient (1)
ILO	: International Labour Organisation
ITUC	: international trade union confederation
JCQ	: Job content questionnaire
JCT	: Job characteristics theory
JDC	: job demand–control (model)
JDC-S	: job demand–control–support (model)
JD-R	: job demands–resources (model)
KSAOs	: knowledge, skills, abilities, and other (job-related characteristics)
KMO	: Kaiser-Meyer-olkin
L1	: Level 1
L2	: Level 2
LL	: lower-level
M	: mean
MBI	: Maslach Burnout Inventory
M_DOQ	: Majer_D'Amato organizational questionnaire
MCMAM	: Monte Carlo method for assessing mediation
MSEM	: Moderated structural equation modelling
ML-SEM	: Multilevel structural equation modelling
MSD	: musculoskeletal disorder
NIOSH	: national institute for occupational safety and health
NORSCI	: Norwegian offshore risk and safety climate inventory
Ns	: non-significant
OCB	: organizational citizenship behavior
OLBI	: Oldenburg burnout inventory

PANAS : positive and negative affect schedule
PHQ : physical health questionnaire
PhySC : physical safety climate
PNWE : perception of nurse work environment scale
PSC : psychosocial safety climate
PTSD : post-traumatic stress disorder
QEC : quality-work-competence survey
RMSEA : root mean square error of approximation
r_{WG} : inter-rater reliability
SAQ : safety attitude questionnaire
SAS : statistical analysis system
SD : standard deviation
SDT : self–determination theory
SE : standard error
SEM : structural equation modeling
SPSS : statistical package for the social sciences
SOHQ : school organizational health questionnaire
T1 : Time 1
T2 : Time 2
TPP : Trans-Pacific partnership
TLI : tucker–lewis index
UK : United Kingdom
UL : upper-level
USA : United States of America
WHO : World Health Organisation

LIST OF APPENDICES

CHAPTER 1 : BACKGROUND OF STUDY

1.1. Introduction to Chapter 1

This chapter provides a background to the study, a problem statement, and the theoretical framework, hypotheses, research design, significance, innovation and potential limitations of this study.

1.2. Background of the study

Professionals around the world, who are working in the healthcare industry are at risk of experiencing workplace health and safety issues including physical and psychological injuries. A recent report has revealed that nursing and residential workers are more likely to be exposed to non-fatal injuries when compared to other private industries in the United States of America (US) (US Department of Labor, 2015). Likewise, the United Kingdom's Labour Force Survey reported that the human health and social work industry had the highest rate of workplace illnesses in contrast to other industries (Health and Safety Executive, 2015). Several studies have discovered that there is a prevalence of healthcare workers who suffer from a high rate of workplace health issues including illnesses and injuries. For example, a study conducted in the US revealed the higher likelihood of nurses suffering from sleep problems and cardiovascular diseases (Jacobsen et al., 2014). This situation also seems to occur in some Asia Pacific countries, especially among the developing countries, such as Malaysia, which lack a workers' protection policy (Idris, Dollard, Coward, & Dormann, 2012; Kortum & Leka, 2014; Kortum, Leka, & Cox, 2010). For example, the rate of back pain reported among Malaysian nurses is 79%. (Rahmah, Rozy, Halim, Jamsiah, & Shamsul, 2008). These illnesses are not only threatening the health and well-being of workers, but are also diminishing the effectiveness and quality of their work and causing a deterioration in their overall performance, resulting in a financial loss to the organisation.

Several reports have revealed the enormous loss of financial resources caused by workers' medical claims, off-days compensation claims, and insurances. The United Kingdom's Health and Safety Executive (2015) reported an estimated loss of £14.3 billion due to workplace injuries and ill-health in Great Britain in year 2013. Similarly, the National Safety Council of the United States (US) estimated that $198 billion was spent on the very same issues in 2012 (Michaels, 2015). It's a similar situation in Australia too, where an estimate of 61.8 billion Australian dollars were spent due to the cost of fatal and non-fatal work injuries in the year 2012 to 2013 (Safe Work Australia, 2015). Safe Work Australia reported that the amount spent as a result of workplace diseases was "considerably higher" than that spent on workplace injuries (Safe Work Australia, 2015). This phenomenon clearly highlights the importance of preventing workplace health and safety concerns especially in attenuating the impact of workplace risk factors on workers' health and well-being.

1.3 Psychosocial risk factors at work

Psychosocial risk factors have become a common concept when thinking about job stress and work-related fields. The International Labour Organisation (ILO, 1986) defines a psychosocial risk factor as the "interaction between and among the work environment, job content, organizational conditions and the workers' capacities, needs, culture, and personal extra-job considerations that may, through perceptions and experience, influence health, work performance, and job satisfaction (ILO, 1986, p. 3). As such it involves the interaction between individual characteristics and their external context, which in turn results in certain consequences for the individual. Growing evidence suggests that psychosocial hazards have a negative impact on workers' physical and psychological safety, including workplace illnesses and stress (Kortum, Leka, & Cox, 2011; Tynes, Johannessen, & Sterud, 2013). Government bodies, especially in more

developed countries, have also recognized the emergence of psychosocial hazards such as job insecurity, work intensification, work overload and high emotional demands (European Agency for Safety and Health at Work, 2012) as indicated by giving prominence to these features in their legislation (Bruhn & Frick, 2011; Johnstone, Quinlan, & McNamara, 2011; Leka, Jain, Iavicoli, Vartia, & Ertel, 2011). However, in most developing countries, such as Malaysia and Thailand, a national policy which addresses workplace psychosocial risk factors at the macro-level (i.e. organisation or national) is still minimal (Bailey, Cheng, Idris, & Arphorn, 2016; Kortum & Leka, 2014).

1.3.1 Psychosocial risks in Malaysia

As a developing country, Malaysia is exposed to an increasing fast work pace and weak labour laws. Previous studies in Malaysia have revealed the lack of a workers' protection policy particularly regarding psychosocial risks and psychological health (Idris et al., 2012; Zadow et al., 2017). Evidence of this can be seen in the 2014 International Trade Union Confederation's (ITUC) Global Rights Index Report, which rated Malaysia as among the worst countries to work in with a rating of 5+ which means there is "no guarantee of (workers') rights due to the breakdown of the rule of law" (ITUC, 2014). Although a more recent report showed some minor improvement, Malaysia still remains under threat of being given a 4 rating which refers to "systematic violations of (workers') rights" (Figure 1.1). One of the main issues that has been identified as possibly worsening the situation is globalisation (Idris, Dollard & Winefield, 2011). The impact of globalisation comes from several areas including the restructuring of an organisation, the introduction of advanced (or perhaps, hazardous) technology and increased business competitiveness. Although globalisation provides employment opportunities and improved training, the results of globalisation have also increased the burdens workers experience. Unfortunately, the lack of intervention to tackle psychosocial risks in Malaysia intensifies, even further, its negative impact on workers' well-being.

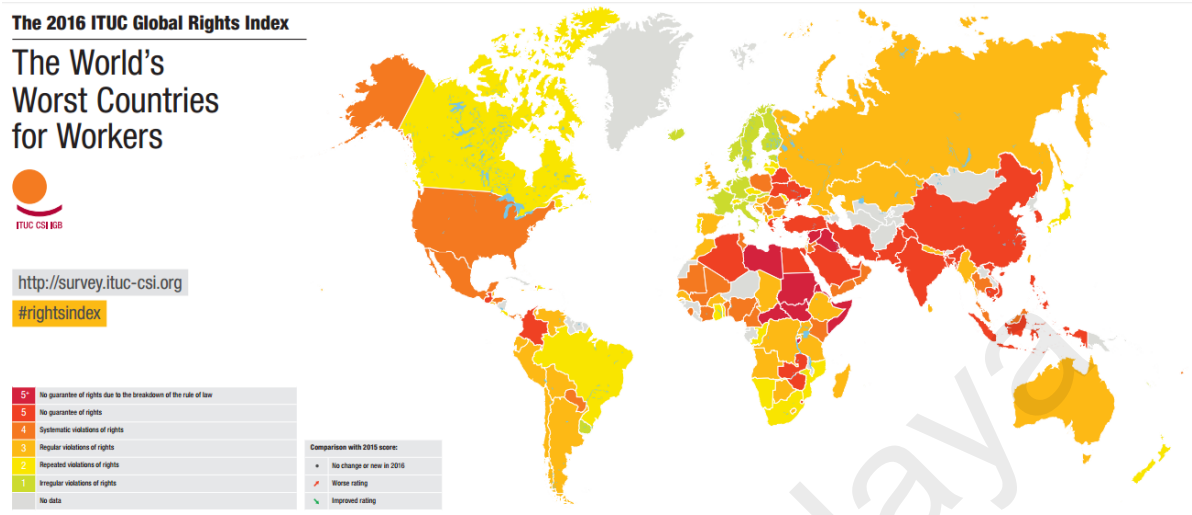

Figure 1.1: The 2016 ITUC Global Rights Index (ITUC, 2016)

1.4 The "Safety concept"

In relation to the idea of psychosocial risks, most scholars use a plan which is designed to eliminate dangers in the workplace or organisation by eliminating the risks. This is referred to as the "Safety Concept" (Kussmaul, 1984). In other words, the "Safety Concept" posits that by emphasizing safety in both job design and location, safety in the workplace can be assured. The idea of formulating a "Safety Concept" arose because of the Industrial Revolution when there was a proliferation of high-risk industries such as nuclear power plants, hospitals and petrochemical plants. These high-risk industries have increased the potential harm to human beings who work in these areas, as well as damaging the environment. The "Safety Concept" was originally proposed to alleviate the risks associated with the catastrophic failure of nuclear power plants. In the aftermath of the Chernobyl accident in 1986 and the loss of the Challenger space shuttle (both accidents involved devastating explosions which killed the workers), scholars and practitioners recognised that technology per se was not enough to completely protect workers from workplace hazards. Instead, organisations should intervene and institute

guidelines that would improve the safety climate of the workplace. Consequently, scholars started to proactively seek a relationship between the safety climate of the workplace and the occupational health and safety issues it presented.

For over 35 years, scholars have continuously put effort into investigating the culture of safety and the safety climate in different job sectors and occupations (Zohar, 2010). Previous meta-analysis has found that at least 203 empirical studies on safety climate were conducted from 1980 – 2011 (Nahrgang, Morgeson, & Hofmann, 2011) and today that number is still rising. This substantial amount of research has constantly revealed the close association between safety climate and occupational safety including accidents, injuries, and unsafe behaviour. However, despite the robust success in using safety climate to predict the safety criteria of a workplace, it has seldom been applied to investigate the workers' psychological safety and health. Even though the psychosocial risks some workers' face at work have been recognized as an emerging issue to deal with, researchers have yet to focus a study on the kind of work climates that generate psychological health risks for the workers. This is due to the fact that two lines of research inquiry have emerged in relation to workplace safety and health. One focuses on the work climate and physical safety, whilst other, work stress researchers highlight the psychosocial risks factor and psychological health. Research on psychosocial risk factors and occupational stress have consistently reported the importance of the organizational context on both physical and psychological health. For instance, recent meta-analysis has found that the high demands placed on nurses, their low level of control and an imbalance in the effort-rewards system correlates with a range of musculoskeletal disorders (Bernal et al., 2015). Similarly, scholars have found that the leadership can predict the onset of worker burnout (Laschinger & Fida, 2013; Laschinger & Fida, 2014). This shows the crucial role psychosocial factors play in workplace health and safety issues.

This situation has inspired some researchers at the University of South Australia to develop a new facet-specific climate construct which focuses on employees' psychological health, namely the psychosocial safety climate (Dollard & Bakker, 2010). Scholars proposed that the psychosocial safety climate (PSC) was generating the causes of work stress (Dollard, 2012). It suggested that work stress maybe caused by the distal, external environment including organisational policies, management practices and the specific design of a job (Zadow & Dollard, 2016). Instead of the traditional concept of individual stress management, the PSC proposes that employers, supervisors, stakeholders, as well as the government and other higher order bodies are responsible in promoting and sustaining the employees' well-being. The underlying idea of this proposal is that individuals are affected by multiple levels of influence which includes both the micro and macro domains.

1.5 Multilevel system of influences on organisational behaviours

One of the recent developments in organisational research has been the bridging of these macro and micro domains by what is called "system-level divide" (Molloy et al., 2011). The concepts of micro and macro are often contradictory across different disciplines, such as psychology, economics (Molloy et al., 2011) and sociology (Tausig & Fenwig, 2001). Psychologists often use the term "micro" to refer to individuals or workers while "macro" is usually used to denote units/groups or organisations. From an economic perspective, 'micro' refers to organisations while 'macro" refers to the economic or social context. In contrast, the sociological approach refers to the individual as the micro unit of analysis, while socio-demographics forms part of a macro investigation. As such, researchers have introduced the term "system-level" to include the individual, institution/organisation and the social system-level. Albeit to the inconsistencies in defining the term of macro and micro, psychological scholars argue

that the differences between the macro and micro domains lie in both conceptual and methodological issues (Molloy et al., 2011; Rousseau, Aguinis, Boyd, Pierce, & Short, 2011). The macro research domain explains the organisational phenomena by assuming that people behave similarly in certain contextual situations. Hence, they are more interested in collective or aggregate data. In contrast, micro domain researchers highlight individual characteristics and variations (Kozlowski & Klein, 2000), focusing on individual-level data. Despite the variations in research focus, both domains attempt to inform managerial strategies and phenomenon within organisations.

However, although they use a different context, most scholars using a multi-level perspective (meso-level) agree that the higher-level context (i.e. macro) influences phenomenon at the lower level (i.e. individual). In the field of work psychology, organisational context is conceived as a major influence on the working conditions within an organisation. This is based on the idea that the top management, or the organisational context, creates the job design, as mentioned above (Johns, 2010; Morgeson & Humphrey, 2008). Organisational factors such as climate have been posited to contribute to the employees' outcomes via the pathway of working conditions. According to the meso-theory of organisational components, individuals represent the smallest unit of the entire organisation with a hierarchy of teams, units or departments. These higher-level units invariably influence the individuals' behaviour and performance. Furthermore, the teams or department themselves operate according to the impact of the organisation's policies, goals, and strategies (Mathieu, Maynard, Taylor, Gilson, & Ruddy, 2007). The meso-theory framework of organisational components (Figure 1.2) suggests that the onset of a worker's health problems may be due to contextual factors rather than mere personal issues. Hence, current studies are using two safety-related organisational climates as the target variables to investigate the issues of workplace safety and health.

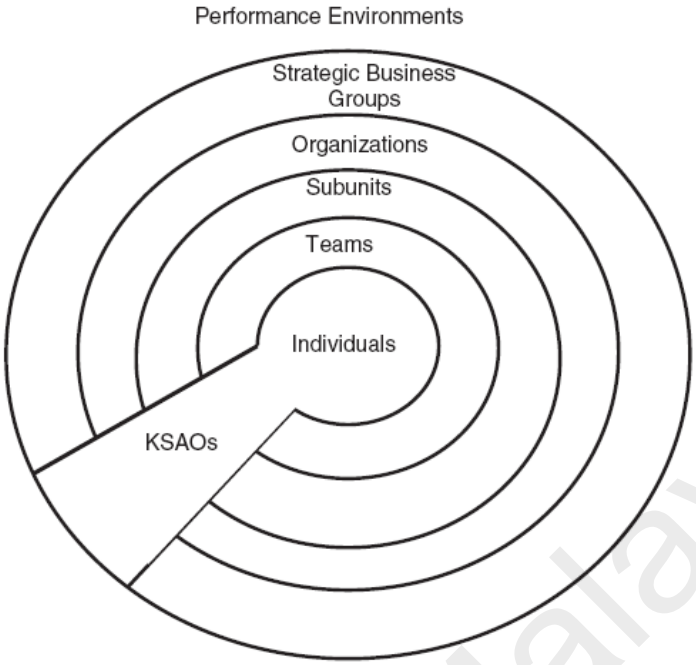

Figure 1.2: Meso-theory framework of organisational components

(Mathieu et al., 2007, p. 892)

Note: KSAO refers to knowledge, skills, abilities and others

1.6 The definition of organisational climate

There are at least two schools of thought that influence the definition of an organisational climate. Firstly, scholars conceptualise climate as being the individual perception of their experience within an organisation as well as objective external features such as the size and structure of the organisation (see Zohar, 1980; Edmondson, 1999). In other words, this cognitive schema approach views the work climate as a cognitive construction of an individual towards his/her working environment (Anderson & West, 1998). It assesses the psychological meaning and significance of the working environment for an individual (James et al., 2008), which can be referred as the psychological climate. Using this approach, researchers have collected data at the individual level. However, some scholars have argued that the individual level of climate perception does not fully capture the idea of the "organisational" climate. Schneider, Ehrhart, and Macey (2011b) argued that while the psychological climate is highly

relevant to individual outcomes such as job satisfaction, this construct offers little explanation about the organisation's function and effectiveness. In the early 1980s, Schneider & Reichers (1983) defined the organisational climate as a 'collective employee perception' rather than an individual's evaluation of their working environment. Scholars who support this notion emphasise the shared meaning of the working environment among a group of people located within a unit or an organisation. This is what researchers infer as the organisational climate, which lies on the upper level of an analysis (i.e. group or organisational level). Although both the cognitive schema and shared perception approaches are closely related they are also distinct from each other. The current study the shared perception approach of the organisational climate measuring the psychosocial and physical safety climate at the team level.

Scholars of shared perception have argued that the organisational climate of a group attributes for at least two reasons. Conceptually, an organisational climate aims to provide the information on how external variables affect employees' behaviour and attitudes (Schneider & Reichers, 1983). Unless, the climate construct measures the organisational level related to organisational functioning, it will not reflect the true essence of the organisational climate but rather reflect individual attitudes (Glick, 1985). Methodologically, measuring climate at an individual-level may lead to the occurrence of atomistic fallacy (i.e. the error of using lower-level data to infer upper-level variables) (Bliese & Jex, 2002). As previously mentioned, employees are nested within levels of influences, social context has a certain impact on an individual's perception and reaction on other variables such as work demands. Hence, it is essential to take into account the variance generated by group membership towards the perception of the organisational climate.

In accordance with the most organizational climate constructs, the PSC and the safety climate are conceptualised as a 'shared perception', rather than individual perception. The

reason for this stems from the different roles and responsibilities of people at different levels within the organisation. At the organisation level, senior managers are responsible for developing corporate policies and procedures to facilitate the implementation of policies in relation to the safety climate and PSC. At the unit level, managers and supervisors are responsible for translating the policies and procedures into practice. At both levels, choices are made regarding what policies, procedures or practices to implement, and trade-offs are made between safety (in this case PSC and physical safety climate) and productivity (Colley & Neal, 2012). Thus, in the current context of this study, PSC and physical safety climate are examined as the shared perception at the team level.

1.7 Current study and research objectives

In the context of the current study that mainly focuses on nurses, the research emphasises two main organisational climates; safety climate (Zohar, 1980) and psychosocial safety climate (Dollard & Bakker, 2010). By definition, scholars conceived safety climate as the organisational climate that has policies, practices, and procedures which focus on (physical) safety issues at the workplaces while the PSC targets workers' psychological health and safety. Empirically, both constructs have been examined with reference to several physical safety problems such as occupational injuries, near misses, and accidents, and psychological strains such as work stress, emotional exhaustion, and depression. For instance, safety climate has been revealed as the predictor of nurses' needle stick injuries and back injuries in a three-wave longitudinal study (Mark et al., 2007). Unlike safety climate, psychosocial safety climate is found as the antecedent for psychological injuries (Dollard & Bakker, 2010), such as emotional exhaustion, depression, psychological distress and fatigue (Idris, Dollard, Yulita, 2014; Idris & Dollard, 2011) and several evidences have been found in both Western and Eastern

contexts (Garrick et al., 2014; Idris, Dollard, & Yulita, 2014). Given the close links between safety climate, psychosocial safety climate and workers' safety related outcomes, the current research examines both.

Specifically, current research examines how both types of safety-related climate influences employees' outcomes, particularly through job demands and job resources. A good deal of research has supported the notion of physical safety environment, ergonomics and (physical) safety climate as the important antecedents to the deterioration of workers' health (Golubovich, Chang, & Eatough, 2014; Rivilis et al., 2008; Robertson, Ciriello, & Garabet, 2013). However, recent, research argues that, beyond the mere physical working environment, psychosocial factors at the workplace would cause negative consequences to the workers (Burgard & Lin, 2013; Eatough, Way, & Chang, 2012). For example, Laschinger, et al. (2012) discovered that psychosocial factors such as workload and bullying are predictors of burnout and poor mental health among nurses. Moreover, several evidences show that physical health outcomes at work are a joint product resulting from both physical and psychosocial hazards (Marras, Cutlip, Burt, & Waaters, 2009; Widanarko, Legg, Devereux, & Stevenson, 2015). Take for instance, Bailey, Dollard, McLinton, and Richards (2015) study which discovered that psychosocial and physical factors led to the onset of musculoskeletal disorders (MSDs) among nurses. This suggests the possible collaborating effects of physical and psychosocial contextual variables on influencing workers' outcomes. However, research that investigates the simultaneous effect of the physical and psychosocial safety climates still remains scarce.

Recently researchers have urged more attention should be placed on studying the simultaneous effect of the multiple climates that exist at a workplace (Kuenzi & Schminke, 2009; Schneider, Ehrhart, & Macey, 2011a). This is important as scholars argue that different climates may have competing or collaborating effects on organisation

and employees. Although some authors such as Kuenzi & Schminke (2009) agree that a facet-specific climate has unique specific outcomes (e.g. safety climate vs. safety outcomes), in reality, there are multiple climates that exist at the same time, and perhaps may also contribute to several outcomes as well. Yet, little research has examined multiple climates simultaneously. Furthermore, many physical and psychosocial safety climate research has shown common outcomes (e.g. depression and musculoskeletal disorders).

To date, there are few empirical studies that have investigated the effect of both constructs simultaneously to see how these constructs (i.e. safety climate vs. PSC) lead to two different types of health effects, namely, physical and psychological. Conceptually, physical safety climate has its main focus on physical features of organisational safety policies, procedures and practices, while psychosocial safety climate highlights the psychological aspects. In such a case, physical safety climate may have a greater effect on physical outcomes while psychosocial safety climate should have a greater effect on psychological outcomes.

Hence, the objectives of current research are as follows:

(1) To study the team-level of physical and psychosocial safety climate in Malaysian healthcare industry simultaneously.

(2) To examine the impact of team-level physical and psychosocial safety climate towards (a) working conditions (i.e. job demands and job resources) and (b) individual outcomes (i.e. emotional exhaustion and general health) in Malaysian healthcare workplaces.

(3) To examine the mediational effect of job demands and job resources on the relationship between safety climates and health outcomes.

The current research model as illustrated in Figure 1.1.

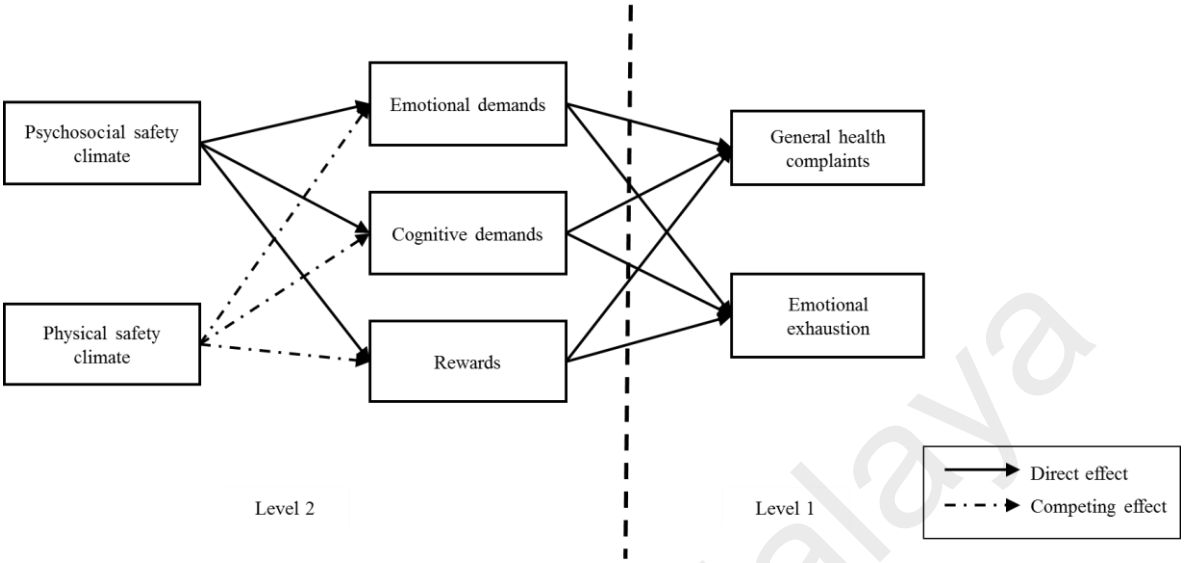

Figure 1.3: Proposed research model

1.8 Hypotheses development

1.8.1. Linkage of safety constructs and workers' health

So far, the PSC framework has provided evidence that a high level of PSC is associated with lower levels of job demands and higher levels of job resources. This can be explained by using an assumption that the management team is tasked with creating the working condition in a unit or an organisation (Johns, 2010; Morgeson & Humphrey, 2008). A high sense of PSC from top management that prioritises workers' psychological well-being, indirectly decreases demands and increases resources at the workplace. The logic assumption for this is due to the fact that higher PSC management ensures that the workers are not exposed to a high stress environment. Supervisors who uphold the importance in protecting workers' psychological health will provide adequate resources to their subordinates such as social support in order to cope with the demands. (Law, Dollard, Tuckey, & Dormann, 2011). Recently, several studies have provided support to the idea that that PSC, is a precursor of working conditions and is highly related to the

onset of emotional exhaustion and depression (Dollard, Opie, et al., 2012; Idris & Dollard, 2011; Idris et al., 2014).

In contrast to the PSC, the physical safety climate focuses more on physical injuries, by being concerned with employees' awareness of physical injuries and protecting them from physical harm. In line with the notion of a multilevel framework, it was assumed that senior management, who are concerned with the safety and health of workers, will prioritize safety rather than productivity (Zohar, 2008). Also, the supervisor executes the enacted policies and procedures in relation to safety to ensure that employees use the safety equipment or do not violate the safety steps. Studies to date on safety climate have found that accidents (Wallace, Popp, & Mondore, 2006), micro-accidents (Zohar, 2000), back and needle-stick injuries (Halbesleben, 2010), and occupational errors (Hofmann & Mark, 2006) result from a low safety climate environment. In addition, Liu et al. (2015) confirmed the relationship between the physical safety climate, safety behaviour and safety outcomes in Chinese manufacturing companies through a path analysis. Nonetheless, with only a few studies having been conducted, little is known about the relationship between the physical safety climate and working conditions.

Given the evidence that the PSC, rather than the physical safety climate, is the lead indicator of demand and resource job characteristics, it is thus expected that:

H1: Team-level psychosocial safety climate (PSC) and not physical safety climate is related negatively to job demands.

H2: Team-level PSC and not physical safety climate is related positively to job resources.

1.8.2 Working conditions and the link to emotional exhaustion and general health

By using the assumption that the PSC is a precursor to job characteristics, several researchers have integrated PSC with the job demands-resources (JD-R) model (Bakker

& Demerouti, 2007). According to the JD-R model, job demands are defined as "those physical, psychological, social, or organisational aspects of the job that require sustained physical and/or psychological (cognitive and emotional) effort or skills" (Bakker & Demerouti, 2007, p. 312). The example of job demands includes physical workload, emotional demands, cognitive demands, time pressure and job insecurity (Schaufeli & Taris, 2014). Job resources, on the other hand, is defined as "those physical, psychological, social, or organisational aspects of the job that are either (a) functional in achieving work goals, or (b) reduce job demands and the associated physiological and psychological costs, or (c) stimulate personal growth, learning, and development (Bakker & Demerouti, 2007, p. 312)". Examples of job resources include social support, job control (i.e. skill discretion, decision authority), organisational justice and organisational rewards.

Previous studies have supported the notion that job demands increase psychological injuries, such as burnout and depression (e.g. de Beer, Pienaar, & Rothmann, 2015; Idris et al., 2014; Li, Jiang, Yao, & Li, 2013). For example, Tuxford and Bradley (2014) conducted a study among 644 teachers which showed that emotional demands are significantly related to emotional exhaustion. In addition, Idris et al. (2014) revealed that emotional demands have a significant association with workers' burnout which, in turn, leads to depression. Emotional demands have also been recognised as a common stress generator among human service workers including nurses and medical residents (Maslach & Jackson, 1981; van Vegchel, de Jonge, Söderfeldt, Dormann, & Schaufeli, 2004). Several studies have revealed the significant effect that emotional demands place on healthcare workers' psychological health. In a study among 826 healthcare workers, de Jonge, Blanc, Peeter, and Noordam (2008) found that the emotional demands and employees' emotional exhaustion positively related. More recently, Dollard, Opie, et al. (2012) conducted research among Australian nurses concluding that emotional demands

between groups (assessed at the organisational level) was related to nurses' emotional exhaustion two years later.

While the relationship between emotional demands and emotional exhaustion is well established in the literature, van den Tooren and de Jonge (2010) argued that an emotionally demanding environment may cause cognitive disturbance and indirectly lead to unfavourable emotions. Working in a healthcare setting, especially in an emergency department, requires a medical worker to make clinical decisions quickly and efficiently which may deplete the worker's energy (Laxmisan et al., 2007). Frequent interruptions during their work such as patients' call and emergency admission, will increase the burden on working memory and attention loss pushing a nurse into a more demanding environment for cognitive control. A study of Lavoie-Tremblay et al. (2010) discovered that cognitive demands were associated with psychological distress among 1254 Canadian nurses. Several other researchers, such as Bakker, Demerouti, and Schaufeli (2005) and Bakker, Brummelhuis, Prins, and Heijden (2011) found that cognitive demands also had a significant impact on the emotional exhaustion of female spouses and medical workers' work–family interface. Given the relevance of emotional and cognitive demands on healthcare workers, they are both considered in this study.

As discussed previously, one function of job resources is to reduce the effect of job demands and, consequently, psychological injuries. Rewards, as one of the job resources, has been shown to decrease some depressive symptoms at work (Hoven, Wahrendorf, & Siegrist, 2015). For instance, Preckel, Meinel, Kudielka, Haug, and Fischer (2007), in examining working conditions and their effect on workers' health, revealed that low rewards were related to poorer health and sleeping issues. Rewards for workers can be explained by the concept of social reciprocity where workers perform or work in exchange for certain gains, both monetary and non-monetary (e.g. esteem, job security) (Siegrist, 1996). According to Siegrist et al. (2004), high effort and low rewards causes

feelings of being unappreciated and treated unfairly which in turn leads to the onset of work-related stress. Inadequate rewards evoke negative emotions and have a detrimental effect on workers. High job demands with low rewards are expected to cause emotional exhaustion in workers. Indeed, studies have found that working in a low-reward environment may lead to psychological distress, depression and exhaustion (Hoven et al., 2015; Rasmussen et al., 2016; Shimazu & de Jonge, 2009). Schulz and colleagues (2009) revealed that the imbalance between effort and rewards was the main predictor for emotional exhaustion. Again, using computerized ambulatory diaries, researchers found a significant relationship between low rewards and nurses' self-rated stress levels (Johnston, Beedie, & Jones, 2006). Taken together, the evidence on the relationship of working conditions and emotional exhaustion, suggests:

H3: (a) Job demands are positively related to emotional exhaustion while (b) Job resources are negatively related to emotional exhaustion.

Apart from the deleterious impact of high job demands and low job resources to the psychological aspects, research also found evidence of the relationship between job demands and workers' physical health issues, including fatigue, sleeping issues, musculoskeletal disorders and somatic symptoms complaints (e.g. Bailey et al., 2015; Garrick et al., 2014; van der Heijden, Demerouti, Bakker, & Hasselhorn, 2008). The effect of working conditions on workers' physical health issues can be explained by the exposure to high demanding work which leads to changes in irritability and restlessness, predisposing several health issues including insomnia and hypertension. In their study, Garrick et al. (2014) examined the moderating effect of PSC on job demands and fatigue, revealing that job demands including physical, emotional and cognitive demands have a positive relationship to fatigue among nurses. Preckel et al. (2007) using the Effort-Reward Imbalance model (Siegrist, 1996) reported that rewards is a resource with a dominating effect when comes to predicting self-reported health issues. In a similar vein,

Aboa-Eboule et al. (2011) found that workers who gained low rewards tended to have a higher risk of recurrent coronary heart disease. Hence the current study hypothesizes that:

H4: (a) Job demands are positively related to general health complaints while (b) resources are negatively related to general health complaints.

1.8.3. The integrated model

In line with the findings of Dollard and Bakker (2010), PSC is often studied in relation to its effect on working conditions and, in turn, on the psychological strain placed on workers. To be specific, Dollard and Bakker (2010) and Dollard, Tuckey, and Dormann (2012) revealed that PSC is the antecedent of working conditions which then influences psychological strain among workers. Recently, researchers started to examine the possible effect of PSC on physical health such as musculoskeletal disorder among the general population of workers (Bailey et al., 2015; Yulita, Idris, & Dollard, 2014). Akin to previous studies, Idris and Dollard (2011), in their study of the Malaysian private sector, found job demands and job resources to be the mediators between PSC and depression. Compared to PSC, no study, to date, except that by Idris et al. (2012), has empirically studied the link between the physical safety climate, working conditions and the psychological health of workers. Furthermore, the work of Idris et al. (2012) suggested that PSC is superior in predicting job characteristics and workers' psychological health than any other safety climate construct including the physical safety climate. Thus, it was expected that:

H5: PSC but not physical safety climate is negatively related to emotional exhaustion via (a) job demands and (b) job resources

H6: PSC but not physical safety climate is negatively related to general health complaints via (a) job demands and (b) job resources

1.9 Research design and methodology

This study was conducted by using cross-sectional multilevel survey research which entailed collecting data from frontline healthcare workers at a Malaysian university hospital, including nurses and nursing assistants. Ethical approval was obtained before the study commenced. Details of the data collection and analysis procedure is further elaborated in Chapter 3. A general view on the questionnaire and types of analysis used is provided here.

The data was collected from 74 workgroups by using a self-reporting questionnaire which was divided into two parts: a) the social-demographic details of the participants (e.g. gender, ethnicity, marital status and medical history), and b) the validated scales of each of the variables: physical safety climate (Neal & Griffin, 2006); psychosocial safety climate by using PSC-12 (Hall, Dollard, & Coward, 2010); job demands including emotional demands (Kristensen, Hannerz, Hogh, & Borg, 2005) and cognitive demands (National Institute for Occupational Safety and Health, 1997); job resources including rewards (Siegrist, 1996); emotional exhaustion (Schaufeli, Leiter, Maslach, & Jackson, 1996) and general health complaints (e.g. cold, headache, back pain, fatigue and dizziness) of the participants.

To confirm the distinctiveness between the concepts of the physical safety climate and the PSC, a confirmatory factor analysis (CFA) was conducted using AMOS 20 (Arbuckle, 2011). Firstly, both organisational climate constructs (PSC vs. safety climate) were run as two latent variables. Next, to ensure whether both constructs were separately distinguished from each other or shared a common overlap, all items from both constructs were put together as one single latent variable. The researcher used several fit indexes, including the Chi-square value, goodness-of-fit index (GFI), comparative-fit index (CFI), Tucker-Lewis Index (TLI), and root mean square error of approximation (RMSEA), are

reported and compared between the two models. The results are presented in Chapter 4 Methodology.

Due to the nature of the data that nested within wards, the current study also tested the justification of data for aggregation (i.e. team-level of safety climate measures) by using several recommended indices such as one-way random analysis of variance (ANOVA), F-value, intra-class correlation (ICC) and within-group agreement (r_{WG}) (Bliese, 2000). Previous literature suggested that a value of r_{WG} ranging .05 - .30 (Bliese, 2000; Peugh, 2010) and ICC > .70 (Mathieu & Taylor, 2007) justified the appropriateness for aggregation with sufficient variation between-group and within-group. Then, hierarchical linear modelling (HLM) software was used to conduct the multilevel analysis and test the hypotheses. The results obtained from the analyses is reported in detail in Chapter 4. A Monte Carlo stimulation test was conducted to test the significance of the effect of mediation on the hypotheses with a 95% confidence interval (CI) and 20,000 times repetition. Significance of the effect of mediation is confirmed by whether there is zero involvement between the upper level (UL) and lower level (LL) intervals (Preacher & Selig, 2008).

1.10 Significance and innovation of the study

This current study contributes to the body of knowledge in at least three ways. Firstly, this study integrates both physical and psychosocial aspects of inquiry in safety climate research to understand their impact on workers' general health via working conditions (i.e., job demands and job resources). Secondly, this study will increase research focus on healthcare workplace safety, as a response to the call from researchers to examine the safety precursor (i.e. safety climate) in healthcare workplaces. Finally, it has been tested in Malaysia, which is a developing country with a rapidly increasing work pace and competitiveness due to global demands.

This study also aims to enhance current safety systems in Malaysia. Responding to the call from the Malaysian National Institute of Occupational Safety and Health (Niosh) to promote a healthy physical and psychosocial working environment in Malaysia (Povera, 2015), it seeks to inform the appropriate strategies in upgrading an organisation's safety environment particularly in working conditions, policy implications, and management priority. By identifying the roles that the organisational climate plays, prevention can be achieved by redesigning organisational policies and regulations which help to reduce workplace risk factors. The study will help to determine how the researchers and practitioners can improve the safety climate in hospitals and thus lower the incidents and cost of accidents and injuries by maintaining the health of workers. By applying an innovative study design, this current research helps workers and practitioners to build a safe and productive working environment.

1.11 Conclusion of Chapter 1

This chapter summarizes the general overview of the study including the purpose of the study and the current gap in knowledge. This study also purports to examine both the physical and psychosocial safety climates, linking to the widely-used JD-R model and their effects on the general well-being of healthcare frontline workers. The hypotheses of this study are summarised below:

H1: Team-level psychosocial safety climate (PSC) and not physical safety climate is negatively related to job demands.

H2: Team-level PSC and not physical safety climate is positively related to job resources.

H3: (a) Job demands are positively related to emotional exhaustion while (b) Job resources are negatively related to emotional exhaustion.

H4: (a) Job demands are positively related to general health complaints while (b) resources are negatively related to general health complaints.

H5: PSC but not physical safety climate is negatively related to emotional exhaustion via (a) job demands and (b) job resources

H6: PSC but not physical safety climate is negatively related to general health complaints via (a) job demands and (b) job resources

A brief introduction to the multilevel research design, and data analysis details of which can be found in Chapter 3. Chapter 4, contains the study findings followed by the discussion in Chapter 5. The last chapter of this thesis elaborates the future research recommendations and practical implications of the present study. Before the study was undertaken, a systematic literature review was conducted (Chapter 2) to investigate the current trend of research in climate-health studies.

CHAPTER 2 : LITERATURE REVIEW

2.1 Introduction

Overall current study used three concepts to form the framework of study, namely psychosocial safety climate (PSC), (physical) safety climate and the job demands-resources (JD-R) model, which had been introduced in Chapter 1.

2.2 Psychosocial safety climate

Although the concept of psychosocial factors has been a key major discussion in the fields of psychology and organisational management, it has not emerged in literature related to organisational climate. Most of the research relies on general aspects of work (i.e. Organisational climate, leadership, working conditions) and not specifically on a climate that relates to psychological health, namely to the Psychosocial Safety Climate. In comparison to the Physical Safety Climate (Zohar, 1980; Zohar & Luria, 2005), the Psychosocial Safety Climate (PSC) is defined as the "shared perceptions of workers related to the organisational policies, procedures and practices regarding workers' psychological health and safety" (Dollard & Bakker, 2010, p.580).

Psychosocial safety climate is a specific construct that particularly focuses on the psychosocial aspects that affect in the workplace. This construct only emerged in 2007 when Dollard proposed that the organisational context (i.e. Psychosocial Safety Climate) precedes the design of working conditions through management values, priorities, and practices before it affects the employees' well-being (Dollard & Bakker, 2010; Zadow & Dollard, 2016). Specifically, the PSC captures the basic idea of an organisational climate and the work stress model, which postulates that the PSC precedes working conditions and in turn can be used to predict the workers' psychological health. The first publication of the PSC was only in 2010 by Dollard and Bakker and was followed by several other

pieces of research that continuously supported the notion of PSC (Hall, Dollard, Winefield, Dormann, & Bakker, 2013; Idris, Dollard, Coward, & Dormann, 2012; Idris, Dollard, & Winefield, 2011; Law, Dollard, Tuckey, & Dormann, 2011).

In recent literature, Yulita, Idris, and Dollard (2016) discovered that there is an increasing trend in PSC research, with a total of 13 articles published in ISI Social Science Indexed journals since the year 2010. These mostly originated in the, Asia Pacific countries including Australia and Malaysia. However, this review has limited their search by only including ISI indexed empirical research from three databases. In fact, the expansion of PSC literature is so vigorous that it appears in the form of concept papers (Dollard & McTernan, 2011), benchmarking papers (Bailey, Dollard, & Richards, 2014), case studies (Zinsser & Zinsser, 2016), psychometric tools development (Hall, Dollard, & Coward, 2010), and book chapters (Afsharian, Zadow, & Dollard, 2016; Yulita, Idris, & Dollard, 2014). Furthermore, some articles have been published under Scopus indexed journals (Bond, Tuckey, & Dollard, 2010; Dollard & Neser, 2013). More recently, there have been several articles that investigated the PSC in some other Asia Pacific countries such as Iran (Afsharian et al., 2016) and Vietnam (Nguyen, Teo, Grover, & Nguyen, 2017). Beyond that, the growing evidence of PSC and the inclusion of PSC items in the widely-used Job Content Questionnaire (JCQ) 2 showed that the PSC has become a gradually recognized construct when discussing workplace safety and health issues.

At the initial stage of PSC research, researchers tried to assess PSC by using only five author-developed items (Dollard & Bakker, 2010). Hall et al. (2010) then developed PSC-12 from the original 26 items on PSC scales (Dollard & Kang, 2007). This PSC tool has been widely used to measure the framework in almost all the later quantitative PSC research. The PSC-12 consists of four main elements, namely: management commitment and support, management priority, organisational communication and organisational participation (see Figure 2.1). Management commitment and support refers to the

immediate actions and decisions taken by the supervisors or top managers whenever there is a treat to the psychological health of workers. Management priority measures the management team's priorities in relation to psychological health and safety compared to productivity. Organisational communication, on the other hand, refers to the process where managers talk directly to the employees about the psychological health and safety of the workforce as well as giving related information to them. Lastly, organisational participation and involvement reflects on how all the people within an organisation, including the stakeholders, top management, unions and workers, participate and get involved in protecting the psychological health and safety within the organisation. All these four elements form the foundation of PSC theory, which is believed to precede working conditions (i.e. job demands and job resources).

The PSC is proposed as the "cause of causes" of psychological health among workers, through the working conditions they have to comply with. Researchers explained that a low PSC acts like the latent pathogen of psychological hazards such as bullying and harassment (Law et al., 2011), as well as producing high-risk working conditions (i.e. high demands and low resources) (Dollard et al., 2012; Idris et al., 2012), as shown in the theoretical framework below (Figure 2.1). For example, in their study among Malaysian private sector workers, Idris et al. (2014) discovered that over a three month period PSC was related to low emotional demands and was likely to ameliorate the effect of unwanted demands. In a high PSC context, it is believed that top management will commit themselves to prevent their workers from being exposed to hazardous situations such as work overload, being bullied by colleagues or clients, experiencing emotional outbursts from others, to name just a few. They are aware of these situations and will try to intervene when these hazards occur. At the same time, high PSC creates a "safe" environment for the workers to try new things and take up challenges. A high level of PSC also helps to boost social support (Dollard et al., 2012; Idris & Dollard, 2011);

procedural justice (Law et al., 2011); and job control (Dollard & Bakker, 2010; Dollard et al., 2012) in workplaces. To be specific, in their study Law et al. (2011) revealed that job resources including rewards, procedural justice and job control can be predicted as outcomes of a high level of PSC.

Previous research has found that PSC precedes working conditions, which in turn reducing several psychological work outcomes including emotional exhaustion, psychological distress, depression, fatigue and work engagement (Dollard et al., 2012; Garrick et al., 2014; Idris et al., 2012; Idris, Dollard, & Tuckey, 2015; Idris, Dollard, & Yulita, 2014). Given the basic premise of PSC as an antecedent of psychological health, recent research has found that the PSC is also linked to absenteeism, work injuries, musculoskeletal disorders and physical health via demands and/or emotional exhaustion (Bailey, Dollard, McLinton, & Richards, 2015; Bronkhorst & Vermeeren, 2016; Yulita et al., 2014; Zadow, Dollard, McLinton, Lawrence, & Tuckey, 2017). While scholars revealed that the PSC is more salient in predicting psychological health than the physical safety climate (Idris et al., 2012), the previous study findings on PSC leading to somatic symptoms, challenges the proposition of the physical safety climate as being the major antecedent of physical safety and health issues. This leaves a question about which safety-related climate should be the target for intervention when considering workplace safety and health issues.

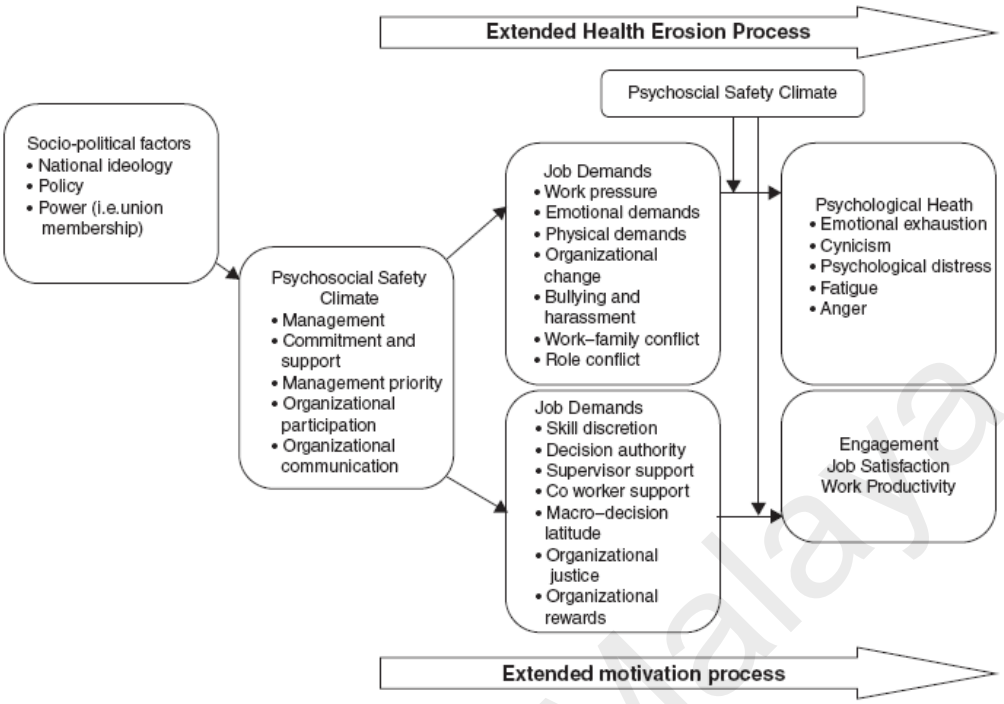

Figure 2.1: Theoretical framework of PSC (Zadow & Dollard, 2016, p.420).

2.3 Physical safety climate

In contrast to the PSC which relates to psychological issues, safety climate is defined as the workers' shared perceptions on organisational (physical) safety related policies, procedures and practices (Neal & Griffin, 2006) It focuses on physical aspects of workplace health and safety, thus it is refered to as the Physical Safety Climate in the current study. The physical safety climate was first proposed in the 1980s and since then it has been under constant discussion in terms of workplace safety issues. Traditionally the safety climate was conceived at an individual level but this was redefined when Zohar (2000) suggested that safety climate was a multilevel entity, aligned with the myriad ideas of organisational climate (Schneider, Ehrhart, & Macey, 2011). For over thirty-five years, safety climate has been highly related to workplace safety and health issues. Ample evidence has emerged about the importance of the safety climate as the antecedent of accidents, injuries and other safety outcomes. Despite the similarities between the PSC and the safety climate, as the lead indicators for psychological and physical health and

safety outcomes of the workers respectively, the safety climate has been tested using different mechanisms, namely: safety knowledge, safety behaviour and safety performance (Christian, Bradley, Wallace, & Burke, 2009; Griffin & Neal, 2000; Neal & Griffin, 2006). Researchers have suggested that the level of safety climate will influence the workers' knowledge and motivation regarding safety. This knowledge and motivation helps them to carry out and retain safety behaviour which can protect them from physical hazards. Organisations with a high safety priority provide training and encourage participation in safety-related activities, which helps to increase the employees' knowledge and motivation. Once acquired, this knowledge helps them to avoid danger and risks.

Despite the robustness of safety climate research, the discussion about a comprehensive conceptual framework is still lacking. Even though extensive research has been undertaken, there is little agreement about the dimensions of safety climate, leading to conceptual confusion. According to past safety climate studies, it has been estimated that there are at least 50 different dimensions (Guldenmund, 2000) which can be measured by more than 20 safety climate scales. (Flin, Mearns, O'Connor, & Bryden, 2000). Apart from the variety of definitions, a plethora of safety climate instruments have been developed to assess safety climate from both general and generic (occupation-specific) aspects. Although the dimensionality of safety climate measurements is instable, studies have shown that there is a common feature among these measurements, which is the management commitment to safety (Kuenzi & Schminke, 2009; Zohar, 2014). Thus, a general view of an organisation's safety climate can be ascertained by measuring the workers' perception of the management's commitment to safety. According to Neal and Griffin 2006), an example of these safety climate definitions is that "Management places a strong emphasis on workplace health and safety" Moreover, Zohar (2010) has suggested developing occupational-specific safety climate measurements in order to provide

context-dependent of climate perceptions. This approach is based on the assumption that different occupations have their own unique context and safety issues. For example, a generic safety climate item for truck drivers would be "provides enough hands-on training to help new drivers be safe" (Huang et al., 2013). Scholars conceived that, while general safety climate allows comparison between different industries, the generic safety climate could help to address occupational specific issues with rich contextual related information (Zohar, 2003). Another issue of safety climate measurement is the level of safety climate. Scholars suggested that rather than adhering to the level of climate perceptions that researchers use in their investigations, the scales should be level-adjusted so that they are more relevant to the respective levels. Given the evidence on the variation between organisational and team level safety climate (Zohar & Luria, 2005), this adjustment would be necessary to avoid any measurement bias.

Both of these concepts are summarised in Table 2.1 below.

Table 2.1: Comparison of the conceptual features between psychosocial and physical safety climate.

	Psychosocial safety climate	Physical safety climate
Definition	The "shared perceptions of workers related to the organisational policies, procedures and practices regarding workers' psychological health and safety" (Dollard & Bakker, 2010, p.580).	The shared perceptions of employees on organisational (physical) safety related policies, procedures and practices (Neal & Griffin, 2006)
Main premise	Psychosocial Safety Climate is the antecedent of job design and in turn affects workers' psychological health, including emotional exhaustion.	Safety climate predicts the safety criteria at workplaces including safety behaviour, safety outcomes (e.g. injuries, accidents, near misses) and safety performance.
Domain	Management commitment and support; management priority; organisational communication and organisational participation.	Lack of agreement on the dimensionality of safety climate. Despite the numerous dimensions measured, "management commitment to safety" is considered as one of the most important higher-order elements of safety climate (Zohar 2011).
Measurement tools	PSC-12 developed by Hall et al. (2010) which is a shortened version from the original 26 items of PSC scale (Dollard & Kang, 2007)	Various measurement tools were developed by scholars. For example, the original measurement of Zohar (1980); Griffin and Neal (2000) and Huang et al. (2013).
Proposed pathway to safety outcomes	Working conditions (i.e. job resources and demands), emotional exhaustion	Safety knowledge, safety motivation and safety compliance

2.4 Job Demands-Resources model

By assuming that PSC is a precursor to job characteristics, several researchers have integrated PSC with the Job Demands-Resources (JD-R) model (Bakker & Demerouti, 2007). The JD-R model was inspired by several traditional work-stress theories (Bakker & Demerouti, 2016), including the Job Demands-Control-(support) model (JDC/JDCS)

(Johnson & Hall, 1988; Karasek, 1979) the Effort-Rewards Imbalance model (ERI) (Siegrist, 1996) and the JD-R model (Bakker & Demerouti, 2007). The JDC and ERI, models respectively, divide job characteristics into two broad dimensions, namely: demands and control for JDC and effort and reward for the ERI model. Specifically, The JDC model specifically argues that employees' well-being is determined by these two elements while low control and high demands will lead to a high prevalence of work stress and job strain and, vice versa. However, working condition are not only represented by the conditions of low control (or high control) and low rewards (or high rewards). In fact, there are several other features that exist in the workplace such as rewards which have been highlighted in the ERI model.

Although it is another well-established theory, the ERI model, does not however, place too much focus on the working conditions themselves, but rather on the interaction between the employees' cognitive evaluation of their working conditions. The ERI model was based on the social reciprocity theory which suggests reciprocity between cost and gains (which also refers to effort and rewards respectively) (Siegrist, 1996; Siegrist et al., 2004). When individuals devote their effort into something, and particularly when it's a work task, they expect a reward - either monetary in the form of a salary or commission, or non-monetary in the form of acknowledgement or appraisal. Failure to receive compensation will generate negative feelings, which in turn could cause adverse health in the long term (Laftman, Modin, Ostberg, Hoven, & Plenty, 2015; Rasmussen et al., 2016).

Despite the extensive work on both models, the JDC and the ERI are not without critics. The JDC and ERI models are too simplistic to explain the total complexity of a workplace. The basic tenet of both the JDC and the ERI models is that the interaction between job demands and specific job resources (control for JDC and rewards for ERI) will influence the level of an employees' well-being. However, the real situation at a workplace is often

far more complex than these models allow because of the multiple demands and resources that exist at the same time. Apart from control and rewards, workers can be affected by other workplace issues such as social support, performance feedback, emotional demands, cognitive demands, to name just a few(Bakker & Demerouti, 2007; Schaufeli & Taris, 2014). In this sense, JDC and ERI become too simple in acknowledging the widely varied characteristics of a job.

A later model, the JD-R model, attempts to overcome the shortcomings of both the JDC and ERI models. The JD-R expands the boundaries and posits that there is a variety of demands and resources at the workplace. These working conditions (i.e. demands and resources) play different roles in empolyees' outcomes via two pathways, namely: the health erosion and the motivation pathways (Bakker & Demerouti, 2007). Whilst high job demands lead to psychological strains (i.e. burnout) among employees (through the health erosion pathway), job resources boost an employees' engagement (through the motivational pathway). Highly demanding working conditions are expected to inflict significant psychological costs on workers, leading to feelings of being drained which leads to depleted energy in the long run (Bakker, Van Emmerik, & Van Riet, 2008). Employees with high demands will try to balance their energy by using their own resources to compensate and to diminish the negative impact of the demands they are placed under. In line with the conservation of resources theory, the loss of resources will result in workers' feeling threatened and burned out (Bakker & Demerouti, 2007; Hobfoll & Shirom, 1993, 2000).

In alignment with meso-theory, each unit/ team consists of their unique level of demands and resources affecting the employees. For example, healthcare workers who work in the immediate care unit or radiology unit would probably encounter more terminally-ill patients than those working in an outpatient department. Consequently, the emotional demands placed on the former could be much higher than those encountered

by the latter group of workers. The level of resources will also vary across different teams due to the practices of the team supervisor. A supervisor who is committed to take care of workers' health will allocate more resources (e.g. social support or emotional debrief) to help the workers reduce the impact of the job's demands. Those who do not, may act recklessly with regard to workers' complaints of bullying or stress. As a result of this, the team-level of demands and resources have been included in the current study.

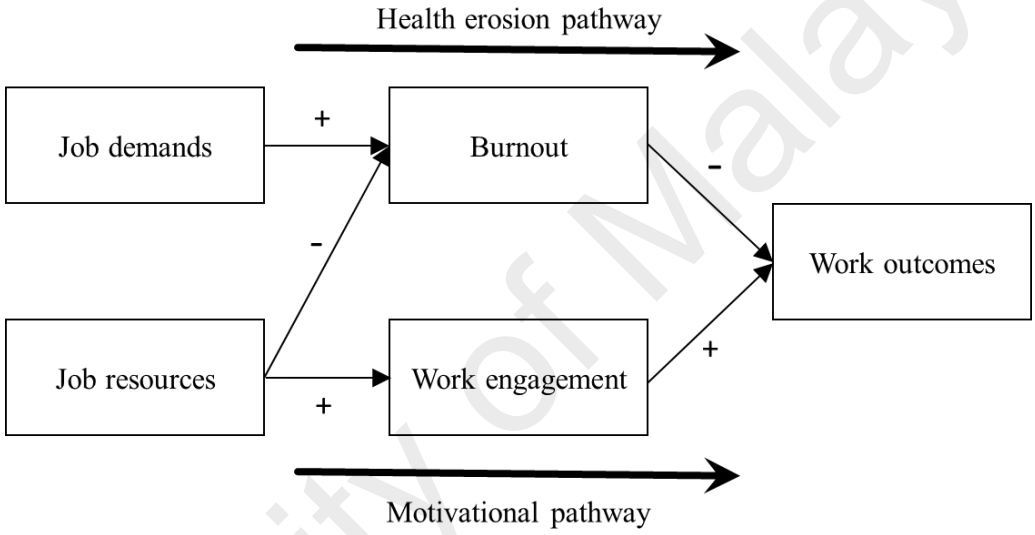

Figure 2.2: Theoretical framework of JD-R model.

In the context of current study, the research was undertaken by using two approaches. First, a systematic literature review (SLR) was conducted investigating the recent trend of research in climate-health studies including the region of study which included in this chapter. Secondly, an empirical study on the association of psychosocial safety climate and physical safety climate affect Malaysian healthcare workers' health outcomes.

2.5 Systematic literature review on work climate and health outcomes

2.5.1 Introduction to systematic literature review

In attempt to have a more comprehensive understanding on the relation of work climate and employees' health, a systematic literature review has been conducted. So far, several reviews have been done examining the evidence of climates and its related constructs. Amid of the substantial amount of reviews, Kuenzi and Schminke (2009) provided a comprehensive work on the climate research from year 1980 until 2008, including a detailed comment on the roles of climate, level-of-analysis and its antecedents and consequences. These authors concluded that many facet-specific climates are related to similar outcomes (e.g. justice climate and climate for empowerment are both related to satisfaction) and put forward for multiple climate simultaneously. Scholars conceived that multiple climates exist at a workplace, they interact with each other, providing impact to the employees. Taking an example, service climate and ethical climate may compliment with each other in a context where customer service quality could be highlighted (i.e. service climate) by encouraging honesty towards the customers (i.e. being ethical) (Jiang, Hu, Hong, Liao, & Liu, 2016; Myer, Thoroughgood, & Mohammed, 2016). Aligning with the idea of multiple climates, current systematic review included other work climate research which investigating climate and health relationship for better illustration on possible complementary or competitive climate in future research.

In addition, several researchers have also completed some review on some other facet-specific climates such as ethical climate (K. A. Martin & Cullen, 2006), service climate (Hong, Hu, Liao, & Jiang, 2013), and safety climate (Beus, Payne, Bergman, & Arthur, 2010; Clarke, 2006, 2010; Yulita et al., 2016). With current study interest on workplace safety and health, the previous extensive review and meta-analyses of safety climate and other related constructs shed some lights on the foundation of the literature (Clarke, 2010; Nahrgang et al., 2011; Yulita et al., 2016). However, these reviews relied on safety-

related climate studies (i.e. safety climate and psychosocial safety climate) only and most these review does not specifically focus on health-related issues. Previous reviews also implicitly left out a detailed discussion on different types of health outcomes, whether it is a physical or psychological; objective or subjective data and the geographical region of study. Thus, this review fills the gap by carefully differentiate the health outcomes involved in each climate-health study, methodological used, sources of data and specific region of the study.

2.5.2 Review Procedure

The steps of reviewing follow PRISMA 2009. The review used three main databases: ISI Web of Knowledge, PsycINFO and EbscoHost Academic Premier Search. A series of search strings was used by combining the keywords of "organisational climate" or "work climate" with one of following terms: "physical health", "workers' health", "mental health", "psychological health", "body pain", "back pain", "musculoskeletal disorders", "work illnesses" and "stress". The search was limited to only English language, peer-reviewed original research articles with full-text available, and omitting review papers and meta-analyses. To be more specific, current review took only articles from the area of study of psychology, occupational health, social sciences, and management. This yield a total of 879 articles without duplication. The search was continued by identified the articles in which the relationship of organisational climate and workers' health is of the researchers' interest. After reading the abstract and full text of the articles, this yields a result of 57 articles in total. Other articles were found irrelevant to the topic or did not indicate the relationship between the two variables of interest. Figure 2.3 showed the detailed procedure of articles retainment.

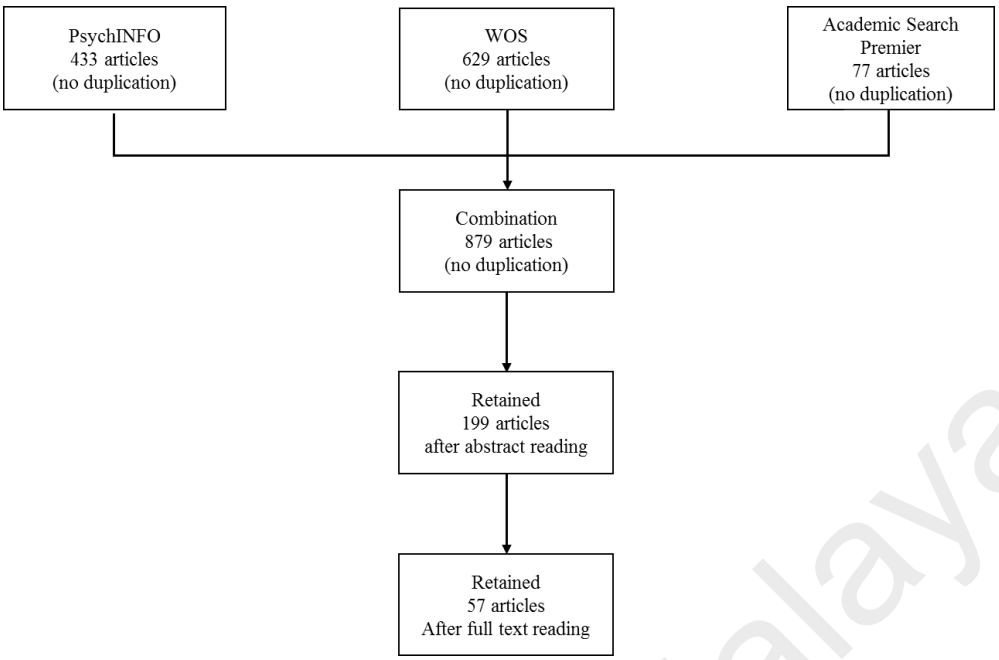

Figure 2.3: Review procedure

During the reading, several questions were asked: (a) types of health outcomes and instrument used, (b) types of data collected (objective or subjective data), (c) research design and level of climate measured, (d) sample selection and study region. From these studies, types of health outcomes, both physical and psychological, which had been studied so far and the instruments used to gather the information was summarised. From there current review explored the types of health data collected by the researchers, specifically on objective and subjective data. Also, the research techniques used by the scholars in these studies and their sample selection. Overall, this study is to provide a comprehensive understanding on the research method used to investigate relationship between work climate and workers' health issues so far.

Table 2.3 to 2.9 show the summaries of each articles used in this review. It is organized in the tables according to the types of climate allowing a better illustration on the types of organisational factors of workplace health issues. In the table, the information of each study which included sample and region, types of health outcomes and its instrument is detailed, together with whether it was objective or subjective data. The antecedents,

consequences, and mediators or moderators of each study were provided in the tables, as well as the key findings on the relationship between climate and health.

Table 2.2: List of journals included in this review

Academy of Management Journal
Accident Analysis and Prevention
Anxiety, Stress and Coping
Applied Ergonomics
European Journal of Work and Organisational Psychology
European Review of Applied Psychology
The Gerontologist
International Archives of Occupational and Environmental Health
International Journal of Nursing Practice
International Journal of Nursing Studies
International Journal of Stress Management
Journal of Advanced Nursing
Journal of Business Research
Journal of Leadership & Organisational Studies
Journal of Management
Journal of Management & Organisation
Journal of Managerial Psychology
Journal of Nursing Management
Journal of Occupational and Environmental Medicine
Journal of Occupational and Organisational Psychology
Journal of Occupational Health Psychology
Journal of Organisational Behavior
Journal of Organisational Change Management
Journal of Personnel Psychology
Journal of Safety Research
Leadership Quarterly
Occupational and Environmental Medicine
Safety Science
Scandinavian Journal of Educational Research
Sex Roles
Social Science & Medicine
Stress and Health: Journal of the International Society for the Investigation of Stress
Stress Medicine
Transportation Research Part F-Traffic Psychology and Behaviour
Universitas Psychologica
Work and Stress
Work-a Journal of Prevention Assessment & Rehabilitation

Table 2.3: Summary of global climate-health studies.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
Piirainen, Rasanen, and Kivimaki (2003)	4209 Finnish employees and self-employed persons; longitudinal two-wave randomized computer-assisted telephone survey; SAS 6.12 chi-square test	General psychological climate	Perceived work-related symptoms; sickness absence	-	SD *Sickness absence*; *work-related symptoms* and; *general psychological climate* were asked by using questions planned by the experts from the Finnish Institute of Occupational Health	Psychological climate was highly associated with psychological work-related symptoms and sickness absence, especially when the climate is tense and prejudiced.
Stone, Du, and Gershon (2007)	2047 registered nurses from 13 United States (US) hospitals; cross-sectional survey; SAS 9.0 multivariate general estimating	Organisational climate	Lost workday due to illness; occupational injuries (i.e. musculoskeletal injuries, blood and body fluid exposures and any injury	-	SD *Sickness absence* and *occupational injuries* by using self-reported survey; *Burnout* by using the Maslach Burnout Inventory (MBI; Maslach, Jackson, &	Various aspects of organisational climate were negatively related to the health outcomes. All aspects of the climate significantly related

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
	equations (GEE) model		or illnesses); burnout		Leiter, 1996); *Organisational climate* by using 31-item modified version of Perception of Nurse Work Environment (PNWE) scale (Choi, Bakken, Larson, Du & Stone, 2004, as cited in Stone et al., 2007)	to all three components of burnout except for positive scheduling climate which was insignificant related to personal accomplishment and depersonalisation.
D'Amato and Zijlstra (2008)	406 hospital workers from 6 wards in an Italian hospital; cross-sectional survey; LISREL 8.1 Structural Equation Modelling (SEM)	Psychological climate; self esteem	Performance; burnout	Organisational citizenship behaviour (OCB) as the mediator of the relationship between climate and work outcomes.	SD *Burnout* by using Italian version of MBI (Sirigatti & Stefanile, 1993, as cited in D'Amato & Zijlstra, 2008); *Psychological climate* and *service climate* by using 70-item Majer-D'Amato Organizational	Psychological climate was positively related to OCB (stronger than the relationship of self-efficacy and OCB), while OCB was negatively related to burnout.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
					Questionnaire 10 (M_DOQ10; Majer et al. 2001, as cited in D'Amato & Zijstra, 2008)	
Giorgi (2010)	730 Japanese workers; cross-sectional survey; SEM	Organisational climate	Workplace bullying; psychological health (i.e. depression); negative health behaviours (i.e. alcohol use and sleeping hours)	Workplace bullying as the mediator of the relationship between climate and psychological health. Psychological health as the mediator of the relationship between (a) workplace bullying and negative health behaviours; (b) organisational climate and	SD *Depression* by using Wada et al.'s (2006) 20-item Center for Epidemiologic Study for Depression scale, as cited in Giorgi (2010); *Perceived health and sleeping hours* measured by using single item; *Organisational climate* by using reduced version of M_DOQ10 (D'Amato & Majer, 2005, as cited in Giorgi, 2010)	Poor climate associated with negative psychological health and negative health behaviours. Workplace bullying mediated the relationship of climate and psychological health, in turn affecting negative health behaviours.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
				negative health behaviours.		
Arnetz, Lucas, and Arnetz (2011)	5316 Swedish healthcare workers from 4 hospitals; cross-sectional survey; SEM	General psychological climate	Mental health	Efficiency as the mediator of the relationship between climate and stress; occupational stress as the mediator of efficiency and mental health.	SD *Occupational stress*; *Mental health;* and *General psychological climate* by using Quality-Work-Competence (QEC) survey instrument developed by Arnetz (1996), as cited in Arnetz et al. (2011)	Psychological climate was significant and negatively related to occupational stress and mental health.
Cassie and Cassie (2012)	1114 workers from 203 US nursing homes; cross-sectional survey; HLM	Organisational context (i.e. organisational culture and climate)	Depression; cognitive performance; physical functioning	-	SD *Depression* by using the 7-item Minimum Data Set Depression Rating Scale (Burrows, Morris, Simon, Hirdes, & Philips, 2000, as cited in Cassie,	All dimensions of climate (i.e. stress, engagement and functionality) was associated with depression.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
					2012); *Organisational climate* by using the 105-item Organisational Social Context (OCS) Scale (Glisson, Landsverk, Schoenwald, Kelleher, Hoagwood, Mayberg (2008), as cited in Cassie, 2012)	
Bedi, Courcy, Paquet, and Harvey (2013)	1893 workers in a Canadian research hospital; cross-sectional survey; AMOS SEM	Aggression	Burnout	Psychological climate as the mediator of the relationship between aggression and burnout.	SD *Burnout* by using French-Canadian version of MBI (Dion & Tesser, 1994, as cited in Bedi et al., 2013); *Psychological climate* by using French version of	Psychological climate mediated the relationship between aggression and burnout.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
					the Psychological Climate Questionnaire (Gagnon, Paquet, Courcy, & Parker, 2009, as cited in Bedi et al., 2013)	
Burns and Machin (2013)	250 high school teachers in Norway; cross-sectional survey; STATA *xtmixed* command	Personality; organisational climate	Well-being	-	SD *Subjective well-being* by using 20-item Positive and Negative Affect Schedule (PANAS; Watson et al., 1988, as cited in Burns & Machin, 2013); *Organisational climate* by using the School Organisational Health Questionnaire (SOHQ; Hart et al., 2000 as cited in	Positive climate was associated with positive well-being.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
					Burns & Machin, 2013)	
Hinkka, Kuoppala, Vaananen-Tomppo, and Lamminpaa (2013)	967 civil service workers in Finland; cross-sectional survey with .03-7.3 years of follow-up data; multiple regression	Leadership, job content, physical work environment; social work climate	Sick leave; occupational accidents and diseases; disability pension	-	OD *Sick leave* and *occupational diseases* by using secondary data; *Social work climate* by using author-developed items.	Team climate was associated with sick leave and occupational accidents and diseases.
Gervais and Millear (2014)	652 women across countries and professions, mainly from the United Kingdom (UK) and Australia; cross-sectional survey; hierarchical regression	Work climate; job autonomy; skill discretion; social support; life satisfaction; positive and negative affect	Mental health (i.e. depression, anxiety and stress); performance; satisfaction	-	SD *Mental health* by using DASS-21 (Lovibond and Lovibond, 1995, as cited in Gervais & Millear, 2014); *Work climate* by using Baard et al.'s (2004) work climate questionnaire, as	Work climate, as compared to job autonomy and affect,but not significantly associated with all three mental health components.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
					cited in Gervais & Millear (2014).	
Giorgi et al. (2014)	658 Italian nurses; cross-sectional survey; SEM	Organisational climate	Burnout; health	Workplace bullying as the mediator of the relationship between climate and burnout; Burnout as the mediator between bullying and health.	SD *Burnout* by using the Italian-developed Burnout Indicatory tool with 8 items (Manci & Magnani, 2008, as cited in Giorgi, 2014); *Perceived psychological and physical health* by using 20 items of Magnani, Mancini, Majer & Opra's (2009) measure, as cited in Giorgi (2014); *Organisational climate* by using 5 items from MDOQ-10 (D'Amato &	Workplace bullying was mediated the relationship between climate and burnout which in turn related to health.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
					Majer, 2005, as cited in Giorgi, 2014)	
Veld and Van De Voorde (2014)	263 nurses from 3 healthcare organisations of the Netherlands; cross-sectional survey; SPSS 19 hierarchical linear regression	Work climate	Work commitment; job strain (the need for recovery)	Social exchange and economic exchange as the mediators of the relationship between climate and both work commitment and job strain.	SD *Job strain* and *climate for well-being* by using shortened version of Van Veldhoven et al.'s (2002) measure, as cited in Veld & Van de Voorde (2014).	Climate for well-being was negatively associated with job strain mediated by social exchange and economic exchange.
Desrumaux et al. (2015)	298 teachers from France; cross-sectional survey; Hayes & Preacher, 2014 macro for SPSS	Job demands; organisational resources (job climate); personal resources (optimism)	Psychological health (well-being; distress)	Satisfaction of basic needs (competence; relatedness; autonomy) as the mediators between (a) job demands and health; (b) job climate and health, and (c)	SD *Psychological well-being* and distress by using Massé et al. (1998), as cited in Desrumaux et al. (2015); *Job climate* by using Gilbert, Dagenais-Desmarais & Savoie's (2008) measure), as cited in	Job climate was associated with psychological health, mediated by the satisfaction of basic needs. Indirect effect of climate contributes 83% of the total effect on well-being

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
				optimism and health.	Desrumaux et al. (2015)	and 53% on distress.

Note: OD = objective data; SD = subjective data.

Table 2.4: Summary of psychosocial safety climate (PSC)-health studies.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
Dollard & Bakker (2010)	209-288 employees from 18 Australian schools; 3-wave longitudinal survey; Hierarchical linear modelling (HLM)	PSC	Psychological distress; emotional exhaustion; work engagement	Job demands and job resources, respectively, as the mediators of the relationship between PSC and psychological health; PSC as the moderator of the relationship between job demands and psychological health.	SD *Psychological distress* by using General Health Questionnaire-12 (GHQ-12, Goldberg, 1972, as cited in Dollard and Bakker, 2010); *emotional exhaustion* by using 2 items from MBI emotional exhaustion scale (Maslach & Jackson, 1981); *PSC* by using four authors developed items	PSC predicted demands and then psychological health. PSC moderated the relationship between emotional demands and emotional exhaustion.
Idris and Dollard (2011)	269 Malaysian employees from different organisations; cross-sectional	PSC	Anger; work engagement; depression	Job demands as the mediator between the relationship of PSC and both	SD *Depression* by using 9-item Patient Health Questionnaire	Demands mediated the association between PSC and both anger and depression.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
	survey; AMOS 17 SEM			anger and depression; job resources as the mediator of the relationship between PSC and work engagement. Anger and depression as mediators of the relationship between demands and engagement.	(PHQ-9; Spitzer, Kroenke, & Williams, 1999, as cited in Idris and Dollard, 2011); *PSC* by using PSC-12 Hall et al. (2010)	
Law et al. (2011)	220 Australians employees of 30 organisations from all sectors; cross-sectional computer assisted telephone survey; HLM 6.06	PSC	Psychological distress; emotional exhaustion; engagement	Bullying/harassment as the mediator of the relationship between PSC and psychological health; supervisor support; procedural justice, and;	SD *Psychological distress* by using 10-item Kessler 10 (K10; Kessler and Mroczek, 1994 as cited in Law et al., 2011). *Emotional exhaustion* by using	PSC indirectly affected psychological distress and emotional exhaustion via bullying and harassment. PSC moderated the relationship

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
				rewards as the mediators of the relationship between PSC and engagement. PSC as the moderator of the relationship between bullying/harassment and both psychological health and engagement.	5 items from MBI (Schaufeli et al., 1996, as cited in Law et al., 2011). *PSC* by using PSC-12 (Hall et al., 2010)	between bullying/harassment and psychological health.
Dollard, Opie, et al. (2012)	363 workers from 48 Australian remote hospitals; two-waved longitudinal survey; HLM 6.06	PSC	Psychological strain (i.e. emotional exhaustion and psychological distress)	Emotional demands; workload; social support; control as the mediators of the relationship between PSC and psychological strain.	SD *Emotional exhaustion* by using 4 items from MBI-GS (Schaufeli et al., 1996, as cited in Dollard, Opie, et al., 2012); *psychological distress* by using the General Health Questionnaire	PSC was associated with emotional exhaustion via T1 emotional demands and T2 workload. PSC was associated with psychological distress via T2 job control.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
					(GHQ-12, Goldberg, 1972, as cited in Dollard, Opie, et al., 2012); *PSC* by using PSC-12 (Hall et al., 2010)	
Dollard, Tuckey, et al. (2012)	319 police at Time 1 sample and 139 police at Time 2 sample from 23 Australian police station; two-wave longitudinal survey; HLM three-way interaction	Emotional demands; emotional resources	Workgroup distress	Emotional resources as the moderator of the relationship between demands and distress; PSC as the moderator of demand-resource interaction.	SD *Workgroup distress* by using 5 items developed by authors; *PSC* by using PSC-12 (Hall et al., 2010)	PSC moderated the interaction of emotional demands and resources in predicting distress.
Idris et al. (2012)	126 healthcare Australian workers from 16 work teams of a same	PSC; safety climate; team psychological safety; perceived	Psychological health (i.e. psychological distress and	Job demands as the mediators of the relationship between climate	SD *Psychological distress* by using GHQ-12 (Goldberg, 1978, as cited in	PSC was the strongest predictor of psychological heath via job demands.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
	organisation and 180 Malaysian workers from 31 teams of various sectors; cross-sectional survey; AMOS SEM & HLM	organisational support	emotional exhaustion)	and psychological health.	Idris et al., 2012); *Emotional exhaustion* by using 5-item from MBI exhaustion scale (Schaufeli et al., 1996, as cited in Idris et al., 2012); PSC by using PSC-12 (Hall et al., 2010)	
Hall et al. (2013)	2343 workers in Australia from various sectors; cross-sectional telephone survey; AMOS moderated SEM	Job demands	Depression; positive organisational behaviours (POB, i.e. engagement and job satisfaction)	PSC as the moderator of the relationship between demands and both depression and POB.	SD *Depression* by using 9 items which adapted from the Patient Health Questionnaire (PHQ-9; Spitzer, Kroenke, Williams & Patient Health Questionnaire Primary Care Study Group. 1999, as cited in Hall et al., 2013); *PSC* by using	PSC moderated the positive relationship between demands and depression.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
					PSC-12 (Hall et al., 2010)	
Garrick et al. (2014)	61 teachers and school principal of Australian schools; two follow up diary study; MLwiN HLM	Job demands; recovery	Engagement; and fatigue	PSC as the moderator of the relationship between (a) demands and both engagement and fatigue, and; (b) recovery and both engagement and fatigue.	SD *Fatigue* by using the Occupational Fatigue Exhaustion Recovery (OFER, Winwood et al., 2006, as cited in Garrick et al., 2014); *PSC* by using PSC-12 (Hall et al., 2010)	PSC moderated the negative relationship of recovery and fatigue and the positive relationship of demands and fatigue.
Idris et al. (2014)	T1: 253 and T2: 117 workers from 47 private sector organisations in Malaysia; 2-wave longitudinal survey; HLM	PSC	Depression	Emotional demands as the mediator of the relationship between PSC and emotional exhaustion; emotional exhaustion as the mediator of the relationship	SD *Emotional exhaustion* by using 5 items from MBI (Schaufeli et al., 1996, as cited in Idris et al., 2014); *Depression* by using PHQ-9 (Spitzer, Kroenke, Williams & Patient Health	PSC was predicting emotional exhaustion through emotional demands, but not depression.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
				between emotional demands and depression.	Questionnaire Primary Care Study Group. 1999, as cited in Idris et al., 2014); *PSC* by using PSC-12 (Hall et al., 2010)	
Bailey et al. (2015)	1095 Australian healthcare workers; two-wave longitudinal survey; AMOS SEM	PSC; physical demand	Musculoskeletal Disorders (MSDs); compensation claim	Work pressure and bullying as the mediators of the relationship between PSC and emotional exhaustion; emotional exhaustion as the mediator between the relationship of both work pressure and harassment and MSDs; MSDs as the mediators of the relationship	SD *MSDs* by using 3 items from Rush et al.'s (2003) QIDS-SR, as cited in Bailey et al. (2015); *Emotional exhaustion* by using 5 items from MBI-GS (Schaufeli et al., 1996, as cited in Bailey et al., 2015); *Workers' compensation claims* by using self-reported item; *PSC*	PSC predicted emotional exhaustion via psychosocial risks (i.e. work pressure and bullying), which in turn predicted MSDs.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
				between emotional exhaustion and compensation claims.	by using PSC-12 (Hall et al., 2010)	

Note: OD = objective data; SD = subjective data.

Table 2.5: Summary of physical safety climate-health studies.

Author/s (years)	**Sample; research design; analysis strategy**	**Antecedents**	**Consequences**	**Moderators/ Mediators**	**Types of data collected, health outcomes, climate, & instrument**	**Key climate-health findings**
Mark et al. (2007)	Nurses from 281 units in 143 US hospitals were asked to answer three different questionnaires (1st wave: 4911 nurses answered contextual information; 2nd wave: 3689 nurses answered structural information and safety climate; 3rd wave: 3272 nurses answered information on organisational effectiveness); 3-wave longitudinal	Safety climate; organisational structure (i.e. work engagement and work conditions)	Organisational effectiveness (i.e. back injuries and needle-stick injuries)	Safety climate as the moderator between the relationship of (a) unit capacity and organisational effectiveness; (b) work engagement and organisational effectiveness; (c) work conditions and organisational effectiveness.	OD *Needle-stick* and *back injuries* by using objective data; *Safety climate* by using 25-item revised version of Zohar's (1980) safety climate measure (Mueller, DaSilva, Townsend & Tetrick, 1999, as cited in Mark et al., 2007)	Safety climate moderated the relationship between: (a) work engagement and needle sticks; (b) work conditions and needle sticks and; (c) work conditions and back injuries. Safety climate was positively related to work engagement and work conditions. Safety climate had direct negative effect on back injuries.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
	survey and over 6 consecutive months of objective data; M*plus* multilevel modelling					
Hahn and Murphy (2008)	Study 1: 1716 healthcare workers from 3 large hospitals in US; Study 2: 1941 employees from the US Department of Energy worksites; cross-sectional survey; regression	Safety climate	Environmental stress; noise; injury; communication ; involvement; feedback quality; decision authority; sleep problems; negative mood	-	SD *Sleep problem* by using single item on trouble falling asleep; *Negative mood* by using 5 items from the General Mental Health Scale of the Medical Outcomes Study (Ware and Sherbourne, 1992, as cited in Hahn & Murphy, 2008); *Safety climate* by using 6-item of DeJoy et al's (2000)	Safety climate is related to negative mood and sleeping problems in both study but the relationship was stronger in Study 2.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
					measure, as cited in Hahn & Murphy (2008)	
Strahan, Watson, and Lennonb (2008)	219 drivers from two Australian state-government organisations; cross-sectional survey; hierarchical regression analysis	Safety climate; occupational stress	Fatigue-related behaviour; fatigue-related near misses	-	SD *Stress* by using the 15-item Job-Related tension scale (Kahn, Wolfe, Quinn, & Snoek, 1964, as cited in Strahan et al., 2008); 5 authors developed *Fatigue-related behaviours* items; *Safety climate* using 35 items from Glendon & Litherland's (2001) Safety Climate Questionnaire (SCQ), as cited in Strahan et al. (2008)	Both organisational safety climate and stress predicted self-reported fatigue-related behaviours and near-misses. Safety climate was a stronger predictor than stress.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
Chowdhury and Endres (2010)	194 healthcare professionals from 11 units of two U.S. hospitals; cross-sectional survey and six consecutive months of objective data; HLM 6.04 multilevel modelling	Client-variability	Occupational injury	Occupational strain as the mediator between client variability and injury. Unit-level safety climate as the moderator between client variability-strain and injury.	OD+SD *Occupational strain* by using Keller's (1984) measure, as cited in Chowdhury & Endres, 2010; *Injury* from objective data; *Safety climate* by using 6-item modified scales from previous studies (Hoffman & Stetzer, 1996; Katz-Navon, Naveh & Stern, 2005, as cited in Chowdhury & Endres, 2010)	Occupational strain mediated the relationship between client variability and injury, moderated by unit-level of safety climate.
Cigularov, Chen, and Rosecrance (2010)	235 workers from U.S. union; cross-sectional survey; HLM	Safety communication ; Error management climate	Safety behaviours; injury; pain	EMC as the moderator of the relationship between safety communication and (a) safety	SD *Work-related injuries* by using 9-item reduced version of Krauss's (2004) scale, as cited in	Safety communication and EMC were both significant related to pain but not with injuries. EMC did

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
				behaviours; (b) injury; and (c) pain.	Cigularov et al. (2010); *Pain* by using 8 author developed items; *Error management climate (EMC)* by using 16 items from van Dyck et al.'s (2005) measure, as cited in Cigularov et al. (2010)	not moderate the relationship of safety communication and all outcomes.
Hope, Overland, Brun, and Matthiesen (2010)	9601 employees from 52 offshore oil installations of Norway; cross-sectional survey; hierarchical multiple regression	Risk perception; safety climate	Sleep quality	-	SD *Sleep quality* by using four statements developed by the Norwegian Petroleum Safety Authorities; *Safety climate* by using 46 items from "Norwegian offshore risks and safety	Safety climate was associated with sleep quality. Of the six aspects of safety climate, safety management and involvement, safety vs. production and safety prioritisation were three strongest predictors of sleep quality.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
					climate inventory" (NORSCI)	
Aytac and Dursun (2012)	240 Turkish workers from various sectors; cross-sectional survey; multiple regression	Violence prevention climate	Stress; anxiety; depression; job satisfaction	-	SD *Depression*; *Anxiety* and; *Stress* by using DASS; *Violence prevention climate* by using the adapted Turkish version of Kessler et al.'s (2008) 18-item measure, as cited in Aytac and Dursun (2012)	Violence prevention climate was associated with depression but not stress and anxiety.
Yang, Spector, Chang, Gallant-Roman, and Powell (2012)	176 nurses from two hospitals in Florida, US.; two-wave longitudinal survey; SAS logistic regression	Violence prevention climate	Health outcomes (i.e. somatic symptoms and MSDs)	Physical violence exposure as the mediator of the relationship between climate and health outcomes.	SD *Somatic symptoms* by using 12 items from Spector & Jex's (1998) Physical symptoms Inventory, as cited in (Yang et al., 2012); *musculoskeletal*	Violence prevention climate predicted the chance of violence exposure over six months, which in turn affecting the workers' health outcomes.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
					disorder (MSDs) symptoms by using 9-item of Standard Nordic Questionnaire (Dickinson et al., 1992, as cited in Yang et al., 2012); Violence prevention climate by using 12-item Klesser et al. (2008)'s measure, as cited in Yang et al. (2012)	
McCaughey, DelliFraine, McGhan, and Bruning (2013)	218 healthcare providers from Western Canada; cross-sectional survey; multiple regression	Workplace injuries and illnesses	Job stress; turnover intention; job satisfaction	Safety climate as the mediator of the relationship between: (a) workplace injury and job stress; (b) workplace injuries and turnover intention; (c)	SD *Workplace injury* and sick day by using self-reported data; *Stress* by using 13-item job stress scale (Parker & Decortiis, 1983, as cited in McCaughey et al., 2013); *Safety*	Safety climate mediated the relationship between injury and job stress.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
				workplace injuries and job satisfaction.	*climate* by using Hayes et al.'s (1998) 50-item Work Safety Scale (WSC), as cited in McCaughey et al. (2013)	
Swanberg, Clouser, Browning, Westneat, and Marsh (2013)	103 Latino farmworkers from Kentucky, US; cross-sectional survey; logistic regression	Abusive supervision; safety climate; awkward position; long work hours; work-related stress	Occupational health (i.e. work injuries and illnesses, and miss work day)	-	SD *Work injuries and illnesses* by using self-reported data; *Work stress* by using one item from the Job Content Questionnaire (JCQ; Karasek et al., 1998) and four authors developed items; *Safety climate* by using 9 items from the Perceived Safety Climate Scale	Safety climate was negatively associated with occupational health, but not statistically significant in the model.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
Golubovich et al. (2014)	464 working adults who studying part-time in a US university; cross-sectional survey; Mplus	Safety climate	Musculoskeletal complaints	Frustration as the mediator of the relationship between safety climate and musculoskeletal complaints; psychological hardiness as the moderator of the relationship between climate and frustration.	SD *Musculoskeletal complaints* by using Kuorinka et al.'s (1987) Nordic Musculoskeletal Questionnaire, as cited in Golubovich et al. (2014); *Safety climate* by using 9-item Neal et al.'s (2000) measure, as cited in Golubovich et al. (2014)	Hardiness moderated the relationship of safety climate and musculoskeletal complaints via frustration.
Tang, Leka, Hunt, and MacLennan (2014)	704 teachers from 35 schools in Hong Kong; cross-sectional survey; SEM	Social capital; safety climate	Safety complaints; general health	Safety knowledge as the mediator between the relationship of safety climate and both compliance and participation; safety participation and safety compliance	SD *General health* by using GHQ-12 (Goldberg, 1978, as cited in Tang et al., 2014); *Safety climate* by using Neal and Griffin's (2006) measure, as	Safety climate was associated with general health through safety knowledge, participation, compliance and complaints.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
				as the mediators of the relationship between safety knowledge and safety complaints; safety complaints as the mediator between safety compliance and participation and general health.	cited in Tang et al.(2014)	
Arcury et al. (2015)	220 Latinas from US farmworker families; 2-year longitudinal survey; linear and logistic regression	Psychological demands; skill variety; job control; vulnerability; job benefits; work safety climate	Individual stress; depressive symptoms; physical activity; family conflict; family economic insecurity	-	SD *Stress* by using 25-item from Farmworker stress inventory (Magaña & Hovey, 2003, as cited in Arcury et al., 2015); *Depressive symptoms* by using 10-item from Spanish short version Center for	Greater psychological demands and safety climate related to higher stress; safety climate is not significant related with depressive symptoms.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
					Epidemiological Studies Depression Scale (Gzywacz et al., 2010, as cited in Arcury et al., 2015); *Safety climate* by using Perceived Safety Climate Scale from Gillen et al. (2002), as cited in Arcury et al. (2015)	
Haslam, O'Hara, Kazi, Twumasi, and Haslam (2016)	2067 employees from 31 UK organisations; triangulation approach with interviews, questionnaire and company-provided data; template analysis and multivariate analysis of	Job attitude (i.e. organizational commitment, job satisfaction, intention to quit, and intrinsic job motivation); Safety climate	General health; mental health; vitality	-	SD *Employee health and well-being* by using the SF-36 Health Survey version 2 (Ware and Sherbourne, 1992, as cited in Haslam et al., 2016); *Safety climate* by using a shorter version of the	Safety climate was associated with employee health and well-being.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
	covariance (MANCOVA).				Safety Climate Assessment (Cox and Cheyne, 1999, as cited in Haslam et al., 2016)	

Note: OD = objective data; SD = subjective data.

Table 2.6: Summary of service climate-health studies.

Author/s (years)	**Sample; research design; analysis strategy**	**Antecedents**	**Consequences**	**Moderators/ Mediators**	**Types of data collected, health outcomes, climate, & instrument**	**Key climate-health findings**
A. Martin (2008)	340 university staffs from three Australian university; cross-sectional online survey; EQS 6.1 SEM	Service climate	Psychological dysfunction; job satisfaction	Job-induced tension as the mediator of the relationship between service climate and both psychological distress and job satisfaction.	SD *Job-induced tension* by using seven-item of House & Rizzo's (1972) Anxiety and Stress Questionnaire, as cited in Martin (2008); *Psychological dysfunction* by using six-item of GHQ-12 (Goldberg, 1972, as cited in A. Martin, 2008); *Service climate* by using six-item from Martin, Kennedy and Stock's (2006) measure, as cited in Martin (2008)	The direct path of service climate to all other variables were significant. Job-induced tension was mediated the relationship between service climate and psychological dysfunction.

Carrasco, Martinez-Tur, Moliner, Peiro, and Ramis (2014)	512 workers from 152 units of hotels in Spain; cross-sectional survey; R multilevel packages	Service climate; emotional dissonance	Engagement and burnout	-	SD *Burnout* by using Spanish version MBI-GS (Schaufeli et al., 1996, as cited in Carrasco et al., 2014); *Service climate* by using 4-item version of the Global Service Climate Scale (Salanova, Agut, & Peiró, 2005 as cited in Carrasco et al., 2014)	Service climate was negatively associated with burnout.
Kao, Cheng, Kuo, and Huang (2014)	420 employees and 30 supervisors from 30 hotels in Taiwan; cross-sectional survey; HLM	Supervisor-caused stressors; colleague-caused stressors; customer-caused stressors	Turnover intention; sick leave; service sabotage	Caring climate and service climate respectively as the moderator of the relationship between the antecedents and the outcomes.	OD *Sick leave* from database; *Caring climate* by using 8 items of caring climate scale (Cullen et al., 1993, as cited in Kao et al, 2014); *Service climate* by using Schneider et al.'s (1998) measure, as cited in Kao et al (2014)	Caring climate, but not service climate, was associated with sick leave but did not moderated the relationship of stressors and sick leave.

Note: OD = objective data; SD = subjective data.

Table 2.7: Summary of support and affective climate-health studies.

Author/s (years)	**Sample; research design; analysis strategy**	**Antecedents**	**Consequences**	**Moderators/ Mediators**	**Types of data collected, health outcomes, climate, & instrument**	**Key climate-health findings**
Bacharach and Bamberger (2007)	1110 New York City firefighters from 101 engine and ladder companies; cross-sectional survey; SAS Proc mixed HLM	Critical incident involvement	Negative emotional state, including depression; anxiety, and; stress	Control and support climate as the moderators of the relationship of (a) critical incident involvement and negative emotional states, (b) critical incident and posttraumatic distress and, (c) posttraumatic distress and negative emotional states; Posttraumatic distress as the mediator between the relationship of critical incident involvement and	SD *Negative emotional state* by using 21-item of DASS-21 (Antony, Bieling, Cox, Enns & Swinson, 1998, as cited in Bacharach and Bamberger, 2007); *Current unit control climate* by using Bacharach, Bamberger, Conley & Bauer's (1990) instrument, as cited in Bacharach and Bamberger (2007); *Current supervisory support climate* by using Caplan, Cobb, French, Harrison, & Pinneau's (1975) social support	Control and support climate moderated the relationship between critical incident involvement and anxiety and stress. The relationship of critical incident involvement was no longer significant when climate-moderated distress was added into the model. Support climate moderated the relationship between incident involvement and distress but not distress and negative emotional states. Control

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
				each negative emotional state.	measures, as cited in Bacharach and Bamberger (2007)	climate moderated the relationship between distress and anxiety and stress. Finally, control climate appeared to be stronger moderator between the relationship of distress and negative emotional states. The stronger the control climate, the weaker the association above.
Rego and e Cunha (2008)	199 employees from 118 organisations of various sectors in Portugal; cross-sectional survey;	Authentizotic climate	Performance	Affective well-being (AWB) and stress as the mediator of the relationship between authentizotic	SD *Stress* by using 3 items from Staples et al. (1999), as cited in Rego and Cunha (2008) and eight items from authors; *Affective well-being*	Among the four aspects of authentizotic climate, three aspects predicted stress and AWB. Stress and AWB mediated

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
	LISREL SEM and hierarchical regression analysis			climate and performance.	by using 15 items from Daniels' (2000) measure, as cited in Rego and Cunha (2008); *Authentizotic climate* by using Rego and Souto's (2004) measure, as cited in Rego and Cunha (2008)	authentizotic climate and performance. Stress is significantly negative related to all dimensions of AWB.
Grandey, Foo, Groth, and Goodwin (2012)	359 healthcare providers from 48 units in an Australian metropolitan hospital; cross-sectional survey; HLM	Mistreatment by patients	Emotional exhaustion	Surface acting as the mediator of the relationship between mistreatment and exhaustion; climate as the moderator of the relationship between surface acting and emotional exhaustion.	SD *Emotional exhaustion* by using 6 items Wharton's (1993) measures, as cited in Grandey et al 2012; *Climate of authenticity* by using 7 authors-developed items	Climate of authenticity moderated the negative relationship between surface acting and emotional exhaustion.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
Kozusznik, Rodriguez, and Peiro (2015)	535 social service employees from 78 teams in Spain; two-wave longitudinal survey; ANOVA and agglomerative hierarchical cluster analysis	Distress and Eustress climate	Work engagement; Burnout	-	SD *Burnout* by using Spanish version of MBI-GS (Salanova & Schaufeli, 2000, as cited in Kozusznik et al., 2015); *Stress climate* by using the Spanish version of the Valencia Eustress-Distress Appraisal Scale (VEDAS, Rodríguez, Kozusznik, & Peiró, 2013, as cited in Kozusznik et al., 2015)	Among the three dimensions of burnout, only exhaustion showed significant difference between different types of stress climate. Longitudinally, exhaustion decrease if the climate change from distressed to eustressed.
Ortiz-Bonnin, Garcia-Buades, Caballer,	317 workers from 99 teams of Spanish hotels and restaurants;	Emotion rule (ER) dissonance	Emotional exhaustion	Supportive climate as the moderator of the relationship between ER	SD *Emotional exhaustion* by using 5 items from the Spanish version of	Supportive climate was significantly associated with emotional exhaustion and

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
and Zapf (2016)	cross-sectional survey; HLM			dissonance and emotional exhaustion.	MBI-GS (Salanova & Schaufeli, 2000, as cited in Kozusznik et al., 2015; *Supportive climate* by using the First Organizational Climate Unified Search (FOCUS-93; González-Romá & Peiró, 1999, as cited in Ortiz-Bonnin et al., 2016)	moderated the relationship between ER dissonance and emotional exhaustion.

Note: OD = objective data; SD = subjective data.

Table 2.8: Summary of team climate-health studies.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
Kivimäki et al. (2001)	447 physicians and 483 controls (female head nurses and ward sisters) from 11 Finnish hospitals; cross-sectional survey with 2-year follow up sickness absence record; SAS analysis of variance (ANOVA) and logistic regression	Health and behavioural risks; work characteristics (incl. team climate); social circumstances	Sickness absence	-	OD *Sickness absence* by using objective data; *Team climate* by using 14-item short version team climate inventory (Kivimäki & Elovainio, 1999, as cited in Kivimäki et al., 2001)	Sickness absence of healthcare workers can be explained by all three antecedents. Team climate contributed more to physicians' sickness absence than to the control group.
Ylipaaval-niemi et al. (2005)	4815 Finnish hospital employees	Job control; job demand; team climate;	Psychological distress	-	SD *Psychological distress* by using 12-	The incidence rate was 1.5 times higher among those

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
	from 12 hospitals; 2-wave longitudinal self-reported survey; SPSS 10.0 logistic regression	procedural and relational justice			item of General Health Questionnaire (GHQ; Goldberg & Williams, 1988); *Team climate* by using 14-item short version team climate inventory (Kivimäki & Elovainio, 1999, as cited in Ylipaaval-niemi et al., 2005)	who experienced poor team climate. Team climate was appeared as the strongest predictor when controlling the psychological distress at the baseline.
Sinokki (2009)	3347 Finnish employees; cross-sectional survey, third-party diagnostic and three-year follow-up objective data; SAS 9.1	Team climate	Anxiety disorder; depressive disorder; alcohol-use disorder; any self-reported mental disorder; antidepressant	Job demands and job control as the mediators of the relationship between team climate and health outcomes.	OD *Depressive disorders*; *Anxiety disorders*; *Substance-use disorders* using the World Health Organisation (WHO) Composite International Diagnostic Interview	Poor team climate was associated with higher depressive and anxiety disorders but not alcohol-use disorder. However, the relationship of team climate and anxiety disorder was attenuated

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
	binary logistic regression		medication purchased		(M-CIDI) assessed by trained interviewers; *Antidepressant medication purchased* by using objective data; *Team climate* by using the Healthy Organisation Questionnaire (Lindström et al., 1997, as cited in Sinokki, 2009)	when job demands and job control were adjusted. Poor team climate predicted the purchase of antidepressant medication three years later indicating the possible long term effect of negative working environment.
Dackert (2010)	329 healthcare employees from an elderly care unit in Sweden; cross-sectional survey; LISREL 8.72 SEM	Team climate	Well-being; stress	Well-being as the mediator of the relationship between team climate and stress.	SD *Well-being* by using Warr's (1990) Anxiety-Contentment Scale and Depression-enthusiasm scale, as cited in Dackert (2010); *Stress* by using 24-item	Team climate was significant associated with well-being and stress. Nonetheless the model fit was weak for the above relationship. SEM indicated that well-being was

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
					General Well-being Questionnaire developed by Cox et al. (2000), as cited in Dackett (2010); *Team climate for innovation* by using Anderson & West's (1998) team climate inventory, as cited in Dackett (2010)	mediating the relationship between team climate and stress with good model fit.
Cheng, Bartram, Karimi, and Leggat (2013)	201 registered nurses in Australia; cross-sectional survey; AMOS SEM	Emotional labour	Turnover intention	Burnout and quality of care as the mediator of relationship between emotional labour and turnover intention; burnout as the mediator of the relationship between emotional labour and quality of	SD *Burnout* by using the Oldenburg Burnout Inventory (OLBI; Demerouti et al., 2010); *team climate* by using 38-item Team Climate Inventory (Anderson & West, 1998, as cited in Cheng et al., 2013)	Team climate moderated the relationship between emotional labour and burnout.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
				care; team climate as the moderator between emotional labour and both burnout and quality of care.		
Pisarski and Barbour (2014)	Final sample of 166 nurses from an Australian hospital; two-wave longitudinal survey; hierarchical regression	Team climate; roster control; work-life conflict	Fatigue	Shift type as the moderator of the relationship between (a) team climate and fatigue, (b) roster control and fatigue, and; (c) work-life conflict and fatigue.	SD *Fatigue* by using 2 items from the Standard Shiftwork Index (SSI; Barton et al., 1995, as cited in Pisarki & Barbour, 2014); *team climate* by using Pisarski et al.'s (2006) measure, as cited in Pisarki and Barbour (2014).	Team climate only predicted fatigue when the relationship is moderated by shift type.

Note: OD = objective data; SD = subjective data.

Table 2.9: Summary of other climate-health studies.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
Lansisalmi and Kivimaki (1999)	1767 Finnish workers from 108 work units of healthcare and metal and retails industries; cross-sectional survey; multiple regression	Occupational stress; Work factor (i.e. autonomy; goal clarity; feedback; communication)	Innovative climate	Occupational stress as the moderator of work factor and climate.	SD *Stress* by using one item from the Occupational Stress Questionnaire (Elo, Leppãnen, Lindström and Ropponen, 1992, as cited in Lansisalmi & Kivimaki, 1999); *Innovative climate* by using the Organisational Health Survey developed by Philips (1988), as cited in Lansisalmi & Kivimaki (1999).	Innovative climate is positively related to all the predictors, but negative with stress. Stress did not moderate the relationship of all predictors and innovative climate.
Cole and Bedeian (2007)	828 military and civilian employees nested in 27	Emotional exhaustion	Work commitment	Leadership climate as the moderator of the relationship	SD *Emotional exhaustion* by using 8-item Maslach and	Transformational and Laissez-faire leadership climate moderated the

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
	units from 10 military installations of U.S. Air Force; cross-sectional survey; non-linear and linear mixed effect (NLME) program for S-PLUS and R multilevel random coefficient modelling			between emotional exhaustion and work commitment.	Jackson (1981)'s Emotional Exhaustion measure; *Leadership climate* by using 20 items of Multifactor Leadership Questionnaire (MLQ) Form-5X from Bass & Avolio (2000), as cited in Cole and Bedeian (2007),	relationship between emotional exhaustion and work commitment. When the transformational leadership climate was high, only slightly higher work commitment was reported with high emotional exhaustion, but the level of work commitment increased drastically during low emotional exhaustion. Lasseiz-faire leadership climate was positively moderated the relationship between emotional

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
						exhaustion and work commitment.
Spell and Arnold (2007)	483 employees and 56 managers from 56 groups of different sectors; cross-sectional survey; SAS Proc Mixed HLM	Justice climate	Anxiety and depression	Procedural justice climate (PJC) as a moderator of the relationship between distributive justice climate (DJC) and depression and anxiety; Interactional justice climate (IJC) act as the moderator of the relationship between DJC and depression and anxiety; organisational structure as a moderator between (a) PJC and depression	SD *Mental health* by using 6-item shortened version of Warr's (1990) Anxiety-Contentment and Depression-Enthusiasm Scales, as cited in Spell & Arnold (2007); *Justice climate* (collective perceptions of procedural, distributive and interactional justice) by using Colquitt's (2001) organisational justice measures, as cited in Spell & Arnold (2007).	PJC moderated the relationship between DJC and depression and anxiety. High level of PJC attenuating the negative relationship between DJC and both depression and anxiety. But IJC did not moderate the relationships.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
				and anxiety; (b) IJC and depression and anxiety.		
Fletcher, Major, and Davis (2008)	916 IT professionals from 127 workgroups in 11 US organisations; cross-sectional survey; multilevel random coefficient modelling	Competitive climate	Work attitudes; stress; performance	Trait competitive-ness as the moderator of the relationship between CPC and a) work attitudes, (b) stress and (c) performance. Trait competitiveness also as the mediator between COC and a) work attitudes, (b) stress and (c) performance.	SD *Stress* by using six-item Bernas and Major's (2000) measure, as cited in Fletcher et al. (2008); *Psychological competitive climate* (CPC) and *Organisational Competitive climate* (COC) by using 4-item measurement adapted from Brown et al. (1998), as cited in Fletcher et al. (2008).	Trait competitiveness moderated the relationship between COC and job stress.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
Sliter, Boyd, Sinclair, Cheung, and McFadden (2014)	172 Caucasian female nurses working in US; cross-sectional online survey; LISREL SEM	Diversity climate	Engagement; burnout	Interpersonal conflict (i.e. physician conflict, manager conflict and co-worker climate) as the mediator of the relationship between diversity climate and both engagement and burnout.	SD *Burnout* by using Shirom and Melamed's (2006) burnout measure, as cited in Sliter et al. (2014); *Diversity climate* by using McKay et al.'s (2007) measures, as cited in Sliter et al. (2014).	Diversity climate indirectly affect women workers' burnout through physical and manager conflict but not co-worker conflict.
Kiersch and Byrne (2015)	137 employees supervised by 27 supervisors from 25 different organisations in US and Canada; cross-sectional online survey;	Authentic leadership at both individual and group level	Stress; turnover intention; organisational commitment	Justice climate as the mediator between the relationship of group-level leadership and outcomes; individual justice as a mediator between the relationship of individual level	SD *Perceived stress* by using 5-item short version of the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1993 as cited in Kiersch and Byrne, 2015); *Justice climate* by using Colquitt's	Individual perceived justice predicted stress but not justice climate.

Author/s (years)	Sample; research design; analysis strategy	Antecedents	Consequences	Moderators/ Mediators	Types of data collected, health outcomes, climate, & instrument	Key climate-health findings
	Mplus 6.0 MSEM			leadership and outcomes.	(2001) measure, as cited in Kiersch and Byrne (2015)	

Note: OD = objective data; SD = subjective data.

2.5.3 Descriptive findings of the articles

2.5.3.1 Types of health outcomes and instruments used

Table 2.10 shows the types of both physical and psychological health outcomes which had been studied in climate-health research so far. Climate study to date has tended to focus on investigating psychological health (36 studies; 63%) rather than physical health (11 studies; 19%) with some investigated both (10 studies; 18%). Of this, most of the studies on psychological health of workers focussed on burnout and its core components, i.e. emotional exhaustion (16 studies), followed by stress (15 studies) and depression (10 studies). While for physical health, various types of physical health outcomes had been equally studied, including sleeping issues (four studies), fatigue (three studies) and musculoskeletal disorders (three studies) with the exception of absenteeism which was involved in seven studies.

While the instruments used to assess these health outcomes were widely varied (see Table 2.10), the self-reported Maslach Burnout Inventory (MBI) (Maslach et al., 1996; Schaufeli et al., 1996) had been consistently applied for measuring burnout and emotional exhaustion in 12 out of 16 studies (e.g. Bedi et al., 2013; Law et al., 2011; Ortiz-Bonnin et al., 2016; Stone et al., 2007). In relation to the types of data, among all the studies, six studies had obtained company registered data for employees' sick leave and workplace injuries and diseases. However, in their analysis, only three studies (5%) (i.e. Hinkka et al., 2013; Kao et al., 2014; Kivimäki et al., 2001) had investigated the relationship between climate and health (excluded injuries). Only one study was using third-party rating for depressive symptoms (i.e. Sinokki et al., 2009).

Table 2.10: Types of psychological and physical health outcomes, data and instruments used.

Types of health outcomes	Types of data	Numbers of study	Examples of instruments used
Psychological health outcomes			
Burnout/emotional exhaustion	SD	16	MBI, OLBI, Burnout Indicatory tool
Stress	SD	15	Job-related tension scale, DASS, Job stress scale, JCQ, General well-being questionnaire, Perceived stress scale
Depression	SD	10	DASS, Centre for Epidemiologic Study for Depression scale, Minimum Data Set Depression Rating Scale, PHQ-9,
	Third-party rating	1	WHO M-CIDI
Distress	SD	9	GHQ-12, K10
Other outcomes (i.e. anxiety, anger, need for recovery, positive and negative affect, and well-being)	SD	13	PANAS, DASS, QEC, General Mental Health Scale, Anxiety-Contentment scale, Anxiety and Stress questionnaire
Physical health outcomes			
Sickness absence	OD	3	Company data
	SD	4	-
Musculoskeletal-related symptoms	SD	4	Standard Nordic Questionnaire
Sleeping issues	SD	3	-
Fatigue	SD	3	Occupational Fatigue Exhaustion Recovery (OFER), Standard Shiftwork Index
Perceived health	SD	3	-
Workplace diseases	SD	3	-
Other outcomes (i.e. body pain, somatic symptoms)	SD	3	Physical symptoms inventory

Note: SD = subjective data; OD = objective data. Outweighed total of studies due to multiple outcomes involved in one study.

2.5.3.2 Sample selection and geographical region of study

Table 2.11 and Figure 2.4 show the numbers of climate-health studies according to sectors and region. Most of the climate-health studies were conducted in Westernized countries including US, Europe and Australia (86%), a lesser extent comes from the Eastern part (two studies from Malaysia, one study from Japan, Hong Kong and Taiwan respectively). So far, no study was found from Africa and South America. Among these studies, healthcare sector had been most investigated (37%), followed by education (11%) and defence (5%). Some of the studies recruited their sample from various sectors (26%).

Table 2.11: Sectors and geographical region of sample selection.

Sectors	**Geographical region**					
	U.S & Canada	**Europe**	**Australia**	**Asia**	**Cross-countries**	**Total**
Healthcare	9	7	5			21
Education		2	3	1		6
Defence (military, police, firefighters)	2		1			3
Other sectors (i.e. agriculture, hospitality, IT service, government, oil and petroleum, private, social service)	4	5		3		12
Cross-sectors	4	5	2	1	2	15
Total	19	19	11	5	2	57

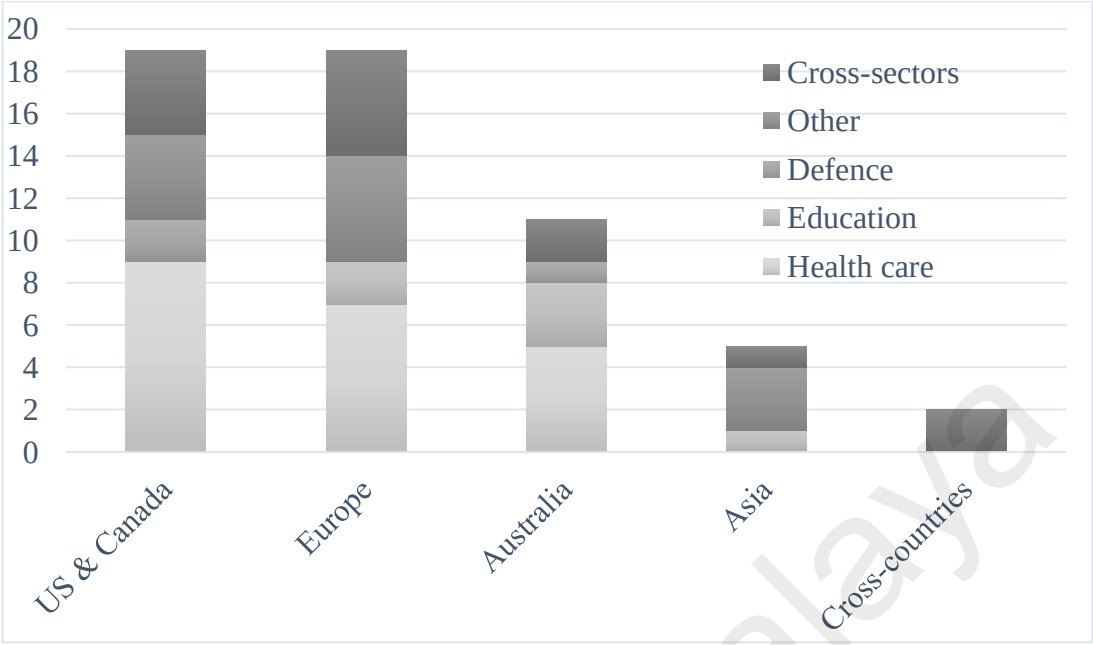

Figure 2.4: The studies of climate-health research by region.

2.5.3.3 Research design and analysis method

With increased attention in multilevel research, the types of research design and analysis method of the previous climate-health studies were analysed. Since year 2007, there are 22 articles (39%) using a multilevel approach in measuring climate, with most of them cross-sectional study (15 out of 22), four two-wave longitudinal studies, two three-wave longitudinal study and one diary study. Similarly, of the 35 articles using individual level of data analysis, current review found 77% of cross-sectional design, 20% of two-wave longitudinal study and one study using triangulation method which included interview, survey and objective data. From the review, one can see that the trend of climate-health research in year 2000 and before was low, but it continued to rise over these years. While multilevel studies are only started to gain attention in year 2005, several cross-sectional studies had been conducted to investigate the relationship between climate and health in the period of 2001-2004. It has been a dramatic grow in the climate-health research since year 2005.

Table 2.12: Research design and level-of-analysis.

Research Design	Level of analysis		Total
	Multilevel	Individual level	
Cross-sectional	15	27	42
Longitudinal (two-wave)	4	7	11
Longitudinal (three-wave)	2	-	2
Diary	1	-	1
Triangulation	-	1	1
Total	22	35	57

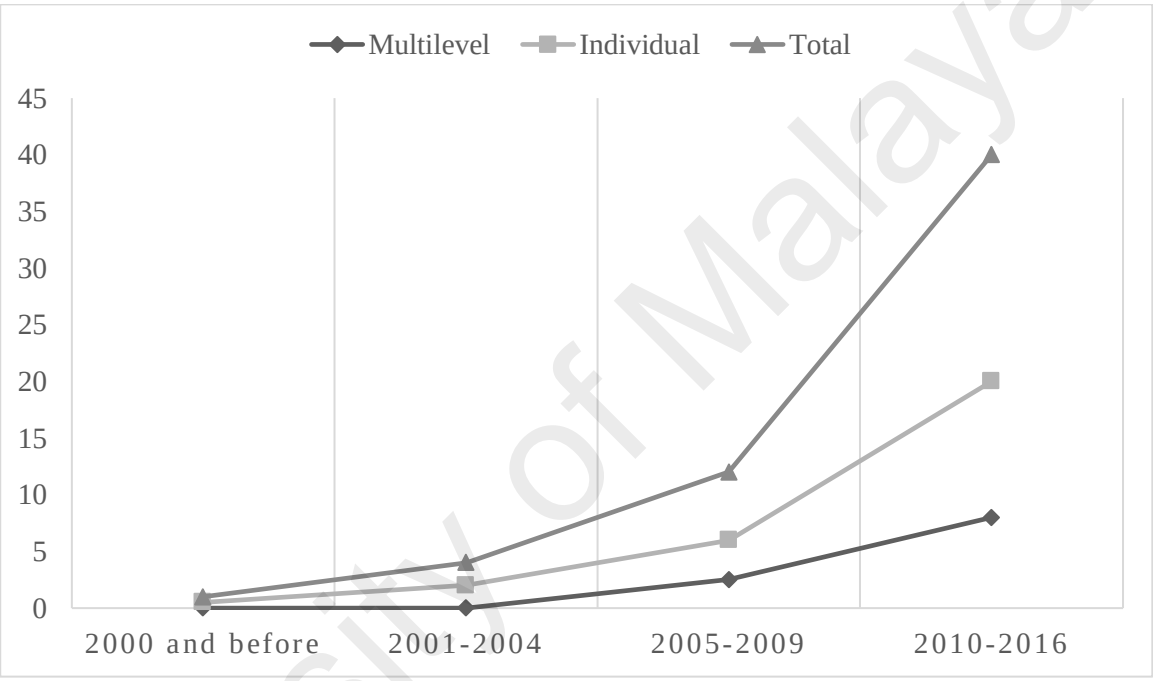

Figure 2.5: The number of publication of climate-health studies by year.

2.5.4 Review of the previous climate-health studies

This review focused on investigating the extant literature on climate and workplace health issues. Specifically, current review sought to know the research design and methodology used in this area of research and how it contributes to the current knowledge pool. This chapter provided a more systematic approach in reviewing the outcomes included in previous climate- health studies, their methods of collecting data and the geographical region of their sample selection. With the increased interest in innovation method of organisational research, this review provided a comprehensive understanding of what have been done and what are yet to be explored in this line of inquiry.

2.5.4.1 Physical vs psychological health outcomes

Since the last century, prior workplace health and safety research happened to focus more on psychological health rather than physical health (not injuries) (Cole & Bedeian, 2007; Lansisalmi & Kivimaki, 1999). For example, Veld and Van De Voorde (2014) using cross-sectional survey found the negative relationship between climate and job strain; Idris et al. (2012) posited that psychosocial safety climate is able to predict emotional exhaustion and psychological distress better than physical safety climate; and more recently, Arcury et al. (2015) studied the longitudinal effect of safety climate on workers' stress. This phenomenon may due to the risen of awareness in the detrimental impact of workplace stressors towards one's inner world. Most of the studies had provided the evidence on the relationship between climate and both stress and burnout, supporting the notion that working environment is crucial for workers' health. Unfortunately, other than burnout, stress and depression, lesser studies had been done to investigate other aspects of psychological health, such as anxiety, anger, and negative affect (Burns & Machin, 2013; Idris & Dollard, 2011; Sinokki et al., 2009). Yet, these symptoms can be indicated as the pre-signal of worker burnout or depression. Similar to the idea of micro-accident (i.e. accident which required minor treatment) (D Zohar, 2000), these variables are leading to negative impact on both employees and the organisation (e.g. Idris & Dollard, 2011), which may also lead to onset of physical health problems such as cardiovascular disease (Watkins et al., 2013).

The climate studies on physical health also provided evidence on the relationship of climate and physical health. These studies have largely depended on the sickness absence as the outcomes. McCaughey et al. (2013) and Kivimäki et al. (2001) found that climate is related to sickness absence, both self-reported and company registered. Although sleeping issues, fatigue, and perceived health are equally studied, the work lost days may be the most obvious and easiest way to measure an individual's health. Nonetheless, it

should not be neglected that sickness absence may be due to both physical or psychological factors (Bakker, Demerouti, & Sanz-Vergel, 2014). Self-reported sickness absence may also involve some recall bias which need to be tackled carefully (Ferrie et al., 2005).

2.5.4.2 Objective vs subjective data

Common method bias has always hampered social behavioural research which largely relied on self-reported data (Podsakoff, MacKenzie, & Podsakoff, 2012; Podsakoff & Organ, 1986; Spector, 2006). It is often believed that self-reported data will inflate the research findings (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). However, most of the research have built up the knowledge of climate-health relationship by using this method (e.g. Bjerkan, 2011; Devonish, 2013). In addition, some researchers posited that self-report data as the best tool to measure private experience such as feelings (Conway & Lance, 2010). Nonetheless, when common method bias is one of the most discussed flaw of self-reported data, it is important to increase the variability of data sources, such as observation, third-party rating, objective data et cetera. It is true that these data are more time-consuming and challenging during data interpretation and objective data is sometimes hardly obtained due to the confidentiality and privacy of one organisation. But this is not impossible. As evidence, Kao et al. (2014) obtained the employees' sick leave record from the company database and found that caring climate moderated the relationship between work-related stressors and sick leave. Similarly, Sinokki et al. (2009) had conducted a research in investigating the association of team climate and workers' depressive disorder assessed by trained interviewers. Both studies have confirmed the role of climate in influencing workers' health beyond self-reported data. Despite using different data collection approaches, it is also recommended that a more complex research design and analysis could help reduced the common method bias.

2.5.4.3 Research design and level of analysis

To improve the knowledge and confirm theoretical frameworks, research designs such as longitudinal study, triangulation and diary method have been introduced. Researchers are urged to conduct longitudinal study for causal link confirmation for several reasons. Firstly, cross-sectional research which are the main-stream study is often regarded as limited owing to its inability to infer causal relationship between variables. Often, this kind of research design could not tell exactly on which variables come first and which one followed. For example, several studies that proposed climate as the antecedent of health outcome found the evidence by using cross-sectional study (Aytac & Dursun, 2012; Idris et al., 2012; Sliter et al., 2014). Ironically, both the study of McCaughey et al. (2013) which proposed workplace injuries and illnesses as an antecedent of job stress via safety climate and the study by Lansisalmi and Kivimaki (1999) which proposed stress as antecedent of innovative climate gained an adequate statistical significance in both relationships, too. Apart from that, it is argued that some strain needs a longer time to emerge (Dormann & Zapf, 2002). A support for this notion is the study of Idris et al. (2014) revealing that psychosocial safety climate fails to predict depression three months later but in another study, Ylipaavalniemi et al. (2005) found that team climate is related to depression two years later. Noted that the former study has measured PSC at organisational-level but the latter measured team climate at individual-level.

Apart from the prolonged effect that researchers are interested in, some studies also pay attention to a shorter term of individual' affective states. It is argued that human's feelings or performance can fluctuate from time to time, day to day, depending on what we experience within the day (Ohly, Sonnentag, Niessen, & Zapf, 2010). Diary study is a method which could capture these fluctuations. Although this is not a relatively new concept (Surawy & Cox, 1987), the popularity of diary research in organisational research is only started around a decade ago (Ohly et al., 2010). In this review, only Garrick et al.

(2014) provided the evidence of psychosocial safety climate buffering the effect of daily job demands and fatigue by using diary study. The premise of this momentary method has expanded the common individual unit of analysis to include a within-individual unit, which requires a multilevel analysis.

Level of analysis is another commonly discussed issue in organisational research. Given the notion of organisation as a multilevel system, it is argued that the usage of multilevel analysis is appropriate to assess the phenomenon within an organisation. The meso-theory suggested that an individual is influenced by the teams he/she belongs to, which this team working under being a subunit nesting in an organisation with varied goals and strategies (Mathieu et al., 2007). These goals and policies are often based on the current national policy, trade union, and societal expectation. Put it simply, an individual's health, feelings, experience and behaviours are highly related to the contextual factors around him/her. Aligned with this, Western scholars have recently reviewed and posited that organisational climate should be more appropriately measured at an upper level giving that "climate is both conceptually and practically a unit and/or organisational attribute" (Schneider et al., 2011a, p. 34). With the advanced of analysis software and techniques to date, researchers are able to tell more about the distal influence of a climate towards individual's outcomes.

2.5.4.4 Sample selection

Most of the previous studies, particularly those using sound research design such as diary study and longitudinal research have been done in the Western countries. There is no disputing the fact that whilst the advanced technology and education system in developed Western countries have encouraged the conduct of such research, it seems that researchers pay too little heed on the developing and underprivileged one, where high occupational risks are reported. Apart from that, several researchers have documented

that individualism- organization (Hofstede & Minkov, 2010). By which culture also refers to collective phenomenon in different types of job and social classes (Hofstede & Minkov, 2010). For example, (Erez, 2010) reported that job autonomy and performance feedback are more valued by members of individualistic society compared to collectivistic. This highlighted the importance to design a specific work model based on the cultural backgrounds. Thus, it is important to conduct research on different sample from who share different cultures.

2.5.5 Future research recommendations

Albeit to what researchers have done so far, more work need to be continued to further examine the potential effect of work climate on employees in the wider world by using various innovative research methods and design, as well as in the sample selection.

2.5.5.1 Using novel research designs and multiple sources of data

Advanced research design including multilevel modelling, diary method, dyad study and retrospective event history as well as content analysis of archival data may be used to gather more information regarding the climate-health relationship and to detect some overlooked variables. As most of the studies have been conducted in quantitative approach which depends on certain assumptions or background of study, there are potential incorrect inferences or overlooked details underlying the proposed framework. Using different research approaches will help to address this issue. Another concern of current organisational safety and health research is the lack of actual involvement and practices from employers and stakeholders. Thus, it is necessary to go beyond a mere academic discussion to establish stronger evidence and devote effort into intervention studies.

2.5.5.2 Variety of sample selection and cross-national study

Over these years, climate-health research has been dominant by Western scholars, who mostly come from the developed countries. This leads to the issues of generalising the findings onto non-Westernised countries in other continents. As mentioned by Kortum and Leka (2014), more research, particularly multilevel study should be done to deal with the occupational health and safety concerns in developing countries. More work is required to redefine the strategies and interventions in developing countries due to the influence of different cultures and paradigms. This also apply to a wide range of occupations which have yet to be involved in climate-health study such as those from banking, mass media, mining and forestry. Cross-national or multi-national study will be useful to help multinational organisations to implement appropriate and useful intervention by taking into account the differences between and within countries.

2.5.5.3 Integrating physical and psychological aspects of health

As what have been found, most safety related construct were studied with health outcomes, there are less studies that have explicitly involved both aspects of physical and psychological health with physical and psychosocial safety climate. It is perceived that to be very important to assess both aspects at the same time due to the closely related linkage between one's psychological condition and physical well-being (Armon, Melamed, Shirom, & Shapira, 2010; Armon, Shirom, Shapira, & Melamed, 2008; Toker, Melamed, Berliner, Zeltser, & Shapira, 2012). It is also likely that future research should link multiple climate together in investigating their competing effect on certain health outcomes as researchers have recommended (Kuenzi & Schminke, 2009; Schneider et al., 2011a). By this researcher should able to inform the main target of intervention for workers' well-being.

2.6 Conclusion of Chapter 2

As shown in the review, psychosocial safety climate and safety climate are found as the two mostly discussed facet-specific climates linking with workplace health concerns. This review provided a systematic way to understand the methodology used by the researchers in exploring the possible influence of work climate and workers' health. This chapter also addresses some limitations of these methodology and future research recommendations. Methodology used in current study is presented in Chapter 3.

CHAPTER 3 : METHODOLOGY

3.1 Introduction of Chapter 3

This chapter highlights the methodology used in this study. It is divided into five sections including research design, research procedures, participants, measurements, and data analysis procedure. Detailed explanation of the research design used and how the research was conducted is provided.

3.2 Research Design

Generally, this study is best described as a cross-sectional quantitative multilevel study where the survey was done at one-time point. Self-reported survey design was chosen because of its ability to provide a wide range and detailed information of private human experience, feelings and perception for the researchers (Chan, 2009; Conway & Lance, 2010). Although individual survey dominated psychological and social science research in the past, recently, organizational researchers urge to shift into multilevel research design due to the nature of organization as a hierarchical system. Kozlowski and Klein (2000) argued that it is important to consider the influence of upper level factor towards the lower level workers. In the context of the current study that mainly focuses on organizational climate, majority of scholars in this area argue the best appropriate approach is by using a multilevel design (Yammarino & Dansereau, 2011; D Zohar & Luria, 2005). This is derived from the assumption organizational climate is refer to "shared employees' perception" toward their working environment' (Schneider, Ehrhart, & Macey, 2013; Schneider & Reichers, 1983). Specifically, the research emphasizes on how upper-level organizational climate has its influence on individual-level outcomes. Thus, the current study used the multilevel two safety climate constructs (i.e. psychosocial safety climate and physical safety climate) and working conditions (i.e.

emotional demands, cognitive demands, and rewards) are treated as multilevel constructs, while job satisfaction, work engagement, burnout, psychological distress, turnover intention, and job performance were categorized as individual construct. By using this approach, the research able to evaluate a cross-level effect of PSC and physical safety climate on the individual-level health outcomes through team-level working conditions.

3.3 Sampling technique and sample size

As present study specifically focuses on healthcare employees who are working in a teaching hospital, the current study employed purposive sampling to approach the participating teams. This approach has been used in several multilevel research in the past (Idris et al., 2012; Idris et al., 2015). As several researchers had reported that simple random sampling produces a very low response rate among Malaysians (Ali, Abdullah, & Subramaniam, 2009) and is not cost-efficient for multilevel design (Snijders & Bosker, 2012). Prior to data collection, permission from the management of hospital was obtained to conduct the survey. The researcher then approach all the wards, clinics and departments in the hospital with at least five workers from each ward (Mathieu & Taylor, 2007), resulting in a total of 88 target workgroups (either wards, clinics or departments). Due to the complexity of multilevel sample size calculation (Scherbaum & Ferreter, 2009), all the possible workgroups were approached to participate in the study. As asymptotic assumption is used in multilevel analysis (Maas & Hox, 2005), large sample for the upper level of analysis are required (Snijders & Bosker, 2012). However, the number for team remains inconsistent. For example, Scherbaum and Ferreter (2009) suggested that a ratio 40/20 (40 groups with 20 participants each) will achieve a statistical power more than .90. Level 2 sample is desirably close to 100. Recently, a simulation study (Mathieu, Aguinis, Culpepper, & Chen, 2012) found that at least 25 teams at upper level with more than 15 per team is appropriate. Since the number of group is more influential than the number

of individuals (Maas & Hox, 2005), a higher number of groups with smaller number of individuals is expected to achieve the appropriate power as well. Therefore, the sample size in the study is adequate statistical power and consistent with recommendation from previous studies (Mathieu et al., 2012; Paccagnella, 2011; Scherbaum & Ferreter, 2009). The questionnaires were collected from each workgroup after two weeks from the date of distribution. The questionnaire was distributed to the nurses of targeted group randomly and collected from head nurses. A total of 951 respondents from 74 workgroups (5-20 respondents per workgroup) returned the questionnaire with a response rate of 71.18% for individual (out of a total of 1336 target individual participants) and 86.05% for teams. Non-monetary honorarium had been given to the participants to encourage participation.

3.4 Participants

This study was conducted among 951 participants from 74 workgroups which comprised wards, clinics and departments within a Malaysian teaching hospital. The hospital is located at Kuala Lumpur, Malaysia. A workgroup in the study was defined as a subunit where a team of people who consists different roles and responsibilities, working interdependently towards the same organisational goals and having an identifiable leader (Kozlowski & Ilgen, 2006). Participants including healthcare workers (e.g. nurses, nursing assistants, doctors, dietitians) who work together with other medical staffs and are responsible for medical support and treatment to the patients.

3.5 Study variables and instruments

A self-report questionnaire (Appendix A) was used to assess the safety climate constructs and working conditions at the workplace as well as to gather the demographic details and health outcomes of the participants. Some of the scales were translated by

Idris et al (2012) including PSC-12, emotional demands and emotional exhaustion. Information of these scales was summarized in Table 3.1 (page 121). All the other questions had been translated into Malay language by using back translation (Brislin, 1970; Weeks, Swerissen, & Belfrage, 2007). Both translators are trained in psychology background and have a good command of both English and Malay. The first translator has translated the English version of the scale translated into Malay while the second translator translated back the Malay version scales into English without have any knowledge on the English version scale. Both translations were compared and discrepancies were solved by discussion between both translators.

3.5.1 Socio-demographic characteristics

Age, gender, ethnicity, marital status, working position, duration of employment, employment status, and sickness history of the participants were asked in the questionnaire.

3.5.2 Psychosocial safety climate (PSC)

PSC was assessed by using a 12-item Malay version of the PSC-12 (Idris et al., 2012) derived from the original English version (Hall et al., 2010). PSC-12 is assessing four domains of PSC framework: organizational communication, organizational participation, management priority and management commitment. Each sub-scale consists of 3 items. Given the high correlation between each sub-scale in Confirmatory Factor Analysis (CFA), ranging from $r = .73$ to $r = .88$ (as shown in Figure 3.1), all of the scale I combined together as one sub-scale. An example item is: "Psychological well-being of staff is a priority for this organisation". All items were added together, high scores indicating high PSC. The measure uses a 5-point Likert scale with responses ranging from *1 = strongly disagree* to *5 = strongly agree*. The total mean score obtained was 42.39. The Malay version of PSC has been widely used (Idris et al., 2015; Idris et al., 2014; Yulita et al., 2014) and psychometric properties for the scale has been reported in previous studies

(Hall et al., 2010; Law et al., 2011) as well as discriminant validity from other related measures (Idris et al., 2012). High internal consistency was also reported by using other Malaysian samples which ranging from alpha (α) value .89 to .92 (Idris et al., 2012; Idris et al., 2015). The composite α-value of this scale in current study was .93.

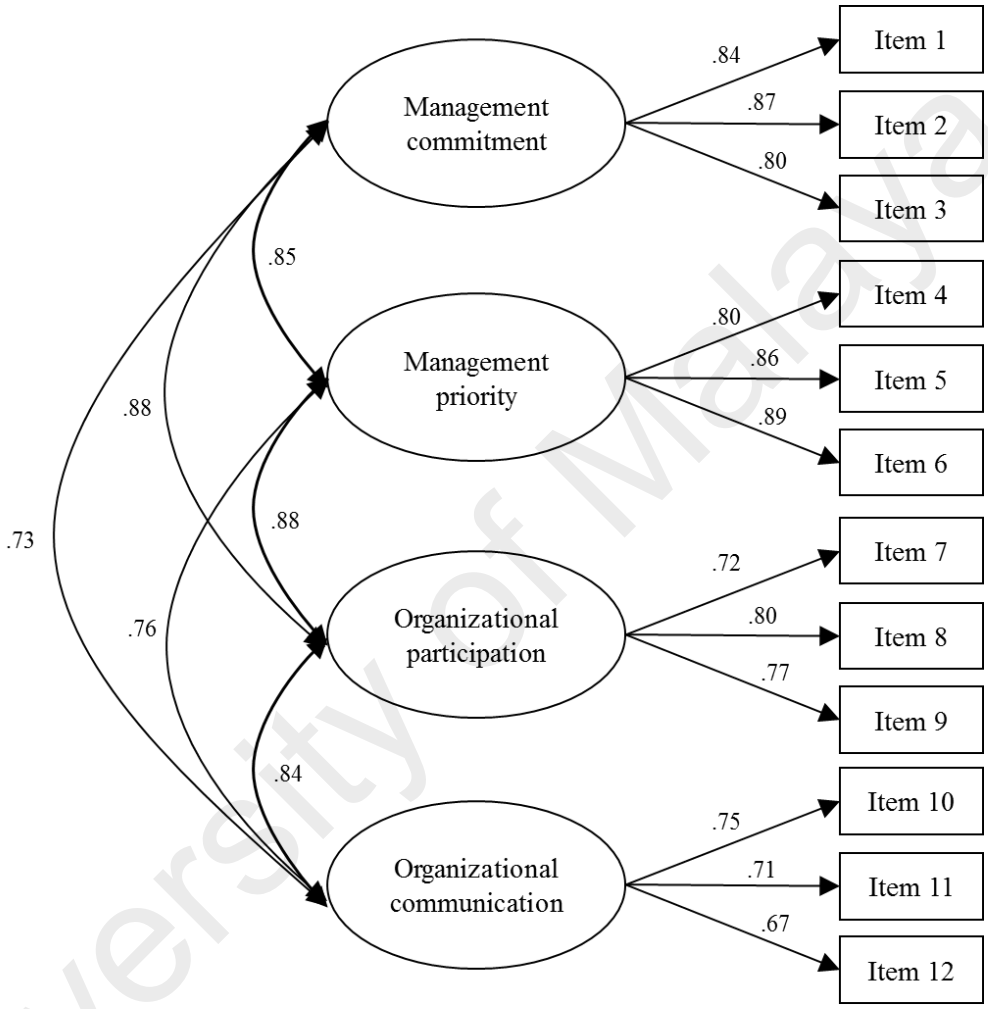

Figure 3.1: Sub-scales of PSC.

3.5.3 (Physical) safety climate

This was assessed using three items from the safety climate scale (Neal & Griffin, 2006). Items were: "Management considers physical safety to be important"; "Physical safety is given a high priority by management"; and "Management places a strong emphasis on workplace physical health and safety". A 5-point Likert scale ranging from *1=strongly disagree* to *5=strongly agree* is used for this scale. Previous study has

reported the psychometric properties of this scale and a good reliability of α = .95 (Neal & Griffin, 2006). Reliability for the scale in a current study is adequate (α = .83).

3.5.4 Emotional demands

This was assessed using the four items emotional demand sub-scale of the Copenhagen Psychosocial Questionnaire (COPSOQ; Kristensen et al., 2005). COPSOQ was developed aiming to measure psychosocial factors at work. The reliability of the scale is good as reported in previous studies by using Malaysian samples, ranging from α = .76 to α = .83 (Idris et al., 2012; Idris et al., 2014). Each item of the emotional demands scale was asked by using a 5-point scale (*1=never/hardly ever, 5=always*). Example of the items are: "Does your work require that you get personally involved?" and "Do you get emotionally involved in your work?". (for this study α = .78).

3.5.5 Cognitive demands.

This measure was derived from the National Institute for Occupational Safety and Health (NIOSH) generic job stress questionnaire (National Institute for Occupational Safety and Health, 1997). In total, four items were asked using a 4-point scale (*1 = strongly disagree* to *4 = strongly agree*). Good internal consistency (ranging from α = .68 to α = .95) and construct validity were reported in previous study (Hurrell & McLaney, 1988). An example of the item is: "My job requires me to remember many different things." Adequate internal consistency was found in current study with α = .68.

3.5.6 Rewards

These were assessed using the 5-item reward subscale of the Effort–Reward Imbalance questionnaire (Siegrist, 1996), which have good psychometric properties as reported in (Siegrist et al., 2004) Previous studies showed high internal consistency of the scale ranging from α = .70 to α = .88. An example of the item is: "Considering all my efforts and achievements, I receive the respect and prestige I deserve at work." Responses were on a 4-point scale (*1 = strongly disagree* to *4 = strongly agree*) (for this study α = .61).

3.5.7 Emotional exhaustion

This was measured using five items of Malay translated exhaustion scale (Idris et al., 2012) adapted from the Maslach Burnout Inventory-General Survey (MBI-GS) (Schaufeli et al., 1996). Good psychometric properties were reported with alpha-value ranging from .87 to .91 (Idris et al., 2012; Idris et al., 2014). An example of the item is: "I feel used up at the end of the workday". A 7-point scale is used for this scale (*0 = never* to *6 = everyday*) (for this study α = .90).

3.5.8 General health complaints.

The general health complaints scale was altered and abbreviated from the Patient Health Questionnaire-15 (PHQ-15) (Kroenke, Spitzer, & Williams, 2002). Good psychometric properties of high internal consistency α = .80 and construct validity were reported in previous studies (Gierk et al., 2015; Hauser, Brahler, Wolfe, & Henningsen, 2014; Kroenke et al., 2002). Six items were used to measure the health status of participants in the previous four weeks, with items comprising "cold", "headache", "muscular pain", "back pain", "fatigue" and "dizziness". A 5-point scale is used to measure symptoms (*1=never/hardly ever* to *5=always*) (for this study α = .87).

Table 3.1: Psychometric properties of the scales in previous studies.

Variables	Scales used	Reliability from previous studies (α)
Psychosocial safety climate	PSC-12 (Hall et al., 2010)	.89 - .92
Physical safety climate	Neal & Griffin's (2006) measure	.95
Emotional demands	Copenhagen Psychosocial Questionnaire (COPSOQ; Kristensen et al., 2005)	.76 - .83
Cognitive demands	National Institute for Occupational Safety and Health (NIOSH) generic job stress questionnaire (National Institute for Occupational Safety and Health, 1997).	.68 - .95
Rewards	Effort–Reward Imbalance questionnaire (Siegrist, 1996)	.70 - .88
Emotional exhaustion	Malay translated exhaustion scale (Idris et al., 2012) adapted from the Maslach Burnout Inventory (MBI) (Schaufeli et al., 1996).	.87 - .91
General health complaints	Abbreviation of the Patient Health Questionnaire-15 (PHQ-15) (Kroenke et al., 2002).	.80

3.6 Statistical analysis

Several statistical software's were used in the current study. First, data were analyzed by using the Statistical Packages for Social Sciences (SPSS) 20. SPSS 20 was used to perform some preliminary analysis, including data screening, reliability and validity checking, frequencies and descriptive data analysis. Then, AMOS 20 was used to perform confirmatory factor analysis between the two safety-related climates (i.e. PSC and physical safety climate). Finally, to test all hypotheses, a multilevel Hierarchical Linear Modeling 7 (student version) software was used. Data has been screened to ensure there is no error during the data entry process. It is confirmed that missing values is at random

by performing the Little's Missing Completely at Random (MCAR) test and there are no outliers, both univariate and multivariate. Missing values have been replaced by means. Normality was checked by using Q-Q plot.

3.6.1 Data aggregation

As PSC and physical safety climate are considered through a team's shared perception, several tests were run including one-way random analysis of variance (ANOVA), intra-class correlation (ICC[1]) and within-group agreement (r_{WG}) (James, Demaree, & Wolf, 1984) to ensure that these constructs possessed team-level features. ANOVA and r_{WG} was performed by using SPSS while ICC (1) was calculated by using HLM. Results has been reported in Chapter 4.

3.6.2 Hypothesis testing

To test all hypotheses, the hierarchical linear modelling (HLM) software (Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2011) was used. First, the data was standardized at both individual and team level to make it equivalent among different scaled variables (Mathieu & Taylor, 2007). Then by using full information maximum likelihood (FIML), a multilevel analysis was performed. Following recent recommendation (Aguinis, Gottfredson, and Culpepper (2013), the deviance of the model (-2 log likelihood) and its pseudo R^2 also have been reported in the result tables. Deviance allows the researcher to compare the best improvement models, while pseudo R^2 enable to explain the effect size of the model.

In contrast to individual analysis, the mediation testing in a multilevel design is argue as complicated. Dollard, Opie, et al. (2012) noted that when PSC is operationalized as a group level construct it only varies between Level 2 work units and "cannot be associated with differences across people within units" (p. 393) — which refers to individual health

outcomes (i.e. emotional exhaustion and general health complaints) in current study. As recommended by Zhang, Zyphur, and Preacher (2009), between-group mediation effects should be of interest to researchers when considering mediation effects that arise from group level constructs. To take into consideration the possibility of a confounding effect with a 2-1-1 model in multilevel mediation (where 2-1-1 model represents that Level-2 antecedents affecting Level-1 mediator and in turn influences Level-1 outcome), a 2-2-1 model was chosen in the current study but the results of both levels-of-analysis are reported for comparison between levels (Zhang et al., 2009).

First, the mediational path of antecedent, $X \rightarrow$ mediator, M and $M \rightarrow$ consequences, Y in the proposed model were tested. To test Hypotheses 1 and 2, emotional demands, cognitive demands, and rewards were regressed on PSC and physical safety climate (PhySC in equations) simultaneously. However, the researcher omitted further analysis on cognitive demands since there are no relationship between PSC and safety climate on this variable (see Chapter 4 Table 4.5). An example equation is:

$$\textit{Emotional demands} = \beta_0 + r$$

$$\beta_0 = \gamma_{00} + \gamma_{01}(\textit{PSC}) + \gamma_{02}(\textit{PhySC}) + u_0$$

Next, Hypothesis 3 which predicted the relationship between job characteristics and emotional exhaustion was tested. In this model, emotional exhaustion was regressed on emotional demands and rewards to reveal between-groups effects.

$$\textit{Emotional exhaustion} = \beta_0 + r$$

$$\beta_0 = \gamma_{00} + \gamma_{01}(\textit{Emotional demands}) + \gamma_{02}(\textit{Rewards}) + u_0$$

The same model was used to analyse the relationship of job characteristics and general health complaints (Hypothesis 4).

$$\textit{General health complaints} = \beta_0 + r$$

$$\beta_0 = \gamma_{00} + \gamma_{01}(\textit{Emotional demands}) + \gamma_{02}(\textit{Rewards}) + u_0$$

To understand the mediation effect in Hypotheses 5 and 6, emotional exhaustion was regressed on job characteristics and safety climates measures. The researcher repeated similar model for general health complaints.

$$Emotional\ exhaustion = \beta_0 + r$$

$$\beta_0 = \gamma_{00} + \gamma_{01}(PSC) + \gamma_{02}(PhySC) + \gamma_{03}(Emotional\ demands) + \gamma_{04}(Rewards) + u_0$$

and

$$General\ health\ complaints = \beta_0 + r$$

$$\beta_0 = \gamma_{00} + \gamma_{01}(PSC) + \gamma_{02}(PhySC) + \gamma_{03}(Emotional\ demands) + \gamma_{04}(Rewards) + u_0$$

To test the significance effect of the mediation, Monte Carlo bootstrapping was used as it was argue as for the best approach for multilevel mediation (Preacher & Selig, 2012). The cut off value of 95% confidence interval (CI) and 20,000 bootstrap replications were used, and significance was confirmed when there was no zero in the confidence intervals (CIs) (Preacher & Selig, 2008).

3.7 Ethical consideration

Prior to conducting the study, an ethical approval was obtained from the University Malaya Medical Centre Ethical Committee to undergo this research among the hospital staffs (Appendix B). Full written consent was obtained from each participant prior to the study. Identity of the participant was kept highly confidential.

3.8 Conclusion of Chapter 3

This chapter provides the details of the methodology used in current study. By using multilevel hierarchical linear modeling, the research findings of current study are further elaborated in Chapter 4.

CHAPTER 4 : RESULTS

4.1 Introduction of Chapter 4

This chapter has included the research findings of the study. Descriptive findings, Pearson bivariate correlation between each variables, Cronbach alpha, ANOVA F-value and ICC (1)s were reported together. Then, the results from multilevel analysis using hierarchical linear modelling is presented.

4.2 Socio-demographic characteristics of participants

A total of 951 healthcare workers from 75 wards/clinics/nursing department in a Malaysian teaching hospital were involved in this study. Among the participants were 692 nurses, 247 nursing assistants and eight other healthcare professionals, including four doctors, three physiotherapists and one dietician, while four other participants did not indicate their designation. Most participants were female (88.5%), with ages ranging from 20–59 years (median = 34, standard deviation [SD] = 9.86). 881 participants were Malays (92.6%), 14 Chinese (1.5%), 41 Indians (4.3%) and 9 from other ethnic groups (0.9%). 6 of them did not indicate their ethnicity. In terms of marital status, more than 70% of the participants were married (672 participants), followed by 252 single (26.5%), 14 widows and widowers, 9 had divorced (0.9%), and the rest did not indicate their marital status. They worked an average of 44.19 (SD=5.37) hours per week. Of the participants, 92.5% were permanent staff with only 53 being contract workers. The further details of participants are presented in Table 4.1.

Table 4.1: Frequencies and descriptive data of the participants

		n(%)	Mean (SD)
Occupation	Nurse	692 (72.8)	
	Nursing assistants	247 (26.0)	
	Others	8 (0.8)	
	Not indicated	4 (0.4)	
Gender	Male	107(11.3)	
	Female	842(88.5)	
	Not indicated	2 (0.2)	
Ethnicity	Malay	881 (92.6)	
	Chinese	14 (1.5)	
	Indian	41 (4.3)	
	Others	9 (1.0)	
	Not indicated	6 (0.6)	
Marital status	Single	252 (28.5)	
	Married	672 (70.7)	
	Divorce	9 (0.9)	
	Widow/Widower	14 (1.5)	
	Not indicated	4 (0.4)	
Education level	Primary	3 (.3)	
	Secondary	243 (25.6)	
	Diploma/STP	630 (66.3)	
	Cert	27 (2.8)	
	Bachelor	46 (4.8)	
	Not indicated	2 (0.2)	
Employment status	Permanent	880 (92.5)	
	Contract	53 (5.6)	
	Not indicated	18 (1.9)	
Shiftwork	Yes	592 (62.3)	
	No	337 (35.4)	
	Not indicated	22 (2.3)	
Employment years			11.41(9.07)
Working hours/week			44.19(5.37)

N = 951, 74 teams

4.3 Reliability and validity of variables

To ensure that each scale is measuring their respective construct, reliability analysis was conducted for all the variables. The results suggest that each variable is reliable as reported above. Then the exploratory factor analysis (EFA) was conducted to ensure each item lay within its own constructs (Table 4.2). Given the close relationship between psychosocial safety climate (PSC) and physical safety climate, Pearson correlation, r >.50 (Table 4.4), confirmatory factor analysis of PSC and physical safety climate has been conducted.

The results as shown in Table 4.3 showed that the two-factor model (chi-square, χ^2 = 924.99; degree of freedom, *df* = 89; goodness-of-fit index [GFI] = .88; comparative fit index [CFI] = .90; Tucker–Lewis index [TLI] = .88; root mean square error of approximation [RMSEA] = .10) is a better fit than the one-factor model (χ^2 = 1746.06, *df* = 90, GFI = .79, CFI = .81. TLI = .77, RMSEA =.14, $\Delta(df)/\chi^2$ = 1/821.07, p < .001). In general, a cut-off value of GFI, TLI, and CFI higher than .90 and RMSEA less than .08 is acceptable (Marsh, Hau, & Wen, 2004). The larger the value of GFI, CFI and TLI and the smaller the value of RMSEA indicates better fit (Byrne, 2000). As shown in the Table 4.3, the Chi-square scores and RMSEA were significantly increased in the one-factor model followed by the decrease in other model fit indexes. This confirms that both climates are different constructs from each other.

Table 4.2: Exploratory factor analysis of constructs.

	Component						
	1	2	3	4	5	6	7
PSC1	.760						
PSC2	.792						
PSC3	.794						
PSC4	.613						
PSC5	.798						
PSC6	.812						
PSC7	.757						
PSC8	.775						
PSC9	.784						
PSC10	.707						
PSC11	.576						
PSC12	.559						
SC1						.702	
SC2						.822	
SC3						.767	
ED1					.625		
ED2					.821		
ED3					.790		
ED4					.693		
OR1							.486
OR2							
OR3							.723
OR4							.824
OR5							.601
CD1				.876			
CD2				.870			
CD3				.883			
CD4							
EE1		.770					
EE2		.805					
EE3		.839					
EE4		.800					
EE5		.795					
GH1			.554				
GH2			.786				
GH3			.790				
GH4			.767				
GH5			.714				
GH6			.770				

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Note: PSC = psychosocial safety climate; SC = physical safety climate; ED = emotional demands; OR = rewards; CD = cognitive demands; EE = emotional exhaustion; GH = general health complaint.

Table 4.3: Confirmatory factor analysis between PSC and physical safety climate.

Model	χ^2	*df*	GFI	CFI	TLI	RMSEA	$\Delta df/\Delta \chi^2$
One-factor model	1746.06	90	.79	.81	.77	.14	
Two-factor model	924.99	89	.88	.90	.88	.10	1/821.07***

4.4 Correlation between each variable at both individual and team level

Table 4.4 shows the results of descriptive analysis and Pearson bivariate correlations between the variables at both individual level and team-level. Except insignificant relationship between PSC/Safety climate with cognitive demands at team level, all the other variables show a good correlation. As indicated in the table 4.4, most of the variables were associated with each other at individual and/or team level. The significant correlation between the variables indicates the preliminary relationship among all the variables and justified further analysis.

4.5 Interrater reliability and within-group agreement of team-level variables

The results of one-way random analysis of variance (ANOVA), F-values and intra-class correlations ICC (1)s for each variable are showed in Table 4.4. ICC (1) were found to be higher than .05 (.12 for PSC and .05 for physical safety climate); both climate measures showed an adequate level of variance due to the team; 12% of the variance in PSC and 5% of the variance in physical safety climate was due to random team factors. Values between .05 to .20 are appropriate for justification multilevel analysis (Peugh, 2010). The need for multilevel analysis was further justified by significant F-values from one-way random ANOVA for both climate measures. For within-group agreement it is suggested that $r_{WG} > .70$ for each climate measure would indicate its suitability for data aggregation (Mathieu & Taylor, 2007) and $r_{WG} > .90$ considered as very high within-group agreement (LeBreton & Senter, 2007). The mean of r_{WG} for PSC was .97 (standard error [SE] = .02) while for physical safety climate, r_{WG} was .92 (SE = .04). These results

suggest that both PSC and physical safety climate show group level properties, and that it was appropriate to consider them as team level constructs, and that they could be aggregated to the team level accordingly. Likewise, emotional demands, cognitive demands and rewards have also been tested with one-way random ANOVA, F-value and ICC (1), justifying the aggregation of the data. Significant F-value were reported together with ICC (1) of emotional demands, cognitive demands and rewards ranging from .07 - .09.

4.6 Results of hypotheses testing

The findings of the HLM analysis are presented in Tables 4.5 – 4.7 and summarised in Figure 4.1. The tables presented all the results from the testing, both at individual- and team- level, as recommended by Zhang et al. (2009).

4.6.1 The association between safety-related climate and job demand

Hypothesis 1 predicted that psychosocial safety climate (PSC), but not physical safety climate, has a significant cross-level effect on emotional demands and cognitive demands, with this shown in Table 4.5. This hypothesis was partially supported with PSC negatively related to emotional demands (γ = -.28, SE = .12, $p < .01$) but not significant to cognitive demands (γ = -.19, SE = .16, ns). Physical safety climate showed no significant relationship with both emotional demands (γ = -.05, SE = .16, ns) and cognitive demands (γ = .22, SE = .14, ns).

4.6.2 The association between safety-related climate and job resources

Hypothesis 2 predicted that PSC, and not physical safety climate, is positively related to resources (i.e. rewards), with support for this prediction found in this study (γ = .25, SE = .12, $p < .05$). Physical safety climate is not significant relationship with rewards (γ = .27, SE = .14, ns).

Table 4.4: Means, standard deviations, Pearson correlations, F-values and ICC (1)s.

Variables	M	SD	α	1	2	3	4	5	6	7	F(III)	ICC (1)
Psychosocial safety climate	3.56	.56	.93	1	.55**	-.34**	-.08	.35**	-.35**	-.49**	2.66**	.12
Physical safety climate	3.92	.55	.83	.52**	1	-.23*	.07	.34**	-.14	-.20	1.67**	.05
Emotional demands	2.40	.76	.78	-.21**	-.14**	1	.19	-.46**	.53**	.46**	2.51**	.07
Cognitive demands	3.19	.42	.68	-.01	.09**	.06	1	-.13	.27*	.22	2.35**	.07
Rewards	2.67	.34	.61	.34**	.24**	-.18**	-.11**	1	-.40**	-.33**	2.18**	.09
Emotional exhaustion	2.97	1.49	.90	-.24**	-.19**	.36**	.08**	-.26**	1	.60**	2.46**	.11
General health complaints	2.51	.79	.87	-.20**	-.08*	.30**	.10**	-.19**	.30**	1	2.13**	.09

Values below the diagonal indicates correlation at the individual-level, whereas values above diagonal indicates the team-level.

N = 951, 74 teams. *$p < .05$, **$p < .01$.

4.6.3 The association between job demands, resources and emotional exhaustion

Hypothesis 3a predicted that demands are positively related to emotional exhaustion (Table 4.6). Current findings supported this hypothesis with a significant relationship found between emotional demands and emotional exhaustion at Level-2 ($\gamma = .50$, SE = .11, $p<.001$) and at Level-1 ($\gamma = .29$, SE = .04, $p < .001$). Hypothesis 3b proposed that resources are negatively related to emotional exhaustion. It has found a significant relationship between rewards and emotional exhaustion at the individual level ($\gamma = -.18$, SE = .03, $p < .001$) but not the team level ($\gamma = -.19$, SE = .11, ns)

4.6.4 The association between job demands, resources and general health complaints

Hypothesis 4 predicted that (a) demands are positively affecting general health complaints while (b) resources are negatively related to general health complaints. It was found that emotional demands were again significantly related to general health complaints at both levels (Level-1: $\gamma = .25$, SE = .04, $p < .001$; Level-2: $\gamma = .39$, SE = .13, $p < .01$). This supports Hypothesis 4a. Meanwhile, rewards were significantly related to general health complaints only at Level-1 ($\gamma = -.11$, SE = .03, $p < .01$) but not level-2 ($\gamma = -.17$, SE = .11, ns), partially supporting Hypothesis 4b.

4.6.5 The mediational effect of working conditions

Hypothesis 5 expected that PSC but not physical safety climate is negatively related with emotional exhaustion, mediated by (a) job demands and (b) resources. Partial support to Hypothesis 5 was found with significant relationship between emotional demands ($\gamma = .46$, SE = .11, $p < .001$), but not rewards ($\gamma = -.16$, SE = .13, ns), and emotional exhaustion. The between-group effects of emotional demands were stronger than its within-group effects in the model ($\gamma = .29$, SE = .04, $p < .001$). A significant mediational effect of emotional demands between the relationship of PSC and emotional

exhaustion was revealed by using Monte Carlo stimulation method (95% CI, LL= -.2731, UL= -.0189), with the parameter estimate of *X(L2) →Y(L1)* in Model 4a and between-group effects of *M(L2) →Y(L1)* in Model 4c.

Hypothesis 6 predicted that PSC but not physical safety climate is related with general health complaints mediated by working conditions. This was partially supported with emotional demands significantly related to general health complaints in the mediational model (γ = .33, SE = .12, p< .05) but rewards not (γ = -.10, SE = .11, ns). The between-group effects of emotional demands were again found over and above its within-group effect (γ = .25, SE = .04, p < .001). Monte Carlo test was run by using parameter estimates from Model 5a and Model 5c, revealing a significant mediation effect between PSC and general health complaints, with this relationship mediated by emotional demands (95% CI, LL= -.2127, UL= -.0073). This supports Hypothesis 6.

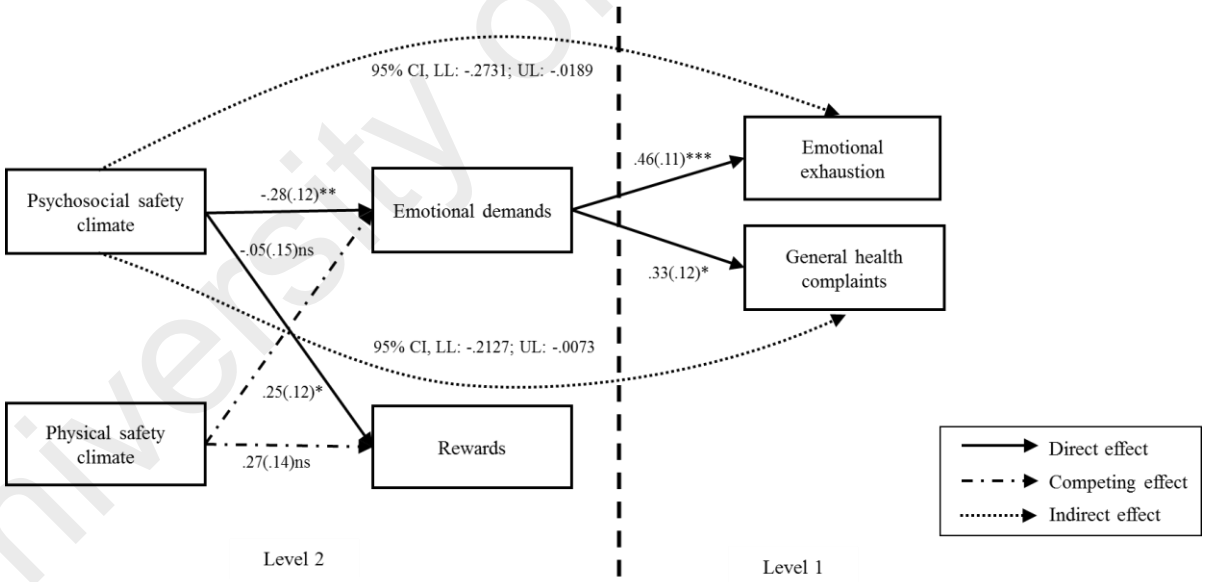

Figure 4.1: Final research model.

4.7 Conclusion of Chapter 4

The results of this study have been presented in details. Most of the hypotheses are partially or completely supported. The next chapter further discussed the results and the underlying reasons.

Table 4.5: Between-group effects of safety climate measures on working conditions.

	Outcomes					
	Emotional demands		Cognitive demands		Rewards	
	Null Model	Model 1	Null model	Model 2	Null model	Model 3
Level 1 (Within-groups effects)						
Intercept	-.01(.04)	.00(.04)	.00(.04)	.00(.04)	.02(.05)	.00(.04)
Level 2 (Between-groups effects)						
Psychosocial safety climate		-.28(.12)**		-.19(.16)		.25(.12)*
Physical safety climate		-.05(.15)		.22(.14)		.27(.14)
Variance components						
Within-team (L1) variance (σ^2)	.94	.94	.93	.93	.91	.91
Intercept (L2) variance (T_{00})	.06	.05	.07	.06	.09	.06
Additional information						
-2 log likelihood (FIML)	2681.68	2671.84	2677.08	2673.96	2664.70	2648.43
No. of estimated parameters	3	5	3	5	3	5
Pseudo R^2	0	.00	0	.00	0	.01

N = 951, 74 teams. *p < .05; **p < .01; ***p < .001

Table 4.6: Within-and between-group effects on emotional exhaustion.

	Emotional exhaustion as the outcome			
	Null model	Model 4a	Model 4b	Model 4c
Level 1 (Within-groups effects)				
Intercept	-.01(.05)	.00(.05)	-.02(.04)	-.02(.04)
Emotional demands				.29(.04)***
Rewards				-.18(.03)***
Level 2 (Between-groups effects)				
Psychosocial safety climate		-.39(.12)**	-.22(.12)	-.22(.12)
Physical safety climate		.05(.16)	.11(.13)	.10(.13)
Emotional demands			.46(.11)***	.46(.11)***
Rewards			-.17(.13)	-.16(.13)
Variance components				
Within-team (L1) variance (σ^2)	.89	.89	.89	.75
Intercept (L2) variance (T_{00})	.11	.08	.04	.05
Slope (L2) variance (T_{11})				.02
Intercept-slope (L2) covariance (T_{01})				.01
Additional information				
-2 log likelihood (FIML)	2657.97	2646.11***	2624.13***	2490.97***
No. of estimated parameters	3	5	7	14
Pseudo R^2	0	.00	.01	.06

N = 951, 74 teams. *p < .05; **p < .01; ***p < .001

Table 4.7: Within-and between-group effects on general health complaints.

	General health complaints as the outcome			
	Null model	Model 5a	Model 5b	Model 5c
Level 1 (Within-groups effects)				
Intercept	-.01(.05)	.01(.04)	-.01(.04)	-.01(.04)
Emotional demands				.25(.04)***
Rewards				-.11(.03)**
Level 2 (Between-groups effects)				
Psychosocial safety climate		-.43(.13)**	-.30(.13)**	-.30(.12)*
Physical safety climate		.05(.16)	.09(.14)	.08(.15)
Emotional demands			.33(.12)*	.33(.12)*
Rewards			-.13(.11)	-.10(.11)
Variance components				
Within-team (L1) variance (σ^2)	.92	.92	.92	.82
Intercept (L2) variance (T_{00})	.08	.05	.03	.04
Slope (L2) variance (T_{11})				.02
Intercept-slope (L2) covariance (T_{01})				.01
Additional information				
-2 log likelihood (FIML)	2672.94	2655.80***	2643.32***	2557.78***
No. of estimated parameters	3	5	7	14
Pseudo R^2		.01	.01	.04

N = 951, 74 teams. *p < .05; **p < .01; ***p < .001

CHAPTER 5: DISCUSSION

5.1 Introduction

This chapter consists of a discussion on the research findings of this study. This study seeks to determine how two types of team-level safety climates, namely, the Psychosocial Safety Climate (PSC) and the Physical Safety Climate might influence employee health. It contributes to the literature by simultaneously investigating these two types of climate, as suggested by recent researchers (Kuenzi & Schminke, 2009; Schneider et al., 2011). By using a multilevel analysis (Kozlowski & Klein, 2000) and a meso-mediational design (Mathieu & Taylor, 2007), the current study tested PSC theory using the extended theoretical framework. In addition, by integrating the physical safety climate at the upper level, it sought to investigate the possible impact of both types of safety climate on working conditions and individual health outcomes. Specifically, it was proposed that PSC has a greater impact than physical safety climate on improving the health of workers by lowering the risks of emotional exhaustion through lower job demands (i.e. emotional demands and cognitive demands) and higher resources (i.e. rewards). Using theories and previous evidence, this chapter provides the possible explanation of how and why the results occurred. The general findings are presented first followed by a discussion on each hypothesis and links to previous research evidence. In addition, the study presents new insights on the topic.

5.2 General discussion on research findings

As expected, the current research findings have discovered that the psychosocial safety climate (PSC), and not the physical safety climate influences job characteristics (i.e. emotional demands and rewards) and indirectly relates to individual outcomes (i.e. emotional exhaustion and general health complaints). Using PSC as the upper level resource to affect the design of a working condition, will consequently influence a

workplace's health and safety issues. It is posited that in a high PSC context, top management and leaders place emphasis on their workers' psychological condition, and consider how to create a psychologically safe environment which will eliminate work aspects that have a negative impact on their workers. In other words, the PSC reduces job demands (e.g. emotional demands, workload, time pressure). Not only does it decrease job demands, but leaders or supervisors with a high sense of PSC will feel responsible to provide help and support for their workers to reduce the detrimental effects of job demands by allocating useful resources (e.g. learning opportunities, social support and rewards).

PSC serves as an organisation's safety signal (Dollard et al., 2012), alerting workers as to whether it is "safe" or "secure" to approach and utilize the resources. For instance, in a high PSC context, a worker is more likely to approach their supervisor for emotional support and consultation as well as requesting a promotion or salary increment for they believe that their supervisor values and understand their psychological needs. This finding, that PSC has greater impacts on a worker's psychological than the physical safety climate, is in line with what Idris et al. (2012) reported in their study featuring Australian and Malaysian samples. This is most probably due to its unique focus on the workers' psychological well-being by encouraging job resources and reducing job demands.

Additionally, the current results support the view that team-level job characteristics mediate the impact of the psychosocial safety climate on workers' health status. Although most of the previous studies using the JD-R model mainly investigated job characteristics at an individual level (Bakker & Xanthopoulou, 2013; Brauchli, Schaufeli, Jenny, Füllemann, & Bauer, 2013; Hakanen, Schaufeli, & Ahola, 2008), more recently an argument has been put forward that postulates that job characteristics may also reside at team level (Albrecht & Kalliath, 2012; Hetty van Emmerik, 2008; Tims, Bakker, Derks, & van Rhenen, 2013). The logical assumption as to why job characteristics can be

attributed to the team level, and not just at an individual level is due to the fact that specific teams may have their own unique job demands (i.e. time pressure, psychological demands) and job resources (i.e. supervisory support, co-workers support). As tasks were distributed at team level (in this case a ward), current study argued that team members (i.e. nurses and nursing assistants) would be exposed to a similar level of job demands. Likewise, team factors such as the amount of support offered by the team leader and the team's cohesiveness, become team resources, implying a certain impact to individual outcomes (Westman, Bakker, Roziner, & Sonnentag, 2011).

Current study also proposed that team-level job characteristics could explain the individual variance of health outcomes. In line with previous research, this study found evidence that PSC as an antecedent of working conditions, including emotional demands and a reward creating environment, either enhanced or caused a deterioration in workers' well-being (Dollard & Bakker, 2010; Idris & Dollard, 2011). Supervisors or team leaders who have a high sense of PSC adjust the level of demands and provide sufficient resources for their workers in the team unit as scholars proposed that managers are responsible for the design of a job (Yukl & Fu, 1999). In contrast, managers who don't have a sincere concern for their workers' well-being (i.e. low PSC) will be reckless about enacting suitable managerial practices and will neglect ameliorating the hazardous work environment. The variety of managerial practices and ideas results in different demands and the level of resources between teams. The mediational effect of team-level job characteristics on the relationship between PSC and employees' health outcomes, thus reflects that team managers or supervisors are important when designing favourable working condition in their groups.

5.3 PSC but not physical safety climate as the predictor of working conditions and workers' health

The study also supports previous research which shows how robust the PSC is as the antecedent of one's working conditions. As job design is influenced by leaders in the work context (Johns, 2010; Lee, Idris, & Delfabbro, 2016), it also concurs that in a high PSC context where the managers or the leaders are concerned about their workers' psychological well-being, jobs will be designed in a way that allows the workers to cope with the demands of those jobs. Leaders are/should be responsible to allocate and adjust team job demands to ensure the workers are able to manage. At the same time, leaders prepare resources which help to boost positive well-being among the workers. In other words, PSC as the upper-level factor is a precursor to working conditions. Dollard and Bakker (2010) argued that PSC is an indicator of working conditions, which is amply supported by other researchers (e.g. Dollard, Opie, et al., 2012; Idris & Dollard, 2011; Law et al., 2011; Yulita et al., 2014). While a manager or a member of a top management team puts a high level of concern on workers' health and well-being, indirectly they will influence emphasis being placed on designing favorable working conditions, providing adequate job resources for workers and creating an environment which allows them to freely and securely utilize resources to cope with their demands. In contrast, the physical safety climate does not relate to working conditions. The logic of this may be due to the emphasis placed on the safety climate to ensure a physically safe environment in the workplace which refers to workplace ergonomics and design but not to the nature of the job itself. Yet, organizations with high PSC are more considerate in balancing demands and resources which relate to psychosocial factors such as emotional demands and rewards. Top management team of these organizations will provide a workplace characterized by low emotional demands and adequate rewards as they realize the importance of working conditions on workplace health and safety.

The current findings also challenge the general view of PSC as the predictor of working conditions. To be specific, the findings show that team-level PSC is not able to predict cognitive demands in workplaces. A possible reason for this is the matching hypothesis (Daniels & de Jonge, 2010; de Jonge & Dormann, 2003) which proposes that job demands and job resources best predict workers' well-being in clusters (i.e. emotional, cognitive or physical). For example, burnout has been found to mediate the relationship between emotional demands and depression (Idris et al., 2014). It is possible that PSC, with its psychosocial emphasis, is best at predicting job demands and job resources which relate to emotions and feelings (e.g. work pressure, emotional demands and harassment, as demands with social support, and job control and rewards, as resources). It is noteworthy that previous research has shown that PSC is able to predict a cognitive resource, namely learning opportunities (Idris et al., 2015). Chrisopoulos, Dollard, Winefield, and Dormann (2010) found that although matching hypothesis able to provide the significance impact on a large extent of demands-strain relationship, non-match hypothesis had its own imperatives. Nonetheless, the matching hypothesis may explain some of the variations in the relationship between PSC and cognitive demands.

5.4 Working conditions and health outcomes

In line with the JD-R model, current finding found that high job demands (i.e. emotional demands and cognitive demands) and low job resources (i.e. rewards) contribute to emotional exhaustion. This finding supports previous studies which have shown that high job demands and lack of job resources trigger psychological strain. The current study is consistent with previous research on the positive effect of high job demands on the emotional exhaustion of workers (Bakker, Demerouti, de Boer, & Schaufeli, 2003; Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007; Westman et al., 2011). Emotional demands require individuals to invest their energy to deal with negative

moods or to handle difficult emotions, while cognitive demands force individuals to stay focused and to concentrate on a situation and, at times, to work things out by using their memories. In conservation of resources (COR) theory, it is proposed that the individual deploys their resources to cope with demands (Hobfoll & Freedy, 1993). With the loss of resources, the individual feels threatened and uneasy and is thus brought to a state of exhaustion.

The findings support the view that within-group rewards help to reduce the likelihood of emotional exhaustion, indicating the importance of enhancing resources in workplaces. Rewards are one of the common job resources available that allow workers to gain satisfaction in the workplace and to compensate them for their contribution to their work (Maslach, Schaufeli, & Leiter, 2001; Siegrist, 1996). By being rewarded for certain efforts in the workplace, workers are filled with happiness and feelings of self-worth. Mark and Smith (2012) found that rewards were negatively related to nurses' psychological health issues including depression and anxiety. But this is not true for between-group rewards, which may indicate that the effect of rewards is subjective rather than collective.

It was also found that there is a significant link between emotional demands and workers' general health complaints, suggesting the impact of working conditions on physical health. The possible reason behind this finding may be due to the impact of emotional demands causing feelings of exhaustion which leads to headaches, body tension and other psychosomatic symptoms. It has been shown in prior studies, that emotional exhaustion is linked to physical health such as fatigue, musculoskeletal complaints and cardiovascular disease, the logic of working conditions being associated with physical health may require further investigation into the possible pathway it takes.

5.5 Working conditions mediated the relationship of PSC and workers' health

The current study's findings on the mediation effects of working conditions supports findings in previous studies. Previous research has suggested that working conditions act as mediators between psychosocial safety climate and emotional exhaustion, and through emotional exhaustion, workers' physical health is affected. (Bailey et al., 2015; Dollard et al., 2012; Idris et al., 2014). Current research, on the other hand, suggests that the impact of PSC towards both a worker's psychological and physical health is mediated through different working conditions between groups. Psychosocial safety climate, as an organizational factor, influences the design of working conditions, changing the perceived environment among workers and, in turn, affecting the workers' health. The results of this study support this view, by having found that within-group emotional demands and rewards had a significant mediation effect, on the relationship between each type of safety climate and emotional exhaustion. While the study focuses mainly on the between-group effect of working conditions, current findings suggest that it was between group emotional demands, but not rewards, that was mediating the relationship between PSC and health outcomes. This is aligned with the results of Dollard, Opie et al., (2012), suggesting that the impact of collective emotional demands is strong enough to affect a workers' health outcome.

5.6 Limitations of the study

Notwithstanding the innovative theoretical framework in this study, the following limitations need to be considered. The first limitation is the use of the subjective self-rated questionnaire which may lead the study into common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Podsakoff & Organ, 1986). However, by using multilevel modelling, author aggregated the data and assessed the between-group variances, thus diminishing the possible flaw of common method bias. Apart from that,

conducting a factor analysis, ensured an adequate number of variables in the current study. In addition, low correlation between each construct is found except for the correlation between PSC and Physical Safety Climate. To check this, author performed a confirmatory factor analysis (CFA) with results showing two latent factors were concluded. Thus, common method bias should not be a major flaw in this study.

The second limitation is that the study was cross-sectional which makes it impossible to draw the relationship causality. Some researchers have argued that a cross-sectional study could not provide the exact relationship between the variables, and would fail to predict the causal effect of the variables. However, ample evidence has proven that PSC and physical safety climate are the antecedents of job strain. Likewise, several studies have revealed that PSC is the lead indicator of job resources and job demands. This proved that the current research model was on the right track. However, a two or three-wave longitudinal study is recommended for future research in this area in order to gain a deeper understanding of the mediational pathway in the study.

The third limitation is that the majority of the study's samples were nurses and nursing assistants which may lower the ability of the study to be generalized to other healthcare professions. Given the variety of job scopes in different professions, the roles of different types of safety climate and job resources, as well as job demands, may differ accordingly. This sample with large proportion on nurses also limits the comprehension of the relationship between safety climate and health in other professions.

Another issue to consider is that this study used snowball sampling rather than a random sampling method. Hence, the findings may not be representative of other professions and those from different cultural backgrounds. However, as mentioned in Chapter 4, simple random sampling methods were not cost-efficient for a multilevel study (Snijders & Bosker, 2012). As the current study's main interest is on the people within the group, simple random sampling seems to ignore the natural hierarchical structure of

the organization. In addition, simple random sampling produced a very low response rate of around 10-20% among Malaysians in in previous studies (Ali, Abdullah, & Subramaniam, 2009). Using random sampling may not be able to yield the sufficient sample size required for a multilevel analysis, which is at least 30 teams of 5 people, as suggested by Scherbaum and Ferreter (2009). Small sample size may have a very low statistical power and high Type_I Error (i.e. incorrect rejection of a true null hypothesis). This explains why purposive sampling was used to select the participatory teams and was followed by snowball sampling of individual participants within the teams.

5.7 Strengths of the study

Despite the aforementioned limitations, this current study innovates in several ways. First, it is the first study to investigate the simultaneous effect of both safety-related climates on physical and psychological health outcomes. Previous researchers (Bronkhorst & Vermeeren, 2016; Idris et al., 2012) who included both constructs in their studies tended to only focus on either the physical or psychological health outcome. Hence, the current study is able to contribute by presenting a new insight into the competing effect between the physical safety climate and the psychosocial safety climate. Secondly, the present study was conducted among frontline healthcare workers in Malaysia. This is a population that is exposed to a high risk of occupational safety and health issues. With a large sample size and innovative study design, the current findings have provided information and given a better understanding of the roles of both the physical and psychosocial safety climates on reducing healthcare workers' safety and health problems. The current study is also able to provide information about how team-level working conditions contribute to individual outcomes by using a multilevel analysis. Overall, this study contributes to the literature by extending the current safety climate framework and utilizing advanced research design and analysis.

5.8 Conclusion of Chapter 5

This chapter has discussed the current study's research findings and the possible theories or logic behind each phenomenon. Generally, this research further supports some prior evidence on how PSC presages working conditions and its robustness in affecting workers' physical and psychological health. Furthermore, it is superior to physical safety climate in predicting emotional exhaustion, as well as general health complaints which may be caused by the psychosomatic effect. The theoretical and practical implications of this study are presented in Chapter 6, together with future research recommendations.

CHAPTER 6: CONCLUSION

6.1 Introduction of Chapter 6

This chapter provides a brief summary of current study and then discusses how this study contributes to the extant literature on safety-related constructs. Specifically, the theoretical and practical implications of current findings is presented, followed by the recommendations for future research to broaden and advance the PSC theory and understanding on occupational health.

6.2 Brief summary of the study

As workplace safety and health issues are often being discussed by both researchers and practitioners, the risks factors at workplaces which is affecting workers' health have become a worldwide concern. While developing countries are suffering from the poorly designed workplace intervention (Kortum & Leka, 2014; Kortum et al., 2010), developed countries such as US, Britain, Australia, and Japan were working hard to ensure their workers a good working conditions and to cut down the financial loss due to workplace safety and health issues. As reported by several governmental departments, an enormous amount of financial expenses has been spent on workplace illness and accidents (see Chapter 1) (Health and Safety Executive, 2015; Michaels, 2015; Safe Work Australia, 2015) pushing the investigation on how to improve it. Over the years, researchers are eager to find out the "cause of the causes" of the workplace hazards and found that both physical and psychosocial risks factors are involved for this.

By conducting a systematic literature review (Chapter 2 section 2.5, page 51), I found that previous studies have established a strong foundation on the relationship between work climate and workers' health outcomes, both physically and psychologically. Of this, psychosocial safety climate and physical safety climate are two mostly used to test with

burnout, depression, sickness absence and other related outcomes. Two safety related constructs are included in current research to examine their impact on workers' physical and psychological health. This study employed a multilevel meso-mediational framework. It tested on how two safety related constructs, namely psychosocial safety climate (PSC) and physical safety climate, related to workers' health outcomes through working conditions. Current study proposed that PSC is related to workers' psychological health while physical safety climate is related physical injuries. Of this, working conditions such as emotional demands and rewards act as the mediators of the relationship between safety climates and health outcomes (see Chapter 1 section 1.8, page 30)

Considering the potential confounding effect of 2-1-1 model (which refers to testing predictors at Level-2, and both mediators and outcomes at Level-1), current study followed the suggestions of Zhang et al. (2009) by using a 2-2-1 model. In other words, current study is interested to know the between-group mediational effect of working conditions on the relationship between safety constructs and workers' health. Each upper level variables (i.e. PSC, physical safety climate, emotional demands, cognitive demands and rewards) had been tested with its appropriateness for aggregation (Chapter 4 section 4.5, page 128) The non-independence (Bliese, 2000) of Level 1 outcomes had confirmed by using ICC (1) (see Table 4.5, page 134) showing that the variance due to group-factor are high, again justifying the usage of 2-2-1 model. Further analysis by using hierarchical linear models showed that PSC but not physical safety climate was related to working conditions and health outcomes, supporting the hypotheses. Yet, it is also found that only emotional demands but not rewards at team level mediating the relationship between PSC and both exhaustion and general health complaints.

6.3 Theoretical implications

Theoretically, current research has extended the current climate research by studying two safety-related climates simultaneously with a multilevel design, revealing the robustness of PSC in relating workers' health status through job demands and job resources. This study have further supported the notion of PSC as the lead indicator of workers' psychological health (Dollard & Bakker, 2010) and proved that it is even more salient than the physical safety climate (Idris et al., 2012) when associated with workers' health generally. Different from the theory of physical safety climate, the main assumption of PSC is that "PSC presages work conditions" (Dollard, Opie, et al., 2012, p. 399). This study confirmed that psychosocial safety climate, as an organisational factor which can influence the design of working conditions, changing the perceived environment among workers and, in turn, affecting in workers' psychological health (Bailey et al., 2015; Dollard, Opie, et al., 2012; Idris et al., 2014).

6.4 Practical Implications

Previous research in Malaysia by Idris et al. (2012) reported a low PSC mean score among Malaysian private-sector workers of 26.03. Surprisingly, current study found a high PSC mean score of 42.39, which is higher than the recommended benchmark of a PSC of 41 for low risk of poor work conditions and psychological health problems such as depression (Bailey et al., 2014). The different PSC results may due to the different nature of jobs involved in the study. The awareness of the importance in taking care of workers' psychological health may be greater among healthcare workers attributable to their constant contact with other human being, exposure to higher risks of emotional demanding environment (e.g. life-death issues). Private sectors with organizational goals of creating high profit margins may pay less attention on psychological conditions among the workers. The practical implications are that although on average the teams in the

hospital sample are high on PSC, there are some teams that score lower than this (27%). PSC works as a "safety signal" in a unit or an organization indicating the level of psychological security of workers and is able to ameliorate the negative effect of psychosocial hazards such as emotional demands and lack of resources. More work should be done to improve the PSC by considering training and selection of supervisors and middle managers who value worker psychological health, and endeavour to construct working contexts that are not too emotionally demanding (e.g. getting too involved with patients' emotions) and that are rewarding (e.g. gain recognition and promotion) too. This can be achieved by allowing nurses to withdraw temporarily from difficult patients when they are too exhausted and having another nurse to help out or by providing recognition and acknowledgement for his/her effort.

For safety climate, current study chose a measure which focuses more on management priority, similar to one of the PSC's factors, the management priority. Moreover, beyond the analyses shown in current study, author also computed the items of psychosocial safety climate under the management priority domain and compared it to the physical safety climate mean score. It was found that management priority on PSC is lower than the mean score of physical safety climate. This suggests that physical safety climate is higher than PSC in the Malaysian context, replicating the findings of Idris et al. (2012). It may be a matter of emphasis too since the physical safety climate is in general higher than PSC, so psychological health could become a priority of the hospital. It may be the case that external demands impinging on the hospital (increased patient demands) means that team leaders have little control over the situation. However, there are clearly some team leaders who were able to achieve high PSC nevertheless, so lessons could be learned from those leaders.

6.5 Recommendations for future research

To provide a more comprehensive understanding on the relationship between safety-related construct on workers' psychological and physical health, several recommendations are given to future researchers. This includes utilising both quantitative and qualitative approaches in data collection such as objective measurements (e.g. financial returns, sales performance, cortisol level), third-party ratings, observation, interview and focus groups. For example, it will be useful to use biological markers to indicate one's health status. Biological markers such as cortisol level, blood pressure level, antibodies level is accurate in reflecting individual body condition. Again, by using variety of data sources would provide further validation and understanding on the model tested. Using qualitative approach can, on the other hand, tests the possible uncovered variables in particular theories and hence advance the existing framework. Qualitative methods may better in capturing the difference of behavioural process attributed to cultural or contextual influences (Spector, Liu, & Sanchez, 2015).

Secondly, more complex research design such as longitudinal or shortitudinal study should be applied to extend the comprehension on the temporal effect of the organisational phenomenon and behaviours. Longitudinal study will be essential for investigating the effects of certain variables over time while shortitudinal study can be used when one is interesting to capture the fluctuation of variables within a short period (e.g. one day or few hours). It is suggested that assessments from two time-point might be enough for the causal link confirmation but three-wave longitudinal could provide a more comprehensive understanding for full-mediational relationship (Cole & Maxwell, 2003). Along with this, researchers should be careful in choosing appropriate time lag between the data collection to capture the maximum effect of antecedents and its outcomes (Dormann & Griffin, 2015). It is often that the time lag chosen is of conventional reasons, yet an explicit explanation on how and why the time lag has been

chosen should be provided by the researchers in terms of construct, methodology, epistemology, study mechanisms and so on (Dormann & Van de Ven, 2014)

On the other hand, it is suggested to further examine the model among heterogenous sample or other healthcare professionals such as pharmacists, doctors, radiotherapists or mental health counsellors. As noted previously, this study consists of mostly nurses. The effect of the models on other professions may be beyond the study's generalizability. In addition, the nature of different jobs may provide different working conditions which require detailed exploration. It is worthwhile to test the safety climate with a more comparable measure with PSC (e.g. Idris et al., 2012) for avoiding the possible unfair comparison due to the different coverage of both measures (Cooper & Richardson, 1986).

6.6 Conclusion of Chapter 6

This study contributes to the literature by testing two different types of safety climate at the same time, thus possibly helping to confirm the unique contribution of each safety climate to workplace health and safety. It is found PSC to be the better and stronger constructs for workers' health in comparison to physical safety climate from the findings. In addition, it confirmed that PSC but not physical safety climate is related to working conditions and individual health outcomes in the workplace. This reflects that low level of PSC may cause a hazardous working condition with high demands and low resources, turning to the likelihood of workers' experience both physical and psychological injuries. Current findings suggested that PSC should be the main target in intervention designing for occupational hazards prevention. It is believed that evidence from this study will help both policy makers and practitioners in organisational job design and practical intervention.

REFERENCES

Aboa-Eboule, C., Brisson, C., Maunsell, E., Bourbonnais, R., Vezina, M., Milot, A., & Dagenais, G. R. (2011). Effort-reward imbalance at work and recurrent coronary heart disease events: a 4-year prospective study of post-myocardial infarction patients. *Psychosomatic Medicine, 73*(6), 436-447. doi:10.1097/PSY.0b013e318222b2d8

Afsharian, A., Zadow, A., & Dollard, M. F. (2016). Psychosocial safety climate from two different cultural perspectives in the Asia Pacific: Iran and Australia Hospitals In A. Shimazu, R. B. Nordin, M. F. Dollard, & J. Oakman (Eds.), *Psychosocial Factors at Work in the Asia Pacific: From Theory to Practice* (pp. 187-201). Switzerland: Springer.

Aguinis, H., Gottfredson, R. K., & Culpepper, S. A. (2013). Best-Practice Recommendations for Estimating Cross-Level Interaction Effects Using Multilevel Modeling. *Journal of Management, 39*(6), 1490-1528. doi:10.1177/0149206313478188

Albrecht, S. L., & Kalliath, T. (2012). The influence of job, team and organizational level resources on employee well‐being, engagement, commitment and extra‐role performance. *International Journal of Manpower, 33*(7), 840-853. doi:10.1108/01437721211268357

Ali, H., Abdullah, N. A. C., & Subramaniam, C. (2009). Management practice in safety culture and its influence on workplace injury: An industrial study in Malaysia. *Disaster Prevention and Management, 18*(5), 470-477. doi:10.1108/09653560911003660

Anderson, N., & West, M. A. (1998). Measuring climate for work group innovation: Development and validation of the team climate inventory. *Journal of Organizational Behavior, 19*, 235-258.

Arbuckle, J. L. (2011). *Amos 20 User's Guide*. Chicago: SPSS.

Arcury, T. A., Trejo, G., Suerken, C. K., Grzywacz, J. G., Ip, E. H., & Quandt, S. A. (2015). Work and Health Among Latina Mothers in Farmworker Families. *Journal of Occupational and Environmental Medicine, 57*(3), 292-299. doi:10.1097/jom.0000000000000351

Armon, G., Melamed, S., Shirom, A., & Shapira, I. (2010). Elevated burnout predicts the onset of musculoskeletal pain among apparently healthy employees. *Journal of Occupational Health Psychology*, *15*(4), 399-408. doi:10.1037/a0020726

Armon, G., Shirom, A., Shapira, I., & Melamed, S. (2008). On the nature of burnout-insomnia relationships: a prospective study of employed adults. *Journal of Psychosomatic Research, 65*(1), 5-12. doi:10.1016/j.jpsychores.2008.01.012

Arnetz, B. B., Lucas, T., & Arnetz, J. E. (2011). Organizational Climate, Occupational Stress, and Employee Mental Health: Mediating Effects of Organizational Efficiency. *Journal of Occupational and Environmental Medicine, 53*(1), 34-42. doi:10.1097/JOM.0b013e3181ffo5b

Aytac, S., & Dursun, S. (2012). The effect on employees of violence climate in the workplace. *Work-a Journal of Prevention Assessment & Rehabilitation, 41*, 3026-3031. doi:10.3233/wor-2012-0559-3026

Bacharach, S. B., & Bamberger, P. A. (2007). 9/11 and New York city firefighters' post hoc unit support and control climates: A context theory of the consequences of involvement in traumatic work-related events. *Academy of Management Journal, 50*(4), 849-868.

Bailey, T. S., Cheng, Y., Idris, A., & Arphorn, S. (2016). Macro-Level Policy and Practice Relating to Psychosocial Factors at Work in the Asia Pacific. 45-59. doi:10.1007/978-3-319-44400-0_3

Bailey, T. S., Dollard, M. F., McLinton, S. S., & Richards, P. A. M. (2015). Psychosocial safety climate, psychosocial and physical factors in the aetiology of musculoskeletal disorder symptoms and workplace injury compensation claims. *Work and Stress, 29*(2), 190-211. doi:10.1080/02678373.2015.1031855

Bailey, T. S., Dollard, M. F., & Richards, P. A. (2014). A national standard for psychosocial safety climate (PSC): PSC 41 as the benchmark for low risk of job strain and depressive symptoms. *Journal of Occupational Health Psychology, 20*(1), 15-26. doi:10.1037/a0038166

Bakker, A. B., Brummelhuis, L. L. t., Prins, J. T., & Heijden, F. M. M. A. v. d. (2011). Applying the job demands–resources model to the work–home interface: A study among medical residents and their partners. *Journal of Vocational Behavior, 79*(1), 170–180. doi:10.1016/j.jvb.2010.12.004

Bakker, A. B., & Demerouti, E. (2007). The Job Demands-Resources model: State of the art. *Journal of Managerial Psychology, 22*(3), 309-328. doi:10.1108/02683940710733115

Bakker, A. B., & Demerouti, E. (2016). Job Demands-Resources Theory: Taking Stock and Looking Forward. *J Occup Health Psychol*. doi:10.1037/ocp0000056

Bakker, A. B., Demerouti, E., de Boer, E., & Schaufeli, W. B. (2003). Job demands and job resources as predictors of absence duration and frequency. *Journal of Vocational Behavior, 62*(2), 341-356. doi:10.1016/s0001-8791(02)00030-1

Bakker, A. B., Demerouti, E., & Sanz-Vergel, A. I. (2014). Burnout and Work Engagement: The JD–R Approach. *Annual Review of Organizational Psychology and Organizational Behavior, 1*(1), 389-411. doi:10.1146/annurev-orgpsych-031413-091235

Bakker, A. B., Demerouti, E., & Schaufeli, W. B. (2005). The crossover of burnout and work engagement among working couples. *Human Relations, 58*(5), 661-689. doi:10.1177/0018726705055967

Bakker, A. B., Hakanen, J. J., Demerouti, E., & Xanthopoulou, D. (2007). Job resources boost work engagement, particularly when job demands are high. *Journal of Educational Psychology, 99*(2), 274-284. doi:10.1037/0022-0663.99.2.274

Bakker, A. B., Van Emmerik, H., & Van Riet, P. (2008). How job demands, resources, and burnout predict objective performance: a constructive replication. *Anxiety, Stress & Coping, 21*(3), 309-324. doi:10.1080/10615800801958637

Bakker, A. B., & Xanthopoulou, D. (2013). Creativity and charisma among female leaders: the role of resources and work engagement. *The International Journal of Human Resource Management, 24*(14), 2760-2779. doi:10.1080/09585192.2012.751438

Bedi, A., Courcy, F., Paquet, M., & Harvey, S. (2013). Interpersonal aggression and burnout: The mediating role of psychological climate. *Stress and Health: Journal of the International Society for the Investigation of Stress, 29*(5), 350-359. doi:10.1002/smi.2476

Bernal, D., Campos-Serna, J., Tobias, A., Vargas-Prada, S., Benavides, F. G., & Serra, C. (2015). Work-related psychosocial risk factors and musculoskeletal disorders in hospital nurses and nursing aides: a systematic review and meta-analysis. *Int J Nurs Stud, 52*(2), 635-648. doi:10.1016/j.ijnurstu.2014.11.003

Beus, J. M., Payne, S. C., Bergman, M. E., & Arthur, W. (2010). Safety climate and injuries: an examination of theoretical and empirical relationships. *J Appl Psychol, 95*(4), 713-727. doi:10.1037/a0019164

Bjerkan, A. M. (2011). Work and health: A comparison between Norwegian onshore and offshore employees. *WORK-A Journal of Prevention Assessment & Rehabilitation, 40*(2), 125-142. doi:10.3233/wor-2011-1214

Bliese, P. D. (2000). Within group-agreement, non-independence, and reliability. In K. J. Klein & S. W. J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations* (pp. 349-381). San Francisco, US: Jossey-Bass, A Wiley Company.

Bliese, P. D., & Jex, S. M. (2002). Incorporating a multilevel perspective into occupational stress research: Theoretical, methodological and practical implications. *Journal of Occupational Health Psychology, 7*(3), 265-276. doi:10.1037//1076-8998.7.3.265

Bond, S. A., Tuckey, M. R., & Dollard, M. F. (2010). Psychosocial safety climate, workplace bullying, and symptoms of posttraumatic stress. *Organization Development Journal, 28*(1), 37-56.

Brauchli, R., Schaufeli, W. B., Jenny, G. J., Füllemann, D., & Bauer, G. F. (2013). Disentangling stability and change in job resources, job demands, and employee well-being — A three-wave study on the Job-Demands Resources model. *Journal of Vocational Behavior, 83*(2), 117-129. doi:10.1016/j.jvb.2013.03.003

Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology, 1*(3), 185-216. doi:10.1177/135910457000100301

Bronkhorst, B., & Vermeeren, B. (2016). Safety climate, worker health and organizational health performance. *International Journal of Workplace Health Management, 9*(3), 270-289. doi:10.1108/ijwhm-12-2015-0081

Bruhn, A., & Frick, K. (2011). Why it was so difficult to develop new methods to inspect work organization and psychosocial risks in Sweden. *Safety Science, 49*(4), 575-581. doi:10.1016/j.ssci.2010.07.011

Burgard, S. A., & Lin, K. Y. (2013). Bad jobs, bad health? How work and working conditions contribute to health disparities. *American Behavioral Scientist, 57*(8), 1105-1127. doi:10.1177/0002764213487347

Burns, R. A., & Machin, M. A. (2013). Employee and Workplace Well-being: A Multi-level Analysis of Teacher Personality and Organizational Climate in Norwegian Teachers from Rural, Urban and City Schools. *Scandinavian Journal of Educational Research, 57*(3), 309-324. doi:10.1080/00313831.2012.656281

Carrasco, H., Martinez-Tur, V., Moliner, C., Peiro, J. M., & Ramis, C. (2014). Linking Emotional Dissonance and Service Climate to Well-Being at Work: A Cross-Level Analysis. *Universitas Psychologica, 13*(3), 947-960.

Cassie, K. M., & Cassie, W. E. (2012). Organizational and individual conditions associated with depressive symptoms among nursing home residents over time. *The Gerontologist, 52*(6), 812-821. doi:10.1093/geront/gns059

Chan, D. (2009). So why ask me? Are self-report data really that bad? In C. E. Lance & R. J. Vandenberg (Eds.), *Statistical and Methodological Myths and Urban Legends: Doctrine, Verity, and Fable in the Organizational and Social Sciences* (pp. 309-336). New York: Routledge.

Cheng, C., Bartram, T., Karimi, L., & Leggat, S. G. (2013). The role of team climate in the management of emotional labour: Implications for nurse retention. *Journal of Advanced Nursing, 69*(12), 2812-2825. doi:10.1111/jan.12202

Chowdhury, S. K., & Endres, M. L. (2010). The impact of client variability on nurses' occupational strain and injury: Cross-level moderation by safety climate. *Academy of Management Journal, 53*(1), 182-196. doi:10.5465/AMJ.2010.48037720

Chrisopoulos, S., Dollard, M. F., Winefield, A. H., & Dormann, C. (2010). Increasing the probability of finding an interaction in work stress research: A two-wave longitudinal test of the triple-match principle. *Journal of Occupational and Organizational Psychology, 83*(1), 17-37. doi:10.1348/096317909x474173

Christian, M. S., Bradley, J. C., Wallace, J. C., & Burke, M. J. (2009). Workplace safety: A meta-analysis of the roles of person and situation factors. *Journal of Applied Psychology, 94*(5), 1103-1127. doi:10.1037/a0016172

Cigularov, K. P., Chen, P. Y., & Rosecrance, J. (2010). The effects of error management climate and safety communication on safety: A multi-level study. *Accident Analysis and Prevention, 42*(5), 1498-1506. doi:10.1016/j.aap.2010.01.003

Clarke, S. (2006). The relationship between safety climate and safety performance: a meta-analytic review. *Journal of Occupational Health Psychology, 11*(4), 315-327. doi:10.1037/1076-8998.11.4.315

Clarke, S. (2010). An integrative model of safety climate: Linking psychological climate and work attitudes to individual safety outcomes using meta-analysis. *Journal of Occupational and Organizational Psychology, 83*(3), 553-578. doi:10.1348/096317909x452122

Cole, M. S., & Bedeian, A. G. (2007). Leadership consensus as a cross-level contextual moderator of the emotional exhaustion - work commitment relationship. *Leadership Quarterly, 18*(5), 447-462. doi:10.1016/j.leaqua.2007.07.002

Colley, S. K., & Neal, A. (2012). Automated text analysis to examine qualitative differences in safety schema among upper managers, supervisors and workers. *Safety Science, 50*(9), 1775-1785. doi:10.1016/j.ssci.2012.04.006

Conway, J. M., & Lance, C. E. (2010). What reviewers should expect from authors regarding common method bias in organizational research. *Journal of Business and Psychology, 25*(3), 325-334. doi:10.1007/s10869-010-9181-6

Cooper, W. H., & Richardson, A. J. (1986). Unfair Comparisons. *Journal of Applied Psychology, 71*(2), 179-184.

D'Amato, A., & Zijlstra, F. R. H. (2008). Psychological climate and individual factors as antecedents of work outcomes. *European Journal of Work and Organizational Psychology, 17*(1), 33-54. doi:10.1080/13594320701307420

Dackert, I. (2010). The impact of team climate for innovation on well-being and stress in elderly care. *J Nurs Manag, 18*(3), 302-310. doi:10.1111/j.1365-2834.2010.01079.x

Daniels, K., & de Jonge, J. (2010). Match making and match breaking: The nature of match within and around job design. *Journal of Occupational and Organizational Psychology, 83*(1), 1-16. doi:10.1348/096317909x485144

de Beer, L. T., Pienaar, J., & Rothmann, S., Jr. (2015). Work overload, burnout, and psychological ill-health symptoms: a three-wave mediation model of the employee health impairment process. *Anxiety, Stress & Coping*, 1-13. doi:10.1080/10615806.2015.1061123

de Jonge, J., Blanc, P. M. L., Peeter, M. C. W., & Noordam, H. (2008). Emotional job demands and the role of matching job resources: A cross-sectional survey study among healthcare workers. *International Journal of Nursing Studies, 45*, 1460-1469. doi:10.1016/j.ijnurstu.2007.11.002

de Jonge, J., & Dormann, C. (2003). The DISC Model : Demand-Induced Strain Compensation Mechanisms in job stress. In M. F. Dollard, H. R. Winefield, & A. H. Winefield (Eds.), *Occupational stress in the service professions* (pp. 43-74). London: Taylor & Francis.

Desrumaux, P., Lapointe, D., Sima, M., Boudrias, J., Savoie, A., & Brunet, L. (2015). The impact of job demands, climate, and optimism on well-being and distress at work: What are the mediating effects of basic psychological need satisfaction? *European Review of Applied Psychology, 65*(4), 179-188. doi:10.1016/j.erap.2015.06.003

Devonish, D. (2013). Workplace bullying, employee performance and behaviors The mediating role of psychological well-being. *Employee Relations, 35*(6), 630-647. doi:10.1108/er-01-2013-0004

Dollard, M. F. (2012). Psychosocial safety climate: A lead indicator of workplace psychological health and engagement and a precursor to intervention success. In M. C. Biron, Karanika-Murray, & C. L. Cooper (Eds.), *Improving organizational interventions for stress and well-being: Addressing process and context* (pp. 77-101). London: Routledge.

Dollard, M. F., & Bakker, A. B. (2010). Psychosocial safety climate as a precursor to conducive work environments, psychological health problems, and employee engagement. *Journal of Occupational and Organizational Psychology, 83*, 579-599. doi:10.1348/096317909X470690

Dollard, M. F., & Kang, S. (2007). *Psychosocial safety climate measure*. Adelaide, Australia: Work & Stress Research Group, University of South Australia.

Dollard, M. F., & McTernan, W. (2011). Psychosocial safety climate: A multilevel theory of work stress in the health and community service sector. *Epidemiology and Psychiatric Sciences, 20*(4), 287-293. doi:10.1017/S2045796011000588

Dollard, M. F., & Neser, D. Y. (2013). Worker health is good for the economy: Union density and psychosocial safety climate as determinants of country differences in worker health and productivity in 31 European countries. *Social Science & Medicine, 92*, 114-123. doi:10.1016/j.socscimed.2013.04.028

Dollard, M. F., Opie, T., Lenthall, S., Wakerman, J., Knight, S., Dunn, S., . . . MacLeod, M. (2012). Psychosocial safety climate as an antecedent of work characteristics and psychological strain: A multilevel model. *Work & Stress, 26*(4), 385-404. doi:10.1080/02678373.2012.734154

Dollard, M. F., Tuckey, M. R., & Dormann, C. (2012). Psychosocial safety climate moderates the job demand-resource interaction in predicting workgroup distress. *Accident Analysis and Prevention, 45*, 694-704. doi:10.1016/j.aap.2011.09.042

Dormann, C., & Griffin, M. A. (2015). Optimal time lags in panel studies. *Psychological Methods, 20*(4), 489-505. doi:10.1037/met0000041

Dormann, C., & Van de Ven, B. (2014). Timing in methods for studying psychosocial factors at work. In M. F. Dollard, A. Shimazu, R. b. Nordin, P. Brough, & M. R. Tuckey (Eds.), *Psychosocial Factor at Work in the Asia Pacific* (pp. 89-116). Dordrecht, the Netherlands: Springer.

Eatough, E. M., Way, J. D., & Chang, C.-H. (2012). Understanding the link between psychosocial work stressors and work-related musculoskeletal complaints. *Applied Ergonomics, 43*(3), 554-563. doi:10.1016/j.apergo.2011.08.009

Edmonson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly, 44*(2), 350-383.

Erez, M. (2010). Culture and job design. *Journal of Organizational Behavior, 31*(2-3), 389-400. doi:10.1002/job.651

European Agency for Safety and Health at Work. (2012). *Management of psychosocial risks at work: An analysis of the findings of the European survey of enterprises on new and emerging risks (ESENER)*. Luxembourg: Publication Office of the European Union, 2011.

Ferrie, J. E., Kivimaki, M., Head, J., Shipley, M. J., Vahtera, J., & Marmot, M. G. (2005). A comparison of self-reported sickness absence with absences recorded in employers' registers: evidence from the Whitehall II study. *Occupational and Environmental Medicine, 62*(2), 74-79. doi:10.1136/oem.2004.013896

Fletcher, T. D., Major, D. A., & Davis, D. D. (2008). The interactive relationship of competitive climate and trait competitiveness with workplace attitudes, stress, and performance. *Journal of Organizational Behavior, 29*(7), 899-922. doi:10.1002/job.503

Flin, R., Mearns, K., O'Connor, P., & Bryden, R. (2000). Measuring safety climate: Identifying the common features. *Safety Science, 34*(177-192).

Garrick, A., Mak, A., Cathcart, S., Winwood, P., Bakker, A. B., & Lushington, K. (2014). Psychosocial safety climate moderating the effects of daily job demands and recovery on fatigue and work engagement. *Journal of Occupational and Organizational Psychology, 87*(4), 694-714. doi:10.1111/joop.12069

Gervais, R. L., & Millear, P. (2014). The well-being of women at work: The importance of resources across the life course. *Journal of Organizational Change Management, 27*(4), 598-612. doi:10.1108/JOCM-05-2014-0103

Gierk, B., Kohlmann, S., Toussaint, A., Wahl, I., Brunahl, C. A., Murray, A. M., & Lowe, B. (2015). Assessing somatic symptom burden: a psychometric comparison of the patient health questionnaire-15 (PHQ-15) and the somatic symptom scale-8 (SSS-8). *J Psychosom Res, 78*(4), 352-355. doi:10.1016/j.jpsychores.2014.11.006

Giorgi, G. (2010). Workplace bullying partially mediates the climate-health relationship. *Journal of Managerial Psychology, 25*(7), 727-740. doi:10.1108/02633941011075274

Giorgi, G., Mancuso, S., Fiz Perez, F., Castiello D'Antonio, A., Mucci, N., Cupelli, V., & Arcangeli, G. (2014). Bullying among nurses and its relationship with burnout and organizational climate. *International Journal of Nursing Practice, 22*(2), 160-168. doi:10.1111/ijn.12376

Glick, W. H. (1985). Conceptualizing and Measuring Organizational and Psychological Climate: Pitfalls in Multilevel Research. *Academy of Management Review, 10*(3), 601-616.

Golubovich, J., Chang, C. H., & Eatough, E. M. (2014). Safety climate, hardiness, and musculoskeletal complaints: A mediated moderation model. *Applied Ergonomics, 45*(3), 757-766. doi:10.1016/j.apergo.2013.10.008

Grandey, A., Foo, S. C., Groth, M., & Goodwin, R. E. (2012). Free to be you and me: A climate of authenticity alleviates burnout from emotional labor. *Journal of Occupational Health Psychology, 17*(1), 1-14. doi:10.1037/a0025102

Griffin, M. A., & Neal, A. (2000). Perceptions of safety at work: A framework for linking safety climate to safety performance, knowledge, and motivation. *Journal of Occupational Health Psychology, 5*(3), 347-358. doi:10.1037fl1076-8998.5.3.347

Guldenmund, F. W. (2000). The nature of safety culture: A review of theory and research. *Safety Science, 34*, 215-257.

Hahn, S. E., & Murphy, L. R. (2008). A short scale for measuring safety climate. *Safety Science, 46*(7), 1047-1066. doi:10.1016/j.ssci.2007.06.002

Hakanen, J. J., Schaufeli, W. B., & Ahola, K. (2008). The Job Demands-Resources model: A three-year cross-lagged study of burnout, depression, commitment, and work engagement. *Work & Stress, 22*(3), 224-241. doi:10.1080/02678370802379432

Halbesleben, J. R. (2010). The role of exhaustion and workarounds in predicting occupational injuries: a cross-lagged panel study of healthcare professionals. *Journal of Occupational Health Psychology, 15*(1), 1-16. doi:10.1037/a0017634

Hall, G. B., Dollard, M. F., & Coward, J. (2010). Psychosocial Safety Climate: Development of the PSC-12. *International Journal of Stress Management, 17*(4), 353-383. doi:10.1037/a0021320

Hall, G. B., Dollard, M. F., Winefield, A. H., Dormann, C., & Bakker, A. B. (2013). Psychosocial safety climate buffers effects of job demands on depression and positive organizational behaviors. *Anxiety, Stress & Coping: An International Journal, 26*(4), 355-377. doi:10.1080/10615806.2012.700477

Haslam, C., O'Hara, J., Kazi, A., Twumasi, R., & Haslam, R. (2016). Proactive occupational safety and health management: Promoting good health and good business. *Safety Science, 81*, 99-108. doi:10.1016/j.ssci.2015.06.010

Hauser, W., Brahler, E., Wolfe, F., & Henningsen, P. (2014). Patient Health Questionnaire 15 as a generic measure of severity in fibromyalgia syndrome: surveys with patients of three different settings. *J Psychosom Res, 76*(4), 307-311. doi:10.1016/j.jpsychores.2014.01.009

Health and Safety Executive. (2015). *Health and safety statistics: Annual report for Great Britain 2014/15*. Retrieved from http://www.hse.gov.uk/statistics/overall/hssh1415.pdf.

Hetty van Emmerik, I. J. (2008). It is not only mentoring: The combined influences of individual-level and team-level support on job performance. *Career Development International, 13*(7), 575-593. doi:10.1108/13620430810911065

Hinkka, K., Kuoppala, J., Vaananen-Tomppo, I., & Lamminpaa, A. (2013). Psychosocial Work Factors and Sick Leave, Occupational Accident, and Disability Pension A Cohort Study of Civil Servants. *Journal of Occupational and Environmental Medicine, 55*(2), 191-197. doi:10.1097/JOM.0b013e31827943fe

Hobfoll, S. E., & Freedy, J. (1993). Conservation of resources. A general stress theory applied to burnout. In W. B. Schaufeli, C. Maslach, & T. Marek (Eds.), *Professional burnout. Recent developments in theory and research* (pp. 115–131). Washington, DC: Taylor & Francis.

Hobfoll, S. E., & Shirom, A. (1993). Stress and burnout in the workplace: conservation of resources. In R. T. Golembiewski (Ed.), *Handbook of organizational behavior* (pp. 41-60). New York: M. Dekker.

Hobfoll, S. E., & Shirom, A. (2000). Conservation of resources theory: Applications to stress and management in the workplace. In R. T. Golembiewski (Ed.), *Handbook of organization behavior* (2nd ed., pp. 57-81). New York: Dekker.

Hofmann, D. A., & Mark, B. (2006). An investigation of the relationship between safety climate and medication errors as well as other nurse and patient outcomes. *Personnel Psychology, 59*(4), 847-869. doi:10.1111/j.1744-6570.2006.00056.x

Hofstede, G., & Minkov, M. (2010). Long- versus short-term orientation: new perspectives. *Asia Pacific Business Review, 16*(4), 493-504. doi:10.1080/13602381003637609

Hong, Y., Hu, J., Liao, H., & Jiang, K. (2013). Missing link in the service profit chain: A meta-analytic review of the antecedents, consequences, and moderators of service climate. *Journal of Applied Psychology, 98*(2), 237-267. doi:10.1037/a0031666

Hope, S., Overland, S., Brun, W., & Matthiesen, S. B. (2010). Associations between sleep, risk and safety climate: A study of offshore personnel on the Norwegian continental shelf. *Safety Science, 48*(4), 469-477. doi:10.1016/j.ssci.2009.12.006

Hoven, H., Wahrendorf, M., & Siegrist, J. (2015). Occupational position, work stress and depressive symptoms: a pathway analysis of longitudinal SHARE data. *Journal of Epidemiology and Community Health, 69*(5), 447-452. doi:10.1136/jech-2014-205206

Huang, Y.-h., Zohar, D., Robertson, M. M., Garabet, A., Lee, J., & Murphy, L. A. (2013). Development and validation of safety climate scales for lone workers using truck drivers as exemplar. *Transportation Research Part F: Traffic Psychology and Behaviour, 17*, 5-19. doi:10.1016/j.trf.2012.08.011

Huang, Y. H., Zohar, D., Robertson, M. M., Garabet, A., Murphy, L. A., & Lee, J. (2013). Development and validation of safety climate scales for mobile remote workers using utility/electrical workers as exemplar. *Accid Anal Prev, 59*, 76-86. doi:10.1016/j.aap.2013.04.030

Hurrell, J. J. J., & McLaney, M. A. (1988). Exposure to job stress - A new psychometric instrument. *Scandinavian Journal of Work Environment and Health, 14*(1), 27-28.

Idris, M. A., & Dollard, M. F. (2011). Psychosocial safety climate, work conditions, and emotions in the workplace: A Malaysian population-based work stress study. *International Journal of Stress Management, 18*(4), 324-347. doi:10.1037/a0024849

Idris, M. A., Dollard, M. F., Coward, J., & Dormann, C. (2012). Psychosocial safety climate: Conceptual distinctiveness and effect on job demands and worker psychological health. *Safety Science, 50*, 19-28. doi:10.1016/j.ssci.2011.06.005

Idris, M. A., Dollard, M. F., & Tuckey, M. R. (2015). Psychosocial safety climate as a management tool for employee engagement and performance: A multilevel analysis. *International Journal of Stress Management, 22*(2), 183-206. doi:10.1037/a0038986

Idris, M. A., Dollard, M. F., & Winefield, A. H. (2011). Integrating psychosocial safety climate in the JD-R model: a study amongst Malaysian workers. *SA Journal of Industrial Psychology, 37*(2), 29-39. doi:10.4102/sajip.v37i2.851

Idris, M. A., Dollard, M. F., & Winefield, A. H. (2011). The effect of globalization on employee psychological health and job satisfaction in Malaysian workplaces. Journal of Occupational Health, 53, 447-454.

Idris, M. A., Dollard, M. F., & Yulita. (2014). Psychosocial safety climate, emotional demands, burnout, and depression: A longitudinal multilevel study in the malaysian private sector. *Journal of Occupational Health Psychology, 19*(3), 291-302. doi:10.1037/a0036599

ILO. (1986). Psychosocial Factors at Work: Recognition and Control. Occupational Safety and Health Series No. 56.

ITUC. (2014). ITUC Global Rights Index. Retrieved from https://www.ituc-csi.org/IMG/pdf/survey_ra_2014_eng_v2.pdf

ITUC. (2016). ITUC Global Rights Index. Retrieved from https://www.ituc-csi.org/IMG/pdf/survey_ra_2016_eng.pdf

Jacobsen, H. B., Reme, S. E., Sembajwe, G., Hopcia, K., Stiles, T. C., Sorensen, G., . . . Buxton, O. M. (2014). Work stress, sleep deficiency and predicted 10-year cardiometabolic risk in a female patient care worker population. *American Journal of Industrial Medicine, 57*(8), 940-949. doi:10.1002/ajim.22340

James, L. R., Choi, C. C., Ko, C.-H. E., McNeil, P. K., Minton, M. K., Wright, M. A., & Kim, K.-i. (2008). Organizational and psychological climate: A review of theory and research. *European Journal of Work and Organizational Psychology, 17*(1), 5-32. doi:10.1080/13594320701662550

James, L. R., Demaree, R. G., & Wolf, G. (1984). Estimating within-group interrater reliability with and without response bias. *Journal of Applied Psychology, 69*(1), 85-98.

Jiang, K., Hu, J., Hong, Y., Liao, H., & Liu, S. (2016). Do it well and do it right: The impact of service climate and ethical climate on business performance and the boundary conditions. *J Appl Psychol, 101*(11), 1553-1568. doi:10.1037/apl0000138

Johns, G. (2010). Some unintended consequences of job design. *Journal of Organizational Behavior, 31*, 361-369. doi:10.1002/job.609

Johnson, J. V., & Hall, E. M. (1988). Job strain, work place social support, and cardiovascular disease: a cross-sectional study of a random sample of the Swedish working population. *American Journal of Public Health, 78*(10), 1336-1342.

Johnston, D. W., Beedie, A., & Jones, M. C. (2006). Using computerized ambulatory diaries for the assessment of job characteristics and work-related stress in nurses. *Work & Stress, 20*(2), 163-172. doi:10.1080/02678370600902872

Johnstone, R., Quinlan, M., & McNamara, M. (2011). OHS inspectors and psychosocial risk factors: Evidence from Australia. *Safety Science, 49*(4), 547-557. doi:10.1016/j.ssci.2010.09.016

Kao, F.-H., Cheng, B.-S., Kuo, C.-C., & Huang, M.-P. (2014). Stressors, withdrawal, and sabotage in frontline employees: The moderating effects of caring and service climates. *Journal of Occupational and Organizational Psychology, 87*(4), 755-780. doi:10.1111/joop.12073

Karasek, R. (1979). Job demands, job decision latitude and mental strain: implications for job redesign. *Administrative Science Quarterly, 24*(2), 285-308. doi:10.2307/2392498

Karasek, R., Brisson, C., Kawakami, N., Houtman, I., Bongers, P., & Amick, B. (1998). The job content questionnaire (JCQ): an instrument for internationally comparative assessments of psychosocial job characteristics. *Journal of Occupational Health Psychology, 3*(4), 322-355.

Kiersch, C. E., & Byrne, Z. S. (2015). Is Being Authentic Being Fair? Multilevel Examination of Authentic Leadership, Justice, and Employee Outcomes. *Journal of Leadership & Organizational Studies, 22*(3), 292-303. doi:10.1177/1548051815570035

Kivimäki, M., Sutinen, R., Elovainio, M., Vahtera, J., Rasanen, K., Toyry, S., . . . Firth-Cozens, J. (2001). Sickness absence in hospital physicians: 2 year follow up study on determinants. *Occupational and Environmental Medicine, 58*(6), 361-366. doi:10.1136/oem.58.6.361

Kortum, E., & Leka, S. (2014). Tackling psychosocial risks and work-related stress in developing countries: The need for a multilevel intervention framework. *International Journal of Stress Management, 21*(1), 7-26. doi:10.1037/a0035033

Kortum, E., Leka, S., & Cox, T. (2010). Psychosocial risks and work-related stress in developing countries: Health impact, priorities, barriers and solutions. *International Journal of Occupational Medicine and Environmental Health, 23*(3), 225-238. doi:10.2478/v10001-010-0024-5

Kortum, E., Leka, S., & Cox, T. (2011). Perceptions of Psychosocial Hazards, Work-related Stress and Workplace Priority Risks in Developing Countries. *Journal of Occupational Health, 53*(2), 144-155. doi:10.1539/joh.O10016

Kozlowski, S. W. J., & Ilgen, D. R. (2006). Enhancing the effectiveness of work groups and teams. *Psychological Science In The Public Interest, 7*(3), 77-124. doi:10.1111/j.1529-1006.2006.00030.x

Kozlowski, S. W. J., & Klein, K. J. (2000). A multilevel approach to theory and research in organizations: Contextual, temporal and emergent processes. In K. J. Klein & S. W. J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions* (pp. 3-90). San Francisco, CA: Jossey-Bass.

Kozusznik, M. W., Rodriguez, I., & Peiro, J. M. (2015). Eustress and Distress Climates in Teams: Patterns and Outcomes. *International Journal of Stress Management, 22*(1), 1-23. doi:10.1037/a0038581

Kristensen, T. S., Hannerz, H., Hogh, A., & Borg, V. (2005). The Copenhagen Psychosocial Questionnaire-a tool for the assessment and improvement of the psychosocial work environment. *Scandinavian Journal of Work Environment and Health, 31*, 438-449.

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2002). The PHQ-15: Validity of a new measure for evaluating the severity of somatic symptoms. *Psychosomatic Medicine, 64*(2), 258-266.

Kuenzi, M., & Schminke, M. (2009). Assembling fragments into a lens: A review, critique and proposed research agenda for the Organizational Work Climate literature. *Journal of Management, 35*(3), 634-717. doi:10.1177/0149206308330559

Kussmaul, K. (1984). German basis safety concept rules out possibility of catastrophic failure. *Nuclear Engineering International, 12*, 41-46.

Laftman, S. B., Modin, B., Ostberg, V., Hoven, H., & Plenty, S. (2015). Effort-reward imbalance in the school setting: associations with somatic pain and self-rated health. *Scandinavian Journal of Public Health, 43*(2), 123-129. doi:10.1177/1403494814561818

Lansisalmi, H., & Kivimaki, M. (1999). Factors associated with innovative climate: What is the role of stress? *Stress Medicine, 15*(4), 203-213. doi:10.1002/(sici)1099-1700(199910)15:4<203::aid-smi816>3.0.co;2-b

Laschinger, H. K., & Fida, R. (2013). A time-lagged analysis of the effect of authentic leadership on workplace bullying, burnout, and occupational turnover intentions. *European Journal of Work and Organizational Psychology, 23*(5), 739-753. doi:10.1080/1359432x.2013.804646

Lavoie-Tremblay, M., Paquet, M., Duchesne, M. A., Santo, A., Gavrancic, A., Courcy, F., & Gagnon, S. (2010). Retaining nurses and other hospital workers: An intergenerational perspective of the work climate. *Journal of Nursing Scholarship, 42*(4), 414-422. doi:10.1111/j.1547-5069.2010.01370.x

Law, R., Dollard, M. F., Tuckey, M. R., & Dormann, C. (2011). Psychosocial safety climate as a lead indicator of workplace bullying and harassment, job resources,psychological health and employee engagement. *Accident Analysis and Prevention, 43*, 1782-1793. doi:10.1016/j.aap.2011.04.010

Laxmisan, A., Hakimzada, F., Sayan, O. R., Green, R. A., Zhang, J., & Patel, V. L. (2007). The multitasking clinician: decision-making and cognitive demand during and after team handoffs in emergency care. *International Journal of Medical Information, 76*(11-12), 801-811. doi:10.1016/j.ijmedinf.2006.09.019

LeBreton, J. M., & Senter, J. L. (2007). Answers to 20 Questions About Interrater Reliability and Interrater Agreement. *Organizational Research Methods, 11*(4), 815-852. doi:10.1177/1094428106296642

Lee, M. C. C., Idris, M. A., & Delfabbro, P. (2016). The linkages between hierarchical culture and empowering leadership and their effects on employees' work engagement: Work meaningfulness as a mediator. *International Journal of Stress Management*, Advanced online publication. http://dx.doi.org/10.1037/str0000043.

Leka, S., Jain, A., Iavicoli, S., Vartia, M., & Ertel, M. (2011). The role of policy for the management of psychosocial risks at the workplace in the European Union. *Safety Science, 49*(4), 558-564. doi:10.1016/j.ssci.2010.02.002

Li, F., Jiang, L., Yao, X., & Li, Y. (2013). Job demands, job resources and safety outcomes: The roles of emotional exhaustion and safety compliance. *Accident Analysis and Prevention, 51*, 243-251. doi:10.1016/j.aap.2012.11.029

Liu, X., Huang, G., Huang, H., Wang, S., Xiao, Y., & Chen, W. (2015). Safety climate, safety behavior, and worker injuries in the Chinese manufacturing industry. *Safety Science, 78*, 173-178. doi:10.1016/j.ssci.2015.04.023

Maas, C. J. M., & Hox, J. J. (2005). Sufficient Sample Sizes for Multilevel Modeling. *Methodology, 1*(3), 86-92. doi:10.1027/1614-1881.1.3.86

Mark, B. A., Hughes, L. C., Belyea, M., Chang, Y., Hofmann, D., Jones, C. B., & Bacon, C. T. (2007). Does safety climate moderate the influence of staffing adequacy and work conditions on nurse injuries? *Journal of Safety Research, 38*(4), 431-446. doi:10.1016/j.jsr.2007.04.004

Mark, G., & Smith, A. P. (2012). Occupational stress, job characteristics, coping, and the mental health of nurses. *British Journal of Health Psychology, 17*(3), 505-521. doi:10.1111/j.2044-8287.2011.02051.x

Marras, W., Cutlip, R., Burt, S., & Waaters, T. (2009). National Occupational Research Agenda (NORA) future directions in occupational musculoskeletal disorders health research. *Applied Ergonomics, 40*(1), 15-22.

Marsh, H. W., Hau, K.-T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling, 11*(3), 320-341.

Martin, A. (2008). Service climate and employee well being in higher education. *Journal of Management & Organization, 14*(2), 155-167. doi:10.5172/jmo.837.14.2.155

Martin, K. A., & Cullen, J. B. (2006). Continuities and extensions of ethical climate theory: A meta-analytic review. *Journal of Business Ethics, 69*(2), 175-194. doi:10.1007A10551-006-9084-7

Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal Of Occupational Behaviour, 2*, 99-113.

Maslach, C., Jackson, S. E., & Leiter, M. P. (1996). *MBI: The Maslach Burnout Inventory manual* (3rd ed.). Palo Alto, CA: Consulting Psychologists Press.

Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. *Annual Review of Psychology, 52*, 387-422.

Mathieu, J. E., Aguinis, H., Culpepper, S. A., & Chen, G. (2012). Understanding and estimating the power to detect cross-level interaction effects in multilevel modeling. *Journal of Applied Psychology, 97*(5), 951-966. doi:10.1037/a0028380

Mathieu, J. E., Maynard, M. T., Taylor, S. R., Gilson, L. L., & Ruddy, T. M. (2007). An examination of the effects of organizational district and team contexts on team processes and performance: a meso-mediational model. *Journal of Organizational Behavior, 28*(7), 891-910. doi:10.1002/job.480

Mathieu, J. E., & Taylor, S. (2007). A framework for testing meso-mediational relationships in organizational behavior. *Journal of Organizational Behavior, 28*(2).

McCaughey, D., DelliFraine, J. L., McGhan, G., & Bruning, N. S. (2013). The negative effects of workplace injury and illness on workplace safety climate perceptions and healthcare worker outcomes. *Safety Science, 51*(1), 138-147. doi:10.1016/j.ssci.2012.06.004

Michaels, D. (2015). *Adding inequality to injury: The costs of failing to protect workers on the job*. United States Department Of Labor,, Retrieved from https://www.dol.gov/osha/report/20150304-inequality.pdf.

Molloy, J. C., Aguinis, H., Boyd, B. K., Pierce, C. A., Short, J. C., Ployhart, R. E., & Wright, P. M. (2011). The Myth of "the" Micro-Macro Divide: Bridging System-Level and Disciplinary Divides. *Journal of Management, 37*(2), 581-609. doi:10.1177/0149206310365000

Morgeson, F. P., & Humphrey, S. E. (2008). Job and team design: Toward a more integrative conceptualization of work design. In J. Martocchio (Ed.), *Research in personnel and human resource management* (Vol. 27, pp. 39-91). United Kingdom: Emerald Group Publishing Limited.

Myer, A. T., Thoroughgood, C. N., & Mohammed, S. (2016). Complementary or competing climates? Examining the interactive effect of service and ethical climates on company-level financial performance. *J Appl Psychol, 101*(8), 1178-1190. doi:10.1037/apl0000119

Nahrgang, J. D., Morgeson, F. P., & Hofmann, D. A. (2011). Safety at work: a meta-analytic investigation of the link between job demands, job resources, burnout, engagement, and safety outcomes. *Journal of Applied Psychology, 96*(1), 71-94. doi:10.1037/a0021484

National Institute for Occupational Safety and Health. (1997). *NIOSH generic job stress questionnaire*. Cincinnati: NIOSH.

Neal, A., & Griffin, M. A. (2006). A study of the lagged relationship among safety climate, safety motivation, safety behavior, and accidencts at the individual and group levels. *Journal of Applied Psychology, 91*(4), 946-953. doi:10.1037/0021-9010.91.4.946

Nguyen, D. T. N., Teo, S. T. T., Grover, S. L., & Nguyen, N. P. (2017). Psychological safety climate and workplace bullying in Vietnam's public sector. *Public Management Review*, 1-22. doi:10.1080/14719037.2016.1272712

Ohly, S., Sonnentag, S., Niessen, C., & Zapf, D. (2010). Diary Studies in Organizational Research. *Journal of Personnel Psychology, 9*(2), 79-93. doi:10.1027/1866-5888/a000009

Ortiz-Bonnin, S., Garcia-Buades, M., Caballer, A., & Zapf, D. (2016). Supportive climate and its protective role in the emotion rule dissonance - emotional exhaustion relationship: A multilevel analysis. *Journal of Personnel Psychology, 15*(3), 125-133. doi:10.1027/1866-5888/a000160

Paccagnella, O. (2011). Sample Size and Accuracy of Estimates in Multilevel Models. *Methodology, 7*(3), 111-120. doi:10.1027/1614-2241/a000029

Peugh, J. L. (2010). A practical guide to multilevel modeling. *Journal of School Psychology, 48*(1), 85-112. doi:10.1016/j.jsp.2009.09.002

Piirainen, H., Rasanen, K., & Kivimaki, M. (2003). Organizational climate, perceived work-related symptoms and sickness absence: A population-based survey. *Journal of Occupational and Environmental Medicine, 45*(2), 175-184. doi:10.1097/01.jom.0000052957.59271.f4

Pisarski, A., & Barbour, J. P. (2014). What roles do team climate, roster control, and work life conflict play in shiftworkers' fatigue longitudinally? *Applied Ergonomics, 45*(3), 773-779. doi:10.1016/j.apergo.2013.10.010

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommeded remedies. *Journal of Applied Psychology, 88*(5), 879-903.

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology, 63*, 539-569. doi:10.1146/annurev-psych-120710-100452

Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in Organizational Research: Problems and prospects. *Journal of Management, 12*(4), 531-544. doi:10.1177/014920638601200408

Povera, A. (2015, August 16). Psychosocial risks among workers are cause for concern: Niosh. Retrieved from http://www.nst.com.my/node/96412

Preacher, K. J., & Selig, J. P. (2008). Monte Carlo method for assessing mediation: An interactive tool for creating confidence intervals for indirect effects [Computer software].

Preacher, K. J., & Selig, J. P. (2012). Advantages of Monte Carlo Confidence Intervals for Indirect Effects. *Communication Methods and Measures, 6*(2), 77-98. doi:10.1080/19312458.2012.679848

Preckel, D., Meinel, M., Kudielka, B. M., Haug, H.-J., & Fischer, J. E. (2007). Effort-reward-imbalance, overcommitment and self-reported health: Is it the interaction that matters? *Journal of Occupational and Organizational Psychology, 80*(1), 91-107. doi:10.1348/096317905x80183

Rahmah, M. A., Rozy, J., Halim, I., Jamsiah, M., & Shamsul, A. S. (2008). Prevalence of back pain among nurses working in government health clinics and hospital in Port Dickson, Malaysia. *Journal of Community Health, 14*(2), 12-18.

Rasmussen, V., Turnell, A., Butow, P., Juraskova, I., Kirsten, L., Wiener, L., . . . Committee, I. R. (2016). Burnout among psychosocial oncologists: an application and extension of the effort-reward imbalance model. *Psychooncology, 25*(2), 194-202. doi:10.1002/pon.3902

Raudenbush, S. W., Bryk, A. S., Cheong, Y. F., Congdon, R. T., & du Toit, M. (2011). *HLM 7: Hierarchical linear and non-linear modeling*. United States: SSI, Inc.

Rego, A., & e Cunha, M. P. (2008). Authentizotic climates and employee happiness: Pathways to individual performance? *Journal of Business Research, 61*(7), 739-752. doi:10.1016/j.jbusres.2007.08.003

Rivilis, I., Van Eerd, D., Cullen, K., Cole, D. C., Irvin, E., Tyson, J., & Mahood, Q. (2008). Effectiveness of participatory ergonomic interventions on health outcomes: a systematic review. *Applied Ergonomics, 39*(3), 342-358. doi:10.1016/j.apergo.2007.08.006

Robertson, M. M., Ciriello, V. M., & Garabet, A. M. (2013). Office ergonomics training and a sit-stand workstation: effects on musculoskeletal and visual symptoms and performance of office workers. *Applied Ergonomics, 44*(1), 73-85. doi:10.1016/j.apergo.2012.05.001

Rousseau, D. M., Aguinis, H., Boyd, B. K., Pierce, C. A., & Short, J. C. (2011). Reinforcing the Micro/Macro Bridge: Organizational Thinking and Pluralistic Vehicles. *Journal of Management, 37*(2), 429-442. doi:10.1177/0149206310372414

Safe Work Australia. (2015). *The cost of work-related injury and illness for Australian employers, workers and the community: 2012–13*. Canberra Retrieved from http://www.safeworkaustralia.gov.au/sites/SWA/about/Publications/Documents/940/cost-of-work-related-injury-and-disease-2012-13.docx.pdf.

Sauter, S., & Murphy, L. (2003). Monitoring the changing organization of work: International practices and new developments in the United States. *Social and Preventive Medicine, 48*(6), 341-348. doi:10.1007/s00038-003-3026-2

Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: a multi-sample study. *Journal of Organizational Behavior, 25*, 293-315. doi:10.1002/job.248

Schaufeli, W. B., Leiter, M. P., Maslach, C., & Jackson, S. E. (1996). The MBI-General Survey. In C. Maslach, S.E. Jackson, & M. P. Leiter (Eds.), *Maslach Burnout Inventory Manual* (3rd ed., pp. 19-26). Palo Alto, CA: Consulting Psychologists Press.

Schaufeli, W. B., & Taris, T. W. (2014). A critical review of the Job Demands-Resources Model: Implications for improving work and health. In G. F. Bauer & O. Hämmig (Eds.), *Bridging Occupational, Organizational and Public Health: A Transdisciplinary Approach* (pp. 43-68). Dordrecht, the Netherlands: Springer.

Scherbaum, C. A., & Ferreter, J. M. (2009). Estimating statistical power and required sample sizes for organizational research using multilevel modeling. *Organizational Research Methods, 12*(2), 347-367. doi:10.1177/1094428107308906

Schneider, B., Ehrhart, M. G., & Macey, W. H. (2011a). Organizational Climate Research: Achievements and the Road Ahead. In N. M. Ashkanasy, C. P. M. Wildero, & M. F. Peterson (Eds.), *The handbook of organizational culture and climate* (pp. 29-49). United States of America: SAGE Publications, Inc.

Schneider, B., Ehrhart, M. G., & Macey, W. H. (2011b). Perspectives on organizational climate and culture. 373-414. doi:10.1037/12169-012

Schneider, B., Ehrhart, M. G., & Macey, W. H. (2013). Organizational climate and culture. *Annual Review of Psychology, 64*, 361-388.

Schneider, B., & Reichers, A. E. (1983). On the etiology of climates. *Personnel Psychology, 36*, 19-39.

Schulz, M., Damkroger, A., Heins, C., Wehlitz, L., Lohr, M., Driessen, M., . . . Wingenfeld, K. (2009). Effort-reward imbalance and burnout among German nurses in medical compared with psychiatric hospital settings. *Journal of Psychiatric and Mental Health Nursing, 16*(3), 225-233. doi:10.1111/j.1365-2850.2008.01355.x

Shimazu, A., & de Jonge, J. (2009). Reciprocal relations between effort-reward imbalance at work and adverse health: a three-wave panel survey. *Social Science & Medicine, 68*(1), 60-68. doi:10.1016/j.socscimed.2008.09.055

Siegrist, J. (1996). Adverse health effects of high-effort/low-reward conditions. *Journal of Occupational Health Psychology, 1*, 27-41.

Siegrist, J., Starke, D., Chandola, T., Godin, I., Marmot, M., Niedhammer, I., & Peter, R. (2004). The measurement of effort–reward imbalance at work: European comparisons. *Social Science & Medicine, 58*(8), 1483-1499. doi:10.1016/s0277-9536(03)00351-4

Sinokki, M., Hinkka, K., Ahola, K., Koskinen, S., Klaukka, T., Kivimaki, M., . . . Virtanen, M. (2009). The association between team climate at work and mental health in the Finnish Health 2000 Study. *Occupational and Environmental Medicine, 66*(8), 523-528. doi:10.1136/oem.2008.043299

Sliter, M., Boyd, E., Sinclair, R., Cheung, J., & McFadden, A. (2014). Inching toward inclusiveness: Diversity climate, interpersonal conflict and well-being in women nurses. *Sex Roles, 71*(1-2), 43-54. doi:10.1007/s11199-013-0337-5

Snijders, T. A. B., & Bosker, R. J. (2012). *Multilevel analysis: An introduction to basic and advanced multilevel modeling* (2nd ed.). Los Angeles: Sage Publication Ltd.

Spector, P. E. (2006). Method variance in organizational research: Truth or urban legend? *Organizational Research Methods, 9*(2), 221-232. doi:10.1177/1094428105284955

Spector, P. E., Liu, C., & Sanchez, J. I. (2015). Methodological and Substantive Issues in Conducting Multinational and Cross-Cultural Research. *Annual Review of Organizational Psychology and Organizational Behavior, 2*(1), 101-131. doi:10.1146/annurev-orgpsych-032414-111310

Spell, C. S., & Arnold, T. J. (2007). A multi-level analysis of organizational justice climate, structure, and employee mental health. *Journal of Management, 33*(5), 724-751. doi:10.1177/0149206307305560

Spence Laschinger, H. K., & Fida, R. (2014). New nurses burnout and workplace wellbeing: The influence of authentic leadership and psychological capital. *Burnout Research, 1*(1), 19-28. doi:10.1016/j.burn.2014.03.002

Spence Laschinger, H. K., Grau, A. L., Finegan, J., & Wilk, P. (2012). Predictors of new graduate nurses' workplace well-being: testing the job demands-resources model.

Healthcare Management Review, 37(2), 175-186. doi:10.1097/HMR.0b013e31822aa456

Stone, P. W., Du, Y. L., & Gershon, R. R. M. (2007). Organizational climate and occupational health outcomes in hospital nurses. *Journal of Occupational and Environmental Medicine, 49*(1), 50-58. doi:10.1097/01.jom.0000251622.05429.0c

Strahan, C., Watson, B., & Lennonb, A. (2008). Can organisational safety climate and occupational stress predict work-related driver fatigue? *Transportation Research Part F-Traffic Psychology and Behaviour, 11*(6), 418-426. doi:10.1016/j.trf.2008.04.002

Surawy, C., & Cox, T. (1987). Smoking under natural conditions: A diary study. *Personality and Individual Differences, 8*(1), 33-41. doi:10.1016/0191-8869(87)90008-0

Swanberg, J. E., Clouser, J. M., Browning, S. R., Westneat, S. C., & Marsh, M. K. (2013). Occupational Health Among Latino Horse and Crop Workers in Kentucky: The Role of Work Organization Factors. *Journal of Agromedicine, 18*(4), 312-325. doi:10.1080/1059924x.2013.826604

Tang, J. J., Leka, S., Hunt, N., & MacLennan, S. (2014). An exploration of workplace social capital as an antecedent of occupational safety and health climate and outcomes in the Chinese education sector. *International Archives of Occupational and Environmental Health, 87*(5), 515-526. doi:10.1007/s00420-013-0890-9

Tausig, M., & Fenwick, R. (2011). Work and Mental Health in Social Context. 161-183. doi:10.1007/978-1-4614-0625-9_7

Tims, M., Bakker, A. B., Derks, D., & van Rhenen, W. (2013). Job Crafting at the Team and Individual Level: Implications for Work Engagement and Performance. *Group & Organization Management, 38*(4), 427-454. doi:10.1177/1059601113492421

Toker, S., Melamed, S., Berliner, S., Zeltser, D., & Shapira, I. (2012). Burnout and risk of coronary heart disease: a prospective study of 8838 employees. *Psychosomatic Medicine, 74*(8), 840-847. doi:10.1097/PSY.0b013e31826c3174

Tuxford, L. M., & Bradley, G. L. (2014). Emotional job demands and emotional exhaustion in teachers. *Educational Psychology, 35*(8), 1006-1024. doi:10.1080/01443410.2014.912260

Tynes, T., Johannessen, H. A., & Sterud, T. (2013). Work-Related Psychosocial and Organizational Risk Factors for Headache. *Journal of Occupational and Environmental Medicine, 55*(12), 1436-1442. doi:10.1097/JOM.0b013e3182a7e678

US Department of Labor. (2015). Nonfatal occupational injuries and illnesses requiring days away from work, 2014 [Press release]. Retrieved from http://www.bls.gov/news.release/archives/osh2_11192015.pdf

van den Tooren, M., & de Jonge, J. (2010). The role of matching job resources in different demanding situations at work: A vignette study. *Journal of Occupational & Organizational Psychology, 83*(1), 39-54.

van der Heijden, B. I., Demerouti, E., Bakker, A. B., & Hasselhorn, N. S. G. c. b. H.-M. (2008). Work-home interference among nurses: reciprocal relationships with job demands and health. *Journal of Advanced Nursing, 62*(5), 572-584. doi:10.1111/j.1365-2648.2008.04630.x

van Vegchel, N., de Jonge, J., Söderfeldt, M., Dormann, C., & Schaufeli, W. (2004). Quantitative Versus Emotional Demands Among Swedish Human Service Employees: Moderating Effects of Job Control and Social Support. *International Journal of Stress Management, 11*(1), 21-40. doi:10.1037/1072-5245.11.1.21

Veld, M., & Van De Voorde, K. (2014). How to take care of nurses in your organization: Two types of exchange relationships compared. *Journal of Advanced Nursing, 70*(4), 855-865. doi:10.1111/jan.12247

Wallace, J. C., Popp, E., & Mondore, S. (2006). Safety climate as a mediator between foundation climates and occupational accidents: a group-level investigation. *Journal of Applied Psychology, 91*(3), 681-688. doi:10.1037/0021-9010.91.3.681

Watkins, L. L., Koch, G. G., Sherwood, A., Blumenthal, J. A., Davidson, J. R., O'Connor, C., & Sketch, M. H. (2013). Association of anxiety and depression with all-cause mortality in individuals with coronary heart disease. *Journal of the American Heart Association, 2*(2), e000068. doi:10.1161/JAHA.112.000068

Weeks, A., Swerissen, H., & Belfrage, J. (2007). Issues, challenges, and solutions in translating study instruments *Evaluation Review, 31*(2), 153-165. doi:10.1177/0193841X06294184

Westman, M., Bakker, A. B., Roziner, I., & Sonnentag, S. (2011). Crossover of job demands and emotional exhaustion within teams: a longitudinal multilevel study. *Anxiety Stress Coping, 24*(5), 561-577. doi:10.1080/10615806.2011.558191

Widanarko, B., Legg, S., Devereux, J., & Stevenson, M. (2015). Interaction between physical and psychosocial work risk factors for low back symptoms and its consequences amongst Indonesian coal mining workers. *Applied Ergonomics, 46*, 158-167. doi:10.1016/j.apergo.2014.07.016

World Economic Forum, & Schwab, K. (2016). The Global Competitiveness Report 2016-2017. Retrieved from http://www.nmi.is/media/338436/the_global_competitiveness_report_2016-2017.pdf

Yammarino, F. J., & Dansereau, F. (2011). Multilevel issues in organizational culture and climate research. In N. M. Ashkanasy, C. P. M. Wilderom, & M. F. Peterson (Eds.), *The handbook of organizational culture and climate* (pp. 50-76). United States: SAGE Publications, Inc.

Yang, L.-Q., Spector, P. E., Chang, C.-H., Gallant-Roman, M., & Powell, J. (2012). Psychosocial precursors and physical consequences of workplace violence towards nurses: A longitudinal examination with naturally occurring groups in hospital settings. *International Journal of Nursing Studies, 49*(9), 1091-1102. doi:10.1016/j.ijnurstu.2012.03.006

Ylipaavalniemi, J., Kivimaki, M., Elovainio, M., Virtanen, M., Keltikangas-Jarvinen, L., & Vahtera, J. (2005). Psychosocial work characteristics and incidence of newly diagnosed depression: a prospective cohort study of three different models. *Social Science & Medicine, 61*(1), 111-122. doi:10.1016/j.socscimed.2004.11.038

Yulita, Idris, M. A., & Dollard, M. F. (2014). A multi-level study of psychosocial safety climate, challenge and hindrance demands, employee exhaustion, engagement and physical health. In M. F. Dollard, A. Shimazu, R. b. Nordin, P. Brough, & M. R. Tuckey (Eds.), *Psychosocial factors at work in the Asia Pacific* (pp. 127-143). Dordrecht, the Netherlands: Springer.

Yulita, Idris, M. A., & Dollard, M. F. (2016). Psychosocial safety climate: Past, present, and future research. In A. Shimazu, R. B. Nordin, M. F. Dollard, & J. Oakman (Eds.), *Psychosocial Factors at Work in the Asia Pacific: From Theory to Practice* (pp. 89-111). Switzerland: Springer

Zadow, A., & Dollard, M. F. (2016). Psychosocial safety climate. In S. Clarke, T. M. Probst, F. Guldenmund, & J. Passmore (Eds.), *The Wiley Blackwell Handbook of the Psychology of Occupational Safety and Workplace Health* (1st ed.): John Wiley & Sons, Ltd.

Zadow, A., Dollard, M. F., McLinton, S. S., Lawrence, P., & Tuckey, M. R. (2017). Psychosocial safety climate, emotional exhaustion, and work injuries in healthcare workplaces. *Stress & Health*. doi:10.1002/smi.2740

Zhang, Z., Zyphur, M. J., & Preacher, K. J. (2009). Testing multilevel mediation using hierarchical linear models: Problems and solutions. *Organizational Research Methods, 12*(4), 695-719. doi:10.1177/1094428108327450

Zinsser, K. M., & Zinsser, A. (2016). Two Case Studies of Preschool Psychosocial Safety Climates. *Research in Human Development, 13*(1), 49-64. doi:10.1080/15427609.2016.1141278

Zohar, D. (1980). Safety climate in industrial organizations: Theoretical and applied implications. *Journal of Applied Psychology, 65*, 96-102.

Zohar, D. (2000). A group-level model of safety climate: Testing the effect of group climate on microaccidents in manufacturing jobs. *Journal of Applied Psychology, 85*, 587-596. doi:10.1037//0021-9010.85.4.587

Zohar, D. (2008). Safety climate and beyond: A multi-level multi-climate framework. *Safety Science, 46*(3), 376-387. doi:10.1016/j.ssci.2007.03.006

Zohar, D. (2010). Thirty years of safety climate research: Reflections and future directions. *Accident Analysis and Prevention, 42*, 1517-1255. doi:10.1016/j.aap.2009.12.019

Zohar, D. (2014). Safety climate: Conceptualization, measurement, and improvement. In B. Schneider & K. M. Barbera (Eds.), The Oxford handbook of organizational climate and culture (pp. 317-334). United States: Oxford University Press.

Zohar, D., & Luria, G. (2005). A multilevel model of safety climate: Cross-level relationships between organization and group-level climates. *Journal of Applied Psychology, 90*(4), 616-628. doi:10.1037/0021-9010.90.4.616

LIST OF PUBLICATIONS AND PAPERS PRESENTED

1) Isahak, M, Loh, M. Y., Susilowati, I., Kaewboonchoo, O., Harncharoen, K., N Mohd Amin, N., …Ratanasiripong, P. (2017). The association of workplace exposures on quality of life in small and medium enterprises workers: A cross-sectional study in four ASEAN countries. *Asia Pacific Journal of Public Health*. Advance online publication. doi: 10.1177/1010539517699060

2) Loh, M. Y., Idris, M. A., Dollard, M. F. & Isahak, M. (2017). *PSC as a moderator of the moderators: Contextualising JDC and ERI models and emotional demands effects* . Manuscript submitted for publication .

3) Loh, M. Y., Idris, M. A., Isahak, M., & Dollard, M. F. (2016). *The physical and psychosocial safety climate impact on Malaysian healthcare workers' health*. Paper presented at the 6th Expert Workshop on Psychosocial Factors at Work in The Asia Pacific" Shanghai, China.

4) Loh, M. Y., Idris, M. A., Isahak, M., & Dollard, M. F. (2016). *The physical and psychosocial safety climate impacts on healthcare workers' health*. Manuscript submitted for publication.

5) Loh, M. Y., Idris, M. A., Isahak, M., & Muhamad, H. (2017). *Work climate and employees' health: A systematic review.* Manuscript submitted for publication