THE INVESTIGATION OF HEAT STRESS AMONG WORKERS IN PINEAPPLE PLANTATION

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I hereby declare that I have checked this thesis and in my/our* opinion, this thesis/project* is adequate in terms of scope and quality for the award of the degree of Bachelor in Occupational Safety and Health with Hons.

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I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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Dedicated to Almighty Allah SWT, my beloved supervisors and lecturers, my beloved family especially my father and mother, and finally to all my beloved friends. Whose encouragements and prayers of days and nights make me be able to be who I am now.

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ABSTRAK

Bekerja di ladang nanas agak mencabar kerana bekerja di bawah panas matahari dengan tempoh yang panjang tanpa sebarang pengudaraan mekanikal atau kaedah teknikal lain untuk mengurangkan haba. Kerja fizikal dalam persekitaran yang panas dan lembap membebankan risiko kesihatan, penurunan produktiviti dan masalah keselamatan pekerja. Kajian keratan rentas telah dijalankan di ladang nenas yang terletak di Temerloh, Pahang. Objektif utama ini adalah untuk mengenal pasti tahap pendedahan haba di kalangan pekerja perladangan nanas dan kesannya dengan parameter fisiologi seperti suhu badan, tekanan darah dan kadar jantung pekerja. Parameter alam sekitar seperti WBGT (dalam) dan WBGT (di luar) diukur. Soal selidik digunakan untuk menentukan data sosio-demografi responden dan gejala tekanan haba. Kajian ini mendapati bahawa nilai indeks WBGT melebihi had ACGIH. Ujian korelasi Pearson menunjukkan bahawa korelasi antara indeks WBGT dengan suhu badan, tekanan darah dan kadar denyutan jantung adalah lemah. Tinjauan ini dicadangkan kepada pengurusan untuk mematuhi garis panduan pengurusan tekanan haba, melaksanakan kerja berdasarkan 50% kerja dan rehat 50% kerana pekerja ladang nenas terdedah kepada risiko tekanan panas.

ABSTRACT

Working in the pineapple plantation is quite challenging due to working under hot sun with long period without any mechanical ventilation or other technical methods. Physical work in hot and humid environments imposes health risks, productivity falling and safety problems on workers. A cross-sectional study had been conducted at pineapple plantation in Temerloh, Pahang. The main objective of this to identify the level of heat exposure among the pineapple plantation workers and its effect with physiological parameters such as body core temperature, blood pressure and heart rate of workers at pineapple plantation. Environment parameter such as WBGT(in) and WBGT (out) was measured. The questionnaire was used to determine respondent's socio-demographic data and heat stress symptoms. This study found that WBGT index value exceeded the limit of ACGIH. The Pearson correlation test showed that there is week correlation between WBGT index with body core temperature, blood pressure and heart rate. This finding suggested to the management to follow heat stress management guidelines, implement work based on 50% work and 50% rest because the workers are exposed to the risk of heat stress.

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CHAPTER 2 LITERATURE REVIEW

LIST OF SYMBOLS

SYMBOL	DESCRIPTION
%	Percentage
<	Less than
>	Greater than

LIST OF ABBREVIATIONS

SHORT FORM	DESCRIPTION
ACGIH	American Conference of Governmental Industrial Hygienists
DOSH	Department of Occupational Safety and Health
WBGT	WetBulb Globe Temperature
TLV	Threshold Limit Value

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Working with hot sources exposure especially in farming, confectioneries, or brick can be the cause of serious health problem for employees. All jobs done at outdoor require working in hot environment especially in farming sector, the employee are working all day long under the sun with heavy work load. The purpose of this study is to identify the impact of heat on health and, which is focused on pineapple plantation workers. This section briefly explained about the background study, problem statement, research objectives, research questions, research hypothesis, scope of study, significance of study, conceptual framework and operational definition of the study.

1.2 STUDY BACKGROUND

The pineapple fruit is one of popular tropical plant in Malaysia. Pineapple can be eating fresh, cooked or juiced. The cultivation and production of this fruit keep increasing due to high request from the factory that produced pineapple canned because now a day, the production of commercial products is focused on canned pineapple. Besides that, some of small industry, they produce the pineapple into sweet sour sauce, pineapple candy and more. Hence, there are many which are based on pineapple which can be developed commercially and all these innovation and creativity of products have increase its value to the Malaysian pineapple industry and give high income to the farmer.

Unfortunately, found (Sadiq, 2016) that workers in agricultural field workers are exposed to high temperature that can cause heat stress symptoms. Exposure to high temperature to the body can undergo thermal strain that may give impact to the health, comfort, performance and can cause fatality especially when the body cannot withstand high temperature. Various studies on heat stress among workers was conducted by researchers to study and find solutions to avoid accidents in the workplace. The key factors that contribute to heat stress are physiological, environmental and non-environmental effect(Krishnamurthy et al., 2016)

The impact of heat stress can give bigger opportunities for accident at work. Exertional heat disease can happen in many environmental conditions however are most regular with maintained extreme warmth and exposure of humidity(Fudge et al., 2015). The most huge physiological reaction demonstrated is an expansion in body temperature, beat rate and sweating (Lucas et al., 2014).

Workers who with several places like plantation, steel foundries, brick firing, glass product or others can have exposed to excessive of heat exposure that can cause high risk while performing the operation. Workers who works in farm tend to have high heat exposure while performing their job that can threat to human health. Operations including high air temperatures from sunlight, high dampness, coordinate physical contact with hot items, or strenuous physical exercises have a high potential for bringing on heat related disease.

Large number of workers in the construction, agricultural and industry with long hour in thermally stress environment with climate change, these can make situation more worsen (V. S. Miller et al., 2007). Heat stress can lead to distress, weariness, fatigue, exhaustion, and heat stroke in humans. Heat stress in work environments is considered particularly risky, and chance relies on upon the muscular work of man is performing. Heat exposure in the workplace also can cause lack of productivity and accidents at work due to loss of concentration.

Those who work in plantation industry that involving heat exposure in its work process are exposed to the higher heat level because they are working under

hot sun, without access to shade and minimum amount of drinking water taken and less rest period time also particularly increase the hazard because heat stress has a tendency to increase accidents through physical fatigue, impaired mental capacity, and abuse of personal protective equipment (PPE). The reduce speed of reaction, thinking capacity, visual recognition, associative learning, and mental readiness which has been accounted for to be one of the causation of death accidents (Chi et al., 2005).

Several cross sectional study have been done by the researchers for heat assessment at workplaces where the workers are expose to high temperature, three kind of contributing factors will be investigated socio-demographic data, environmental data, and physiological data

Outrageous body temperature unsettling influence result when introduction to extraordinary natural temperatures over-burdens working thermoregulatory handle, endogenous heat production is higher than the limit of the body dissipates warm or is lacking to keep up body temperature or medical illness or different xenobiotics interfere with ordinary thermoregulation (William N. Rom, 2007). Changes in temperature lead to increases in heat exposure, which may impact worker's health. Recognizing the importance of heat in the area of work, mitigation programs must be implemented to lessen problems related to heat stress.

Cross sectional study will be used among pineapple cultivation workers. This study is suitable to estimate the outcome prevalence and the exposure in a population. The data will be measured by using equipment at the workplace and some information will be gained by using the answer from questionnaire.

Previous study intended by (Krishnamurthy et al., 2016) revealed that an intensive comprehension of the issue of work related heat stress by the supervisors, administration support, and asset allotment for improvement, for example, building controls, regulatory controls incorporating work reallocation in cooler zones, proper provision of good workplace and welfare conditions may prompt positive changes in the administration of heat stress and enhance the wellbeing and profitability issues emerging because of heat at workplace. So that, by implementing this study, we can find the sources of complication that can

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