UNIVERSITI PUTRA MALAYSIA

THE ACCEPTANCE LEVEL OF NEW SAFETY HELMET DESIGN AMONG PALM OIL PLANTATION HARVESTERS IN JOHOR.

SITI NAJIHAH BINTI ABDUL SALAM

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BY

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Thesis submitted in fulfilment of the requirement for the degree of Bachelor Science (Environmental and Occupational Health) from the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

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ABSTRACT

THE ACCEPTANCE LEVEL OF NEW SAFETY HELMET DESIGN AMONG PALM OIL PLANTATION HARVESTERS IN JOHOR.

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Introduction: Occupational accidents by sector reported that agriculture is the second highest with 289 cases. Head injury is the main concern as it can result severe injury and fatality. Improvement of the safety helmet is crucial since the level on the usage of current safety helmet in palm oil is very low due to the main issue such as discomfort. **Objectives:** The aims of this study are to determine the acceptance level of new safety helmet design and to determine the significance difference on practice before and after implementation of training. **Methodology:** This one-group pretest-posttest study design was conducted among 124 harvesters in three palm oil plantations located in Johor. Modified structured questionnaires were used to collect data on socio demographic background, knowledge, attitude, practice on safety helmet usage and the acceptance level of new safety helmet design. A training session through video presentation on correct usage of safety helmet was given. The new safety helmet design was given to the harvesters for three days. Observation on field was carried out on practice item for post-test. **Results:** Descriptive analysis shows harvesters have high score for knowledge, attitude and practice. There is no significance difference ($p>0.05$) on practice before and after implementation of training. There is significant increase ($p<0.001$) of acceptance level of parameter (comfort, safety, ventilation, peak, fit, design and heat) of new safety helmet design in day 1, day 3 and day 6 among palm oil plantation harvesters. **Conclusion:** Overall, the harvesters have high knowledge, attitude and practice level and new safety helmet design is well accepted by the harvesters. Training session implemented is helpful, however, the module need to be improvised to increase the practice level.

Keywords: Acceptance, new safety helmet design, practice, harvesters

ABSTRAK

TAHAP PENERIMAAN TOPI KESELAMATAN BARU DALAM KALANGAN PENUAI LADANG KELAPA SAWIT DI JOHOR

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Pengenalan: Kemalangan pekerjaan oleh sektor melaporkan bahawa pertanian adalah yang kedua tertinggi dengan 289 kes. Kecederaan kepala adalah kebimbangan utama kerana ia boleh menyebabkan kecederaan teruk dan kematian. Penambahbaikan topi keselamatan adalah penting kerana tahap penggunaan topi keledar keselamatan di ladang kelapa sawit adalah sangat rendah disebabkan isu utama seperti ketidakselesaan. **Objektif:** Tujuan kajian ini adalah untuk menentukan tahap penerimaan reka bentuk topi keledar keselamatan baru dan untuk menentukan perbezaan penting dalam amalan penggunaan topi keselamatan sebelum dan selepas pelaksanaan latihan. **Kaedah:** Reka bentuk kajian ujian pra- ujian pos satu kumpulan ini dijalankan di kalangan 124 penuai di tiga ladang kelapa sawit yang terletak di Johor. Soal selidik berstruktur yang diubahsuai telah digunakan untuk mengumpul data tentang latar belakang sosioekonomi, pengetahuan, sikap, amalan penggunaan helmet keselamatan dan tahap penerimaan reka bentuk topi keselamatan baru. Sesi latihan melalui persembahan video mengenai penggunaan topi keselamatan yang betul telah diberikan. Reka bentuk topi keselamatan baru diberikan kepada penuai selama tiga hari. Pemerhatian di lapangan dijalankan pada item latihan untuk ujian pasca. **Keputusan:** Analisis deskriptif menunjukkan penuai mempunyai skor tinggi untuk pengetahuan, sikap dan amalan. Tiada perbezaan signifikan ($p > 0.05$) pada amalan sebelum dan selepas pelaksanaan latihan. Terdapat peningkatan ketara ($p < 0.001$) paras penerimaan parameter (keselesaan, keselamatan, pengudaraan, puncak, kemuatan, reka bentuk dan haba) reka bentuk topi keledar keselamatan baru pada hari 1, hari 3 dan hari 6 di kalangan penuai ladang kelapa sawit. **Kesimpulan:** Keseluruhannya, penuai mempunyai tahap pengetahuan, sikap dan amalan yang tinggi dan reka bentuk topi keledar keselamatan yang baru diterima dengan baik oleh para penuai. Sesi latihan yang dilaksanakan adalah membantu tetapi modul perlu diperbaiki untuk meningkatkan tahap amalan.

Kata kunci: Penerimaan, reka bentuk topi keselamatan baru, amalan, penuai

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LIST OF ABBREVATIONS

DOSH	Department of Occupational Safety and Health
FFB	Fresh Fruit Bunches
KAP	Knowledge, Attitude and Practice
MIMOS	Malaysian Institute of Microelectronic Systems
MPOB	Malaysian Palm Oil Board
MS	Malaysian Standard
OSHA	Occupational Safety and Health Act
SOCSO	Social Security Organization
SPSS	Statistical Package of Social Sciences

CHAPTER 1

INTRODUCTION

1.1 Research Background

Agriculture sector plays an important role in economic development of Malaysia. Before industrialization, this sector was the major contributor to Malaysian economy in the production of agricultural products for domestic consumption and providing foreign exchange. Palm oil has become the main sub-sector in agricultural sector and has created a lot of job opportunities among local and foreign workers (Hussein et al., 2017). Areas under oil palm increased from 54,000 hectares in 1960 to 4.05 million hectares in 2005 (Basiron, 2007). In 2017, the total oil palm planted areas are 5,811,145 hectares and the total productions of crude palm oil from January until August 2018 are 12,045,306 tonnes (MPOB, 2018).

According to the Department of Occupational Safety and Health Malaysia (DOSH, 2018), occupational accidents by sector until October 2018 were reported that agriculture, forestry and fishery sector (289 cases) is the second highest after manufacturing sector (1303 cases) as shown in figure 1.1. The occupational accidents include non-permanent disability, permanent disability and fatal cases.

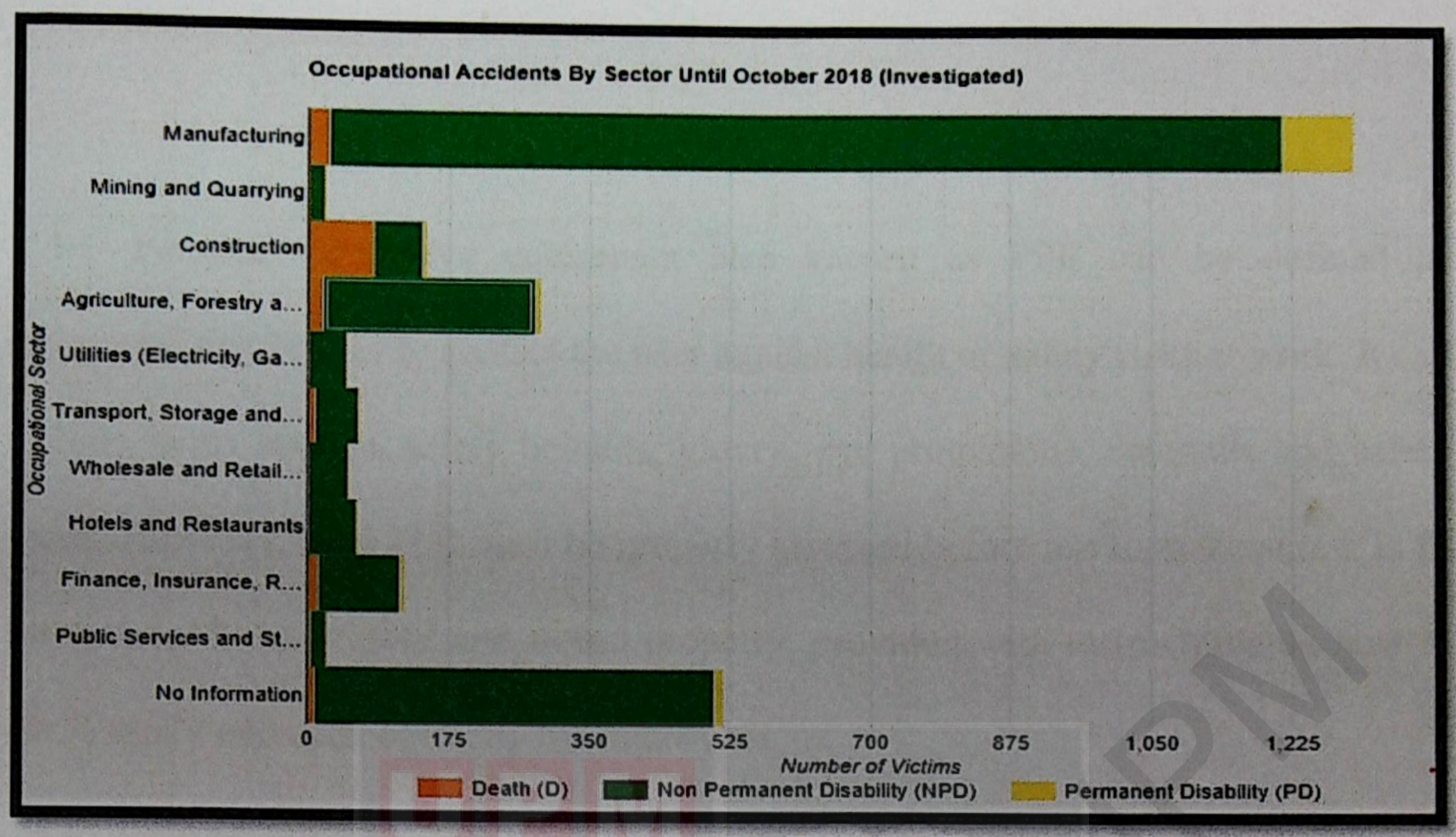


Figure 1.1: Chart of number of occupational accident by sector in Malaysia

Head injury is the main focus in palm oil plantation and other agricultural plantation, and become a concern as it can result severe injury and may lead to fatality. The usage of safety helmet is essential to protect workers from danger during inspection and operation. Based on the previous study, there are some problems related to the safety helmet usage among harvesters in palm oil plantation (Shuhada, 2015). The study found that the heat and weight of safety helmet contribute to the discomfort of safety helmet when using it. Therefore in order to ensure the consistent usage of safety helmet during working, there is a need to improve the safety helmet based on issues experienced by the harvesters (Shuhada, 2015). Process of designing the new safety helmet was developed by taking into consideration of many aspects such as the opinion from the palm oil harvesters, the opinion from palm oil plantation management, the expert opinion and also through observation at field of palm oil plantation itself. Thus, this study is to ponder the acceptance level of new safety helmet design among palm oil plantation harvesters.

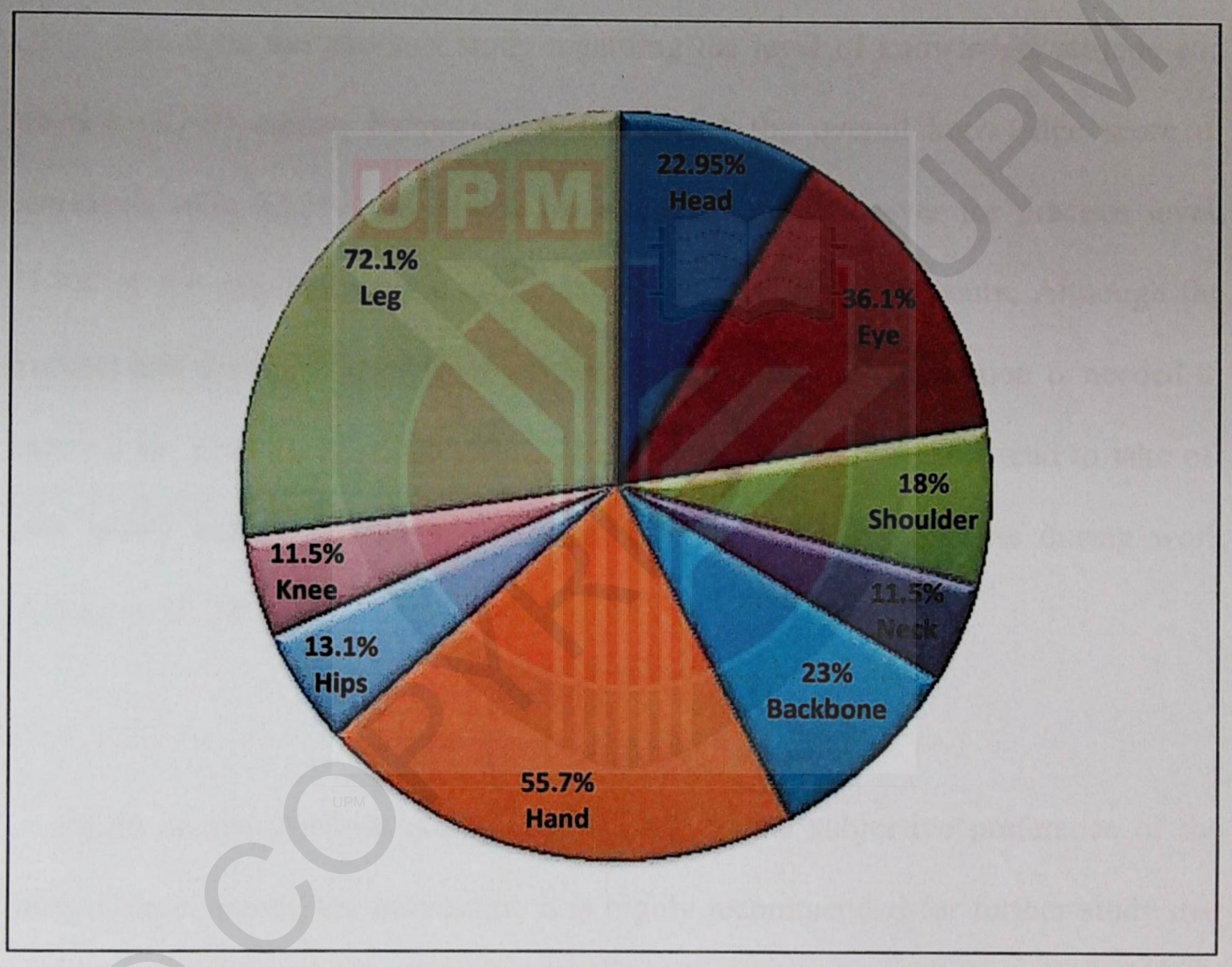
1.2 Problem Statement

Personal protective equipment also known as PPE can be defined as equipment that is used to protect the user against health or safety risks at work. It can include items such as safety helmets, gloves, eye protections, coveralls and safety shoes. However, each PPE must be properly assessed before use to make sure it is fit for purposed, maintained and stored properly, provided with instructions on how to use it safely and used correctly by employees.

Hickling (1986) discussed 12 factors that affect the acceptability of head protection at work: weather protection, thermal properties, tactile properties, absorptivity/permeability, mass distribution, degree of fit, size and shape, retention performance and fit, helmet volume, visual factors, speech and sound factors, and helmet compatibility. Although wearing safety helmet in this plantation is mandatory and can be enforced to a degree through supervision, most agricultural workers such as reported among forest workers are likely to remove the helmet during uncomfortably hot weather if they experience discomfort such as heat stress (Abeysekera, 1988).

Palm oil plantation is commonly associated with high prevalence of ergonomic injuries, particularly during intensive manual labor and during harvesting. Based on previous study, the prevalence of injury among palm oil harvesters is 34.4% (Adnan et al., 2016). In a case study reported that a man sustained brachial plexus injury caused by a falling fruit bunch (FFB) with weighed 10 to 20 kg and fell

from a palm tree of a height of 5.5 meter2 (Arumugam & Tamrin, 2014). Thus, usage of PPE especially safety helmet in palm oil plantation is a must to prevent occupational accidents during work (Adnan et al., 2016). Among the injury by body parts, injury involving eye, head and neck can be related to the usage of safety helmet (Beth et al., 2008). Figure 1.2 is the percentage of injury by body parts (Adnan et al., 2016).



N = 178

Figure 1.2: Prevalence of injury among palm oil harvester

Based on interviews, meetings and personal communication with authorities from Department of Occupational Safety and Health, FELDA and SIME DARBY plantation concluded that the existing hard hat is not suitable for the use of oil palm plantation. The reason includes not properly ventilated for the use in tropical

environment, the tips of hard hat limit the range of vision particularly when the harvesters need to extend his shoulder and neck when harvesting older oil palm trees, neck discomfort experienced by users, and discomfort of using coverall, gloves and boot in plantation namely due to the environmental heat and the heavy work (Bahri et. al, 2015).

Based on the previous study regarding the level of knowledge, attitude and practice (KAP) among harvesters, it found that the overall knowledge score of harvesters were 83.3% and 71.2% for attitude level. However for practice level, 47.7% of the respondents are in the category of fair and low score. Although the workers had the basic knowledge of safety helmet usage, intervention is needed to improve the practice of it (Zolkifli, 2016). This is because workers tend to take off their safety helmet due to hot working condition and discomforts during work (Adnan et. al, 2016).

Based on the previous study, with regards to the subjective preference of the safety helmet among the harvesters, it is highly recommended for further study that involves testing for prototype of safety helmet C being conducted to confirm the effectiveness of the safety helmet preferred by the harvesters (Nazri, 2018). Therefore, safety helmet C was used in this study to determine the acceptance level among harvesters.

1.3 Study Justification

This study provide the answers regarding the acceptance level of new design safety helmets device among palm oil plantation harvesters. Therefore, this study will give the chance for the harverters to evaluate the performance of new design safety helmet device such as comfort, ventilation, weight, capacity and heat as they will wear the new safety helmet in the field throughout specific time provided.

Besides, this study provide information on the knowledge, attitude and practice on the safety helmet usage among palm oil harvesters. The level of knowledge among harvesters can be determined through this study based on the pre-intervention questionnaires. In addition, the attitude of the harvesters also was assessed. The intervention in this study will provide the answer on the difference of practice on safety helmet usage before and after implementation of training among harvesters. This is very important in order to help the harvesters regarding the knowledge they gained to be implemented in the real working situation. Regarding the practice of the safety helmet in the field, this study determined whether the harvester's practice is influenced by new design of safety helmets or not, and the acceptance level on the use of the new proposed safety helmet.

By doing this study, the data obtained can increase the level of awareness of the whole nation. The introduction of this new design safety helmet device provide better side impact protection for head and neck as the developments comes from

many recommend improvement from the other studies. Thus this study eventually brings the workers to move towards using safety helmets on their own.

Since safety helmet has always been a very important issue in agriculture sector such as palm oil plantation especially during harvesting fresh fruit bunches (FFB), therefore this study would be beneficial to the commercialized plantation companies, such as FELDA palm plantations, Boustead Plantations and others. This is because they would be able to promote safety and health to their employees by encouraging them to use safety helmets to prevent head injuries and indirectly will increase the quality of their work. Besides, the data from this study also benefits to the Malaysian Palm Oil Board (MPOB) as the usage of safety helmets can avoid occupational accident thus assist in increasing the productivity. Lastly, the finding from this research also can be used for future study.

1.4 Research Questions

These are the research questions for this study:

I. What are the knowledge, attitude and practice of harvesters on safety helmet usage before implementation of training?

II. What is the acceptance level (comfort, ventilation, design, peak, fit, safety and heat) of new safety helmet design in day 1, day 3 and day 6 among palm oil plantation harvesters?

III. What is the difference on harvester practice of safety helmet usage before and after implementation of training?

1.5 Objectives

1.5.1 General Objective

The general objective of this study is to determine the acceptance level of new safety helmet design among palm oil plantation harvesters.

1.5.2 Specific Objectives

I. To determine the socio-demographic background of harvesters.

II. To determine knowledge, attitude and practice of harvesters on safety helmet usage before implementation of training.

III. To determine the acceptance level of parameter (comfort, ventilation, design, peak, fit, safety and heat) of new safety helmet design in day 1, day 3 and day 6 among palm oil plantation harvesters.

IV. To determine the difference on harvesters practice of safety helmet usage before and after implementation of training.

1.6 Hypothesis

I. There is significant increase of acceptance level of parameter (comfort, ventilation, design, peak, fit, safety and heat) of new safety helmet design in day 1, day 3 and day 6 among palm oil plantation harvesters.

II. There is a significance difference between harvesters' practice on safety helmet usage before and after implementation of training.

1.7 Conceptual Framework

As shown in Figure 1.3, this research focused on the general workers from palm oil plantations. The major daily work done by oil palm plantation workers are cutting fresh fruit bunches (FFBs), collecting, loading and unloading FFBs to be sent to the processing plant (Ng et al., 2013). Therefore oil palm harvesters are not spared from being exposed to various ergonomics risks that leading to musculoskeletal disorders. There are many causes of injuries in palm oil plantations such as falling of fruits, lack of training, safety helmet usage. Meanwhile during transportation, the drivers need to look back frequently, every time the machine is lifting FFB from ground into carts (Syazwani, 2016). According to US Department of Labor (2010) safety helmet should ready to retain the stun of a blow, water resistant and moderate burning. However, based on previous study conducted by Abeysekera (1996), the discomfort of safety helmet are due to certain factors such as hotness, not well fitted and the weight to be carried on the head. In addition, among the emphasized issues for the non-compliance of safety helmet are the comfort, ventilation, weight and safety (Shuhada, 2015). Besides, the knowledge, attitude and practice on using personal protective equipment (PPE) among rattan craftsmen workers was low equal 3.72%, 4.22% and 29% respectively (Truong et al., 2009). However in Malaysia, the score of knowledge, attitude and practice is moderately high among the harvesters (Zolkifli, 2016). This study will prove that there is significance difference in practice before and after training session. Figure 1.3 shows the conceptual framework of this research.

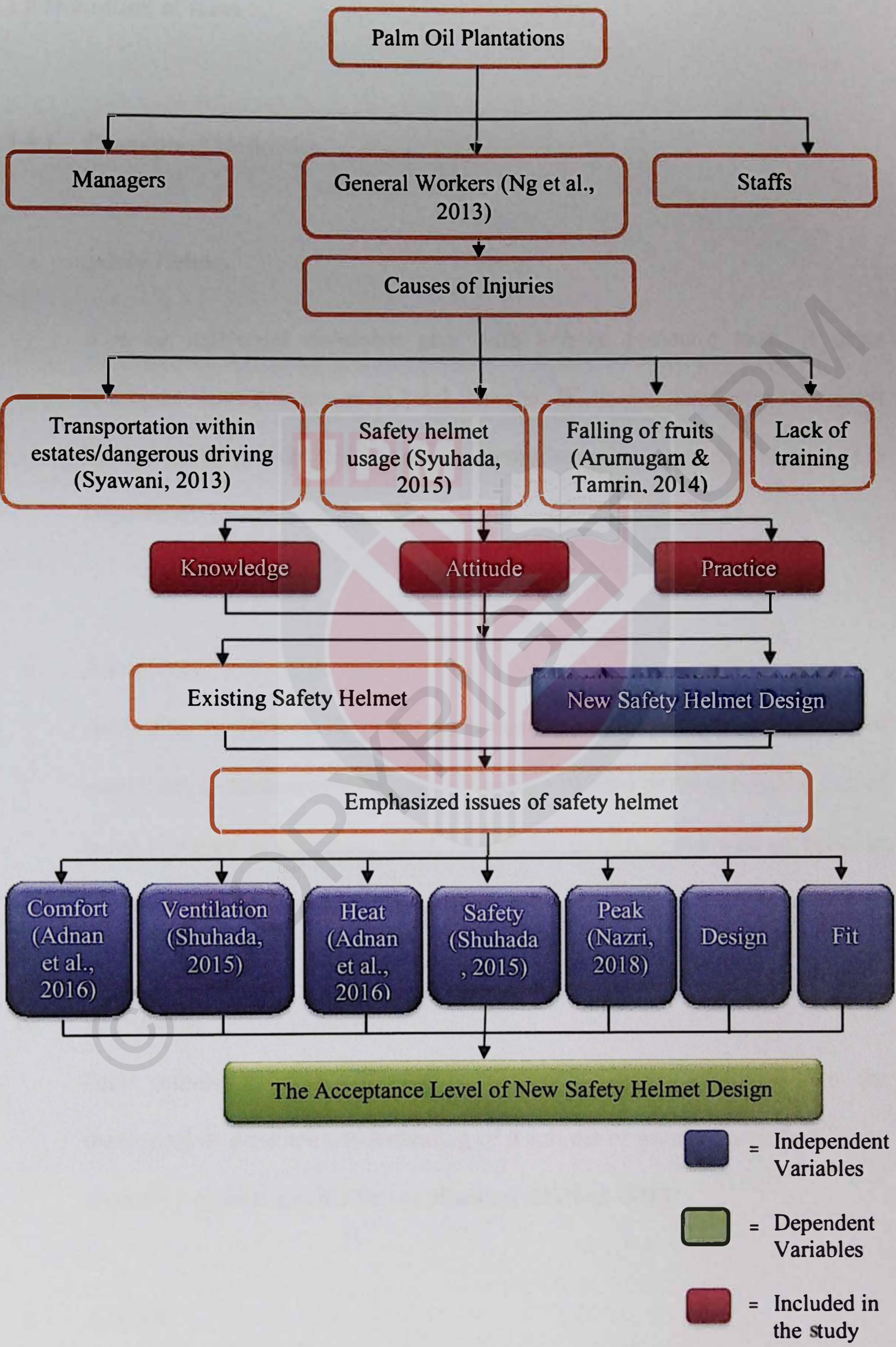


Figure 1.3: Conceptual framework of the acceptance level of new safety helmet design.

1.8 Definition of term

1.8.1 Conceptual Definition

i. Safety Helmet

It is an individual defensive gear with a head protector look. It gives assurance from any potential head damage. Wellbeing head protector must have a hard outside shell and can contradict penetration by objects (US Department of Labor, 2010).

ii. Acceptance

According to Oxford Dictionaries, acceptance is defined as the action of consenting to receive or undertake something offered or the process or fact of being received as adequate, valid, or suitable or agreement with or belief in an idea or explanation (Oxford, 2018).

iii. Knowledge

Facts, information, and skills acquired through experience or education or the theoretical or practical understanding of a subject or awareness or familiarity gained by experience of a fact or situation (Oxford, 2018).

iv. Attitude

A settled way of thinking or feeling about something (Oxford, 2018).

v. Practice

Perform (an activity) or exercise (a skill) repeatedly or regularly in order to acquire, improve or maintain proficiency in it or carry out or perform (a particular activity, method, or custom) habitually or regularly (Oxford, 2018).

1.8.2 Operational Definition

i. Safety Helmet

The new design of safety helmet will be given to the respondents to be worn in the field for day 1, day 3 and day 6.

ii. Acceptance

Acceptance level of the new design safety helmet is based on the evaluation of the new safety helmet performance from the harvesters such as comfort, ventilation, design, peak, fit, safety and heat via questionnaire as they will wear the new safety helmet in the field throughout specific time provided.

iii. Knowledge

Harvesters' knowledge on safety helmet will be assessed in this study to know their understanding on the usage of the protective equipment by answering questionnaire.

iv. Attitude

Attitude is a predisposition on how the workers respond towards the usage of safety helmet, either positively or negatively by answering questionnaire. Attitude will influence the workers choice of action and respond to works tasks, incentives and rewards.

v. Practice

Harvesters supposedly practice the correct usage of safety helmet to help them perform their works in safe condition. Observation method was used to collect data for practice item on the safety helmet usage. A checklist was used to record the observation.

CHAPTER 2

LITERATURE REVIEW

2.1 Safety Helmet

Section 8 of the Occupational Safety and Health Act (1994) is imposed on every employee to take care for the safety and health of others and himself and comply with safety requirements and rules by co-operate with his employer. Meaning to say that every employee must follow the rules and instructions of his employer to ensure the safety helmet provided is properly worn and taken care of and should not misuse the helmet. Any defects should be reported immediately. It can make the difference between being safely covered or dangerously exposed if PPE does not fit properly as it may not provide the level of protection desired thus eventually may discourage employee use.

Malaysian Standard (2001) stated that the helmet shall include at least a shell and harness. Shell is the hard, smoothly finished material that provides the general outer form of the helmet and harness is the complete assembly that provides a means of maintaining the helmet in position on the head for absorbing kinetic energy during an impact. A harness also includes a headband, nape strap and may also include the items defined as cradle and comfort band or sweatband as shown in figure below.

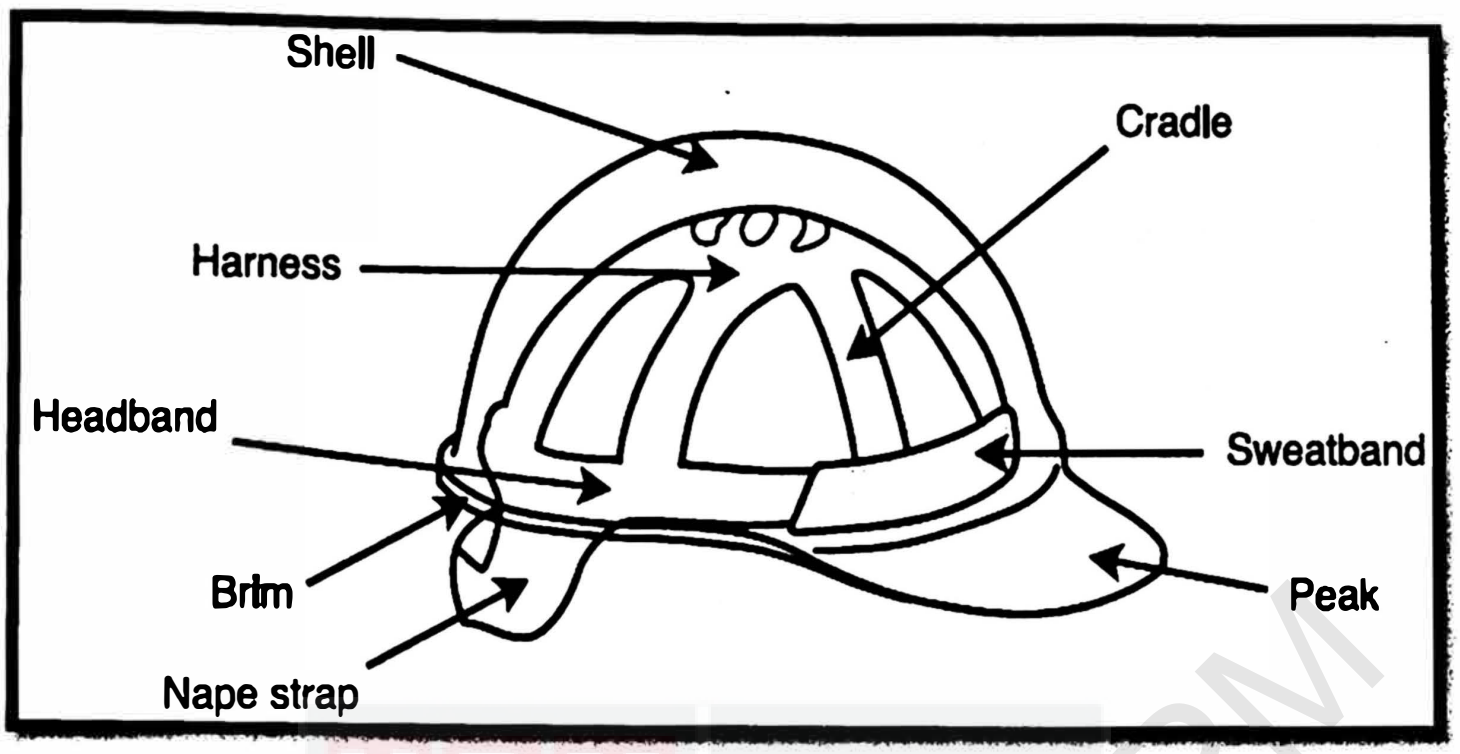


Figure 2.1: General Design of Safety Helmet

2.2 Safety Helmet Usage among Agricultural Sector

According to the previous study from US, the usage of PPE among agricultural workers were low even PPE was already available and highly recommended. This is due to the decision of wearing PPE were personal and has little influence by outside parties (Carpenter et al., 2002). Besides, one of the studies in Australia regarding Agricultural Health and Safety Performance found that the usage of safety helmets when riding quad bikes, motorcycles and horses need to be improved since the implementations of farm health and safety plans are low (Lower et al., 2011). In agriculture sectors, especially in palm oil plantation, safety helmet is one of the important PPE for head, eye and neck protection.

The occupational accidents by sector until October 2018 showed that agriculture, forestry, logging and fishing (289 cases) is the second highest number of

accidents after manufacturing sector (1303 cases). Figure 2.2 showed the latest trend of occupational accidents in agricultural sector of 2014 until 2018. The number of occupational accidents for agriculture, forestry, logging and fishing in 2018 was reported lower than 2017 which were 289 cases and 522 cases respectively (DOSH, 2018).

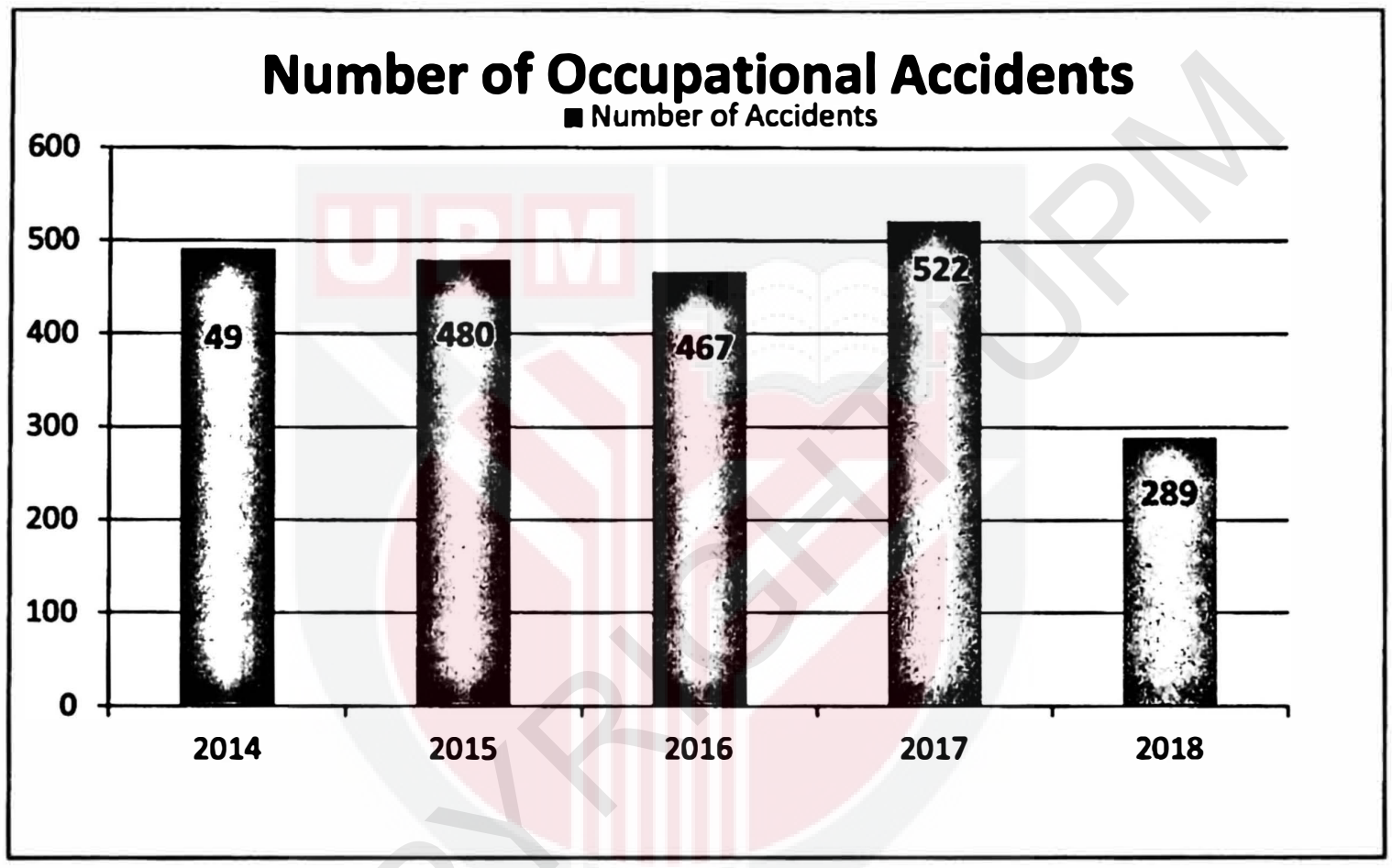


Figure 2.2: Statistics of occupational accidents in Malaysia (2014-2018)

2.3 Design of the Safety Helmet

Process of designing the new safety helmet was developed by taking into consideration of many aspects such as the opinion from the palm oil harvesters, the opinion from palm oil plantation management, the expert opinion and also through observation at field of palm oil plantation itself (Shuhada, 2015).

There are specific design values in order to produce new design of safety helmet based on the product positioning of design concept for safety helmet such as robust, rugged, professional, futuristic, modern, dominant, trendy, conventional and simple as shown in Figure 2.3 below (MIMOS, 2017). For this study, the design of safety helmet is futuristic.

Figure 2.3: Product positioning

2.3.1 Robust

Robust helmet provides optimal protection for the skull, but diminishes the visual field considerably. One of the studies shows the robust Active Noise Control System is used for fighter aircraft pilot helmet application in order to address the noisy environment (Bharath et al., 2016). The prime purpose of a fighter aircraft pilot helmet is protection and it is made of high strength, lightweight para-armid reinforced with epoxy resin shell and the helmet ear cups use open-cell foam rubber.

2.3.2 Rugged

A rugged design of is a safety helmet specifically designed to operate reliably in harsh usage environments and conditions, such as strong vibrations, extreme temperatures and wet or dusty conditions. Figure 2.4 shows the design of rugged safety helmet (MIMOS, 2017).

Figure 2.4: Rugged Safety Helmet Design

2.3.3 Futuristic

Futuristic safety helmet is a design that is thought likely to be current or fashionable at some future time, ultramodern. Figure 2.5 shows the futuristic design of safety helmet (MIMOS, 2017).

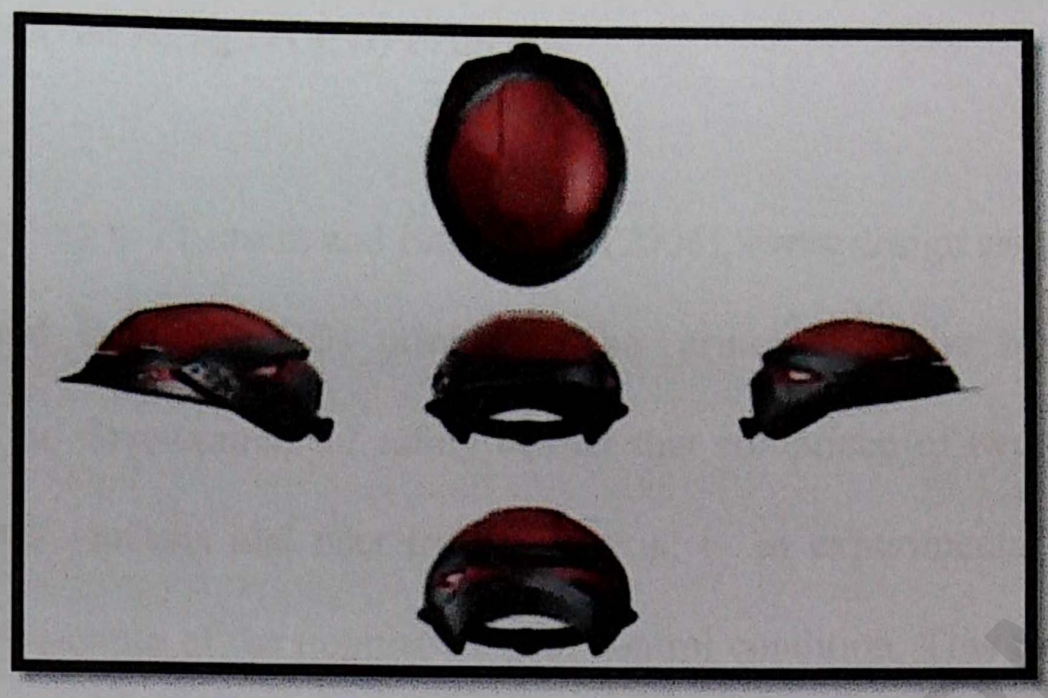


Figure 2.5: Futuristic Safety Helmet Design

2.3.4 Professional

The Professional I(PRO I) industrial safety helmet is enhanced by its unique Ultra Protective Design to provide higher resistance level of penetration impact against falling object efficiently slow down the shock being impacted directly to the wearer's head. Figure 2.6 below shows the design for professional safety helmet (MIMOS, 2017)

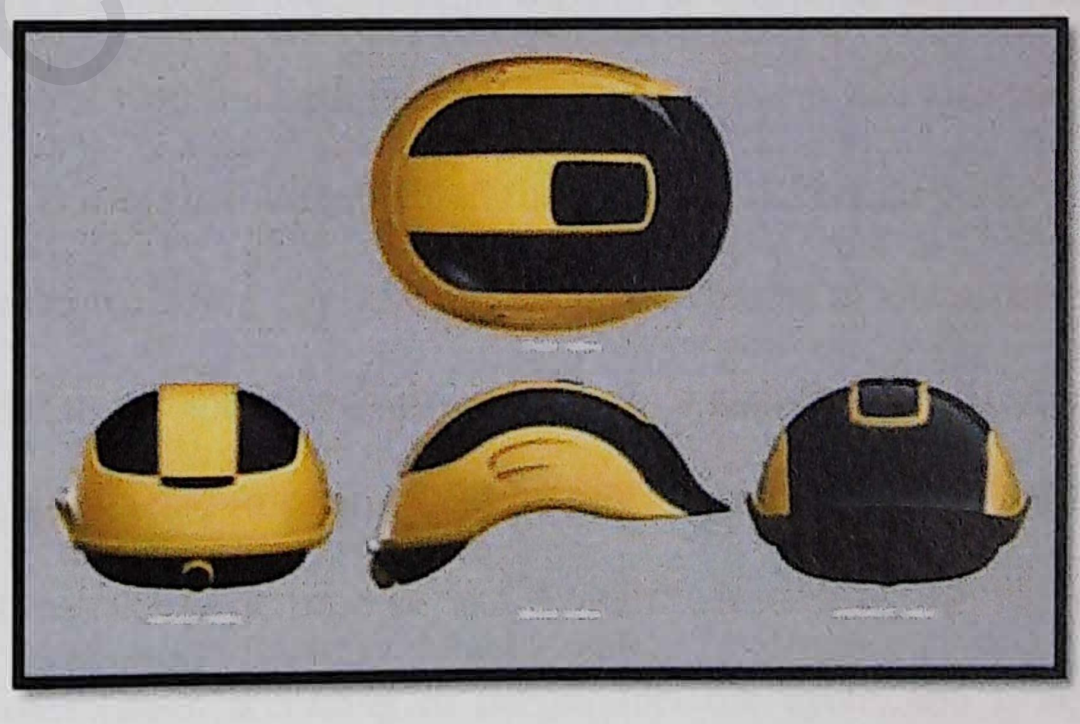


Figure 2.6: Professional Safety Helmet Design

2.4 User Centered Design (UCD) Principle

According to Pheasant and Haslegrave (2006), every design should follow the User Centered Design (UCD) principle. This principle is the best ergonomic approach in the development of safety helmet that comprised of two key elements which are task analysis and user trial. User trial is an experimental process of a representative sample of the population with control condition. This trial are mainly focusing on the evaluation and testing of the prototype in determining the product effectiveness, efficiency and safety criteria that contributes to the perceived success and well acceptance by the actual user (Leornard et al., 2006). Secondly, the information is obtained for design specification followed by the production of design in the version of prototype. The next step is testing and evaluation of the proposed design and the design is considered successful if the objectives of the study are fulfilled.

According to Malaysian Standard of Specification for Industrial Safety Helmet, there are specific requirements need to be complied before final production includes physical requirements, performance requirements and also test requirement. In addition, helmets shall be submitted for testing in the condition in which they are offered for sale, including any other means of attachment of any accessories and any requisite holes in the shell specified by the helmet manufacturer. Besides, no helmet that has been subjected to testing shall be offered for sale. Figure 2.7 below shows the product development process and EQUID. It tackles the requirements for addressing user issues according to the product life cycle, and it deals with the

requirements to ensure the quality of addressing user issues in product design (Lange-Morales et al., 2014).

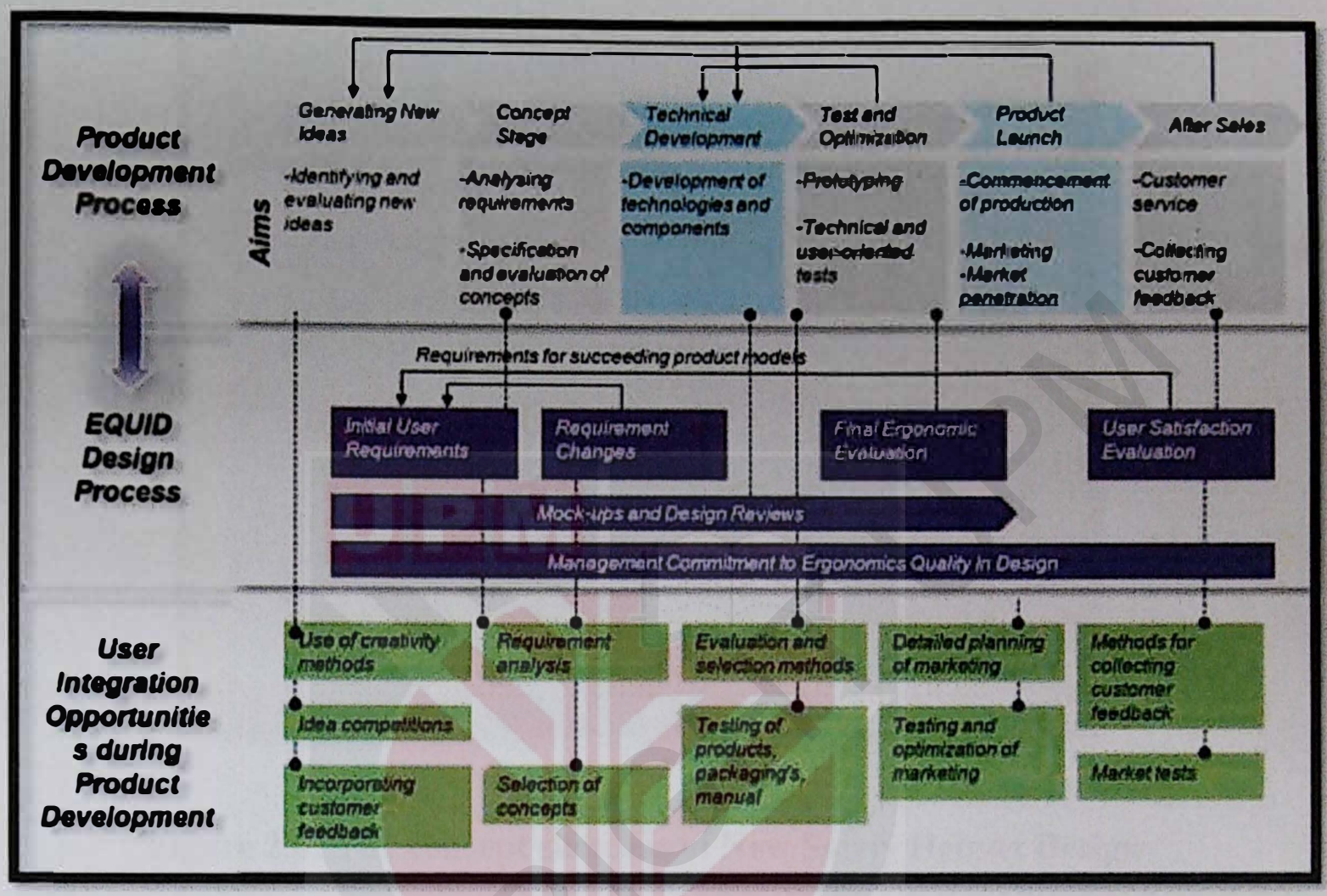


Figure 2.7: Product Development Process and EQUID

2.5 Design Development

The idea of a new design was sketched based on the ergonomics problem raised from the existing safety helmet. Only final sketched design on the proposed idea will be selected. Initially, the selected sketches were drawn and developed by using drawing paper and 2D sketches as shown in Figure 2.8 (MIMOS, 2017). For the next stages, a 2D layout of the selected design was drawn and technically draft by using Adobe Illustrator and Adobe Photoshop software. Finally, SolidWorks software which is a Computer-Aided Design (CAD) was used in the production of

custom designs technically. This software is capable of producing the display model in both 2D and 3D (figure 2.9).

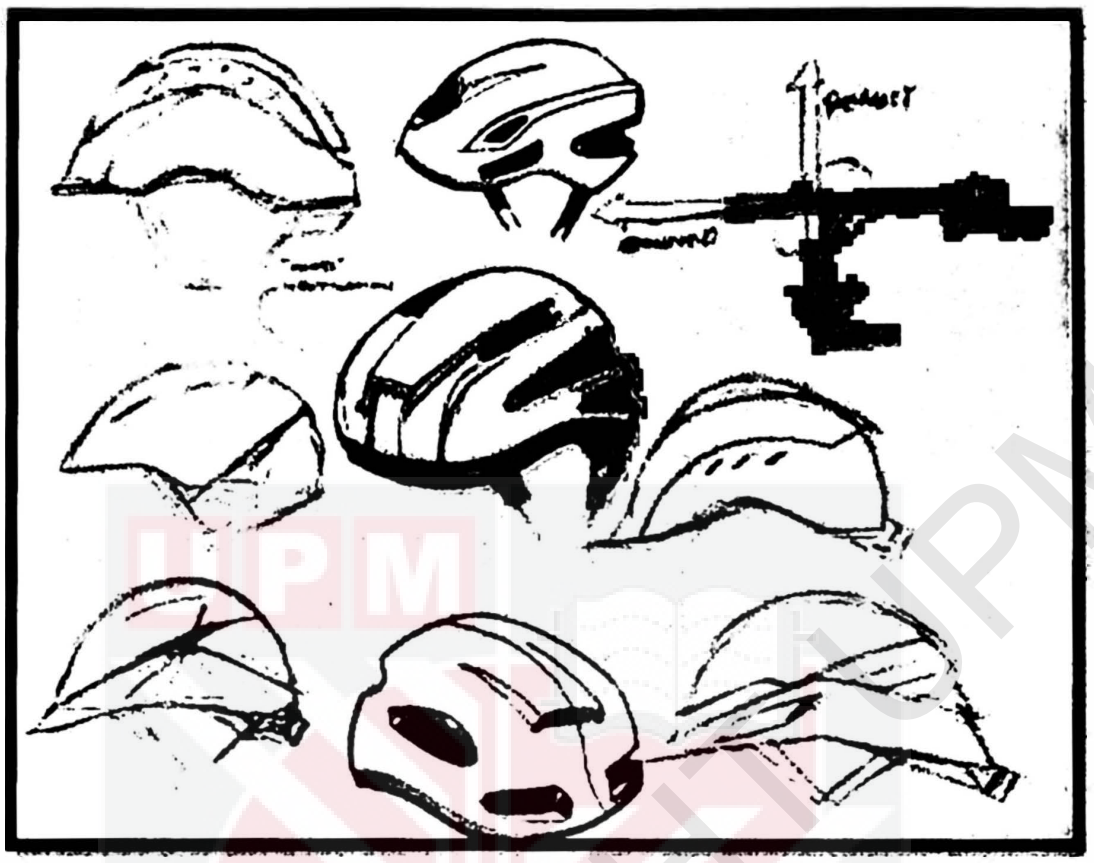


Figure 2.8: The concept sketches of New Safety Helmet Design

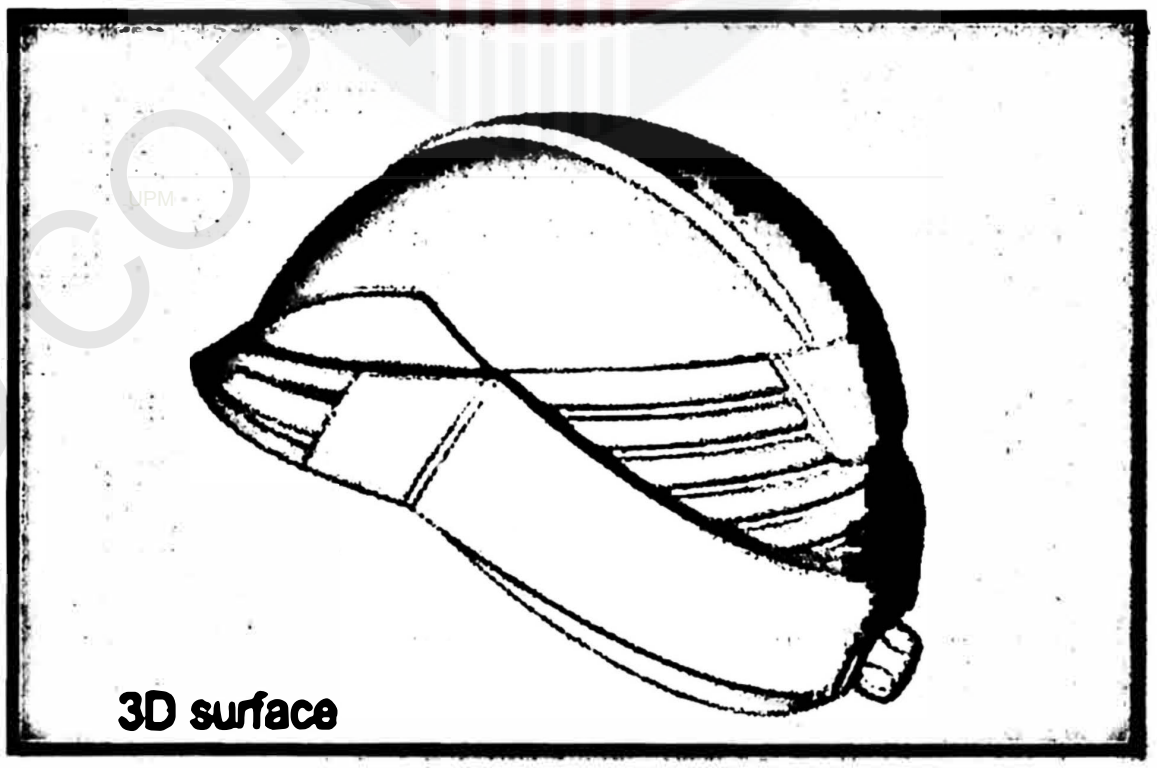


Figure 2.9: The 3D surface of New Safety Helmet Design

2.6 Important Factors in Designing the Safety Helmet

The helmet chosen should offer the desired protection and comfort and not create any additional safety problems in order to ensure the safety helmet provided is appropriate to minimize the effects of the hazards.

2.6.1 Comfort

Discomfort in the use of personal protective devices (PPD) has been one of the chief causes of their non-use. According to Guidance Notes on The Selection, Use and Maintenance of Safety Helmet (2004), safety helmets should be as comfortable as possible. Comfort can be improved by use of light material for the shell without affecting the design strength, a flexible headband of adequate width to fit the forehead, a sweatband that is easy to clean or replace and textile cradle straps. Fitness is one of the important elements for ensuring the proper functioning of safety helmet in case of an impact. A properly fitting safety helmet should have the right shell size for the wearer and an easily adjustable headband, nape and chin strap.

2.6.2 Weight

For maximal effect, the safety helmet must be made of materials which are light in weight and strong enough to give adequate protection to the head (Fernandez, 1963). A well-designed motorcycle crash helmet has proved to be a very good protection device for the rider to prevent or minimize the head injuries in road accidents. If a helmet is not worn, the head impact with any object would cause

localized high pressure on the skull, which leads to brain injury. The helmet design can be divided into functional (like shock absorbing capability, penetration resistance, retention and reliability) and non-functional (like low cost, good aesthetics, comfort, light weight and good thermal characteristics) categories. Another studies found that several factors have been associated with the prevalence of flight-related neck pain including awkward flight postures and wearing heavy equipment (Adams, 2004; Grant, 2002; Thuresson et.al., 2005).

2.6.3 Ventilation

Based on the study investigated by Abeysekera and Shahnavaz (1988), there were the potential benefits of helmets with ventilation holes in both laboratory and field settings as they found that even the subject wore whether the ventilated or unventilated helmet in laboratory, there was no significant differences in the subjects' heart rates and skin temperatures. Meanwhile in larger field study, the ventilated helmet was judged less hot and caused less sweating. In addition, Reischl (1986) found that a helmet with side ventilation holes was cooler than an otherwise identical unventilated helmet and the improved air circulation can be enhanced by increasing the separation between the helmet shell and the head of user.

2.6.4 Safety

The outer shell, an impact liner and a comfort liner are the three primary elements for helmet as shown in Figure 2.10. The tough outer shell protects the head by evenly dispersing forces across the inner impact layer. The impact liner absorbs

most of the impact energy by deforming upon impact. Finally, the comfort liner provides a snug and comfortable fit over the wearer's head (MSF 2002). Hard hats must have a hard outer shell and a shock-absorbing lining that incorporates a headband and straps that suspend the shell from 1 to 1 1/4 inches (2.54 cm to 3.18 cm) away from the head to provide shock absorption during an impact and ventilation during normal wear (United States Department of Labour, 2004).

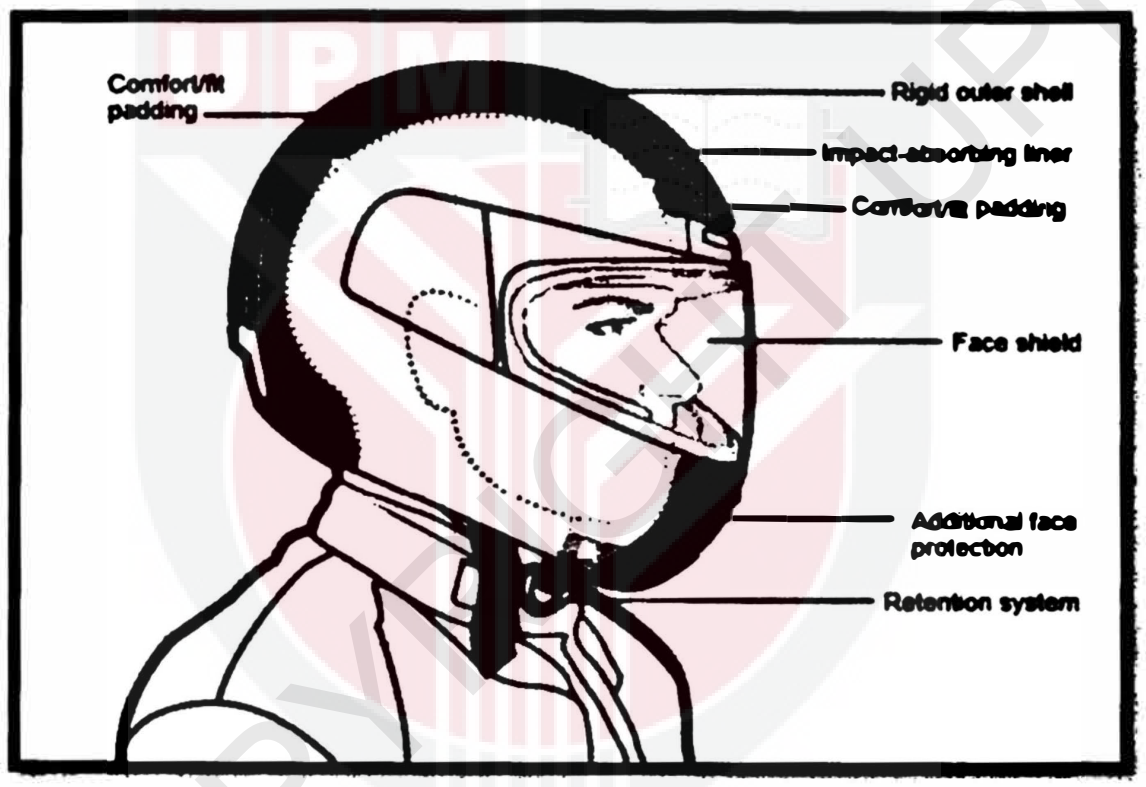


Figure 2.10: Safety helmet components (MSF 2002)

2.7 Knowledge, Attitude and Practice

Knowledge, Attitude and Practice (KAP) study is a type of survey that is used to investigate human behavior related to certain issues. Leresche (2011) define knowledge as a set of understandings and attitude is a way of being, a position which helps in explaining that subject is adopting one practice when it is submitted to a stimulus. Lastly, practice as observable behavior when the subject response to a certain stimulus.

One of the studies regarding Knowledge, Attitude and Practice study was conducted by Zolkifli (2016) among palm oil harvesters in Selangor with an intervention program which consists of training on safety helmet usage using intervention video and safety toolbox talk. Study revealed that there is a need regular supervision to help improve the practice of safety helmet usage among harvesters. Table 2.1 shows the finding regarding the knowledge, attitude and practice of the usage of PPE in agriculture sector in other countries.

Table 2.1: The knowledge, attitude and practice on the usage of PPE in agriculture sector in other countries.

Sources	Title	Findings
(Truong et al., 2009)	Assessment of KAP on Using Of Personal Protective Equipment Rattan Craftsmen at Trade Village, Kienxuong District, Thaibinh Province, Vietnam.	The KAP on using personal protective equipment (PPE) among rattan craftsmen workers was low equal 3.72%, 4.22% and 29% respectively.
(Magoro, 2012)	KAP Regarding Personal Protective Equipment amongst Stevens Lumber Mills Employees in The Capricorn District Of Limpopo Province, South Africa.	The KAP regarding PPE among Steven Lumber Mills workers showed 53% had no knowledge about PPE, 50% had a negative attitude and 62% were not using PPE.

Sources	Title	Findings
(Norkaew, 2009)	KAP of using Personal Protective Equipment (PPE) for Chilli-Growing Farmers In Huarua Sub-district, Mueang District, Ubonrachathani Province, Thailand.	The KAP of using PPE among chilli-growing farmers in Thailand found that associations between knowledge and attitude, knowledge and practice, and attitude and practice demonstrated statistical significance with low positive correlation (0.2116, 0.285 and 0.305 respectively)
(Hoffmann & Bansal, 2018)	Labour Right Assessment: Nestle's Palm Oil Supply Chain in Indonesia.	Based on the assessment at Nestle's Palm Oil Supply Chain in Indonesia, the mill is lack of a health and safety culture because workers did not always wear PPE. Harvesters were observed giving their personal safety helmets to their wives or children because if the helper got injured, they would receive treatment at the health clinic on the plantation but contrary to contract workers they would have to pay for the treatment.

According to The Selection, Use and Maintenance of Safety Helmet (2004), proper training should be provided to each user of safety helmet. Records of training should be kept. The scope of the training should include the risks of head injury in

workplaces, preventive measures for head injury, why safety helmets are necessary, when it should be worn, legal obligations, basic principle on how the safety helmet provides protection, proper methods of wearing, use of accessories and their attachment methods, safe practices, care and maintenance and service life and replacement. Users should be reminded that the safety helmet is only the last resort and appropriate preventive measures should be taken in order to prevent head injury.

2.8 Acceptance Level

Acceptance is the action of consenting to receive or undertake something offered or the process or fact of being received as adequate, valid, or suitable or agreement with or belief in an idea or explanation (Oxford, 2018). Based on the previous study by Abeysekera & Shahnavas (1990), only 5% to 10% of the workers who really worn their helmets in the field study. This showed the discomfort of the existing safety helmet which caused the harvester to refuse wearing the safety helmet. A helmet needs to be developed with acceptable weight, comfortable fit, and adequate ventilation (Davis et al., 2001). Therefore, the acceptance level of safety helmet in this study also takes into consideration the comfort, weight, capacity, design as well as ventilation of the safety helmet. All those parameters play important roles in determining the consumer satisfaction. According to Viemeister (2001), the appearances are important and consumers not only buy a product, but they buy value in the form of entertainment, experience and identity. Product features needs to associate with aesthetics and influence the consumer's visceral, behavioural and reflective aspects of emotion (Khalid, et al., 2012).

CHAPTER 3

METHODOLOGY

3.1 Study Location

This study was carried out in three palm oil plantations under Boustead Plantations Berhad (BPB) in Johor. The plantations involved were Kulai Young, Chamek and Telok Sengat which were purposively chosen by the plantation managements. The location is shown in below figure 3.1.

Figure 3.1: Study Locations of the Plantations in Johor

3.2 Study Design

This study is the one-group pretest-posttest design to determine the practice of harvesters on safety helmet usage before and after implementation of training as well as to determine the acceptance level of new safety helmet design among palm oil plantation harvesters. The intervention tools consist of training video, banners and posters regarding safety helmet usage. The new safety helmet design was given to the harvesters according to specific time provided. The data collection was conducted within the time frame from December 2018 to May 2019.

3.3 Study Population

The populations of this study are the male harvesters of 3 plantations under Boustead Plantation Berhad which were 124 harvesters of the main population.

3.4 Sampling

3.4.1 Sampling Method

- **Plantations**

The method used for the selection of plantation was purposive sampling method as it is determined by the management of the plantation. The sample size required for this study also considered by the management.

- **Respondents**

Stratified random sampling was used for a division of a population from each of the plantations. A total of 124 harvesters were randomly selected as respondents through the name list of harvesters obtained from the respective management offices.

3.4.2 Sample Size

I. To determine knowledge, attitude and practice of harvesters on safety helmet usage before implementation of training, to determine the acceptance level of new safety helmet design in day 1, day 3 and day 6 among palm oil plantation harvesters and to determine the difference on harvesters practice of safety helmet usage before and after implementation of training.

For the sample size, it was calculated by using the sample size formula of proportion for one groups (Lemeshow et al., 1990).

$$n = \frac{z^2_{1-a/2}\, P(1-P)}{d^2}$$

Where:

n = Sample size

$Z^2_{1-\alpha/2}$ = z represents the number of standard errors away from the mean = 1.96

P = estimated proportion

d = desired precision

The percentage of prevalence of head injury in 2016 is 7.94% based on the annual report of Social Security Organization (Social Security Organisation, 2018), where *P* (0.079). Therefore, by computing the prevalence of head injury, a 95% confident interval (1.96) and the margin of error (0.05), the sample size is calculated as below:

$$n = \frac{(1.96)^2(7.94)\,(100-7.94)}{(5)^2}$$

$$= 112.3$$

$$\approx 112 \text{ harvesters}$$

In order to reduce the likelihood of refusals and also take into account any missing data during collection, ten percent from the total sample size which is roughly 12 is added (Bartlett et al., 2001).

$$\frac{n}{1-L}$$

Where,
n = Sample size
L = non-response

$$\frac{112}{1-0.1}$$

$$\therefore 112 + 12 = 124$$

Therefore, the total sample size required to achieve these objectives is **124 harvesters**. From 124 harverters, 82 harvesters from Telok Sengat Estate, 24 harvesters from Kulai Young and 18 harversters from Chamek Estate. With those, it had a proportionate stratified random sample of harverters, which provides a better representation of harvesters.

3.4.3 Sampling Unit

The sampling unit for this study is harvester who is working in palm oil plantation. Below are the inclusive and exclusive criteria for the sampling unit:

Inclusive Criteria:

- Male harvesters
- Age between 18-60 years old
- Able to understand instructions in Indonesian/Malay languages

Exclusive Criteria:

- Less than 3 months working as harvesters

3.5 Study Instrumentation

3.5.1 New Design of Safety Helmets Device

There is one new design of safety helmet device that was used for this study in order to determine the acceptance level regarding the new design of safety helmets device among palm oil plantation harvesters. The safety helmet was worn by the respondents according to the specific time provided as required for this study. Below is the new design of safety helmet device. The characteristic of this new safety helmet design is it has more ventilation hole at top and edge of the helmet compare

to the existing safety helmet. Besides, the new design of safety helmet has shorter peak so that it does not limit the vision of the harvesters during harvesting.

Figure 3.2: The New Design of Safety Helmet

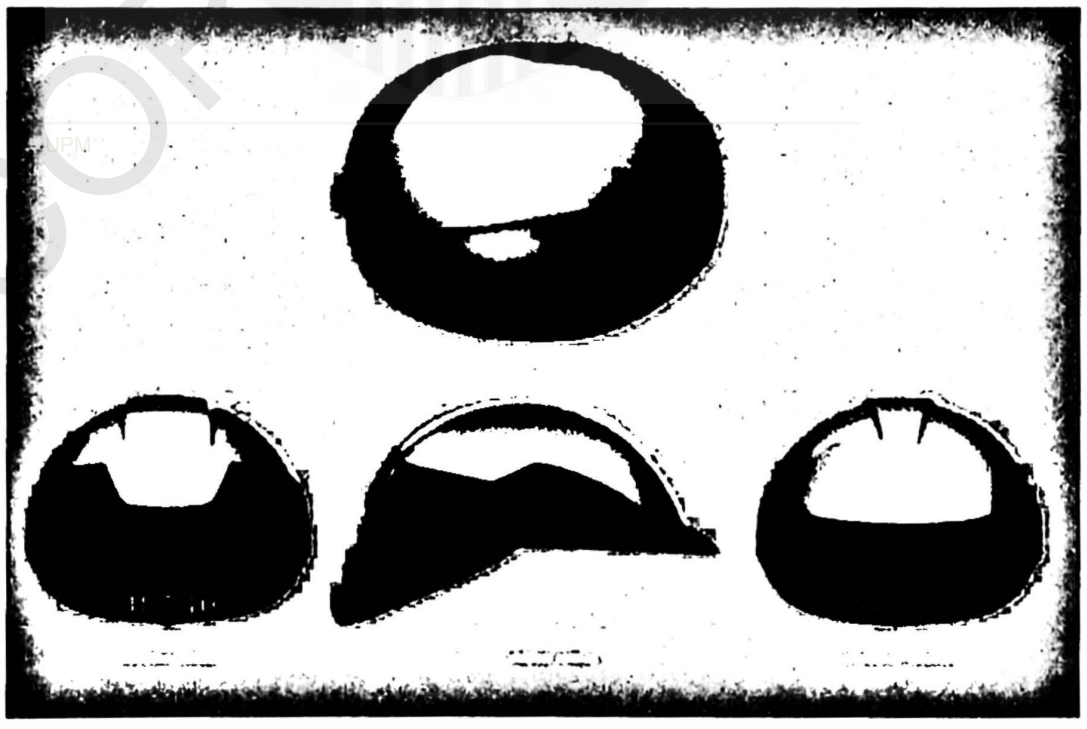


Figure 3.3: The New Design of Safety Helmet from different angles

3.5.2 Questionnaires

There are two phases of questionnaire session for this study in bilingual language (Bahasa Malaysia and Indonesian language) which are pretest-questionnaire and posttest-questionnaire.

Pretest-Questionnaire

Part A: Socio demographic background

Part B: Knowledge on safety helmet usage

Part C: Attitude on safety helmet usage

Part D: Practice on safety helmet usage

For Part A, it is a closed ended question that that asked on harvester background such as age, nationality, salary, marital status, as well as educational level of the respondents.

Part B, it is consists closed ended questions on knowledge of the respondents regarding the usage of safety helmet. It will have seven items of "yes" and "no" questions such as the usage of safety helmet is compulsory during working and head injury can cause death.

Meanwhile, for Part C is also closed ended question. It consists of seven items of "yes" and "no" questions that asked on the attitude of the respondents in using safety helmet such as their usage during management check, the willingness of them wearing and colleagues' encouragement on using safety helmet.

Part D is closed ended question which required harvester to answer seven items of "yes" and "no" regarding on respondents' practice of safety helmet. For examples, practicing the correct way of using safety helmet, wearing chin strap, tighten the gear and reminds colleagues to wear safety helmet as well.

The worker's knowledge, attitude and practice level were determined by using scoring method. Score for knowledge, attitude and practice were calculated as such true answer will score one (1), false and "I don't know" answer score (0). Score less than 50% is low, 50% - 75% is fair and more than 75% is high level of knowledge (Anees, 2014). Figure 3.4 shows the data collection during pre-test session.

Figure 3.4: Pre-Test Session

Posttest-Questionnaire

Part A: Acceptance level of new safety helmet design in day 1, 3 & 6

For Part A, it consists of score scale against new design safety helmet performance. Acceptance level of the new design safety helmet is based on the evaluation of the new safety helmet performance from the harvesters such as comfort, ventilation, design, fit, safety, peak and heat. For example, the harvesters need to mark (X) at the 10 cm line provided in order to choose the scale regarding the comfortability of the new safety helmet design. The 10 cm lines represented 100% score. Based on the scoring, Friedman Test was used to measure the acceptance on comfort, ventilation, peak, design, fit and heat at Day 1, Day 3 and Day 6. Figure 3.5 shows the data collection during post-test session.

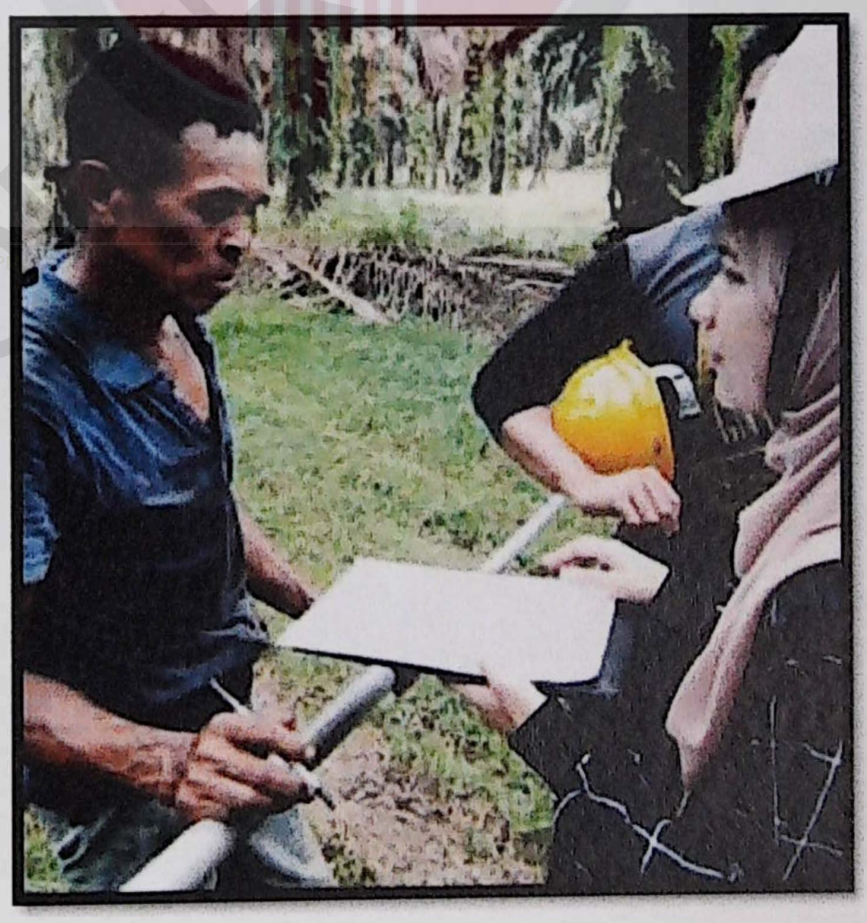


Figure 3.5: Post-Test Session

3.5.3 Intervention

3.5.3.1 Training

For the better understandings on the safety helmet usage, a five minutes training video in Indonesian language and Bengali language produced by an expert team led by an ergonomist was shown to the respondents. This video was used in previous study as intervention tool for plantations in Selangor (Zolkifli, 2016). The contents of the video are the correct ways of using safety helmet, how to identify broken safety helmet, do's and don'ts towards safety helmet and reminders to wear safety helmet as shown in figure 3.6. Figure 3.7, 3.8 and 3.9 shows the training session at Kulai Young Plantation, Chamek Plantation and Telok Sengat Estate respectively.

Figure 3.6: The contents of the video

Figure 3.7: Training Session at Kulai Young Plantation

Figure 3.8: Training Session at Chamek Plantation

Figure 3.9: Training Session at Telok Sengat Estate

3.5.3.2 Banners and Posters

Banner and poster related to safety helmet usage message was put up at visible area such as assembly and rest hub area during first day of arrival at each plantation respectively. Figure 3.10 and 3.11 shows the banners and poster used during data collection.

Figure 3.10: Banners

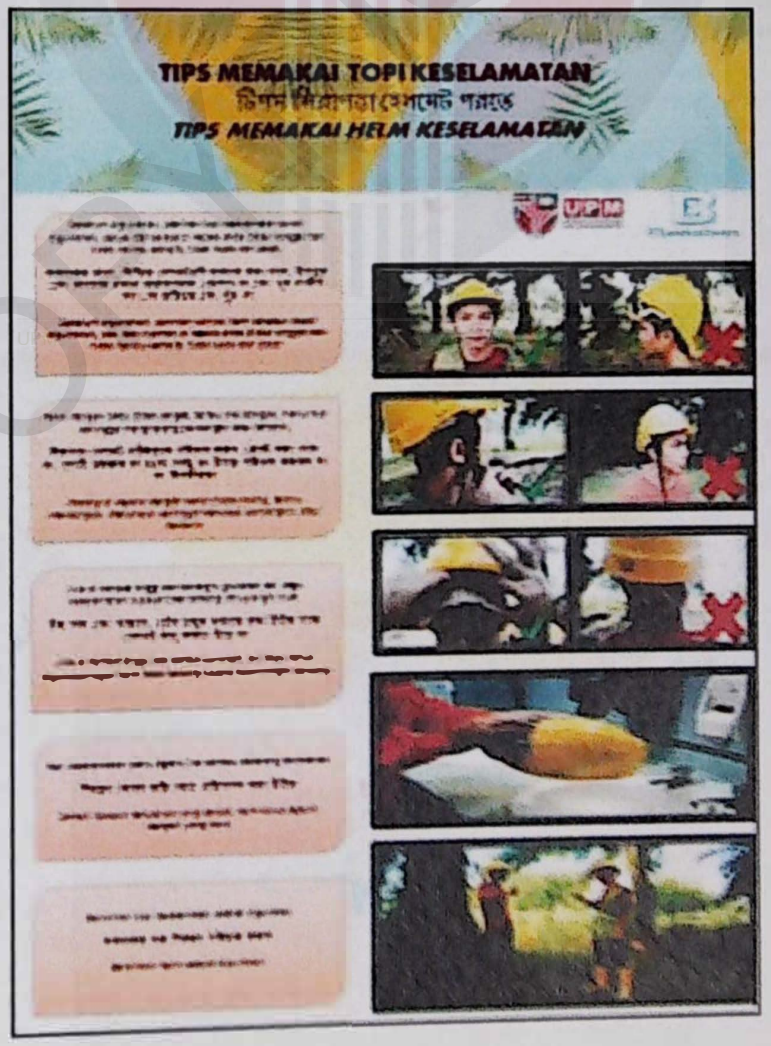


Figure 3.11: Poster

3.5.4 Observation for Practice on New Safety Helmet Usage

Observation method was used to collect data for practice item (posttest) on safety helmet usage. It is different from pre-test because pre-test is self-reported through questionnaire. Researcher went to the plantation field that was assisted by the assistant manager after morning roll-call session, and observed if the harvesters are wearing the new safety helmet during working. The result from the observation was used to compare with pre-test result of the same harvesters. Figure 3.12 shows the observation checklist.

SENARAI SEMAK PEMERHATIAN UNTUK KEGUNAAN TOPI KESELAMATAN.

No. ID

Tarikh

No	Tingkah laku	Mengamalkan	Tidak mengamalkan
1	Penuai memakai topi keselamatan di ladang		
2	Penuai menggunakan topi keselamatan dengan betul		
3	Penuai memakai tali dagu keselamatan		
4	Penuai mengetatkan tali dagu keselamatan sekiranya longgar		
5	Penuai menyesuaikan ukuran pengancing agar muat untuk dipakai		
6	Penuai menasihati rakan-rakan untuk memakai topi keselamatan		

Figure 3.12: Observation Checklist

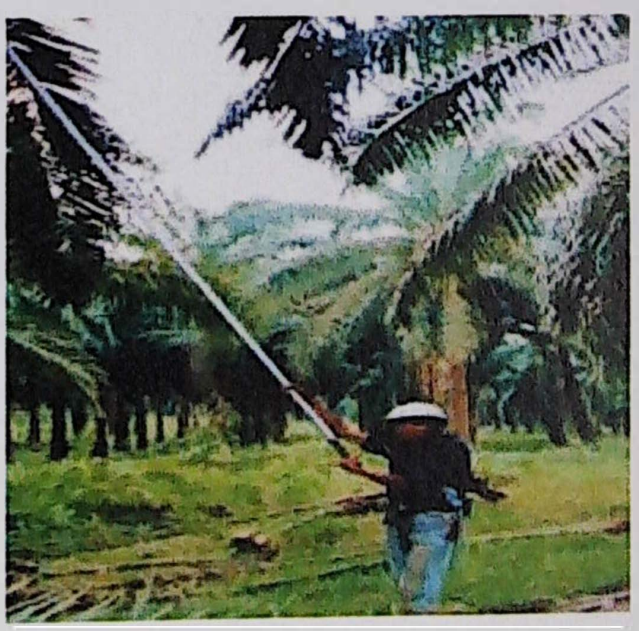


Figure 3.13: Field Observation

3.6 Data Collection Flow

Figure 3.14 shows the data collection flow for this research. After received the approval from company, this study was conducted to 124 harvesters. The respondent had to fill in the written consent before answering questions. The pretest questionnaire was distributed to 124 harvesters which comprised of 82 harvesters from Telok Sengat, 24 harvesters from Kulai Young and 18 harvesters from Chamek Estates to obtain the information on sociodemographic background, knowledge, attitude and practice before training session. Next, the training regarding safety helmet usage was given to harvesters. The new safety helmet design was distributed to the harvesters to be worn at day 1, day 3 and day 6. Meanwhile, at day 2, day 4 and day 5, harvesters had worn their existing safety helmet so that they can felt the differences. There are two purposes for this stage which are to determine the acceptance level of new safety helmet design through posttest questionnaire for day 1, day 3 and day 6 and also field observation in order to monitor their practice on using the new safety helmet after implementation of training. The results were obtained and analyzed.

Received approval from company

Written consent filled by respondents before answering questions

Distribution Pretest Questionnaire

A. Socio demographic background
B. Knowledge
C. Attitude
D. Practice

Training video (morning)

Distribution of new safety helmet design

At day 1, day 3 and day 6, respondent had to fill in Posttest Questionnaire

A. Acceptance level of new design safety helmet device

Field observation

Practice of new safety helmet usage in plantation

Data analysis by Statistical Package for Social Sciences (SPSS) software and report preparation

Figure 3.14: Data Collection Flow

3.7 Quality Control

3.7.1 Content and Translation Validity

The items in the questionnaire is based on validated questionnaire from previous study (Zolkifli, 2017) on knowledge, attitude and practice of safety helmet usage. Questionnaires also was reviewed by manager safety & design engineer Malaysian Institute of Microelectronic Systems (MIMOS) and Senior Manager and Managers from Boustead Plantation Berhad as shown in figure below. Content was evaluated to ensure the questions included are relevant to this study and aligned with the objectives and appropriate for the harvesters. The translation of questionnaires had been made by an Indonesian who is proficient in both Bahasa Malaysia and Indonesian language.

Figure 3.15: Meeting with Senior Manager and Managers from Boustead Plantation Berhad

3.7.2 Pilot Study

The pilot study on the questionnaire was conducted among 12 harvesters in palm oil plantation which is 10% from the sample size population. The pilot study was conducted to ensure that the questionnaire is relevant and can be understood by the harvesters. The questionnaire was corrected after comments are taken from each of the harvesters. A final version of questionnaire was used in this study after the pilot study questionnaire has been corrected.

3.7.3 Reliability Test

For reliability test, Statistical Package for Social Sciences (SPSS) software was used to analyze Cronbach's Alpha in order to determine the internal consistency of the questionnaire. The results from the pilot study showed the value was 0.716 for pre-test questionnaire and 0.914 for posttest questionnaire and was in excellent range of Cronbach Alpha value.

Table 3.1: Results of Reliability Test

Cronbach's Alpha	Internal Consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Quantifiable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

3.8 Statistical Analysis

Data analysis was done through SPSS Version 25. The statistical analysis used :

Table 3.2 : Statistical analysis

Objectives	Statistical Analysis
a. To determine the sociodemographic background of harvesters	Descriptive Analysis
b. To determine the knowledge, attitude and practice of the harvesters on safety helmet usage before implementation of training	Descriptive Analysis
c. To determine the acceptance level of new safety helmet design in day 1, day 3 and day 6 among palm oil plantation harvesters.	Non-parametric: Friedman Test
d. To determine the difference on harvesters practice on safety helmet usage before and after implementation of training.	Chi-Square: Mc Nemar Test

3.9 Ethical Consideration

This study had obtained ethical approval from Ethics Committee of Researches Involving Human of Universiti of Putra Malaysia (JKEUPM-2018-360). The explanation of the purpose for this study had been explains to the harvesters. Written consent form was filled by respondents before they answer the questionnaire. All information regarding the respondents is private and confidential.

CHAPTER 4

RESULTS

4.1 Socio Demographic Background

There were 124 harvesters from Kulai Young Estate, Chamek Estate and Telok Sengat Estate respectively who participated in this study and all of them were male harvesters. Table 4.1 shows the distribution of socio-demographic data among harvesters in all plantations. The distributions of harvesters were 24 harvesters from Kulai Young, 18 harvesters from Chamek and 82 harvesters from Telok Sengat as shown in table 4.2, 4.3 and 4.4 respectively.

Table 4.1: Distribution of socio-demographic data among harvesters

Variables	Frequency (N)	Percentage (%)
Age		
Below 25	27	21.8
26 - 35	39	31.5
36 - 45	45	36.3
Above 45	13	10.5
Nationality		
Indonesian	83	66.9
Bangladesh	38	30.6
Malaysian	3	2.4
Marital Status		
Single	27	21.8
Married	92	74.2
Divorce	5	4
Education		
None	40	32.3
Primary	46	37.1
Secondary	38	30.6
Monthly Income		
Less than 1000	7	5.6
1000 - 2000	117	94.4
More than 2000	-	-

N=124

Table 4.2: Distribution of socio-demographic data among harvesters at Kulai Young

Variables	Frequency (N)	Percentage (%)
Age		
Below 25	5	20.8
26 - 35	5	20.8
36 - 45	7	29.2
Above 45	7	29.2
Nationality		
Indonesian	24	100.0
Bangladesh	-	-
Malaysian	-	-
Marital Status		
Single	6	25.0
Married	17	70.8
Divorce	1	4.2
Education		
None	3	12.5
Primary	12	50.0
Secondary	9	37.5
Monthly Income		
Less than 1000	-	-
1000 - 2000	24	100.0
More than 2000	-	-

N=24

Table 4.3: Distribution of socio-demographic data among harvesters at Chamek

Variables	Frequency (N)	Percentage (%)
Age		
Below 25	1	5.6
26 - 35	4	22.2
36 - 45	10	55.6
Above 45	3	16.7
Nationality		
Indonesian	16	88.9
Bangladesh	-	-
Malaysian	2	11.1
Marital Status		
Single	3	16.7
Married	14	77.8
Divorce	1	5.6
Education		
None	4	22.2
Primary	4	22.2
Secondary	10	55.6
Monthly Income		
Less than 1000	-	-
1000 - 2000	18	100.0
More than 2000	-	-

N=18

Table 4.4: Distribution of socio-demographic data among harvesters at Telok Sengat

Variables	Frequency (N)	Percentage (%)
Age		
Below 25	21	25.6
26 - 35	30	36.6
36 - 45	28	34.1
Above 45	3	3.7
Nationality		
Indonesian	43	52.4
Bangladesh	38	46.3
Malaysian	1	1.2
Marital Status		
Single	18	22.0
Married	61	74.4
Divorce	3	3.7
Education		
None	33	40.2
Primary	30	36.6
Secondary	19	23.2
Monthly Income		
Less than 1000	7	8.5
1000 - 2000	75	91.5
More than 2000	-	-

N=82

4.2 Knowledge, Attitude and Practice of Harvesters on Safety Helmet Usage before Implementation of Training

4.2.1 Knowledge

Table 4.5 shows harvesters' knowledge towards safety helmet usage. Based on the Table 4.6, 58.1% of the harvesters managed to obtain high score with total marks above 75%. Meanwhile, 26.6% of the harvesters scored within 50% to 75% which indicate the fair marks and only 15.3% of them received low marks which are below 50%. Overall, majority of the harvesters have high level of knowledge.

Table 4.5: Harvesters' knowledge on safety helmet usage

	Knowledge	Choice of answers	Frequency (%)
1	It is compulsory to wear safety helmet during work	Yes	121(97.6)
		No	-
		Don't know	3(2.4)
2	Safety helmet training helps workers to have better understanding on safety helmet usage	Yes	105(84.7)
		No	1(0.8)
		Don't know	18(14.5)
3	Chin strap not need to be functioned properly for the safety helmet to perform better	Yes	71(57.3)
		No	37(29.8)
		Don't know	16(12.9)

Knowledge		Choice of answers	Frequency (%)
4	Head injury can lead to death	Yes	102(82.3)
		No	-
		Don't know	22(17.7)
5	Cracked helmet still can be used	Yes	12(9.7)
		No	97(78.2)
		Don't know	15(12.1)
6	Safety helmet must be provided by management	Yes	107(86.3)
		No	1(0.8)
		Don't know	16(12.9)
7	Failure of wearing safety helmet should be fined/compound	Yes	78(62.9)
		No	22(17.7)
		Don't know	24(19.4)

N=124

Table 4.6: Total score of harvesters knowledge on safety helmet usage

Level of knowledge	Frequency (N)	Percentage (%)
High (above 75%)	72	58.1
Fair (50% – 75%)	33	26.6
Low (below 50%)	19	15.3
TOTAL		100

N=124

4.2.2 Attitude

Table 4.7 shows the harvesters' attitude towards safety helmet usage. Based on the Table 4.8, 45.2% of the harvesters managed to obtain high score with total marks above 75%. Meanwhile, 35.5% of the harvesters scored within 50% to 75% which indicate the fair marks and only 19.4% of them received low marks which are below 50%. Overall, majority of the harvesters have high level of attitude.

Table 4.7: Harvesters' attitude on safety helmet usage

	Attitude	Choice of answers	Frequency (%)
1	I am comfortable with wearing safety helmet in the plantation	Yes	99(79.8)
		No	15(12.1)
		Don't know	10(8.1)
2	I will wear the safety helmet if prepared by management	Yes	109(87.9)
		No	4(3.2)
		Don't know	11(8.9)
3	I will wear the safety helmet if the management monitored	Yes	80(64.5)
		No	30(24.2)
		Don't know	14(11.3)
4	I will wear the safety helmet to fulfil the management requirement	Yes	60(48.4)
		No	50(40.3)
		Don't know	14(11.3)

Attitude		Choice of answers	Frequency (%)
5	I will wear the safety helmet if my colleagues wear it	Yes	43(34.7)
		No	69(55.6)
		Don't know	12(19.7)
6	Interesting design of safety helmet will encourage me to wear the safety helmet	Yes	57(46.0)
		No	55(44.4)
		Don't know	12(9.7)
7	I will feel safe if I am wearing the safety helmet during working	Yes	113(91.1)
		No	1(0.8)
		Don't know	10(8.1)

N=124

Table 4.8: Total score of harvesters attitude on safety helmet usage

Level of attitude	Frequency (N)	Percentage (%)
High (above 75%)	56	45.2
Fair (50% – 75%)	44	35.5
Low (below 50%)	24	19.4
TOTAL		100

N=124

4.2.3 Practice

Table 4.9 shows the harvesters' practice towards safety helmet usage. Based on the Table 4.10, 87.1% of the harvesters managed to obtain high score with total marks above 75%. Meanwhile, 9.7% of the harvesters scored within 50% to 75% which indicate the fair marks and only 3.2% of them received low marks which are below 50%. Overall, majority of the harvesters have high level of practice.

Table 4.9: Harvesters' practice on safety helmet usage

	Practice	Choice of answers	Frequency (%)
1	I wear safety helmet in the plantation	Yes	120(96.8)
		No	4(3.2)
2	I checked the safety helmet before using it	Yes	113(91.1)
		No	11(8.9)
3	I am practicing the correct way of safety helmet usage	Yes	114(91.9)
		No	10(8.1)
4	I put on the safety chin strap when using safety helmet	Yes	115(92.7)
		No	9(7.3)
5	I tightened the safety chin strap if loosen	Yes	111(89.5)
		No	13(10.5)
6	I adjusted the safety helmet gear to suit my head size	Yes	116(93.5)
		No	8(6.5)
7	I advised my colleagues to wear safety helmet	Yes	112(90.3)
		No	12(9.7)

N=124

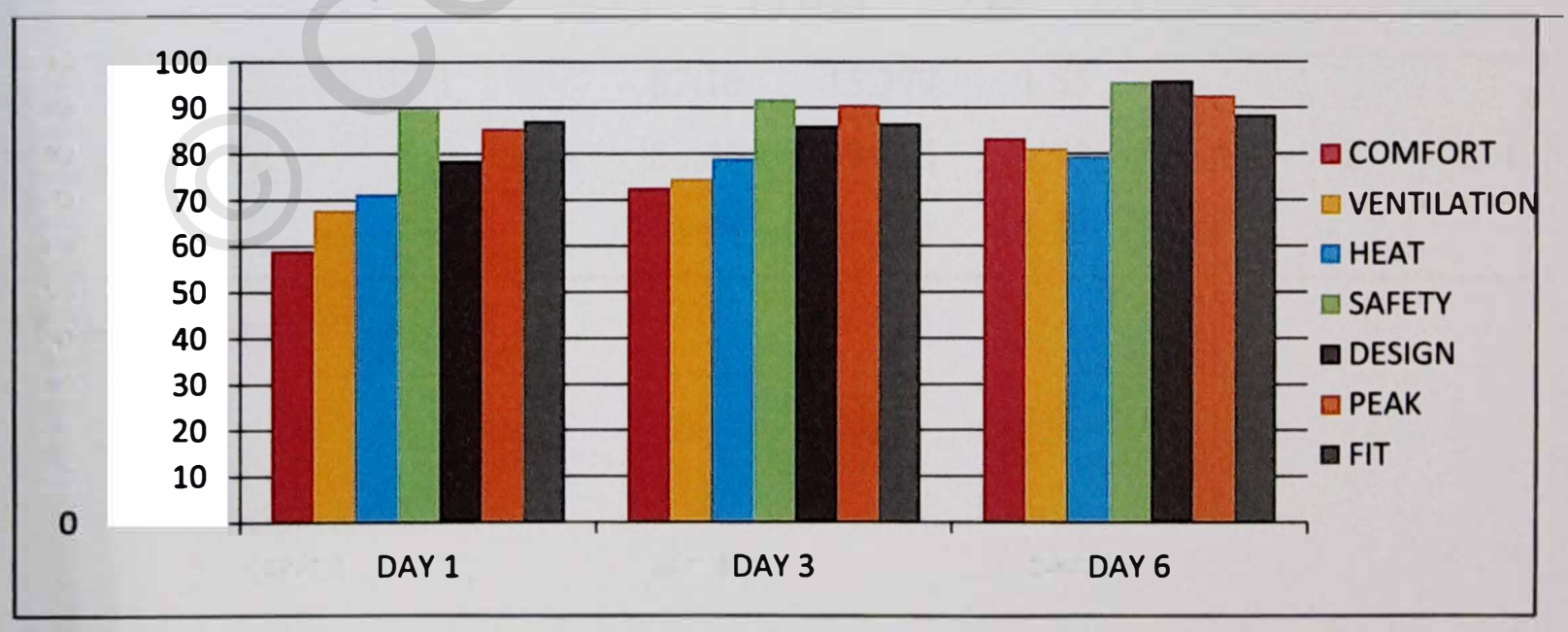
Table 4.10: Total score of harvesters practice on safety helmet usage

Level of practice	Frequency (N)	Percentage (%)
High (above 75%)	108	87.1
Fair (50% – 75%)	12	9.7
Low (below 50%)	4	3.2
TOTAL		100

N=124

4.3 The acceptance level of parameter (comfort, ventilation, safety, design, heat, peak and fit) of new safety helmet design in day 1, day 3 and day 6

Figure 4.1 shows the mean trend of acceptance level in day 1, day 3 and day 6. As the continuous score data is not normally distributed. Non-parametric analysis of Friedman Test was used to determine the acceptance level of parameter (comfort, ventilation, safety, design, heat, peak and fit) of new safety helmet design in day 1, day 3 and day 6 among 44 harvesters. According to Table 4.11, it was shown the result of p value for each of the parameter was less than 0.001 which shown that there was a significance difference acceptance level of parameter (comfort, ventilation, safety, design, heat, peak and fit) of new safety helmet design in day 1, day 3 and day 6. Thus, the hypothesis is accepted which there is significant increase of acceptance level of new safety helmet design in day 1, day 3 and day 6. Table 4.12 shows the post hoc analysis with Wilcoxon signed-rank tests was conducted, resulting in a significance level set between day 1 and day 3, day 1 and day 6, as well as day 3 and day 6.



N=44

Figure 4.1: The mean trend of acceptance level of parameter (comfort, ventilation, heat safety, design, peak and fit) in day 1, day 3 and day 6

Table 4.11: The acceptance of new safety helmet design in day 1, day 3& day 6

Parameter of acceptance	Days	N	Mean	sd	Mean rank	χ^2	df	p-value*
Comfort	1	44	59.02	28.009	1.18	57.341	2	<0.001
	3		72.64	21.631	2.07			
	6		83.93	23.180	2.75			
Ventilation	1	44	67.91	26.423	1.48	25.721	2	<0.001
	3		74.75	22.213	1.98			
	6		81.30	20.408	2.55			
Heat	1	44	71.23	27.350	1.44	25.509	2	<0.001
	3		78.95	20.819	2.06			
	6		79.45	21.168	2.50			
Safety	1	44	89.82	14.343	1.27	56.099	2	<0.001
	3		91.93	14.698	1.93			
	6		95.66	14.499	2.80			
Design	1	44	78.43	12.971	1.14	73.148	2	<0.001
	3		86.07	10.588	1.94			
	6		95.82	9.961	2.92			
Peak	1	44	85.57	18.078	1.30	41.515	2	<0.001
	3		90.70	15.124	2.07			
	6		92.64	13.970	2.64			
Fit	1	44	87.16	15.377	1.55	23.450	2	<0.001
	3		86.66	19.553	1.93			
	6		88.48	17.321	2.52			

*Friedman Test

Table 4.11: The acceptance of new safety helmet design in day 1, day 3& day 6

Parameter of acceptance	Days	N	Mean	sd	Mean rank	χ^2	df	p-value*
Comfort	1	44	59.02	28.009	1.18	57.341	2	<0.001
	3		72.64	21.631	2.07			
	6		83.93	23.180	2.75			
Ventilation	1	44	67.91	26.423	1.48	25.721	2	<0.001
	3		74.75	22.213	1.98			
	6		81.30	20.408	2.55			
Heat	1	44	71.23	27.350	1.44	25.509	2	<0.001
	3		78.95	20.819	2.06			
	6		79.45	21.168	2.50			
Safety	1	44	89.82	14.343	1.27	56.099	2	<0.001
	3		91.93	14.698	1.93			
	6		95.66	14.499	2.80			
Design	1	44	78.43	12.971	1.14	73.148	2	<0.001
	3		86.07	10.588	1.94			
	6		95.82	9.961	2.92			
Peak	1	44	85.57	18.078	1.30	41.515	2	<0.001
	3		90.70	15.124	2.07			
	6		92.64	13.970	2.64			
Fit	1	44	87.16	15.377	1.55	23.450	2	<0.001
	3		86.66	19.553	1.93			
	6		88.48	17.321	2.52			

*Friedman Test

Table 4.12: Post hoc analysis with Wilcoxon signed-rank tests of the acceptance of new safety helmet design in day 1, day 3 and day 6

Parameter of acceptance	Days	Z-statistics	p value*
Comfort	1&3	-4.846	
	1&6	-4.990	<0.001
	3&6	-4.323	
Ventilation	1&3	-2.718	<0.05
	1&6	-3.960	<0.001
	3&6	-2.839	<0.05
Heat	1&3	-3.890	<0.001
	1&6	-2.744	<0.05
	3&6	-1.902	0.057
Safety	1&3	-3.364	
	1&6	-4.970	<0.001
	3&6	-4.437	
Design	1&3	-4.972	
	1&6	-5.243	<0.001
	3&6	-5.138	
Peak	1&3	-4.692	<0.001
	1&6	-3.702	<0.001
	3&6	-2.461	<0.05
Fit	1&3	-1.993	<0.05
	1&6	-1.867	0.62
	3&6	-2.274	<0.05

* Wilcoxon-signed rank test

4.4 Difference on Harvesters Practice on Safety Helmet Usage before and after Implementation of Training.

Referring to Table 4.13, it had shown the p-value for practice items in observing the workers usage of safety helmet in plantation after training implementation. New safety helmet design was given to the harvesters to be worn after the implementation of training. Field observation on practice of new safety helmet was conducted on the same group of harvesters without informing them. The p value for those items is more than 0.05 thus showed that there is no significance difference between before and after implementation of training on practice of safety helmet usage. Therefore, the hypothesis for this objective is rejected.

Table 4.13: Difference on practice of safety helmet usage before and after implementation of training

Practice items	Frequency (%)		p-value
	Yes	No	
Wearing safety helmet in plantation			
Before	40(90.9)	4(9.09)	0.125
After	44(100)	-	
Wearing chin strap			
Before	37(84.1)	7(15.9)	0.180
After	42(95.5)	2(4.5)	
Tightening the loosen chin strap			
Before	35(79.5)	9(20.5)	0.065
After	42(95.5)	2(4.5)	
Adjusting safety helmet gear to suit head size			
Before	40(90.9)	4(9.1)	0.250
After	43(97.7)	1(2.3)	

N=44

CHAPTER 5

DISCUSSION

5.1 Socio-Demographic Background of Harvesters

A total of 124 harvesters were included in this study from three different plantations which are 24 harvesters from Kulai Young Estate, 18 harvesters from Chamek Estate and 82 harvesters from Telok Sengat Estate in Johor. Referring to socio demographic data, most of the harvesters were aged between 36-45 years old which covered 36.3% of the total harvesters.

In term of nationality, based on the result obtained, it showed that majority of the harvesters in this study are Indonesian followed by Bangladesh and Malaysian with percentage 66.9%, 30.6% and 2.4% respectively. This indicated that in order to overcome the issues of local harvesters shortage in palm oil plantations, Malaysia had to rely on foreign harvesters (Kumar et al., 2014). All the Bangladesh's harvesters come from Telok Sengat Estates, meanwhile in Kulai Young Estate, 100% of the harvesters are Indonesian.

For the educational level, 37.1% had attended the primary school, 30.6% until secondary school and 32.3% had none. Thus, the harvesters already had basic skills to write and read however some of them still need assistance from the plantation management in order to reduce communication barrier such as language differences and the difficulty in understanding unfamiliar accents (Boniran, 2017). The questionnaire was in bilingual which are Bahasa Malaysia and Indonesian language.

From different aspect, 94.4% of the harvesters had monthly income between RM 1000 - RM 2000. For Kulai Young and Chamek Estates, 100% of the harvesters had monthly income between RM 1000 - RM 2000. As for the marital status of the harvesters, a total 74.2% of the harvesters were married.

5.2 Knowledge, Attitude and Practice of the Harvesters on Safety Helmet Usage before Implementation of Training.

From a total of 124 harvesters, there were 58.1% of the harvesters who score high marks, 26.6% scored fair marks and 15.3% scored low marks regarding the evaluation on harvesters' knowledge on the safety helmet usage. This is in agreement with the statistic done by Zolkifli (2010) on the knowledge of harvesters in the palm oil plantation which is 83.3% that indicate that they already have the basic knowledge on the safety helmet usage. Knowledge is very important as the primary factor that clearly distinguishes the human power to judge situations, decide between what is good and what is bad and make decisions voluntarily. The talks were delivered in layman term in order to convey the message clearly and directly in as few words as possible.

5.2.1 Knowledge

Based on the evaluation on knowledge item, 97.6% of the harvesters agreed that it is compulsory to wear safety helmet during work. As stated under Section 24 Occupational Safety and Health Act (OSHA) 1994, regarding the general duties of employees at work that declare "It shall be the duty of every employee while at work to wear or use at all times any protective equipment or clothing provided by the employer for the purpose of preventing risks to his safety and health". This also indicates that safety helmet must be provided by the management and based on the result obtained, 86.3% from the harvesters aware regarding this matter.

5.2.2 Attitude

With regards to attitude towards the safety helmet usage, below than half of the harvesters got high score on attitude items which is 45.2%. Meanwhile 35.5% of the harvesters scored fair marks and another 19.4% scored low marks. Attitudes play vital role as it may help people to adjust to their work environment. This is because when employees are well treated, they are likely to develop a positive attitude toward management and the organization. Attitude can be changed by the improvement of knowledge (Jeong, 2018). Previous study reported that education can promote protective behaviour by affecting the attitude (Bondori, 2018).

Based on the attitude item, 79.8% of the harvesters comfortable when wearing safety helmet in the plantation. However, 12.2% feel discomfort. Previous study revealed that workers tend to remove their helmet when they experienced any discomfort when using the safety helmet (Adnan et al., 2016). Majority of them (64.5%) will wear the safety helmet if the management monitored and 48.4% wear the safety helmet to fulfil the management requirement. Almost half of the harvesters (46%) claimed that interesting design of safety helmet encourage them to wear it. Maslow (1987) had emphasized towards the decorative, emotional and symbolic attributes of design. If the helmet is designed accordingly, it will be worn and maintained correctly by the worker. For the last item regarding attitude, 91.1% of the harvesters feel safe when wear the safety helmet during working. This is because the resultant injuries and severity can be prevented or minimized by wearing safety helmet as it can absorb and disperse the impact (Chang et al., 2003).

5.2.3 Practice

The evaluation on harvesters' practice shows 87.1% of them scored high marks, meanwhile for fair and low score were 9.7% and 3.2% respectively. Based result from the responded on the first item, 96.8% claimed that they wore the safety helmet at the plantation. On the other hand, 3.2% of the harvesters did not wear the safety helmet. This is in support with the previous study that harvesters refuse to wear the safety helmet due to discomfort (Abeysekera & Shahnavas, 1990). A helmet needs to be developed with acceptable weight, comfortable, fit and adequate ventilation (Davis et al., 2001). Next, there were 92.7% of the harvesters used the chin strap and 89.5% tighten the loosen chin strap. The function of chin strap is to secure the head and helmet in order to prevent it from rolling off. Those workers who did not wear chin straps, there are few circumstances that will cause the helmets to roll off such as heading up or down, windy condition and slight impact (Ivan, 2014). A safety helmet can prevent head injury and also minimize the severity of such accidents.

Overall findings shows that harvesters' knowledge, attitude and practice (kap) level are already good at the first place. This shows that the managements have delivered safety related messages in the understandable way. The previous studies had emphasized the importance of safety commitment and manpower allocation for a successful safety management system implementation (Robson et al., 2007, Yu and Hunt, 2002). In addition, safety training closely related with compliance, participation and involvement of workers towards any safety requirement from management (Shehu, Subramaniam & Johari, 2016).

5.3 The acceptance level of parameter (comfort, ventilation, safety, design, heat, peak and fit) of new safety helmet design in day 1, day 3 and day 6.

Results for acceptance level of parameter (comfort, ventilation, safety, design, heat, peak and fit) of new safety helmet design in day 1, day 3 and day 6 revealed that there is a significance difference between them and the hypothesis is accepted. The mean trend for each of the parameter is increase in day 1, day 3 and day 6. This shows that the introduction of this new design safety helmet device is well accepted by the harvesters. This is because the safety helmet is well design as the developments are comes from many recommend improvement form the other studies safety helmet.

5.3.1 Comfort

In term of the comfortability of the safety helmet, there was a statistically significant difference in day 1, day 3 and day 6, $\chi^2(2) = 57.341$, $p < 0.001$. Post hoc analysis with Wilcoxon signed-rank tests was conducted, resulting in a significance level set at $p < 0.001$. There were significant differences between day 1 and day 3 ($Z = -4.846$, $p < 0.001$) or between day 1 and day 6 ($Z = -4.990$, $p < 0.001$) and also day 3 and day 6 ($Z = -4.323$, $p < 0.001$). This shows that the harvesters feel comfort when worn the new safety helmet design. Comfortability of safety helmet is very important as it can influence the workers either they want to wear it or not. Discomfort in the use of personal protective devices (PPD) has been one of the chief causes of their non-use (Abeysekera & Shahnavaz, 1990). This is in support based on the previous

study, among the emphasized issues for the non-compliance of safety helmet are the discomfort (Shuhada, 2015). Based on the result, it shows that the ongoing project for new developing and improvising safety helmet using ergonomic principles gives more comfort and environmental friendly to the workers (Zolkifli, 2016).

5.3.2 Ventilation

For the ventilation of the safety helmet, there was also a statistically significant difference in day 1, day 3 and day 6, χ^2 (2) = 25.721, p < 0.001. Wilcoxon signed-rank tests shows there were significant differences between day 1 and day 3 (Z = -2.718, p = 0.007) or between day 1 and day 6 (Z = -3.690, p <0.001) and also day 3 and day 6 (Z = -2.839, p = 0.005). Based on the result obtained, it shows that the new design safety helmet is well ventilated. This is because this helmet has more ventilation hole at top and edge of the helmet compare to existing safety helmet. Based on the previous study, one of the emphasized issues regarding non-compliance of existing safety helmet was due to poor ventilation (97.6%) and there were 66.7% of the harvesters complained about poor ventilation of the existing safety helmet which make them felt very hot and profusely sweating (Nazri, 2018).

5.3.3 Heat

For the heat parameter, there was also a statistically significant difference in day 1, day 3 and day 6, χ^2 (2) = 25.509, $p < 0.001$. Wilcoxon signed-rank tests shows there were significant differences between day 1 and day 3 ($Z = -3.89$, $p < 0.001$) and between day 1 and day 6 ($Z = -2.744$, $p < 0.05$). Since the new safety helmet design has good ventilation and has air gap between head surface and helmet shell, therefore it will increase air flow thus reduce the heat. This is in agreement with the previous study that not well ventilated safety helmet may reduce the air flow over the head (Pang et al., 2013). This is because reducing airflow rapidly will increase the head temperature and affects the heat dissipation from the head to the environment thus eventually could lead to an increase of heat related stress during long period of harvesting in the sun. Another study reported that the air gap between the head surface and the helmet shell or liners may help to increase heat dissipation as the air gap allows cooling air to circulate through the helmet (Toh et al., 2015).

5.3.4 Safety

For the safety parameter, there was a statistically significant difference in day 1, day 3 and day 6, χ^2 (2) = 56.099, p < 0.001. Wilcoxon signed-rank tests shows there were significant differences between day 1 and day 3 (Z = -3.364, p <0.001) or between day 1 and day 6 (Z = -4.970, p <0.001) and also day 3 and day 6 (Z = -4.437, p<0.001). This shows that the harvesters feel safe when wearing this new safety helmet design. This is because based on the previous study, 50.0% from the harvesters made a complaint regarding the safety issue on the existing safety helmet (Izzah, 2018). At the same time, available research unambiguously points to the fact that helmets can reduce crash severity (Olivier and Creighton, 2017, Orsi et al., 2014).

5.3.5 Design

In term of design of the safety helmet, there was a statistically significant difference in day 1, day 3 and day 6, χ^2 (2) = 73.148, p < 0.001. Wilcoxon signed-rank tests shows there were significant differences between day 1 and day 3 (Z = -4.972, p <0.001) or between day 1 and day 6 (Z = -5.243, p <0.001) and also day 3 and day 6 (Z = -5.138, p<0.001). This shows that the harvesters are well accepted the interesting design of the safety helmet. This is in support with the previous study reported that 42.5% of the harvesters claimed that interesting design of safety helmet will encourage them to wear the safety helmet (Muhammad, 2018).

5.3.6 Peak

Other than that, regarding the peak of the safety helmet, there was a statistically significant difference in day 1, day 3 and day 6, χ^2 (2) = 41.515, p < 0.001. Wilcoxon signed-rank tests shows there were significant differences between day 1 and day 3 (Z = -4.692, p <0.001) or between day 1 and day 6 (Z = -3.702, p <0.001) and also day 3 and day 6 (Z = -2.461, p<0.001). This shows that the safety helmet did not limit the vision of the harvesters during harvesting. This is because the new design of safety helmet has shorter peak compare to existing safety helmet. Based on the previous study, 68.5% of the harvesters complained that the existing safety helmet limit their range of vision when conducting their work and 71.0% complained that the existing safety helmet disturbed them in conducting their work appropriately especially cause by tips of the safety helmet by 43.5% (Izzah, 2018).

5.3.7 Fit

Meanwhile, for the fit of the safety helmet, there was a statistically significant difference in day 1, day 3 and day 6, χ^2 (2) = 56.099, p < 0.001. Wilcoxon signed-rank tests shows there were significant differences between day 1 and day 3 (Z = -1.993, p = 0.046) and also day 3 and day 6 (Z = -2.274, p=0.023). This shows that the safety helmet is well fitted among the harvesters. Since the palm oil harvesters worked for more than 6 hours daily, it is fundamental for the safety helmet to be comfortable and well fitted in order to increase the usage of the safety helmet throughout their working hour (Shuhada, 2015). However, there is no significant

difference between day 1 and day 6 (Z = -1.867, p = 0.062). Even though the safety helmet has adjustable gear to suit their head size, however some of the Bangladesh harvesters did not fit well because their head sizes are smaller than Indonesian harvesters. By taking into consideration about the size of head among Bangladesh harvesters, the adjustable gear should be improved so that the safety helmet can be fitted at all size of head especially Bangladesh workers. This is because palm oil management starts to hire Bangladesh workers since the Indonesian workers are demanding nowadays (Zaharudin, 2019).

Overall, the idea of a new design was based on the ergonomics problem raised from the existing safety helmet. Process of designing the new safety helmet was developed by taking into consideration of many aspects such as the opinion from the palm oil harvesters, the opinion from palm oil plantation management, the expert opinion and also through observation at field of palm oil plantation itself (Shuhada, 2015).

5.4 Difference on Harvesters Practice on Safety Helmet Usage before and after Implementation of Training.

Practice items were compared among 44 harvesters regarding safety helmet usage before and after implementation of training. New safety helmet design was given to the harvesters to be worn after the implementation of training. Field observation on practice of new safety helmet was conducted on the same group of harvesters without informing them. The findings showed that there are no significance differences on the practice items between before and after training session, thus the hypothesis for this objective is rejected. However, the trends increase on the post-test result as all the harvesters worn the new safety helmet design and most of them tighten the chin strap and adjust the safety helmet gear to suit their head. This is in contrast with the previous study, the trends decreased on the post-test result as most harvesters did not put on both safety helmet (46.7%) and chin strap (73.3%) (Muhammad, 2018).

Earlier in the pre-test, 90.9% of the harvesters responded that they wear the safety helmet during work. However, after the intervention, the percentage increases to 100% during field observation on the new safety helmet design. This is actually in line with the findings in attitude level in pre-test where 46% of the harvesters responded that interesting design of safety helmet will encourage them to wear the safety helmet. This also in support with the result of acceptance especially for design parameter of the new safety helmet that there is significance difference in day 1, day 3 and day 6.

Same goes to chin strap usage, only 84.1% of the harvesters claimed that they put on chin strap while working but during observation the percentage increase to 95.5%. Meanwhile, the harvesters who did not tighten the chin strap decrease from 20.5% to 4.5%. Next, before the training, 9.1% of the harvesters did not adjust the safety helmet gear to suit head size, however the percentage decrease to 2.3%. This may be attributed to improvement in knowledge and attitude regarding safety helmet usage as well as availability of resources needed for best management practice. Previous study reported that good practice is the result of theoretical understanding that helps workers to acquire new skills (Lewise et al., 2004).

However, harvesters have the tendency to declare that they will comply by wearing safety helmet and chin strap in pre-test but does not practice it when they knew no one will be observing (Zolkifli, 2016). This also aligned with the attitude item on pre-test that 64.5% will wear the safety helmet if the management monitored. This is in support with a finding on the previous study that stated management of practice will enhance workers performance and participation in their work responsibilities (Ichniowski, 1997).

CHAPTER 6

CONCLUSION, LIMITATION AND RECOMMENDATION

6.1 Conclusion

- 58.1% of the harvesters involved in this study was considered have high level of knowledge, 45.2% of them have high level of attitude and more than half of the harvesters (87.1%) was considered have high level practice of safety helmet usage.
- There is significant increase of acceptance level of parameter (comfort, ventilation, heat, safety, design, peak and fit) of new safety helmet design in day 1, day 3 and day 6 ($p<0.001$).
- There is no significant difference on practice item before and after intervention ($p>0.05$).

6.2 Limitation

There was limitation encountered by researcher during carrying out this project. There were only four new safety helmet design can be completed due to the inevitable technical problems at the mould stage. Due to this situation, only 44 of the harvesters were able to wear new safety helmet design in day 1, day 3 and day 6. Next, the new safety helmet design is quite heavy which is not the real weight, so it might effects the other parameter during answer the questionnaire. Other than that, most of the harvesters required assisted to answer the questionnaire, therefore it required a lot of time during that session which may disrupt their productivity on that day.

6.3 Recommendation

The new safety helmet design shall be prepared by an expert in safety helmet manufacturing so that it can be completed according to the specific time provided. It is highly recommended for further study that involves testing this new safety helmet design being conducted again with the real weight of the safety helmet among large number of harvesters in order to confirm the acceptance of the safety helmet. Next, intervention tools such as the training module should be improvised if future studies aimed in increasing the practice of safety helmet usage among harvesters. Researcher shall plan project timeline by considering all factors such distance of each plantation block, weather and time management in order to less disturbance the management and productivity of the harvesters.

Despite the findings of this study, management should maintained regular briefing and supervision to ensure the harvesters always wear safety helmet during harvesting work. Other than that, management should also take into consideration to change the existing safety helmet with this new safety helmet design to be given to the workers in order to encourage them to wear the safety helmet and to avoid non-use in the field. Lastly, in order to promote safety work culture in all palm oil plantations, regular awareness program should be implemented by the government.

REFERENCES

Abeysekera, John. D., & Shahnavaz, H. (1988). Ergonomics evaluation of modified industrial helmets for use in tropical environments. *Ergonomics, 31*(9), 1317-1329.

Abeysekera, J. D. A., & Shahnavaz, H. (1990). Adaptation to discomfort in personal protective devices: An example with safety helmets. *Ergonomics,* 33(2), 137–145. https://doi.org/10.1080/00140139008927105

Acceptance. (2018). In *OxfordDictionaries.com.* Retrieved from https://en.oxforddictionaries.com/definition/acceptance

Adnan, A., Latifi, R., Bahri, S., Tamrin, M., Ng, Y. G., Nazri, K., & Wahib, A. B. D. (2016). Original Article a Case Study of on the Usage of Safety Helmet Among Agricultural Workers in Palm Oil Plantation, *1*(2), 53–57.

Adams, J., 2004, Results of NVG-Induced Neck Strain Questionnaire Study in CH-146 Griffon Aircrew. Defence R&D Study Canada-Toronto, Toronto ON, Canada. TR2004-153.

Anees, M., Mumtaz, A., Uz, S., Adhmi, Z., & Ibrahim, M. (2014). Knowledge, Attitude and Practice (KAP) of Chronic Kidney Disease among Medical Officers of Teaching Hospitals of Lahore, 20(1), 5–12.

Arumugam, M., & Tamrin, S. B. (2014). Occupational Safety and Health in Commodity Agriculture (Vol. 1, pp. 3-10). Serdang: Ministry of Science, Technology and Innovation.

Attitude. (2018). In *OxfordDictionaries.com.* Retrieved from https://en.oxforddictionaries.com/definition/attitude

Bartlett, J. E., Kotrlik, J. W., & Higgins, C. C. (2001). Organizational research: Determining appropriate sample size in survey research. *Information Technology, Learning, and Performance Journal*, *19*(1), 43–50. https://doi.org/10.1109/LPT.2009.2020494

Basiron, Y. (2007). Palm oil production through sustainable plantations. *Eur. J. Lipid Sci. Technol. 109,* 289–295. palmoilworld.org/PDFs/Sustainable_Production/Palm-Oil-Production-Through-Sustainable-Plantations.pdf

Bharath, Y.K., Chitralekha, G., Veena, S., Lokesha, H., Nagalakshmi, K.V., Dilna, U. (2016)
Robust Active Noise Control System for Fighter Aircraft Pilot Helmet Application,
Procedia Computer Science,8, 690-699.

Britain, G., & Health and Safety Commission. (1992). Personal Protective Equipment at Work: Personal Protective Equipment at Work Regulations 1992. HM Stationery Office.

Bondori, A., Bagheri, A., Damalas, C. A., & Allahyari M. S. (2018). Use of personal protective equipment towards pesticide exposure: Farmers' attitudes and

determinants of behaviour. *Science of the Total Environment,* 1156-1163

Boniran, H. (2017). *Meeting With Boustead Plantation*. Sandakan.

Carpenter, W. S., Lee, B. C., Gunderson, P. D., & Stueland, D. T. (2002). Assessment of personal protective equipment use among Midwestern farmers. *American Journal of Industrial Medicine*, *42*(3), 236–247. https://doi.org/10.1002/ajim.10103

Chang, C. Y., Ho, C. H., & Chang, S. Y. (2003). Design of a helmet. *ME, 499, 599.*

Davis, G. A., Edmisten, E. D., Thomas, R. E., Rummer, R. B., & Pascoe, D. D. (2001). Effects of ventilated safety helmets in a hot environment. International Journal of Industrial Ergonomics, 27(5), 321–329. https://doi.org/10.1016/S0169-8141(00)00059-7

Department of Occupational Safety and Health (2018), Ministry of Nature and Human Resources. Occupational Accidents Statistics by Sector. Retrieved from http://www.dosh.gov.my/index.php/en/occupational-accident-statistics/by-sector

Dileep Kumar, M., Ismail, N. A., & Govindarajo, N. S. (2014). Way to measure the concept precarious working conditions in oil palm plantations. *Asian Social Science, 10*(21), 99–108. https://doi.org/10.5539/ass.v10n21p99

Economics & Industry Development Division, Malaysian Palm Oil Board (2018). Retrieved from http://bepi.mpob.gov.my/index.php/en/

Grant, K.A., 2002. Ergonomic assessment of a helicopter crew seat: the HH-60G flight engineer position. Aviat. Space Environ. Med. 73, 913-918.

Hickling, E. M. (1986). Factors Affecting the Thermal Acceptability of Head Protection at Work, *Journal of Occupational Accidents, 8,* 193-206.

Hoffmann, D., & Bansal, T., (2018). Labour rights assessment: Nestlé's palm oil supply chain in Indonesia. Retrieved from https://www.humanrights.dk/sites/humanrights.dk/files/media/dokumenter/udgivelser/hrb_2018/dihr_nestle-es_2018.pdf

Hussein, M. E., Siwar, C., & Adham, K. N. (2017). The Role of Malaysian Palm Oil Industry in the Malaysian Sustainable Economic Development. *International Journal of the Malay World and Civilisation (Iman) 5*(3), 11–18. doi:10.17576/IMAN-2017-05SI1-02

Ichniowski, C., Shaw, K. & Prennushi, G. 1997, The effects of human resource management practices on productivity: a study of steel finishing lines. ,American Economic Review 87,3, 291–313.

Ivan, W.H., Fung, Y.Y.L., Vivian W.Y.T., & Fung, H.W, (2014). A feasibility study of introducing chin straps of safety helmets asa statutory requirement in Hong Kong construction industry. *Safety Science*, 70-78

Jeong, S. C., & Kyung, M. K. (2018). Infection-control knowledge, attitude, practice, and risk perception ofoccupational exposure to Zika virus among nursing students in Korea:A cross-sectional survey. *Journal of Infection and Public Health,* 840-844

Knowledge. (2018). In *OxfordDictionaries.com.* Retrieved from https://en.oxforddictionaries.com/definition/knowledge

Khalid, H.M., Opperud, A., Radha, J.K., Xu, Q., and Helander, M.G. 2012. "Elicitation and analysis of affective needs in vehicle design", Theoretical Issues in Ergonomics Science, 13, 318-334.

Lange-Morales, K., García-Acosta, G. and Bruder, R. 2014. "The EQUID Approach: Improving ergonomics quality in product design and development". In Proceedings of the 5th International Conference on Applied Human Factors and Ergonomics AHFE 2014 (Eds. Ahram, T.; Karwowski, W.; Marek, T.), Kraków, Poland 19-23 July 2014.

Lemeshow, S., Hosmer Jr, D. W., Klar, J., & Lwanga, S. K. (1990). Part 1: Statistical Methods for Sample Size Determination. *Adequacy of Sample Size in Health Studies*, 247. https://doi.org/10.1186/1472-6963-14-335

Leonard, V.K., Maloney, K.P., & Jacko, J.A. (2006). UCD Information Technology In Fundamental and Assessment Tools for Occupational Ergonomics. (2nd Edition, pp 1-40). Boca Patan: Taylor & Francis Group.

Lewise, S., Heitkemper, M., & Dirksen, S. (2004). Medical surgical nursing: assessment and management of clinical problems (6th ed.), Mosby, Mexico.

Liu, X., Abeysekera, J., & Shahnavaz, H. (1999). Subjective evaluation of three helmets in cold laboratory and warm field conditions. *International Journal of Industrial Ergonomics*, *23*(3), 223–230. https://doi.org/10.1016/S0169-8141(97)00055-3

Lower, T., Fragar, L., & Temperley, J. (2011). Agricultural Health and Safety Performance in Australia. *Journal of Agromedicine, 16*(4), 712–720. https://doi.org/http://dx.doi.org/10.1080/1059924X.2011.605726

Magoro, F.M. (2012). Knowledge, Attitude and Practices Regarding Personal Protective Equipment amongst Stevens Lumber Mills Employees in The Capricorn District Of Limpopo Province, South Africa.

Malaysian Institute of Microelectronic Systems (MIMOS Berhad). Industrial Design. *Safety Helmet Design Concept Proposal Slide. Product Positioning.* (2017).

Malaysian Standard. *Specification for Industrial Safety Helmet.* (2001).

Maslow, A. H. (1987). Motivation and personality (; revised by R. frager, J. fadiman, C. McReynolds, & R. cox). *NY: Harper & Row.*

Motorcycle Safety Foundation (MSF), 2002. What you should know about motorcycle helmet. Final Report. February 2002

Mueller, B. A., Cummings, P., Rivara, F. P., Brooks, M. A., & Terasaki, R. D. (2008). Injuries of the head, face, and neck in relation to ski helmet use. Epidemiology, 19(2), 270-276.

Muhammad Taufik Yap, S. N. A. Y. (2018). Knowledge and Practice of Safety Helmet Usage among Palm Oil Harvesters in Sandakan, Sabah

Nazri, N. A. I., (2018). Subjective Preference of New Prototypes Safety

Helmets Device among Palm Oil Plantation Harvesters in Sandakan, Sabah.

Norkaew, S., (2009). Knowledge, Attitude, and Practice (KAP) of Using Personal Protective Equipment (PPE) for Chilli-growing Farmers in Huarua Sub-district, Mueang District, Ubonrachathani Province, Thailand. Chulalongkorn University. Public Health

Ng, Y. G., Bahri, M. T. S., Irwan Syah, M. Y. I., Mori, I., & Hashim, Z. (2013). Ergonomics observation: Harvesting tasks at oil palm plantation. *Journal of Occupational Health*, *55*(5), 405–414. https://www.jstage.jst.go.jp/article/joh/55/5/55_13-0017-FS/_pdf/-char/en

Ng, Y. G., Tamrin, S. B. M., Yusoff, I. S. M., Hashim, Z., Deros, B. M. D., Bakar, S. A., & How, V. (2015). Risk factors of musculoskeletal disorders among oil palm fruit harvesters during early harvesting stage. *Annals of Agricultural and Environmental Medicine*, *22*(2), 286–292. https://doi.org/10.5604/12321966.1152101

Olivier, J., & Creighton, P. (2017), Bicycle injuries and helmet use: A systematic review and meta-analysis. *International Journal of Epidemiology, 46 (1)*, pp. 278-292

Orsi, C., Ferraro, O.E., Montomoli, C., Otte, D., & Morandi, A. (2014), Alcohol consumption, helmet use and head trauma in cycling collisions in Germany. Accident Analysis and Prevention, 65, pp. 97-104

OSHA. (1994). *Occupational Safety and Health Act*. (Legal Research Board, Ed). Petaling Jaya: International Law Book Services.

Pang T. Y., Subic A, Takla M. (2013). A comparative experimental study of the thermal properties of cricket helmets. *International Journal of Industrial Ergonomics;43*:161

Pheasant, S., & Haslegrave, C. M. (2006). *Bodyspace: Anthropometry, Ergonomics And The Design Of Work: Anthropometry, Ergonomics And The Design Of Work*. CRC Press.

Practice. (2018). In *OxfordDictionaries.com*. Retrieved from https://en.oxforddictionaries.com/definition/practice

Reischl,U.,1986. Fire fighter helmet ventilation analysis. *American industry of Hyg Association Journal 47*, 546-551

Robson, A.J. Clarke, K. Cullen, A. Bielecky, C. Severin, L.P. Bigelow, ..., Q. Mahood (2007). The effectiveness of occupational health and safety management system interventions: A systematic review. *Safety Science, 45*, pp. 329-353

Shuhada, M. S. (2015). Development of New Hard Hat Dimension Using User Centered Design Approach Among Oil Palm Harverster in Selangor.

Shehu, M., Subramaniam, C., & Johari, J. (2016). The Effect of Safety Training and Workers Involvement on Healthcare Workers Safety Behavior : The Moderating Role of Consideration of Future Safety Consequences. *International Journal of Business Management*, *1*(2), 46–81.

Social Security Organisation. (2018). Annual Report 2016. Retrieved from https://www.perkeso.gov.my/images/laporan_tahunan/LaporanTahunan2016.pdf

The Selection, Use and Maintenance of Safety Helmets. (n.d.).

Thuresson, M., Ang, B., Linder, J., Harms-Ringdahl, K., 2005. Mechanical load and EMG activity in the neck induced by different head-worn equipment and neck postures. Int. J. Ind. Ergon. 35, 13-18.

Toh, Y.P., Shammas, A. Z., Subic, A., & Takla, M. (2015). A comparative study of vent designs for effective ventilation in cricket helmets. *Procedia Engineering*, 395 – 399.

Truong, C. D., Siriwong, W., & Robson, M. G. (2009). Assessment of Knowledge, Attitude and Practice on Using of Personal Protective Equipment in Rattan Craftsmen at Trade Village, Kienxuong District, Thaibinh Province, Vietnam. *Warasan wichai witthayasat kanphaet = Thai journal of health research*, *23*(Suppl), 1-4.

U.S. Department of Labor. (2004). Personal Protective Equipment. Department of Labor, Occupational Safety and Health Administration, 2004. Federal Register, Part II. 59:196.

Yu, C.K.S., Hunt, B. (2002). Safety management systems in Hong Kong: Is there anything wrong with the implementation. *Managerial Auditing Journal, 17 (9)* (2002), pp. 588-592

Zaharudin, M. (2019). *Meeting With Boustead Plantation*. Johor.

Zolkifli, N. (2016). *Knowledge, Attitude And Practice on Safety Helmet Usage Among Oil Palm Harvester*. Universiti Putra Malaysia.adn

APPENDICES

Appendix I

(Ethical Approval Letter)

ETHICS COMMITTEE FOR RESEARCH INVOLVING HUMAN SUBJECTS (JKEUPM)
UNIVERSITI PUTRA MALAYSIA

Research title	:	**The Acceptance Level of New Safety Helmet Design Among Palm Oil Plantation Harvesters in Johor**
Study Site	:	**Johor**
JKEUPM Ref No.	:	**JKEUPM-2018-360**
Researcher	:	**Siti Najihah binti Abdul Salam**
Supervisor	:	**Prof. Dr. Shamsul Bahri bin Hj Mohd Tamrin**

Documents received and reviewed with reference to the above study:

1. Ethics Application Form, Version 1 dated 29/10/2018
2. Respondent Information Sheet & Consent (Malay), Version 2 dated 6/12/2018
3. Proposal (English), Version 2 dated 27/12/2018
4. Questionnaire / Interviews (Malay), Version 2 dated 27/12/2018
5. Curriculum Vitae of
   a. Prof. Dr Shamsul Bahri bin Hj Mohd Tamrin

The University Research Ethics Committee, Universiti Putra Malaysia (JKEUPM) operates in accordance with Ethical Guidelines.

Decision by JKEUPM

[X] Approved

[X] **Permission MUST BE OBTAINED from the respective hospitals/ institutions before conducting the research**

[ ] Disapproved

Please note that the approval is VALID UNTIL 2 JANUARY 2020

Researchers should comply with the following:

I. Complete a Study Final Report upon study completion (Form 3.2)

II. Ethical approval is required in the case of amendments/ changes to the study documents/ study sites/Study team.

III. Applicable for Clinical Trial Studies and Clinical interventional Studies only, Progress Reports have to be submitted to JKEUPM at every 6 months from the date of approval (Form 3.1). Report occurrences of all Serious Adverse Events (SAEs), Suspected Unexpected Serious Adverse Reaction (SUSARs) and Protocol Deviation/ Violation at all JKEUPM approved site to JKEUPM.

Appendix II

(Ethical Consent Form)

JAWATANKUASA ETIKA UNIVERSITI UNTUK PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,
SELANGOR, MALAYSIA

BORANG 2.4: PENERANGAN DAN PERSETUJUAN RESPONDEN

Sila baca maklumat berikut dengan tellti. Sekiranya anda mempunyai sebarang pertanyaan, sila kemukakan kepada penyelidik.

1.TAJUK KAJIAN

Tahap Penerimaan Reka Bentuk Topi Keselamatan Baru Dalam Kalangan Penuai Ladang Kelapa Sawit Di Johor

2. PENGENALAN

Jabatan Keselamatan dan Kesihatan Pekerjaan Malaysia (DOSH, 2018), melaporkan bahawa sehingga Jun 2018, sektor pertanian, perhutanan dan perikanan merekodkan kadar kemalangan adalah ketiga tertinggi berbanding sektor lain. Kemalangan pekerjaan termasuk ketidakupayaan tidak kekal, hilang upaya kekal dan kes kematian. Kecederaan kepala yang berlaku di ladang kelapa sawit atau ladang pertanian adalah sangat membimbangkan kerana ia boleh menyebabkan kecederaan yang teruk dan boleh mengakibatkan kematian. Justeru, penggunaan topi keselamatan adalah penting untuk mencegah sebarang kemalangan pekerjaan di ladang. Namun begitu, isu utama mengenai penggunaan topi keselamatan di kelapa sawit adalah ketidakselesaan pengguna apabila menggunakan topi keselamatan kerana haba dan juga topi keselamatan yang berat. Maka, terdapat keperluan untuk memperbaiki topi keselamatan berdasarkan isu-isu yang dialami oleh penuai. Oleh itu, kajian ini adalah untuk mengenalpasti tahap penerimaan reka bentuk topi keselamatan baru dalam kalangan penuai ladang kelapa sawit. Seramai 124 orang responden yang terdiri daripada penuai ladang kelapa sawit akan terlibat bagi menjayakan kajian ini.

3. APAKAH YANG PERLU ANDA LAKUKAN?

Peserta perlu menjawab soal selidik sebelum dan selepas yang akan digunakan untuk mengumpul data sosio demografi seperti (nama, umur, bangsa, status perkahwinan, tahap pendidikan serta gaji bulanan), pengetahuan, sikap dan amalan terhadap penggunaan topi keselamatan,penilaian reka bentuk topi keselamatan baru serta tahap penerimaannya. Peserta akan diberi topi keselamatan baru untuk dipakai dalam tempoh tiga hari. Modul latihan yang digunakan adalah selamat dan efektif. Penglibatan peserta dalam kajian ini adalah secara sukarela, anda boleh menolak atau menarik diri pada bila-bila masa tanpa memberi sebarang alasan. Tiada sebarang denda atau aduan yang dikenakan kepada pihak atasan.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

Pengurus ladang dan majikan

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANDA SEBAGAI PESERTA?

Peserta dapat mengetahui kepentingan menggunakan topi keselamatan di tempat kerja. Selain itu, peserta juga dapat mengenal cara menggunakan topi keselamatan dengan betul serta bagaimana caranya mengelak dan melindungi diri daripada bahaya di tempat kerja. Peserta juga berpeluang memakai topi keselamatan baru ketika bekerja di ladang dalam tempoh masa tiga hari. Namun begitu, topi keselamatan perlu dipulangkan semula selepas tempoh tersebut.

b) KEPADA PENYELIDIK?

Penyelidik dapat menyumbang satu penyelidikan yang amat berguna kepada Universiti Putra Malaysia khususnya dan kepada negara Malaysia amnya. Selain itu, penyelidik dapat mengenalpasti tahap penerimaan reka bentuk topi keselamatan baru dalam kalangan penuai ladang kelapa sawit.

6. ADAKAH IA BERISIKO?

Sepanjang kajian ini dijalankan, tiada sebarang kemungkinan risiko yang berlaku kepada responden.

7. ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?

Ya. Semua maklumat dan identiti peserta akan dirahsiakan.

8. SIAPA YANG SAYA PERLU HUBUNGI SEKIRANYA SAYA MEMPUNYAI SOALAN TAMBAHAN SEMASA MENGIKUTI PENYELIDIKAN INI?

Prof. Dr. Shamsul Bahri Hj Mohd Tamrin,

Jabatan Kesihatan Persekitaran dan Pekerjaan,

Fakulti Perubatan dan Sains Kesihatan,

Universiti Putra Malaysia.

Fax: 03-89472394

No Pejabat: 03-89472394

No Telefon: 017-3134792

Emel: shamsul_bahri@putra.upm.edu.my

Siti Najihah Binti Abdul Salam,

Jabatan Kesihatan Persekitaran dan Pekerjaan,

Fakulti Perubatan dan Sains Kesihatan,

Universiti Putra Malaysia.

No. Telefon: 011-14001037

Sila tandatangan di sini sekiranya anda telah membaca dan memahami kandungan halaman ini _____

9. PERSETUJUAN

Saya…… No Kad Pengenalan. ……
beralamat……
……dengan ini bersetuju untuk mengambil bahagian secara sukarela dalam penyelidikan yang tersebut di atas *(kajian klinikal/percubaan ubat-ubatan/rakaman video/kumpulan sasaran/temuduga/ soal selidik).

Saya telah diberi penjelasan secara menyeluruh mengenai penyelidikan ini dari segi metodologi, risiko dan komplikasi (seperti tertulis pada Helaian Penerangan Responden). Saya memahami bahawa saya berhak menarik diri dari penyelidikan ini pada bila-bila masa tanpa memberi sebarang alasan.Saya juga memahami bahawa sebarang maklumat yang berkaitan identiti saya akan dirahsiakan.

Saya* berminat / tidak berminat untuk mengetahui keputusan kajian yang melibatkan saya.

I setuju/tidak bersetuju untuk imei/gambar/rakaman video/ rakaman suara digunakan dalam apa jua bentuk penerbitan atau pembentangan. (sekiranya berkaitan).

*potong yang tidak berkenaan

Tandatangan ……
(*Responden*)

Tandatangan ……
(*Saksi*)

Tarikh :……

Nama :……

No. K/P: ……

Saya mengesahkan bahawa saya telah menerangkan kepada responden ini sifat dan tujuan penyelidikan yang tersebut di atas.

Tarikh ……

Tandatangan ……
(*Penyelidik*)

Appendix III

(Questionnaires)

PRE – QUESTIONNAIRE

"Tahap Penerimaan Reka Bentuk Topi Keselamatan Baru Dalam Kalangan Penuai Ladang Kelapa Sawit Di Johor"

No. ID : ☐☐☐

Organisasi : Telok Sengat ( )
Chamek ( )
Kulai Young ( )

Tarikh : .....

ARAHAN SOALAN:

1. Borang soal selidik ini mengandungi EMPAT (4) bahagian iaitu:

Bahagian A: Maklumat Sosio Demografi
Bahagian B: Pengetahuan Penggunaan Topi Keselamatan
Bahagian C: Sikap Penggunaan Topi Keselamatan
Bahagian D: Tingkah Laku Penggunaan Topi Keselamatan

2. Anda diminta untuk menjawab semua soalan yang ada di dalam buku ini

3. Untuk menjawab, sila tandakan jawapan di bahagian jawapan yang telah disediakan

4. Borang soal selidik hendaklah dikembalikan kepada pengkaji setelah selesai menjawab semua soalan

BAHAGIAN A: MAKLUMAT SOSIO DEMOGRAFI

1.1	Umur *Umur*	..... tahun / *tahun*	
1.2	Warganegara *Warganegara*	.....	
1.3	Status Perkahwinan *Status Pernikahan*	1. Bujang / *Bujang* 2. Berkahwin / *Bernikah* 3. Bercerai / *Bercerai*	☐ ☐ ☐
1.4	Tahap Penddikan *Tingkat Pendidikan*	1. Tidak Sekolah / *Tidak Bersekolah* 2. Rendah / *Dasar* 3. Menengah / *Menengah*	☐ ☐ ☐
1.5	Gaji Kasar (sebulan RM) *Gaji Kasar (sebulan RM)*	.....	

BAHAGIAN B: PENGETAHUAN PENGGUNAAN TOPI KESELAMATAN

Petunjuk : Sila beri tanda (/) pada ruangan yang berkenaan.

Skor : 1 = Ya

2 = Tidak

3 = Tidak tahu

No Item	Pengetahuan	1	2	3
2.1	Penggunaan topi keselamatan adalah wajib semasa bekerja *Wajib memakai topi keselamatan saat jam kerja*			
2.2	Latihan penggunaan topi keselamatan membantu pekerja memahami cara pemakaian dengan betul *Latihan penggunaan topi keselamatan membantu anda memahami bagaimana menggunakan topi keselamatan dengan baik*			
2.3	Tali dagu keselamatan tidak perlu berfungsi sepenuhnya untuk menetapkan kedudukan topi keselamatan Keselamatan *Keselamatan pengikat dagu tidak benar-benar diperlukan untuk mengatur posisi topi keselamatan*			
2.4	Kecederaan kepala boleh membawa maut *Cedera kepala bisa mengakibatkan maut*			
2.5	Topi keselamatan yang retak / berlubang masih boleh digunakan *Topi keselamatan dengan retakan / lubang masih bisa digunakan*			
2.6	Penyediaan topi keselamatan perlu dilakukan oleh pihak pengurusan *Persiapan topi keselamatan harus dilakukan oleh manajemen*			
2.7	Gagal memakai topi keselamatan perlu dikenakan denda *Gagal memakai topi keselamatan harus didenda / kompaun*			

BAHAGIAN C: SIKAP PENGGUNAAN TOPI KESELAMATAN

Petunjuk : Sila beri tanda (/) pada ruangan yang berkenaan.

Skor : 1 = Ya

2 = Tidak

3 = Tidak tahu

No Item	Sikap	1	2	3
3.1	Saya selesa memakai topi keselamatan *Saya nyaman memakai topi keselamatan*			
3.2	Saya akan memakai topi keselamatan sekiranya pihak pengurusan menyediakannya *Saya akan memakai topi keselamatan jika manajemen menyediakannya*			
3.3	Saya akan memakai topi keselamatan sekiranya pihak pengurusan melakukan pemantauan *Saya akan memakai topi keselamatan jika manajemen melakukan pemantauan*			
3.4	Saya memakai topi keselamatan untuk memenuhi kehendak pengurusan ladang *Saya memakai topi keselamatan untuk memenuhi kebutuhan pengelolaan usahatani*			
3.5	Saya akan memakai topi keselamatan sekiranya rakan sekerja saya memakai topi keselamatan *Saya akan memakai topi keselamatan jika rakan saya memakai topi keselamatan*			
3.6	Reka bentuk topi keselamatan yang menarik membuat saya berminat untuk memakainya *Desain menarik topi keselamatan membuat saya tertarik untuk memakainya*			
3.7	Saya rasa lebih selamat sekiranya saya memakai topi keselamatan semasa waktu bekerja *Saya merasa lebih aman jika memakai topi keselamatan saat jam kerja*			

BAHAGIAN D: TINGKAH LAKU PENGGUNAAN TOPI KESELAMATAN

Petunjuk : Sila beri tanda (/) pada ruangan yang berkenaan.

Skor : 1 = Ya

2 = Tidak

No Item	Tingkah Laku	1	2
4.1	Saya memakai topi keselamatan di ladang *Saya memakai topi keselamatan di lapangan*		
4.2	Saya memeriksa topi keselamatan sebelum digunakan *Saya periksa topi keselamatan sebelum digunakan*		
4.3	Saya mempratikkan penggunaan topi keselamatan dengan betul *Saya memakai tali dagu keselamatan Saya memakai pelindung tali dagu*		
4.4	Saya memakai tali dagu keselamatan *Saya memakai pelindung tali dagu*		
4.5	Saya mengetatkan tali dagu keselamatan sekiranya longgar *Saya mengencangkan tali dagu jika longgar*		
4.6	Saya menyesuaikan ukuran pengancing agar muat untuk dipakai *Saya mengencangkan pelaras jika longgar*		
4.7	Saya menasihati rakan-rakan untuk memakai topi keselamatan *Saya menyarankan teman untuk memakai topi keselamatan*		

POST – QUESTIONNAIRE

"Tahap Penerimaan Reka Bentuk Topi Keledar Keselamatan Baru Dalam Kalangan Penuai Ladang Kelapa Sawit Di Johor"

No. ID : ☐☐☐

Organisasi : Telok Sengat ( )
Chamek ( )
Kulai Young ( )

Tarikh : .....

ARAHAN SOALAN:

1. Borang soal selidik ini mengandungi SATU (1) bahagian iaitu:

Bahagian A: Penilaian Rekabentuk Topi Keselamatan Baru Pada Hari 1,3,6

2. Anda diminta untuk menjawab semua soalan yang ada di dalam buku ini

3. Untuk menjawab, sila tandakan jawapan di bahagian jawapan yang telah disediakan

4. Borang soal selidik hendaklah dikembalikan kepada pengkaji setelah selesai menjawab semua soalan

BAHAGIAN A: TAHAP PENERIMAAN TOPI KESELAMATAN BARU

Tandakan (X) pada garisan sebagai pilihan anda untuk setiap skala.

2.1 Keselesaan / *kenyamanan*

Sangat tidak selesa
Sangat tidak nyaman

Sangat selesa
Sangat nyaman

2.2 Pengudaraan / *ventilasi*

Tiada pengudaraan
Tidak ada ventilasi

Pengudaraan sangat baik
Ventilasi sangat baik

2.3 Kemuatan / *kapasitas*

Tidak muat

Muat elok

2.4 Keselamatan / *Keselamatan*

Sangat tidak selamat
Sangat tidak selamat

Sangat selamat

2.5 Rekabentuk / *Design*

Sangat tidak menarik
Sangat tidak menarik

Sangat menarik

2.6 Haba / *panas*

Panas & berpeluh
Panas & berkeringat

Sangat sejuk
Sangat dingin

2.7 Pandangan / *penglihatan*

Menghalang pandangan
Menghalang penglihatan

Tidak menghalang pandangan
Tidak menghalang penglihatan

Appendix IV

(POSTERS)

TIPS MEMAKAI TOPI KESELAMATAN
টিপস নিরাপত্তা হেলমেট পরতে
TIPS MEMAKAI HELM KESELAMATAN

Sebelum digunakan, pastikan topi keselamatan boleh digunakan, sesuai dan selesa di kepala anda (tidak longgar dan tidak terlalu sempit), tidak rosak dan cacat.

ব্যবহারের আগে, নিশ্চিত হেলমেটটি ব্যবহার করা যাবে, উপযুক্ত এবং আপনার মাথায় আরামদায়ক (আলগা না এবং খুব সংকীর্ণ নয়),না ক্ষতিগ্রস্ত এবং খুঁত না

Sebelum digunakan, yakinkan bahwa helm tersebut dapat digunakan, pas dan nyaman di kepala anda (tidak longgar dan tidak terlalu sempit), tidak rusak dan cacat.

Pakai dengan betul (tidak senget, terlalu mendongak, menunduk sehingga menghalang pandangan atau terbalik)

নিরাপত্তা হেলমেট সঠিকভাবে পরিধান করুন (স্ল্যান্ট করা যাবে না, ঘৃণ্যটি অবলম্বন না হওয়া পর্যন্ত বা উপরে পরিধান করবেন না বা বিপরীতভা

Pasang di kepala dengan benar (tidak miring, terlalu mendongak, menunduk sehingga menutupi pandangan, atau terbalik.

Jika di tempat tinggi dan berangin, gunakan tali dagu keselamatan supaya tidak terbang ditiup angin kuat.

উচ্চ স্থান এবং বাতাসে, চোঁয়াল চাবুক ব্যবহার করা উচিত যাতে হেলমেট বায়ু কারণে উড়ে না

Jika di tempat tinggi dan kondisi berangin, tali dagu harus digunakan agar helm tidak terbang karena tiupan angin kencang

Topi keselamatan perlu diganti jika berlaku sebarang kerosakan

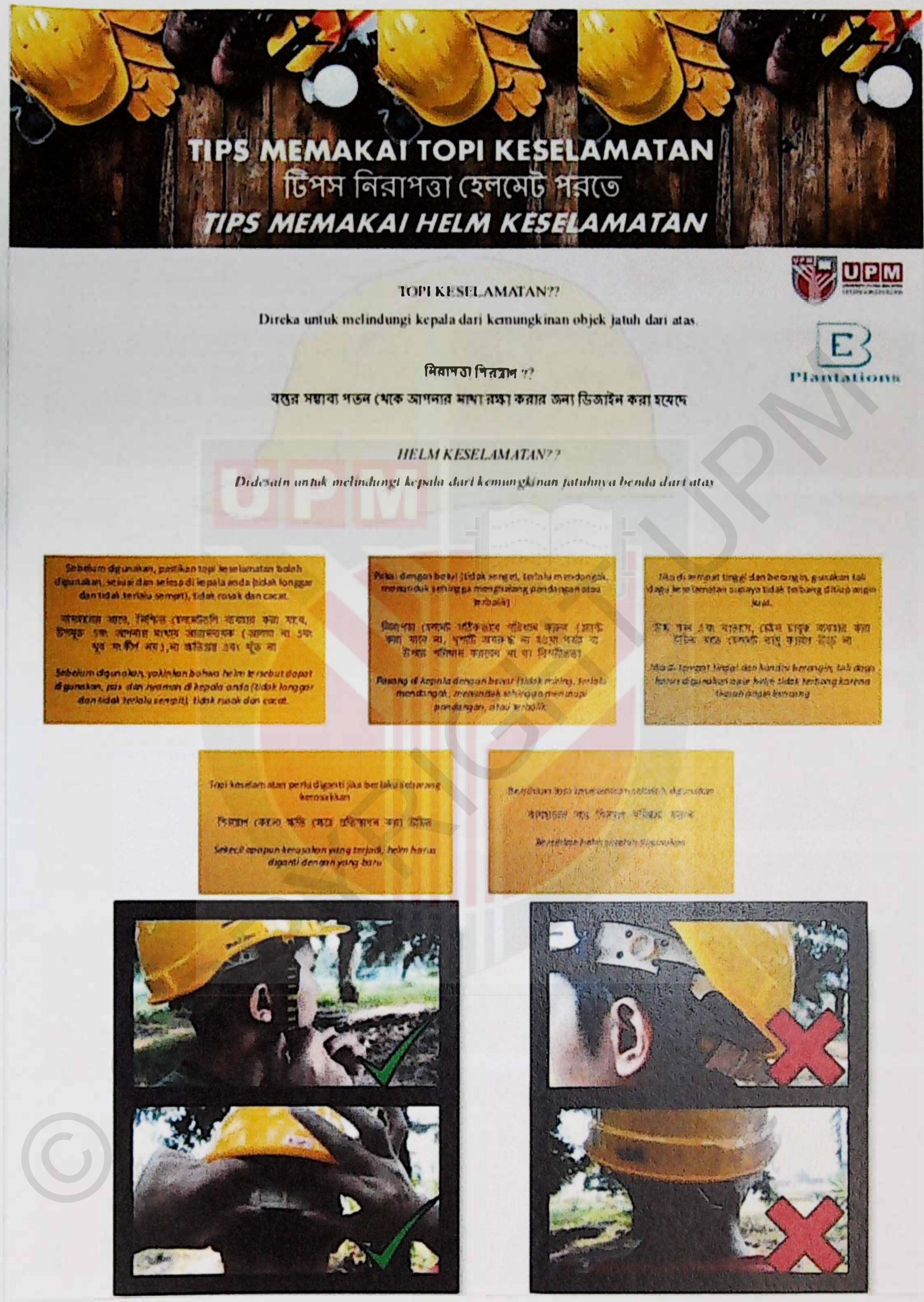
শিরস্ত্রাণ কোনো ক্ষতি ক্ষেত্রে প্রতিস্থাপন করা উচিত

Setiap kerusakan yang terjadi, helm harus diganti dengan yang baru

Bersihkan topi keselamatan setelah digunakan

ব্যবহারের পরে শিরস্ত্রাণ পরিষ্কার করুন

Bersihkan helm setelah digunakan



TIPS MEMAKAI TOPI KESELAMATAN
টিপস নিরাপত্তা হেলমেট পরতে
TIPS MEMAKAI HELM KESELAMATAN
UPM
TOPI KESELAMATAN??
Direka untuk melindungi kepala dari kemungkinan objek jatuh dari atas.
বস্তুর সম্ভাব্য পতন থেকে আপনার মাথা রক্ষা করার জন্য ডিজাইন করা হয়েছে
HELM KESELAMATAN??
Sebelum digunakan, pastikan topi keselamatan boleh digunakan, selesa dan selesa di kepala anda (tidak longgar dan tidak terlalu sempit), tidak rosak dan cacat.
Sebelum digunakan, yakinkan bahwa helm tersebut dapat digunakan, jsis dan nyaman di kepala anda (tidak longgar dan tidak terlalu sempit), tidak rusak dan cacat.
Selecil apapun kerusakan yang terjadi, helm harus diganti dengan yang baru

TIPS MEMAKAI TOPI KESELAMATAN

টিপস নিরাপত্তা হেলমেট পরতে

TIPS MEMAKAI HELM KESELAMATAN

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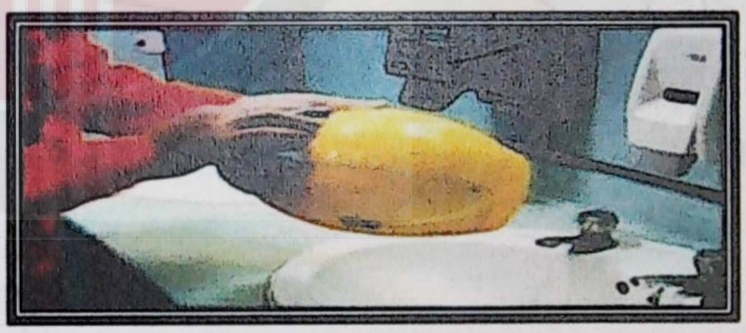
Topi keselamatan perlu diganti jika berlaku sebarang kerosakkan

শিরস্ত্রাণ কোনো ক্ষতি ক্ষেত্রে প্রতিস্থাপন করা উচিত

Sekecil apapun kerusakan yang terjadi, helm harus diganti dengan yang baru



Bersihkan topi keselamatan setelah digunakan

ব্যবহারের পরে শিরস্ত্রাণ পরিষ্কার করুন

Bersihkan helm setelah digunakan