

**AWARENESS OF STROKE RISK FACTORS AND WARNING SIGNS
AMONG UNIVERSITI TUNKU ABDUL RAHMAN STAFF**

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AMONG UNIVERSITI TUNKU ABDUL RAHMAN STAFF**

By

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in partial fulfilment of the requirement for the degree of Bachelor of
Physiotherapy.

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ABSTRACT

AWARENESS OF STROKE RISK FACTORS AND WARNING SIGNS AMONG UNIVERSITI TUNKU ABDUL RAHMAN STAFF

Goh Kuok Wey, Koh Mei Sim, Lim Jia Min

Background: Stroke is largely preventable. Effective Stroke prevention depends on the ability to recognize risk factors and early warning signs of Stroke. Under the rule ‘time is brain’, morbidity and mortality follow a brain attack can be significantly reduced if emergency care is given on time. **Purpose:** This study investigated awareness and perception of risk factors and warning signs of Stroke among Universiti Tunku Abdul Rahman staff. **Method:** This was a cross-sectional study and it was conducted using convenient sampling method on Universiti Tunku Abdul Rahman Staff from Klang Valley campuses which include Setapak, Petaling Jaya and Sungai Long. The study period was from 14th October 2013 to 09th December 2013. The study sample was 49. **Data Analysis & Results:** 29 respondents (59.18%) were having low awareness of Stroke risk factors, 15 respondents (30.61%) had moderate awareness. 4 respondents (8.16%) had high awareness while there was 1 respondent (2.04%) who had no awareness of Stroke risk factors at all. Most of the respondents (36, 73.47%) were having low awareness of Stroke warning signs, 11 respondents (22.45%) had moderate awareness. There were 1 respondent (2.04%) each in no awareness and high awareness level. **Conclusion:** Generally, the awareness level on Stroke risk factors

and warning signs are low among Universiti Tunku Abdul Rahman staff.
Education on Stroke should be given in order to improve the awareness.

Keywords: Stroke, awareness, risk factors, warning signs

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Other than that, we would like to express our appreciation to Universiti Tunku Abdul Rahman for giving us a chance to conduct this research and also the staff who had participated in our questionnaire survey.

Finally, our special thanks are extended to the family members and friends who have been providing us their support and encouragement.

DECLARATION

We GOH KUOK WEY, KOH MEI SIM and LIM JIA MIN hereby declare that this research project is based on our original work except for quotations and citations which have been duly acknowledged. We also declare that it has not been previously or concurrently submitted for any other degree at Universiti Tunku Abdul Rahman or other institutions.

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APPROVAL SHEET

This research project entitled “**AWARENESS OF STROKE RISK FACTORS AND WARNING SIGNS AMONG UNIVERSITI TUNKU ABDUL RAHMAN STAFF**” was prepared by GOH KUOK WEY, KOH MEI SIM and LIM JIA MIN and submitted in partial fulfilment of the requirements for the degree of Bachelor of Physiotherapy at Universiti Tunku Abdul Rahman.

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8 November 2013

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Dear Mr Imtiyaz,

Ethical Approval For Research Project/Protocol

We refer to your application dated 25 October 2013 for ethical approval for your research project and are pleased to inform you that your application has been approved under expedited review.

The details of your research project are as follows:

Research Title	Awareness of Stroke Risk Factors and Warning Signs among Universiti Tunku Abdul Rahman Staff
Investigator(s)	Mr Imtiyaz Ali Mir (PI) Goh Kouk Wey (UTAR Student) Koh Hei Sim (UTAR Student) Lim Jai Min (UTAR Student)
Research Area	Medical and Health Sciences
Research Location	UTAR Sg Long, PJ and KL Campuses
Research Costs	Self-funded
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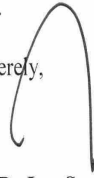
The conduct of this research is subject to the following:

- (1) The participants' informed consent have to be obtained prior to the commencement of the research.
- (2) Confidentiality of participants' personal data must be maintained; and
- (3) Compliance with procedures set out in related policies of UTAR such as the UTAR Research Ethics and Code of Conduct, Code of Practice for Research Involving Humans and other related policies/guidelines.

The University wishes you all the best in your research.

Thank you.

Yours sincerely,

A handwritten signature in black ink, consisting of a large, stylized 'L' shape with a small loop at the top and a vertical line extending downwards.

Professor Dr Lee Sze Wei

Chairman

UTAR Scientific and Ethical Review Committee

c.c Dean, Faculty of Medicine and Health Sciences
 Director, Institute of Postgraduate Studies and Research

FACULTY OF MEDICINE AND HEALTH SCIENCES

UNIVERSITI TUNKU ABDUL RAHMAN

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SUBMISSION OF THESIS

It is hereby certified that GOH KUOK WEY, KOH MEI SIM and LIM JIA MIN has completed this research project entitled “**AWARENESS OF STROKE RISK FACTORS AND WARNING SIGNS AMONG UNIVERSITI TUNKU ABDUL RAHMAN STAFF**” under the supervision of Mr. Imtiyaz Ali Mir from the Department of Physiotherapy, Faculty of Medicine and Health Sciences, and Mr. Nizar Abdul Majeed Kutty from the Department of Physiotherapy, Faculty of Medicine and Health Sciences.

We understand that the University will upload softcopy of my thesis in pdf format into UTAR Institutional Repository, which may be made accessible to UTAR community and public.

Yours truly,

(Goh Kuok Wey)

(Koh Mei Sim)

(Lim Jia Min)

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CHAPTER 1 INTRODUCTION

1.1 Operational definition:

Stroke: A rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than vascular origin.

Universiti Tunku Abdul Rahman staff: Employees of Universiti Tunku Abdul Rahman other than Faculty of Medicine & Health Sciences (FMHS) academic & clinical staff.

The awareness level on risk factors of stroke = The number of correct answers a respondent gives to 11 questions related to the risk factors of stroke.

No awareness: No correct answer to any of the 11 questions.

Low awareness: Correct responses between 1-4 of the 11 questions.

Moderate awareness: Correct responses between 5-7 of the 11 questions.

High awareness: Correct responses between 8-11 of the 11 questions.

The awareness level on warning signs of stroke = The number of correct answers a respondent gives to 13 questions related to the warning signs of stroke.

No awareness: No correct answer to any of the 13 questions.

Low awareness: Correct responses between 1-4 of the 13 questions.

Moderate awareness: Correct responses between 5-8 of the 13 questions.

High awareness: Correct responses between 9-13 of the 13 questions.

1.2 Introduction:

Stroke or cerebrovascular accident (CVA) has been found to be a leading cause of morbidity and the third leading cause of death in developed and developing countries (Venketasubramaniam, 1998). It is defined by the World Health Organization(WHO) as ‘rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than vascular origin’. This definition includes subarachnoid hemorrhage, but excludes transient ischemic attacks, subdural hematoma and hemorrhage or infarction caused by infection or tumor (The Lancet, 1992).

Stroke incidence and mortality rates vary widely between racial groups. According to a study done by National Stroke Registry (NSR, 2002) in Hospital Sultanah Nur Zahirah, Kuala Terengganu and Hospital Seberang Jaya, Pulau Pinang, the racial composition of the patients were Malays (83.7%), followed by Chinese (11.1%), Indians(4.2%) and other races(1.0%). Mean age of Stroke patient in Malaysia is between 54.5 and 62.6 years. The mortality rate is 7.1% among male Stroke patients whereas 10.2% in female Stroke patients in Malaysia. In 2004, there were 10893 deaths among Stroke patients with crude death rate of 43.2% (WHO, 2004).

According to Atlas of Heart Disease and Stroke (2004) by World Health Organization, almost 6 million people are killed as a result of Stroke. Most of these deaths are in developing countries. Nearly 75% of the cardiovascular disease is attributable to modifiable risk factors of Stroke, which means the incidence of Stroke can be prevented well if the public is aware of the modifiable risk factors.

This research study was the first ever study done on Stroke awareness in Malaysia as most of the similar research studies were focus on other human conditions such as hypertension, diabetes, myocardial infarction, diabetes and others. Since Stroke is one of the top 5 leading causes of death (Loo & Gan, 2012), therefore it is very important to raise awareness among general public in order to improve their knowledge on Stroke.

1.3 Objectives:

- To find the level of awareness of Stroke risk factors and warning signs among Universiti Tunku Abdul Rahman staff.
- To compare the awareness of Stroke risk factors and warning signs between men and women.
- To compare the awareness of Stroke risk factors and warning signs between age groups of below 35 years old and above 35 years old.
- To compare the awareness of Stroke risk factors and warning signs between different races.

- To compare the awareness of Stroke risk factors and warning signs between staff of different educational level.

1.4 Hypothesis:

- Null Hypothesis: Staff of Universiti Tunku Abdul Rahman will not be aware of Stroke risk factors and warning signs.
- Alternative Hypothesis: Staff of Universiti Tunku Abdul Rahman will be aware of Stroke risk factors and warning signs.

1.5 Benefits for the participants:

- To improve awareness of Stroke risk factors and warning signs, pamphlet will be distributed to staff to increase their awareness towards Stroke.
- In addition, health campaigns can be organized with emphasis on Stroke in all the Klang Valley campuses of Universiti Tunku Abdul Rahman.

CHAPTER 2 LITERATURE REVIEW

2.1 Epidemiology

According to Neelamegam et al (2013), they found that the overall Stroke incidence rate (first-ever Stroke) in the study region during the study period was 67 per 100,000 after age adjustment to 2010 Malaysian population. In addition, the overall Stroke attack rate which referred to first-ever and recurrent Stroke was 88 per 100,000 after age adjustment to 2010 Malaysian population. Limitations for this study were the authors could not review neuroimaging and clinical notes for individual cases due to restricted access in some study areas. Furthermore, they were unable to identify Stroke cases that did not seek medical attention.

Loo and Gan (2012) stated that Stroke is one of the top five leading causes of death after ischemic heart disease, septicaemia, malignant neoplasms and pneumonia. Percentage of deaths attributed to Stroke in general hospitals has ranged from 6.6% to 8.4%. The crude death rate per 1000 was 5.5. The authors suggested that health-care development and services should be emphasized in view of the high number of cases annually, in order to provide effective, efficient primary and secondary prevention for Stroke patients.

According to a report by Shinya Goto et al (2011), approximately 1.8 million people in South East Asia suffered a first-ever Stroke in 2004 and the number of Strokes per year is expected to rise dramatically as the population ages. Subjects who have the history of transient ischemic attack (TIA) are at a higher risk of

developing Stroke compared with the general population. Therefore, it is very important for the public to recognize the warning signs and symptoms of Stroke as both Stroke and TIA share the same warning signs and symptoms.

Grosso et al (2011) conducted a study on incidence and prognosis of Stroke in young adults in Ferrara, Italy and they found that the incidence rate for Stroke in young adults who aged 35-39 years was 16.43 per 100,000 person-years. The incidence rate for men was 13.6 per 100,000 person-years whereas 19.3 per 100,000 person-years was the incidence rate for women. In subjects who were between 40-44 years old, the overall incidence was 27.56 per 100,000 person-years. Men had higher incidence than women which was 33.19 per 100,000 person-years and women had an incidence of 21.97 per 100,000 person-years. The mean age at onset was 38.3 ± 4 standard deviation (SD) years. The mean age of onset for men was 38.7 ± 3.6 SD while the figure for women was 37.4 ± 4.4 SD.

Spengos and Vemmos (2010) studied on risk factors, etiology and outcome of first-ever ischemic Stroke in young adults aged 15-45 years. The mean age of onset was 36.9 ± 7.2 SD in overall of 253 cases collected. In their study, the ratio of male patients to female patients was 1.3:1, but more female patients were found in patients who aged less than 30 years and for patients who aged 31-45, male patients were the majority. Smoking and dyslipidemia were the most common risk factors in the entire study population. Besides, hypertension, smoking, coronary heart disease, alcohol consumption and sleep apnea syndrome were found to be more in male patients while migraine was found to be more

common among female patients. Moreover, the authors also found that 6.4% of female patients had the onset of Stroke during pregnancy or instantly after delivery.

Biller (2009) found that 3000 individuals who aged 45 years or less were killed in each year as a result of Stroke and Stroke was considered as one of the top 10 causes of childhood death. 5% to 10% of all Stroke cases were referred to children and young adults (< 45 years). The percentage was even rose to 19% to 30% in developing countries. There was an incidence of 2.7 to 9 per 100,000 of ischemic Stroke among individuals who aged 30-35 years.

Jaya et al (2002) found that majority of the patients were Malays (86.1%), then followed by Chinese (13.9%), with a male preponderance (58.2%) compared to female (41.8%). The overall mortality of Stroke in Malaysia was 37% and most patients died in the 1st month after Stroke which accounted for 34%. The age of the patients with first-ever Stroke ranged from 21 to 88 years, the mean age was 59.3 years. The authors also discovered risk factors for Stroke which consisted of hypertension, smoking, diabetes, heart disease and hypercholesterolaemia.

2.2 Risk Factors

Khan et al (2013) have conducted a study to compare the risk factors, the quality of care and the prognosis in South Asian, East Asian and White patients with Stroke. The study included 253 South Asian, 513 East Asian and 8231 White patients. The results of the study has shown that East Asian patients were more likely to present with intracerebral

hemorrhage (30%) compared to South Asian (17%) or White patients (15%). Risk of death or recurrent Stroke at one year after ischemic Stroke was similar for patients who were White (27.6%), East Asian (24.7%), or South Asian (21.9%). Although risk of death or recurrent Stroke at one year after intracerebral hemorrhage was higher in East Asian (35.5%) and White patients (47.9%) compared to South Asian patients (30.2%), these differences disappeared after adjustment for age, sex, Stroke severity and comorbid conditions (aHR 0.89 [0.67-1.19] for East Asian vs White and 0.99 [0.54-1.81] for South Asian vs. White). As conclusion, after stratification by Stroke type, Stroke care and outcomes are similar across ethnic groups in Ontario. Enhanced health promotion is needed to reduce delays to hospital for all ethnic groups.

According to an article “Alcoholic Drinks Could Increase the Possibility of You Getting a Stroke” by Barela (2012), if somebody drinks alcohol on a regular basis, there is increased possibility of them having a Stroke. Alcohol can cause vasoconstriction of cerebral arteries. Latest analysis indicates that consuming 3 or more alcohol based drinks increases the risk of a person getting a hemorrhagic Stroke. Stroke statistics conducted from the American Heart Association reveal that approximately eight hundred thousand people in America have a Stroke every year. In 2008, each one out of eighteen patients passed away because of Strokes, with the majority dying from ischemic Stroke. Thus, daily drinking alcohol is known as a major risk factor of Stroke.

Hypertension is the single most important modifiable risk factor for ischemic Stroke. Most estimates for hypertension indicates a relative risk of Stroke of approximately 4 when hypertension is defined as systolic blood pressure ≥ 160

mm Hg and/or diastolic blood pressure ≥ 95 mm Hg (Macmahon and Rodgers, 1994). Other than that, persons with diabetes have an increased susceptibility to atherosclerosis, impairing blood flow to the brain. Case-control studies of Stroke patients and prospective epidemiological studies have confirmed an independent effect of diabetes with a relative risk of ischemic Stroke in persons with diabetes from 1.8 to 3.0 (Burchfiel et al, 1994). Cigarette smoking increases risk of ischemic Stroke nearly two times, with a clear dose-response relation (Shinton and Beevers, 1989). Research studies have also shown that obesity can increase the risk of Stroke by having excessive fat tissue throughout the body. This can lead to difficulty in blood flow and an increased risk of blockage, both of which can cause Strokes (Kurth et al, 2002).

In the review of a study done in Hospital Universiti Kebangsaan Malaysia (HUKM) (Hamidon et al, 2000), it stated that the commonest risk factor was hypertension (76.1% of patients), followed by diabetes mellitus (55.2%), hypercholesterolaemia (31.3%), smoking (28.2%), ischaemic heart disease (15.3%), previous ischaemic Stroke (15.3%), atrial fibrillation (6.1%), significant family history (3.7%) and others (6.1%).

Physical inactivity is associated with increased risk of incident Stroke. Physical activity exerts a beneficial influence on risk factors for atherosclerotic disease by reducing blood pressure, weight, and pulse rate; raising high-density lipoprotein (HDL) cholesterol and lowering low-density lipoprotein (LDL) cholesterol; decreasing platelet aggregability; increasing insulin sensitivity and improving

glucose tolerance. Studies regarding the association of Stroke and diet have been inconclusive. Increased consumption of fish, green tea, and milk were protective of Stroke, while diets high in fat and cholesterol could be deleterious (Abbott et al 1996).

High cholesterol is another risk factor that attributes to increase Stroke risk. Data clearly support the positive relation between total and LDL cholesterol and a protective influence of HDL cholesterol on extracranial carotid atherosclerosis (Byington et al, 1995). Last but not least, increased alcohol consumption increases risk for brain hemorrhage (Gorelick, 1995).

Risk of getting Stroke is influenced by a number of factors. These factors fall into two groups, the modifiable one and the non-modifiable one. The non-modifiable risks factors include age, gender, hereditary or familial factors and race. As you get older, Stroke risk is increased. For each successive 10 years after age 55, the Stroke rate more than double in both men and women (Brown et al, 1996). Stroke incidence rates are 1.25 times greater in men, but because women tend to live longer than men, more women die of Stroke each year (Wolf et al, 1992). According to National Stroke Association, more woman than man suffered from Stroke each year because woman tends to have higher live span and Stroke occurs more often at older ages. However, incidence of Stroke among man is higher if compare with woman at younger ages. Hereditary or familial factor is another Stroke risk factor. An offspring analysis revealed that both paternal and maternal histories were associated with an increased risk of Stroke (Kiely et al, 1993).

In the Framingham Study (Wolf et al, 1991), probability of Stroke was determined in subjects aged 55-84 years and free of Stroke at the time of two examination cycles, examinations 9 and 14, and is based on 10 years of follow-up from each of these examinations. The probability of Stroke in an individual depends on the presence and level of risk factors. The Stroke risk factors included in the study are age, systolic blood pressure, the use of antihypertensive therapy, diabetes mellitus, cigarette smoking, prior cardiovascular disease, atrial fibrillation, and left ventricular hypertrophy by electrocardiogram. Result from the study shown that hypertension is the major risk factor for Stroke, and Stroke incidence is proportional to the level of the blood pressure. Stroke risk is more than doubled if the systolic pressure >160 mmHg and diastolic pressure <90 mmHg. This is followed by age factor. The average 10-year probability of Stroke was higher than in women, 9.6% versus 6.5%. Stroke probability increased steadily with age, from 5.9% at 55-59 years to 22.3% at 80-84 years in men and from 3.0% to 23.9% over this age range in women. Other significant risk factors are as below:

Figure 2.1: Summary Statistics for Significant Risk Factors in Stroke Profiles

TABLE 2. Summary Statistics for Significant Risk Factors in Stroke Profiles		
Risk factor	Men	Women
Age (mean yr)	65.4	66.1
Systolic blood pressure (mean mm Hg)	139.3	142.8
Antihypertensive therapy (%)	16.1	25.0
Diabetes mellitus (%)	10.6	7.9
Cigarette smoking (%)	33.8	26.4
Cardiovascular disease (%)	22.2	14.2
Atrial fibrillation (%)	2.8	2.2
Left ventricular hypertrophy (%)	3.5	2.9
Cardiovascular disease: history of myocardial infarction, angina pectoris, coronary insufficiency, intermittent claudication, or congestive heart failure. Left ventricular hypertrophy by electrocardiogram.		

Source: Research by Wolf et al (1991)

According to Bogousslavsky et al (1988), male preponderance in Stroke but also suggested that there may be female preponderance in extreme age groups (<30 and >80 years old). They also found an association between sex and the ischemic (female>male) or hemorrhagic (male>female) nature of Stroke in patients younger than 50. These findings may be partially explained by a differential distribution of risk factors, such as oral contraceptive use by two thirds of the women <45 years old. Female preponderance in those >80 years old may be related to lower life expectancy in men in general and earlier death in men with vascular risk factors; the >80-year-old age group was the only one in which the sex distribution was equal to that of the general population. The study confirmed that the most common risk factors were hypertension and cigarette smoking.

Figure 2.2: Risk Factors Related to Selected Etiologies – Lausanne Stroke Registry

TABLE 5. Risk Factors Related to Selected Etiologies—Lausanne Stroke Registry				
Risk factor	Cerebral infarction			Cerebral hemorrhage (n = 109)
	Atherosclerosis (n = 427)	Embolic heart disease (n = 204)	Hypertensive arteriopathy (n = 147)	
Hypertension	46	32	100	55
Diabetes mellitus	18	8	20	9
Cigarette smoking	64	39	31	30
Hypercholesterolemia	19	12	22	6
Hematocrit >0.45	30	25	25	21
History of ischemic heart disease	22	51	20	9
Atrial fibrillation				
History	2	29	2	1
On admission	1	31	3	2
>50% stenosis or occlusion of corresponding artery	53	13	0	4
Data are percent of column. Cases with mixed etiologies have been included.				

Source: Research by Bogousslavsky et al (1988)

2.3 Warning Signs

Early warning signs identified by National Stroke Association are sudden numbness or weakness of the face, arm, or leg especially on one side of the body, sudden confusion, trouble seeing in one or both eyes and sudden confusion, trouble speaking or understanding. The person may also experience sudden trouble in walking, dizziness, loss of balance or coordination and sudden, severe headaches with no known cause. Other important but also less common Stroke signs include sudden nausea, fever, vomiting and brief loss of consciousness or a period of decreased consciousness such as fainting, confusions, convulsions or coma (Sullivan and Schmitz, 2007).

2.4 Stroke Awareness

Lack of awareness of Stroke is a significant problem. As we know, Stroke is preventable if people have adequate knowledge regarding Stroke risk factors, warning signs and response to warning signs.

Phua et al (2013) have conducted a survey on 'Public Awareness of Sepsis and Stroke in Singapore: A Population-Based Survey'. They have stated that a rate-limiting step may be delayed presentation to the emergency department by patients themselves. The conclusion made is there is still some room for improvement in the public's knowledge of Stroke in Singapore. To improve public awareness and to achieve better patient outcomes, more concerted and

organized efforts from healthcare professionals, medical societies, statutory boards, and the mass media are needed.

A population-based national survey on public awareness of Stroke was carried out in Korea by Kim et al (2011); respondents were selected randomly according to regional demographic characteristics and were interviewed in person by trained interviewers. Participants were interviewed by the interviewers with questionnaires which composed of structured, open-ended and closed-ended questions. There were no any public campaigns or educational efforts launched before and during the study that made the result to be more reliable. From a total of 1000 respondents, 62% reported at least 1 Stroke symptom and 56% reported at least 1 risk factor for Stroke in open-ended questioning. Knowledge of signs and risk factors were related with the level of study through the study. Approximately 31% of the respondents showed knowledge of thrombolysis and the proper action in the interviews. Respondents who aged 40-59 years knew more about the treatment and emergency action for Stroke compared to subjects aged 20-39 years. Television was the major sources of information for the respondents (59%) while information from respondents' physicians was reported to be the most reliable source (55%). The authors also found that internet was the second largest source of information for Stroke in respondents who aged 20-39 years. The conclusion from this research study was the Stroke awareness was substandard in Korea, especially in younger citizens and those with less education. They suggested that mass media and the internet should be utilized by physicians in

educating the public with great effort in order to improve the knowledge and awareness of Stroke for the public.

According to the study of “Stroke awareness decreases pre-hospital delay after acute ischemic Stroke in Korea” by Kim et al (2011), delayed arrival at hospital was one of the major obstacles in enhancing the rate of thrombolysis therapy in patients with acute ischemic Stroke. The study investigated factors associated with pre-hospital delay after acute ischemic Stroke in Korea. A prospective, multicenter study was conducted at 14 tertiary hospitals in Korea. 500 consecutive patients with acute ischemic Stroke who arrived within 48 hours were being interviewed. Early arrival within 3 hours of symptom onset was significantly associated with the following factors: high National Institutes of Health Stroke Scale (NIHSS) score, previous Stroke, atrial fibrillation, use of ambulance, knowledge about thrombolysis and awareness of the patient/ bystander that the initial symptom was a Stroke. In Korea, Stroke awareness was not only on the part of patients, but also of bystanders, had a great impact on early arrival at hospital. To increase the rate of thrombolysis therapy and the incidence of favorable outcomes, extensive general public education including how to recognize Stroke signs would be important.

Eugenio et al (2011) determined knowledge of warning signs and risk factors of ischemic Stroke and the impact of an educational program by medical students. Results showed that the educational program was cost-effective and had a positive impact on knowledge of risk factors and warning signs of ischemic Stroke.

Jin et al (2011) have discussed on a research topic of 'Factors Associated with Prehospital Delays in the Presentation of Acute Stroke in Urban China'. They have mentioned that the delays in presentation to the hospital which caused the low rates of thrombolysis for ischemic Stroke in China. To improve awareness of early symptoms of Stroke and to cater for patients likely to experience Stroke at home, an alert system can be established. Wider availability and use of ambulance services are promising methods to help expedite presentation to hospital post-Stroke and thereby improve the management of Stroke in China.

According to an article "Response to symptoms of Stroke in the UK: a systematic review" by Lecouturier et al (2010), they wished to review the evidence base regarding the knowledge, attitudes and behaviors of Stroke patients, witnesses and the public to the symptoms of Stroke and the need for an urgent response at the onset of symptoms. They conducted a systematic review of UK articles reporting empirical research on i) awareness of and response to the symptoms of acute Stroke or TIA, and ii) beliefs and attitudes about diagnosis, early treatment and consequences of acute Stroke. An assumption is made, in the UK, there is lacking of public knowledge of the symptoms of Stroke and of the need for an emergency response.

According to Petrea et al (2009), women have an overall higher lifetime risk of Stroke due to greater life-expectancy. Pre-Stroke and post-Stroke disability rates were higher in women because women developed their first Stroke 5 years later than men who made the prognosis to become worse compared to men. They

stated that although women were getting Stroke when they are more elderly, but the Stroke severity or case fatality rates were similar between women and men.

According to the study by Hickey et al (2009), older people are particularly vulnerable to Stroke, research suggests that they have the poorest awareness of Stroke warning signs and risk factors. This study examined knowledge of Stroke warning signs and risk factors among community-dwelling older adults. Community-dwelling older people (aged 65+) in Ireland were randomly selected (n = 2,033; 68% response rate) for home interviews. Questions assessed knowledge of Stroke warning signs and risk factors, and personal risk factors for Stroke. The results shown, 6% had previously experienced a Stroke or transient ischemic attack. Less than half of the overall sample identified established risk factors (e.g. smoking, hypercholesterolaemia), hypertension being the only exception (identified by 74%). Similarly, less than half identified established warning signs (e.g., weakness, headache), with slurred speech (54%) as the exception. As a conclusion, knowledge deficits in this study suggest that most of the common early signs or signs of Stroke were recognized as such by less than half of the older adults surveyed. They may lose vital time in presenting for medical attention. Lack of public awareness about Stroke warning signs and risk factors must be addressed as one important contribution to reducing mortality and morbidity from Stroke.

According to Ellis et al (2009), a little is known about Stroke awareness in Latinos with low literacy and living in regions with high Stroke rates. A sample of 60 adult Latinos living in Charleston South Carolina was studied to examine

recognition of 4 common warning signs of Stroke and appropriate first action to call 9-1-1. 46% of the participants recognized sudden facial, arm, or leg weakness; 39% recognized sudden vision loss; 43% recognized sudden trouble walking; 45% recognized sudden headache; 17% recognized all four warning signs. Participants at the lowest literacy levels recognized three of the four warning signs more frequently than the participants at higher literacy levels. Overall, awareness of Stroke warning signs was considerably low in this high-risk population. The relationship between low literacy and Stroke awareness was unclear in this sample.

According to Hodgson et al (2009), a study was conducted to see the effect of paid television advertising campaigns upon the general public's knowledge of the warning signs of Stroke and emergency department (ED) Stroke presentations. Data for the study included results of nine random-digit dialing telephone surveys conducted among Ontario adults aged 45 and above. The mean numbers of ED presentations for all Strokes and for transient ischemic attacks (TIA) were obtained from the Registry of the Canadian Stroke Network (RCSN). The polls indicated that long advertising campaigns were associated with significant increases in the public's knowledge of Stroke warning signs, while shorter campaigns were associated with much smaller increases. Time (as represented by month) was the single most important factor determining the mean number of ED presentations for total Stroke but was not for TIAs. Campaign status (on or off the air) had a strong and significant effect on ED presentations when the advertising campaigns were long; when the advertising campaigns were shortened, there was

no campaign effect. As conclusion, long, intermittent campaigns were effective in increasing the public's awareness of the warning signs of Stroke and may have a significant effect on ED presentations for Stroke and TIA. Public awareness of Stroke warning signs declined during advertising black-outs, so short campaigns are less effective.

According to Kraywinkel et al (2007), perception of Stroke risk factors is an important component of the motivation to change unhealthy lifestyles. The survey was conducted by mailed questionnaire among 1483 participants of a prior public Stroke campaign in Germany. Participants had been informed about their individual Stroke risk based on the Framingham Stroke risk score. Overall Stroke risk factor knowledge was good with 67–96% of the participants recognizing established risk factors. Knowledge of a specific factor was superior among those affected by it. 13% of all participants considered they were having a high Stroke risk, 55% indicated a moderate risk. All major risk factors contributed significantly to the perception of being at high Stroke risk, but the effects of age, sex and education were non-significant. Poor self-rated health was additionally associated with high individual Stroke risk perception. Thus, Stroke risk factor knowledge was high in this study. The self-perception of an increased Stroke risk was associated with established risk factors as well as low perception of general health.

In a study done by Mandelweig et al (2006), they found that perceptual social and behavioral factors affect delays in seeking help after symptom onset on Stroke. In the study, patients presenting Stroke signs were interviewed about symptom

experiences, interpretations, and reactions. From the study, 8.4 hours with standard deviation of 15.7 hours was the mean time interval for symptom awareness to seeking help. On the other hand, the time took for patients from symptom awareness to hospital arrival were 15.3 hours with standard deviation of 28.3 hours. There was no significant differences in the time interval from symptom awareness to seeking help regarding age, sex, family status, work status, education, or living alone versus accompanied. Older patients (age > 70) arrived hospital earlier than younger patients (age < 50).

National Audit Office (2005) claimed that a positive impact on primary Stroke prevention was observed through health campaigns which focused on to quit the smoking and improve diet. The awareness of Stroke among the public was still very low and the authors doubted whether the public was aware of the need for any emergency response when Stroke was suspected. There were few suggestions made from the National Audit Office, firstly more focus on Stroke should be placed from the department in more of its campaigns. An access to an outpatient Stroke and TIA service had to be provided by all Primary Care Trust and ensured that outpatients are referred efficiently and effectively. Moreover, work to improve public awareness of Stroke and recognize Stroke as an emergency situation had to be integrated with the provision of information and guidance to general practitioners, Accident and Emergency department staff and ambulance staff to prepare for the increased demand.

Mazor and Billings-Gagliardi (2002) studied on whether print materials on Stroke resulted in increased knowledge in a sample of lay people. Participants rated the

materials on readability, understandability and usefulness immediately after reading. Stroke knowledge scores were significantly higher for the Stroke information groups compared to the control group. Fictionalized materials on Stroke was more effective than the expository materials, overall the impact of print materials on Stroke knowledge, measured after a delay of at least 1 week, was minimal at best.

Arthur et al (1995) conducted a population-based telephone interview using random digit dialing to assess the knowledge of risk factors and warning signs for Stroke. The National Institute of Neurological Disorders and Stroke has included sudden weakness of the face, arm, or leg, sudden dimness or loss of vision, suddenly difficulty speaking or understanding speech, sudden severe headache with no known cause and unexplained dizziness, unsteadiness or sudden falls as the important warning signs of Stroke. Whereas hypertension, stress, poor eating, smoking, high cholesterol, obesity, heart disease, drinking alcohol and diabetes are identified as the Stroke risk factors. They concluded that the knowledge of Stroke risk factors and warning signs among public in the Greater Cincinnati, Ohio, metropolitan area were generally low. Among all the respondents, only 57 % correctly listed at least 1 established warning sign and only 68 % were able to name at least 1 Stroke risk factor.

Figure 2.3: Respondents' Perception of Stroke Warning Signs and Stroke Risk Factors

Responses	No. (%) of Surveyed Responding				Total (N=1880)
	Sex		Race		
	Male (n=759)	Female (n=1121)	Black (n=507)	White (n=1348)	
Warning signs*					
None identified	205 (27)	308 (27)	154 (30)	350 (26)	513 (27)
Dizziness	199 (26)	246 (22)	117 (23)	323 (24)	445 (24)
Numbness (any)	141 (18)	214 (19)	89 (18)	263 (20)	355 (19)
Headaches	112 (15)	197 (18)	96 (19)	209 (16)	309 (16)
Weakness (any)	94 (12)	191 (17)	74 (15)	208 (15)	285 (15)
Pain unspecified	118 (16)	114 (10)†	50 (10)	178 (13)	232 (12)
Numbness, 1 side	80 (10)	126 (11)	58 (11)	147 (11)	206 (11)
Slurred speech	47 (6)	108 (10)	32 (6)	122 (9)	155 (8)
Vision problems	53 (7)	83 (7)	27 (5)	108 (8)	136 (7)
Chest pain	64 (8)	59 (5)	29 (6)	93 (7)	123 (6)
Weakness, 1 side	46 (6)	73 (6)	35 (7)	82 (6)	119 (6)
Shortness of breath	61 (8)	49 (4)†	26 (5)	84 (6)	110 (6)
Risk factors‡					
Hypertension	318 (42)	608 (54)	241 (48)	677 (50)	926 (49)
Stress	170 (22)	257 (23)	128 (25)	296 (22)	427 (23)
Poor eating	164 (22)	216 (19)	121 (24)	251 (19)	380 (20)
Smoking	150 (20)	202 (18)	61 (12)	291 (22)§	352 (19)
Cholesterol	115 (15)	195 (17)	61 (12)	248 (18)§	310 (16)
Obesity	112 (15)	182 (16)	48 (9)	244 (18)§	294 (16)
None identified	117 (15)	151 (13)	99 (20)	162 (12)	268 (14)
Heart disease	22 (3)	72 (6)†	29 (6)	65 (5)	94 (5)
Drinking/alcohol	43 (6)	38 (3)	39 (8)	42 (3)§	81 (4)
Diabetes	17 (2)	41 (4)	23 (4)	34 (2)	58 (3)

*Symptoms reported by fewer than 5% of the total study group are not listed. Data otherwise represent all responses (up to 3 per respondent) and thus include responses that have not been established by the medical community as stroke warning signs.

†P<.003 for sex.

‡Responses reported by fewer than 3% of the total population studied are not listed. The data otherwise represent all responses (up to 3 per respondent) and thus include factors that have not been established by the medical community as stroke risk factors.

§P<.003 for race.

Source: Research by Arthur et al (1995)

According to Barsan et al (1994), in a study of urgent therapy for acute Stroke, they screened for 2099 patients and were able to collect a total of 1116 time data. They found that there was a notable decrease in time taken from onset of symptom till hospital arrival after the start of the study, educational and promotional programs, which stressed signs and symptoms of Stroke and the need to call for emergency were presented to physicians, paramedical personnel and the public. The study was divided into four quartiles in order for them to study and analyze not only the differences in time to hospital arrival but also use of 911. After the National Institutes of Health Tissue Plasminogen Activator Pilot Study,

public education and awareness campaigns were conducted, there was an increased in use of emergency line from 39% in the first quartile to 60% in the fourth quartile. Through this research study, the authors concluded that the decreased in time from signs onset to hospital arrival and the use of emergency line were due to the public and professional education programs conducted at all study sites.

CHAPTER 3 MATERIAL AND METHODS

3.1 Research Design

This is a cross-sectional study and it was conducted using convenient sampling method. The respondents were selected from Universiti Tunku Abdul Rahman campuses in Klang Valley which include Setapak, Petaling Jaya and Sungai Long.

Inclusion Criteria:

- Staff from Universiti Tunku Abdul Rahman Klang Valley campuses
- Above 18 years old
- Able to read and understand English

Exclusion Criteria:

- Staff from Universiti Tunku Abdul Rahman Kampar campus
- FMHS academic & clinical staff
- Below 18 years old
- staff that has prior history of Stroke
- staff whose family member or relative or friend has prior history of Stroke

Universiti Tunku Abdul Rahman staff were selected as sample because they can be said as a small community and inferences can be made on public based on the results that we obtained. Besides, Universiti Tunku Abdul Rahman staff were

comparatively smaller population than general public, so as a starting point Universiti Tunku Abdul Rahman staff were more suitable population to study with and after that more studies can be carried out which will be focus on general public. Furthermore, due to time constrain for this study, Universiti Tunku Abdul Rahman staff were selected because it was more convenient for us to collect data within three weeks of data collection period.

3.2 Material

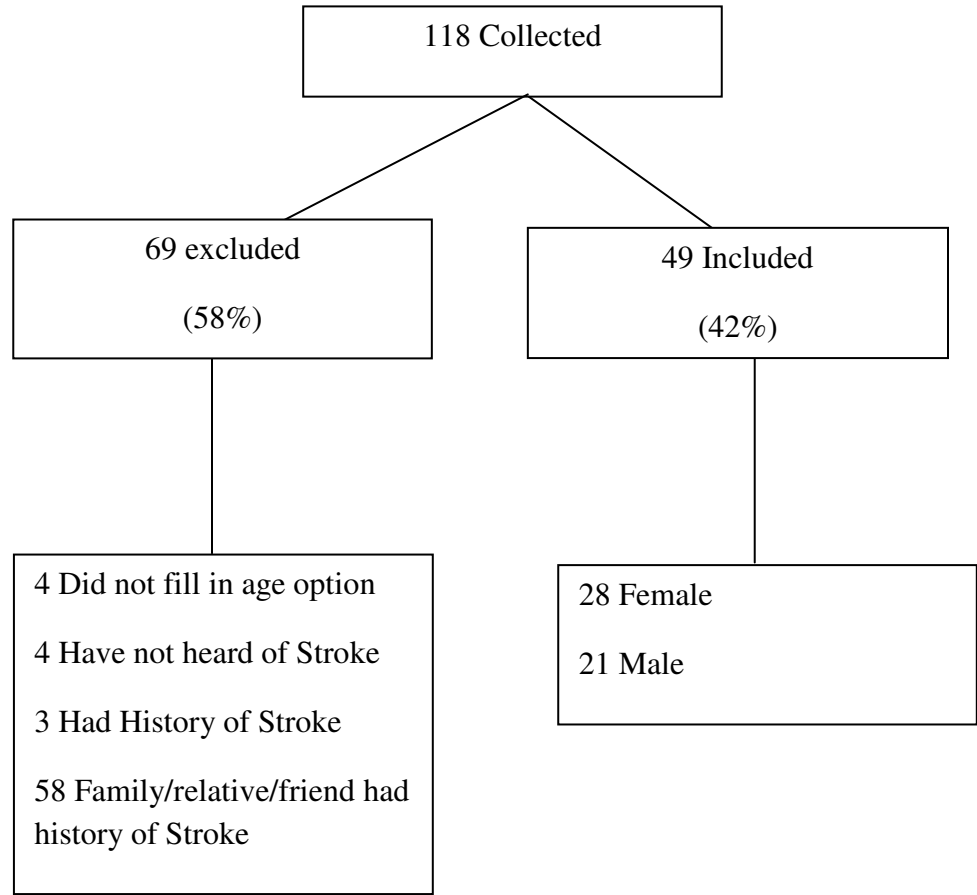
The survey instrument which was used in this study is a self-administered questionnaire designed to assess information about Stroke risk factors and warning signs. The questionnaire contained 17 questions subdivided into 4 sections. The first section was about 10 questions of socio demographic data. The second section contained 5 questions about the information regarding Stroke. The third section was related to the awareness of the participants about risk factors of Stroke which consisted of 18 options of related and non-related risk factors. The fourth section was a question about the warning signs of Stroke; there were 22 options of related and non-related warning signs. In the third and fourth section, respondents had to tick the most appropriate option and they had the choice to tick more than one option.

Group of three physiotherapy students from third year administered this questionnaire in English language. Informed consent was taken from the

participants before administration of the questionnaire. The data collected was kept strictly confidential only to authorized individuals.

Paper-based questionnaires and online questionnaires were being distributed to the respondents from 14th November 2013 to 29th November 2013. Before conducting the survey in respective campuses, the respondents were informed in advance through Universiti Tunku Abdul Rahman email. A total of 150 paper-based questionnaires had been distributed to the respondents but only 78 responded in the survey. 32 of them are males and 46 of them are females. Other than that, a total of 391 online questionnaires were sent to the respondents through Universiti Tunku Abdul Rahman email and we received 40 responses; 16 male respondents and 24 female respondents. Hence, all together a total of 118 respondents participated in our study.

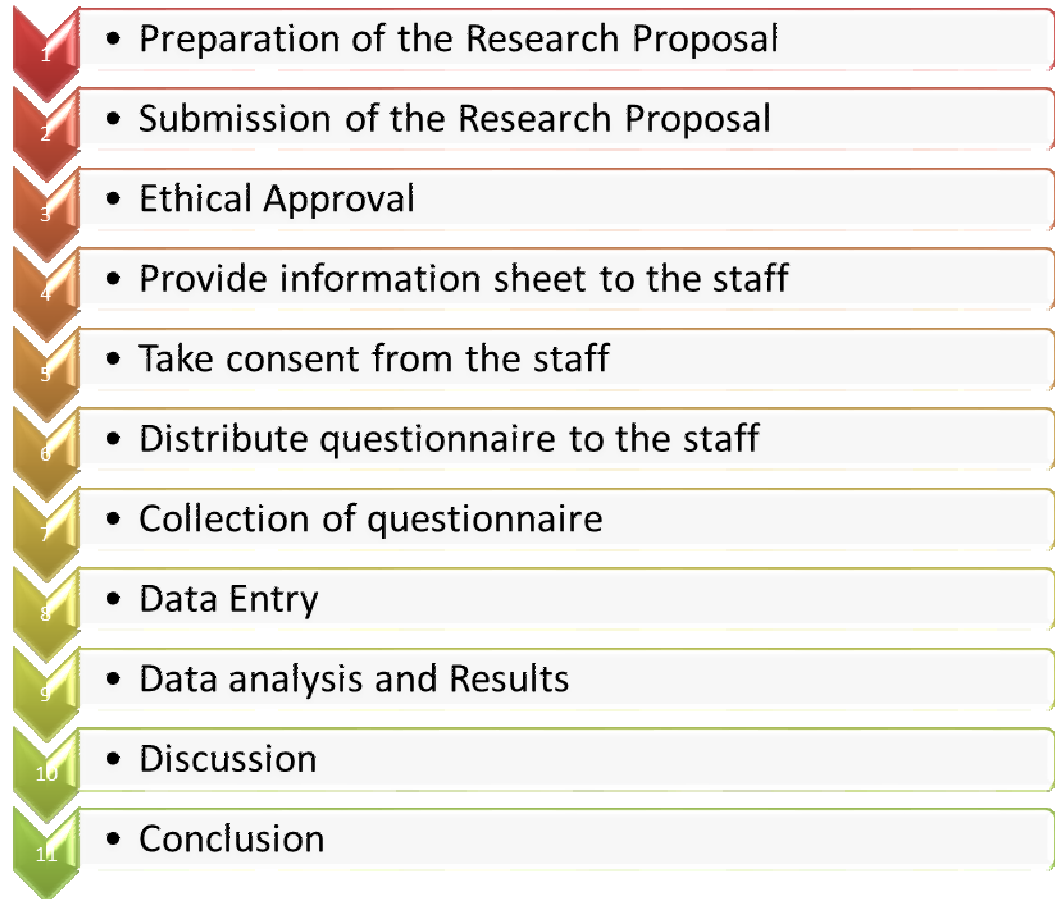
Figure 3.1: Sampling



69 (58%) participants were excluded. This is because 4 (5.8%) of them did not fill in their age, 4 (5.8%) stated that they have not heard of Stroke, 3 (4.4%) of them had previous history of Stroke and 58 (84%) of them have mentioned family / relative / friend had history of Stroke. Among those 49 (42%) included, 28 (57.14%) of them were females and 21 (42.86%) of them were males.

3.3 Procedure

Figure 3.2: Procedure for the Whole Research Process



Before we started data collection, ethical approval was obtained from Universiti Tunku Abdul Rahman Scientific & ethical review committee (SERC). Questionnaires with information sheet and consent form attached were distributed to staff. Explanation on intention of this survey was given to staff and staff were told to sign the consent form to address voluntary participation in this research study. Questionnaires were collected few minutes later after they had completed filling the questionnaires in Sungai Long campus. The procedure in questionnaire distribution was slightly different in Setapak and Petaling Jaya campuses, where

questionnaires were left at Faculty General Office because we had limited access to distribute questionnaires to each staff. Staff who were interested in this research took one copy from the Faculty General Office. Questionnaires were collected one week later in both the campuses. Furthermore, online questionnaires were sent to some of the staff as they were not approachable due to rules and regulations in different departments. Online questionnaires were created by using Google Drive and the format was the same as paper questionnaires. The data collected through online questionnaires were exported to Microsoft Excel for data analysis. Data coding have been completed by using Microsoft Excel. Tables and charts have been constructed in Microsoft Excel after data coding. Cronbach's Alpha reliability test was carried out by using SPSS version 19 to check the reliability of the survey questions. Results were recorded and tabulated and discussion was completed before we made our conclusion.

CHAPTER 4 DATA ANALYSIS AND RESULT

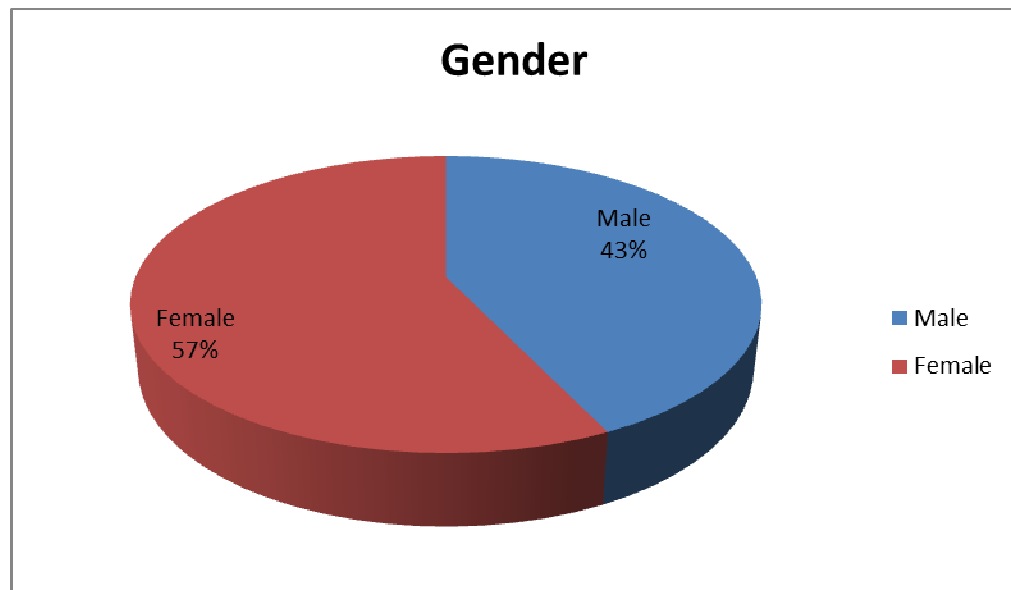
4.1 Demographic Data

4.1.1 Gender

Table 4.1: Gender

Gender	No.
Male	21
Female	28

Figure 4.1: Gender



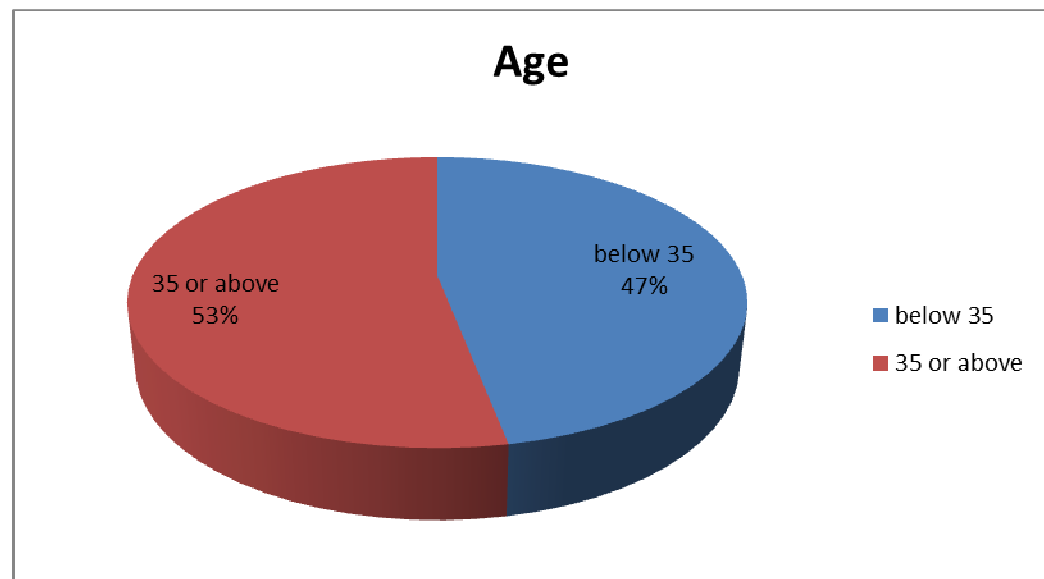
A total of 49 respondents, 28 (57%) of them were females and the remaining 21 (43%) were males.

4.1.2 Age

Table 4.2: Age

Age	No.
Below 35	23
35 or above	26

Figure 4.2: Age



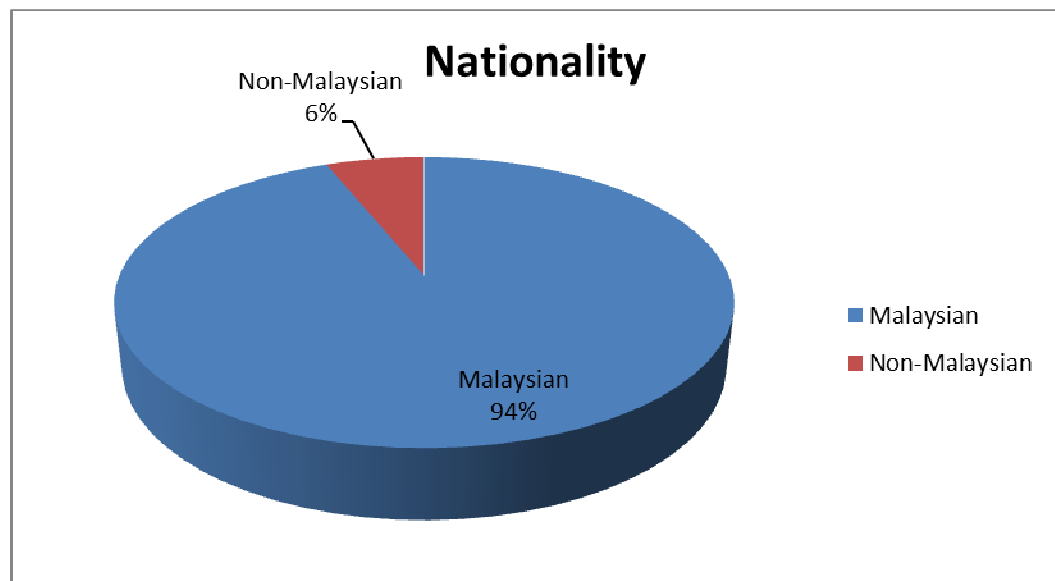
23 (48%) of the total respondents fall under age group ranged from 19 to 34, while the remaining 26 (53%) of them aged above 35.

4.1.3 Nationality

Table 4.3: Nationality

Nationality	No.
Malaysian	46
Non-Malaysian	3

Figure 4.3: Nationality



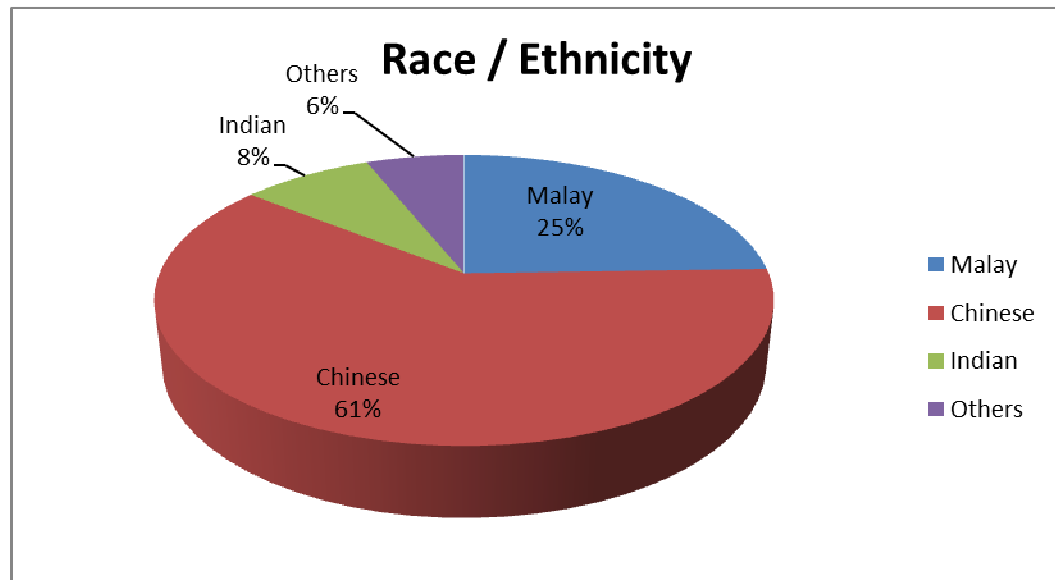
Most of the Universiti Tunku Abdul Rahman staff, 46 (94%) were Malaysian and only 3 (6%) of them were non-Malaysian. They are from Vietnam, Japan and Kazakhstan.

4.1.4 Race / Ethnicity

Table 4.4: Race / Ethnicity

Race / Ethnicity	No.
Malay	12
Chinese	30
Indian	4
Others	3

Figure 4.4: Race / Ethnicity



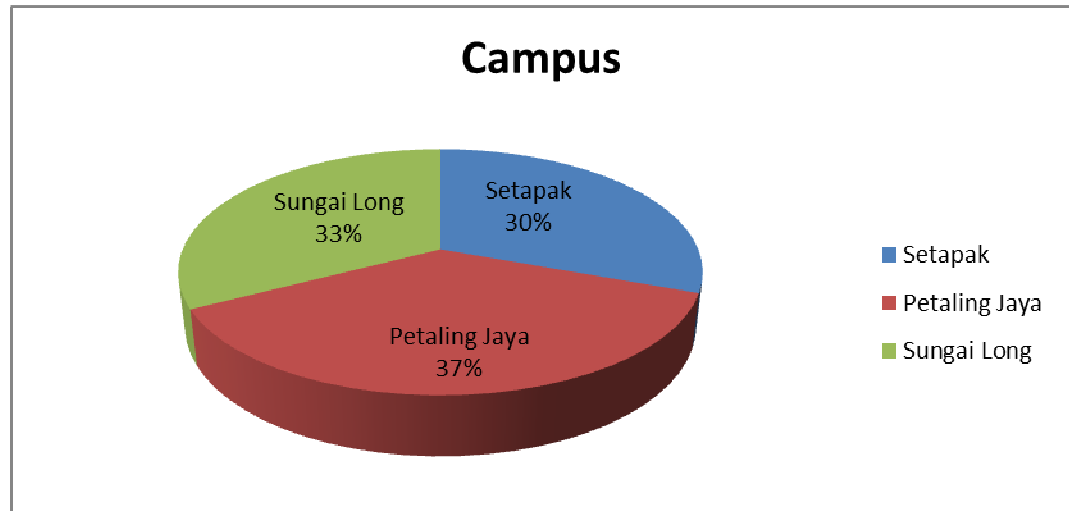
Out of 49 respondents who participate in our research project, 30 (61%) of them were Chinese. This is followed by 12 (25%) Malay respondents and 4 (8%) were Indian. The remaining 3 (6%) respondents are of other races.

4.1.5 Campus

Table 4.5: Campus

Campus	No.
Setapak	15
Petaling Jaya	18
Sungai Long	16

Figure 4.5: Campus



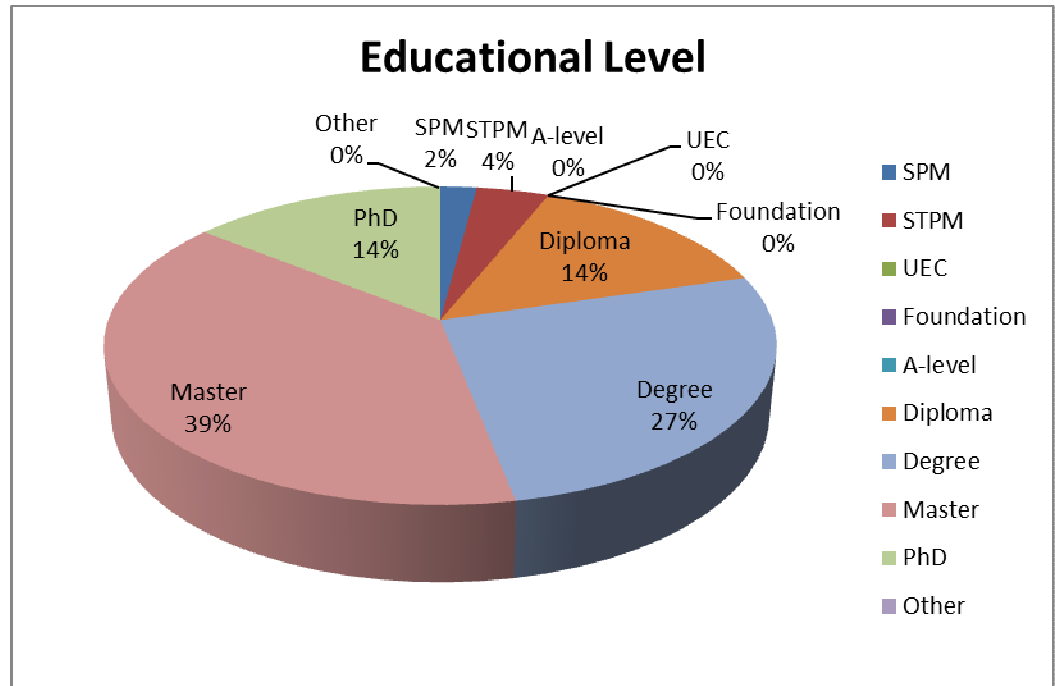
The questionnaires were collected from respondents of three different Universiti Tunku Abdul Rahman campuses (Setapak, Petaling Jaya and Sungai Long). From the table above, among the 49 respondents who were being included in the study, there were 15 (30%) respondents from Setapak campus, 18 (37%) respondents from Petaling Jaya campus and 16 (33%) respondents from Sungai Long campus.

4.1.6 Educational Level

Table 4.6: Educational Level

Educational Level	No.
SPM	1
STPM	2
UEC	0
Foundation	0
A-level	0
Diploma	7
Degree	13
Master	19
PhD	7
Other	0

Figure 4.6: Educational Level



In the study, we had respondents from different educational level. There were 7 (14%) of respondents at PhD level, 19 (39%) at Master level, 13 (27%) at Degree level, 7 (14%) at Diploma level, 2 (4%) at STPM level and 1 (2%) at SPM level.

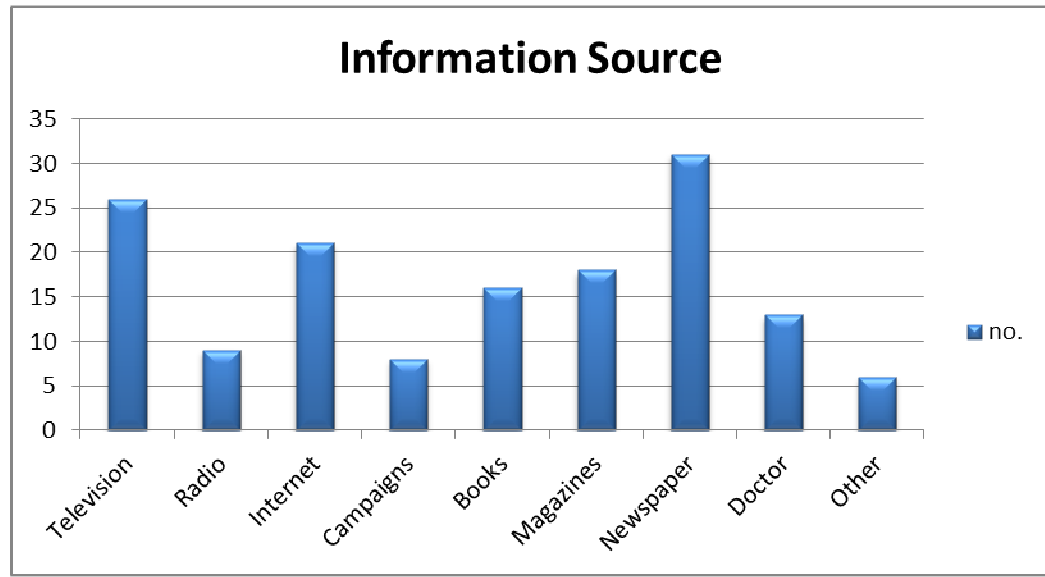
4.2 Information about Stroke

4.2.1 Information Source

Table 4.7: Information Source

Information Source	No.
Television	26
Radio	9
Internet	21
Campaigns	8
Books	16
Magazines	18
Newspaper	31
Doctor	13
Other	6

Figure 4.7: Information Sources



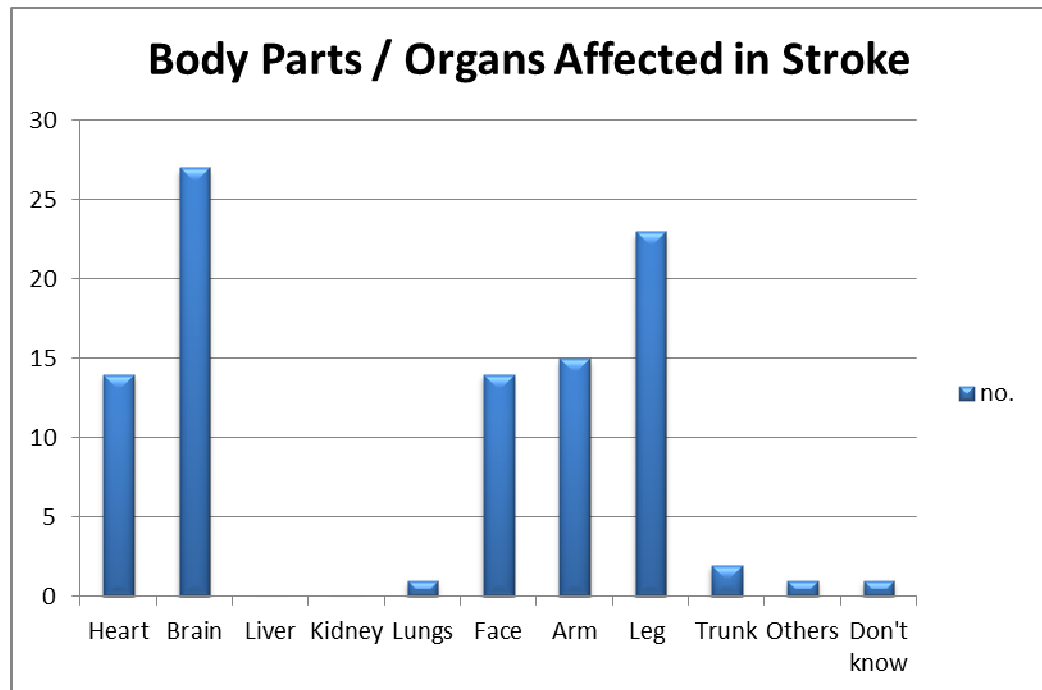
Methods of mass media were the most commonly cited sources of respondent's information about Stroke, with "Newspaper" identified by 31, "Television" identified by 26, "Internet" identified by 21, followed by magazines, books, doctor, radio, and campaigns. There were 6 responses of "other", which had mentioned getting the information about Stroke from friends or relatives.

4.2.2 Body Parts / Organ Affected in Stroke

Table 4.8: Body Parts / Organ Affected in Stroke

Part / Organ	No.
Heart	14
Brain	27
Liver	0
Kidney	0
Lungs	1
Face	14
Arm	15
Leg	23
Trunk	2
Others	1
Don't know	1

Figure 4.8: Body Parts / Organ Affected in Stroke



About the knowledge of which body parts or organs affected in Stroke, most of the respondents correctly identified the brain as the organ affected in Stroke. Followed by that, leg, arm, face, heart, trunk, and lungs were also answers chosen by the respondents. One respondent was not aware of which body parts or organ affected in Stroke.

4.3 Risk Factors

Table 4.9: Risk Factors

Risk Factors	Yes	No	total	%
a = Increase in age*	24	25	49	48.98
b = Male Gender*	3	46	49	6.12
c = Kidney stone	0	49	49	0
d = Diabetes*	17	32	49	34.69
e = Excessive sun exposure	0	49	49	0
f = Nigh shift	5	44	49	10.2
g = Cigarette smoking*	22	27	49	44.9
h = Family history*	22	27	49	44.9
i = Light to moderate coffee consumption	0	49	49	0
j = Intake of steroids	7	42	49	14.29
k = Factory workers	2	47	49	4.08
l = Race / ethnicity*	2	47	49	4.08
m = High blood pressure*	40	9	49	81.63
n = Obesity*	17	32	49	34.69
o = High cholesterol level*	31	18	49	63.27
p = Lung infection	1	48	49	2.04
q = Physical inactivity*	13	36	49	26.53
r = Excessive alcohol consumption*	18	31	49	36.73

* refers to true risk factors for Stroke

In the questionnaire, there were actually 11 related risk factors of Stroke out of the 18 options. The related risk factors are shown as “*” in the above table. Respondents had to choose the most appropriate; they had the choice to choose

more than one option. High blood pressure is the risk factor for stroke which was correctly chosen by most of the respondents, 40 (81.63%) out of 49 respondents had picked this option. Race or ethnicity is the related risk factor which was least recognized by the respondents, there were only 2 (4.08%) respondents who picked it as answer. However, there were also respondents who had wrongly recognized those non related Stroke risk factors as answer.

4.4 Warning Signs

Table 4.10: Warning Signs

Warning Signs	Yes	No	%
a = Loss of vision*	10	39	20.41
b = Dizziness*	13	36	26.53
c = Shoulder pain	11	38	22.45
d = Problems with speaking*	19	30	38.78
e = Neck pain	7	42	14.29
f = Fever*	2	47	4.08
g = Breathlessness	7	42	14.29
h = Urinary urgency	1	48	2.04
i = Vomiting*	0	49	0
j = Weakness or numbness of face*	30	19	61.22
k = Weakness or numbness of leg*	25	24	51.02
l = Cold fingers / toes	7	42	14.29
m = Confusion*	3	46	6.12
n = Fainting*	16	33	32.65
o = Severe headache*	7	42	14.29
p = Fits*	0	49	0
q = Chest pain	11	38	22.45
r = Back pain	5	44	10.2
s = Calf pain	0	49	0
t = Profuse sweating	7	42	14.29
u = Loss of balance*	14	35	28.57
v = Weakness or numbness of arm*	33	16	67.35

* refers to true warning signs for Stroke

In the questionnaire, there were actually 13 related warning signs of Stroke out of the 22 options. The related warning signs are shown as “*” in the above table. Respondents had to choose the most appropriate; they had the choice to choose more than one option. Weakness or numbness of arm is the warning sign of stroke which was correctly chosen by most of the respondents. 33 (67.35%) out of 49 respondents had picked this option. However, no respondent could recognize vomiting and fits as the related warning signs of Stroke. There were also respondents who had wrongly recognized those non related Stroke warning signs as answer.

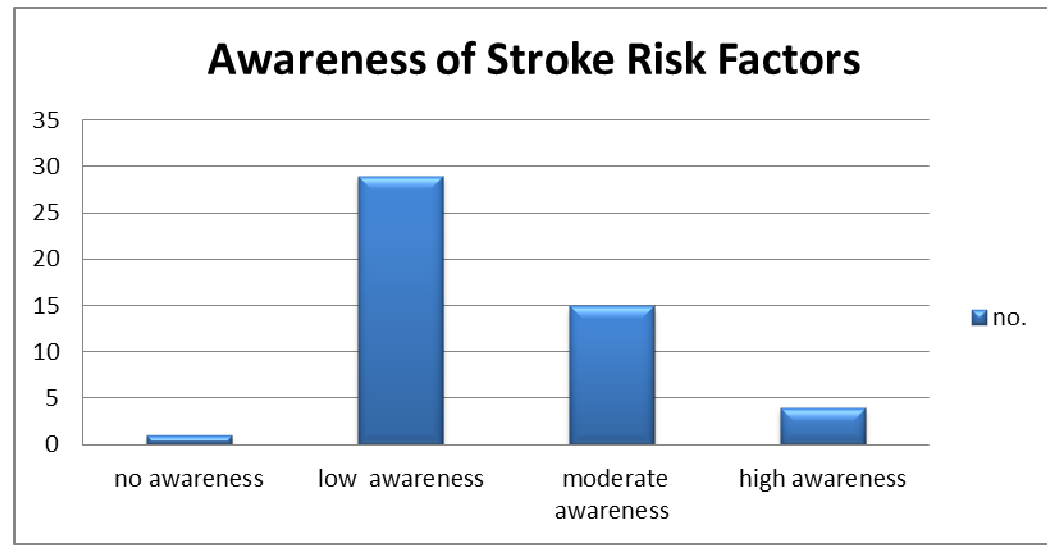
4.5 Stroke Awareness

4.5.1 Awareness of Stroke Risk Factors

Table 4.11: Awareness of Stroke Risk Factors

No.	No Awareness	Low Awareness	Moderate Awareness	High Awareness
	1	29	15	4

Figure 4.9: Awareness of Stroke Risk Factors



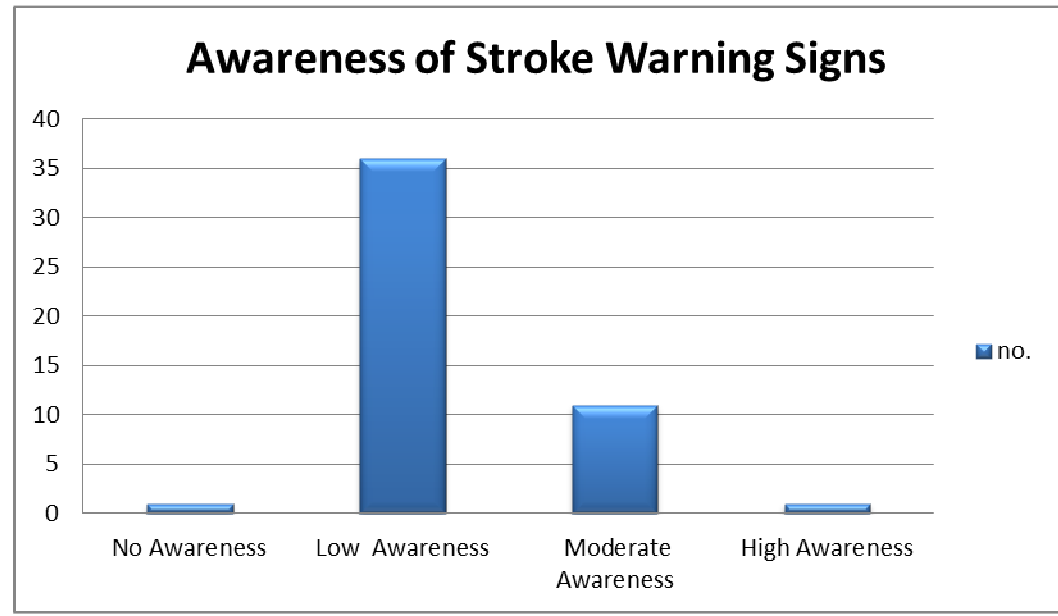
From the bar chart above, 29 of the respondents (59.18%) were having low awareness of Stroke risk factors; followed by 15 respondents (30.61%) with moderate awareness. 4 respondents (8.16%) had high awareness while there was 1 respondent (2.04%) who had no awareness of Stroke risk factors.

4.5.2 Awareness of Stroke Warning Signs

Table 4.12: Awareness of Stroke Warning Signs

No.	No Awareness	Low Awareness	Moderate Awareness	High Awareness
	1	36	11	1

Figure 4.10: Awareness of Stroke Warning Signs



Most of the respondents (36, 73.47%) were having low awareness of Stroke warning signs, followed by 11 respondents (22.45%) had moderate awareness. There were 1 respondent (2.04%) each in no awareness and high awareness level.

4.5.3 Awareness Level (Risk Factors) Among Age Groups

Table 4.13: Awareness Level (Risk Factors) Among Age Groups

Awareness Level	Below 35	35 and above
No awareness	0	1
Low awareness	14	15
Moderate awareness	8	7
High awareness	1	3
Total	23	26

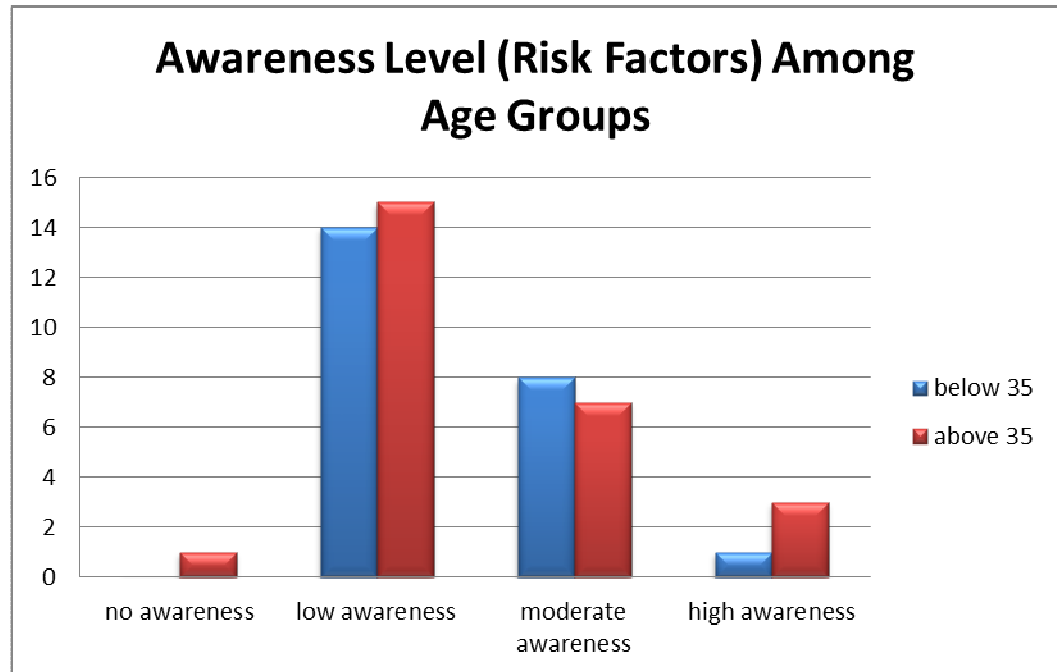


Figure 4.11: Awareness Level (Risk Factors) Among Age Groups

We also wanted to check the difference in level of awareness of risk factors of stroke among participants below 35 years old and above 35 years old. From the table above, 23 respondents who were aged below 35, 14 respondents were

having low awareness of Stroke risk factors, 8 respondents were having moderate awareness and only 1 of them were highly aware of Stroke risk factors.

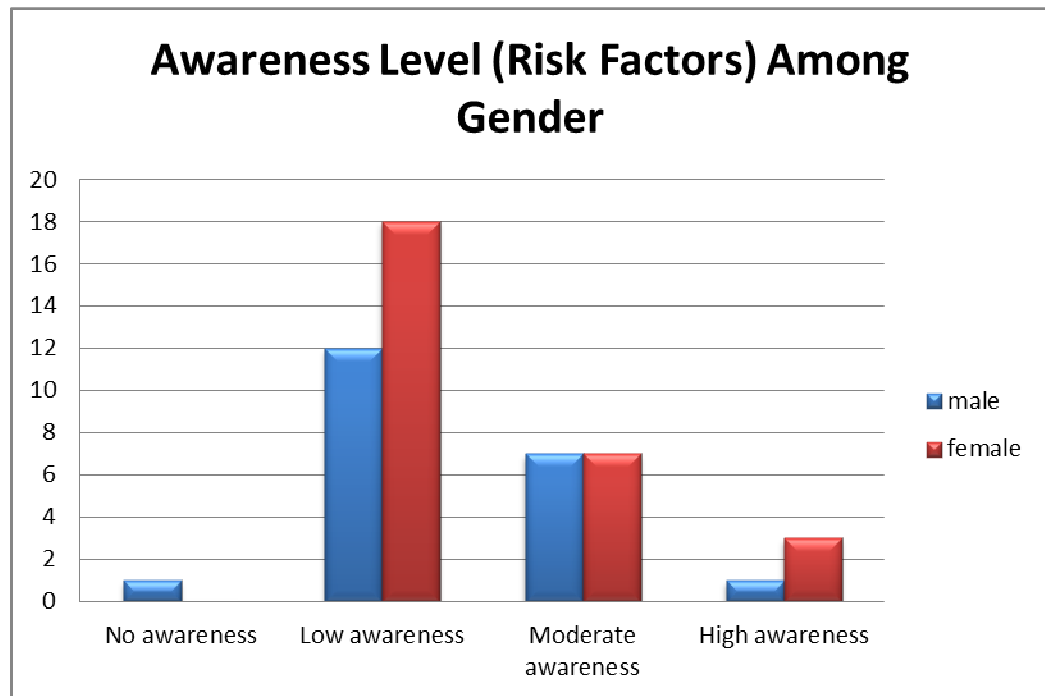
On the other hand, among 26 respondents who were aged 35 years and above, 1 respondent had no awareness of Stroke risk factors. 15 respondents were having low awareness of Stroke risk factors, 7 respondents were having moderate awareness of Stroke risk factors and 3 respondents showed high awareness of Stroke risk factors.

4.5.4 Awareness Level (Risk Factors) Among Gender

Table 4.14: Awareness Level (Risk Factors) Among Gender

Awareness level	Male	Female
No awareness	1	0
Low awareness	12	18
Moderate awareness	7	7
High awareness	1	3
total	21	28

Figure 4.12: Awareness Level (Risk Factors) Among Gender



This study also focused on determining the awareness level of risk factors of stroke among gender. Among 21 male respondents, 1 respondent showed no

awareness of Stroke risk factors, 12 respondents had low awareness, 7 respondents had moderate awareness and only 1 respondent had high awareness.

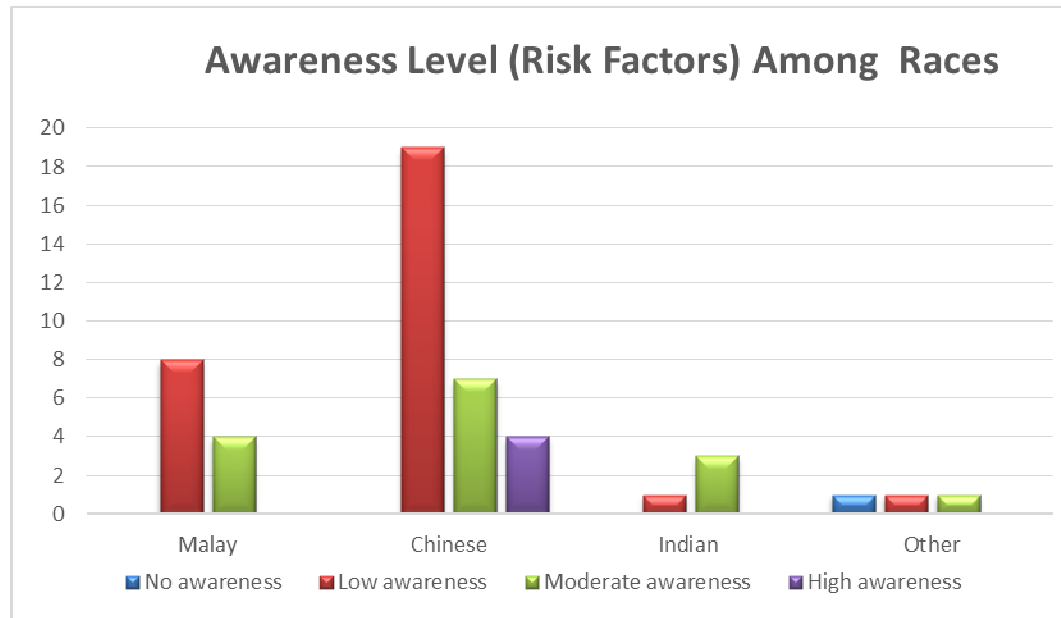
There were a total of 28 female respondents, 18 respondents had low awareness, 7 respondents had moderate awareness whereas 3 respondents showed high awareness of Stroke risk factors.

4.5.5 Awareness Level (Risk Factors) Among Races

Table 4.15: Awareness Level (Risk Factors) Among Races

Awareness level	Malay	Chinese	Indian	Other
No awareness	0	0	0	1
Low awareness	8	19	1	1
Moderate awareness	4	7	3	1
High awareness	0	4	0	0
total	12	30	4	3

Figure 4.13: Awareness Level (Risk Factors) Among Races



We compared the races too to identify the awareness level of risk factors about stroke. Respondents were categorized into 4 groups, which were Malay, Chinese, Indian and other. Out of 12 Malay respondents, 8 respondents were having low

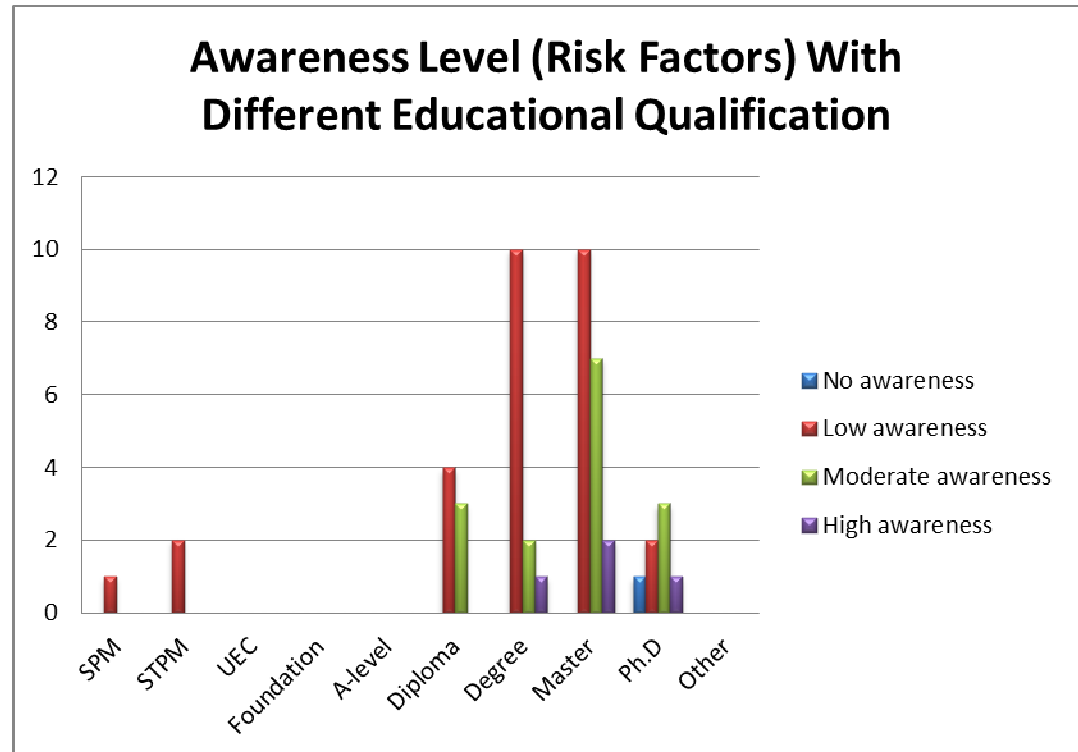
awareness of Stroke risk factors and 4 respondents had moderate awareness. Out of total 30 Chinese respondents, 19 respondents were having low awareness of Stroke risk factors, 7 respondents had moderate awareness and 4 respondents had high awareness. Among 4 Indian respondents, 1 of them had low awareness of Stroke risk factors whereas 3 respondents had moderate awareness. Out of 3 respondents from other races, 1 respondent had no awareness, 1 respondent had low awareness and 1 respondent had moderate awareness.

4.5.6 Awareness Level (Risk Factors) With Different Educational Qualification

Table 4.16: Awareness Level (Risk Factors) With Different Educational Qualification

Awareness level	SP M	STP M	UE C	Founda tion	A- level	Diplo ma	Deg ree	Mas ter	Ph. D	Oth er
No awareness	0	0	0	0	0	0	0	0	1	0
Low awareness	1	2	0	0	0	4	10	10	2	0
Moderate awareness	0	0	0	0	0	3	2	7	3	0
High awareness	0	0	0	0	0	0	1	2	1	0
total	1	2	0	0	0	7	13	19	7	0

Figure 4.14: Awareness Level (Risk Factors) With Different Educational Qualification



Stroke awareness level of risk factors in participants with different educational level was also compared. From the table above, there was 1 respondent whose highest educational qualification was SPM, 2 respondents have STPM, 7 respondents have diploma, 13 respondents are degree holders, 19 respondents have Master's degree and 7 respondents are Ph.D. holder Respondent with SPM had low awareness of Stroke risk factors. All the 2 respondents from STPM had low awareness. 4 out of 7 respondents in Diploma group had low awareness of Stroke risk factors and 3 respondents had moderate awareness. 10 respondents from Degree group had low awareness of Stroke risk factors, 2 respondents had moderate awareness and 1 respondent had high awareness. There were 19

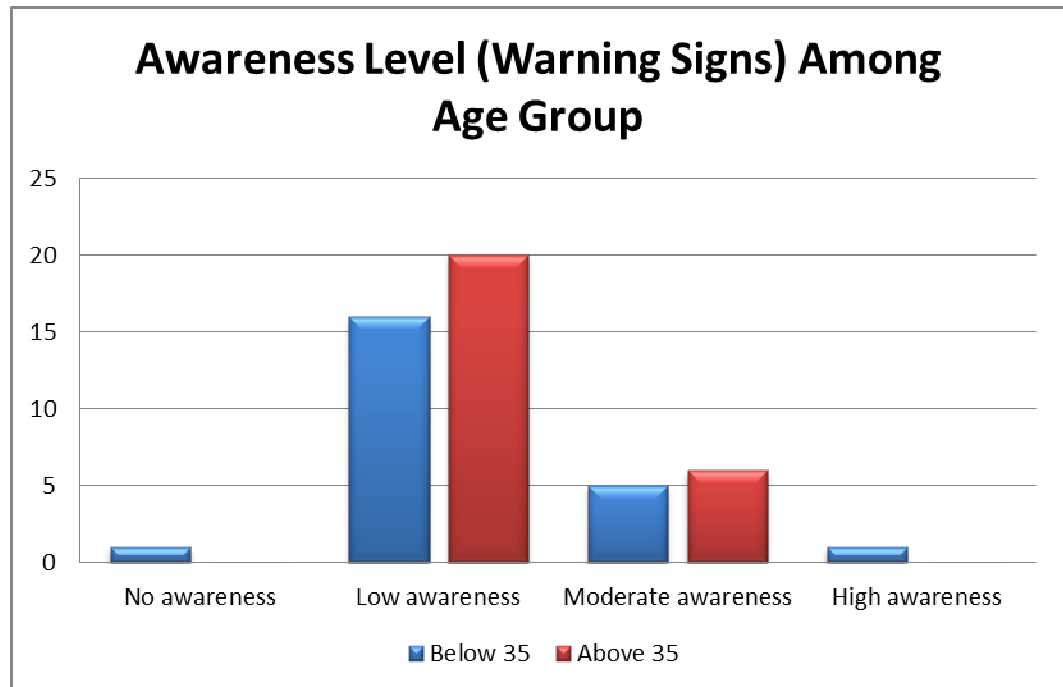
respondents from Master's Degree, 10 respondents had low awareness of Stroke risk factors, 7 respondents had moderate awareness and 2 respondents had high awareness. A total of 7 respondents' data were collected for Ph.D. holder, 1 respondent had no awareness of Stroke risk factors, 2 respondents had low awareness, 3 respondents had moderate awareness and 1 respondent had high awareness.

4.5.7 Awareness Level (Warning Signs) Among Age Group

Table 4.17: Awareness Level (Warning Signs) Among Age Group

Awareness Level	Below 35	35 and Above
No awareness	1	0
Low awareness	16	20
Moderate awareness	5	6
High awareness	1	0
total	23	26

Figure 4.15: Awareness Level (Warning Signs) Among Age Group



Our study also wanted to check the difference in level of awareness of warning signs among participants below 35 years old and above 35 years old. From the

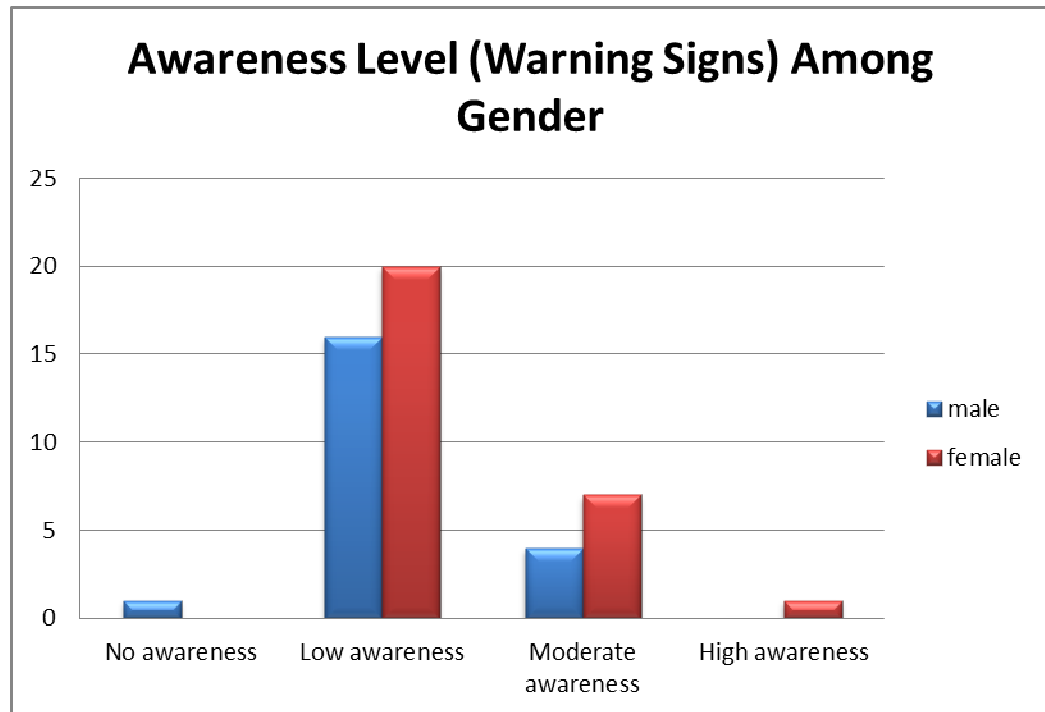
table above, there were 23 respondents who aged below 35 years and 26 respondents who aged 35 and above. Out of 23 respondents from below 35 years, 1 respondent had no awareness of Stroke warning signs, 16 respondents had low awareness, 5 respondents had moderate awareness and 1 respondent had high awareness. Out of 26 respondents from 35 years and above, 20 respondents had low awareness of Stroke warning signs, 6 respondents had moderate awareness.

4.5.8 Awareness Level (Warning Signs) Among Gender

Table 4.18: Awareness Level (Warning Signs) Among Gender

Awareness Level	Male	Female
No awareness	1	0
Low awareness	16	20
Moderate awareness	4	7
High awareness	0	1
total	21	28

Figure 4.16: Awareness Level (Warning Signs) Among Gender



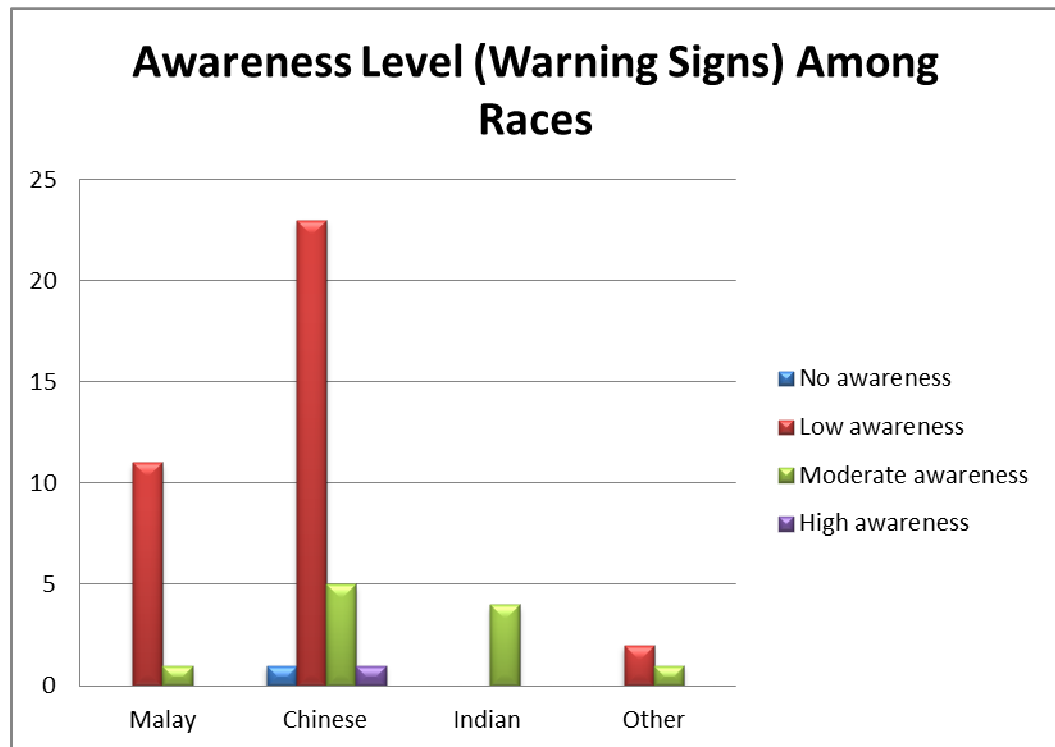
In this research we also focused on determining the awareness level of warning signs of stroke among gender. From the table above, out of 21 male respondents, 1 respondent had no awareness of Stroke warning signs, 16 respondents had low awareness and 4 respondents had moderate awareness. Out of 28 female respondents, 20 respondents had low awareness of Stroke warning signs, 7 respondents had moderate awareness and 1 respondent had high awareness.

4.5.9 Awareness Level (Warning Signs) Among Races

Table 4.19: Awareness Level (Warning Signs) Among Races

Awareness Level	Malay	Chinese	Indian	Other
No awareness	0	1	0	0
Low awareness	11	23	0	2
Moderate awareness	1	5	4	1
High awareness	0	1	0	0
total	12	30	4	3

Figure 4.17: Awareness Level (Warning Signs) Among Races



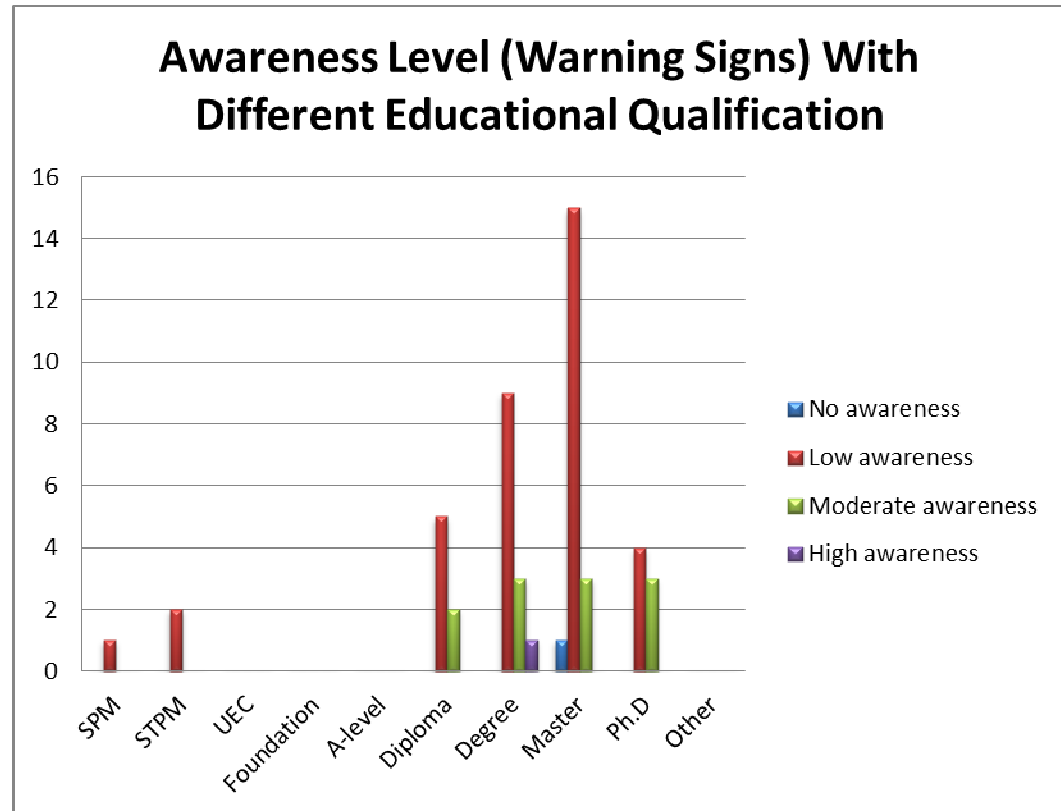
We compared the races too to identify the stroke warning signs about stroke. From the table above, a total of 12 Malay respondents had answered the survey form, 11 respondents had low awareness of Stroke warning signs while 1 respondent had moderate awareness. Out of 30 Chinese respondents, 1 respondent had no awareness of Stroke warning signs, 23 respondents had low awareness, 5 respondents had moderate awareness and 1 respondent had high awareness. For all the 4 Indian respondents, they had moderate awareness of Stroke warning signs. For 3 respondents of other races, 2 respondents had low awareness of Stroke warning signs and 1 respondent had moderate awareness.

4.5.10 Awareness Level (Warning Signs) With Different Educational Qualification

Table 4.20: Awareness Level (Warning Signs) With Different Educational Qualification

Awareness Level	SP M	STP M	UE C	Founda tion	A- level	Diplo ma	Deg ree	Mas ter	Ph. D	O th er
No awareness	0	0	0	0	0	0	0	1	0	0
Low awareness	1	2	0	0	0	5	9	15	4	0
Moderate awareness	0	0	0	0	0	2	3	3	3	0
High awareness	0	0	0	0	0	0	1	0	0	0
total	1	2	0	0	0	7	13	19	7	0

Figure 4.18: Awareness Level (Warning Signs) With Different Educational Qualification



In this study we also investigated the stroke awareness level of warning signs in participants with different educational level. From all 49 respondents, 1 SPM holder, 2 STPM holders, 7 Diploma holders, 13 Degree holders, 19 Master's Degree holders and 7 Ph.D. holders. The only 1 SPM holder had low awareness of Stroke warning signs whereas 2 STPM holders had also low awareness. Out of 7 Diploma holders, 5 respondents had low awareness while 2 respondents had moderate awareness. 9 Degree holders had low awareness of Stroke warning signs, 3 respondents had moderate awareness and 1 respondent had high awareness. There was 1 respondent who had Master's Degree had no awareness

of Stroke warning signs. 15 respondents from Master's Degree holders had low awareness and 3 respondents had moderate awareness. 4 respondents of Ph.D. holders had low awareness of Stroke warning signs and 3 respondents had moderate awareness.

4.6 Scale Measurement

4.6.1 Internal Reliability Test

Cronbach's Alpha was used to test for reliability of the survey questions, which included questions on Information Source, Body Parts / Organs which are affected in Stroke, Risk Factors and Warning Signs. The summary of the results of Cronbach's Alpha is shown in the table below.

Table 4.21 Reliability Statistics for Each of the Variable

No.	Construct	Coefficient Alpha	No. of Item
1	Information Source	.668	9
2	Body Parts / Organs which are affected in Stroke	.136	11
3	Risk Factors	.621	18
4	Warning Signs	.717	22

According to Malhotra and Birks (2006), the coefficient value range from 0 to 1, and a value of 0.6 or less usually indicates unsatisfactory internal consistency reliability. From all 4 survey questions which were tested, the coefficient alpha for each construct was ranged from 0.136 to 0.717. 3 survey questions had coefficient alpha of more than 0.6 which showed satisfactory consistent result, which were Information Source (0.668), Risk Factors (0.621) and Warning Signs (0.717). The coefficient alpha for Body Parts / Organs which are affected in

Stroke was 0.136 which meant this survey question did not provide satisfactory consistent results. This showed that modifications should be made for this question in future studies in order to obtain results with better consistency.

CHAPTER 5 DISCUSSION, LIMITATIONS, RECOMMENDATIONS AND CONCLUSION

5.1 Discussion

Focus of our study was to determine the awareness level of Stroke risk factors and warning signs of Universiti Tunku Abdul Rahman staff. Generally, the awareness level of Universiti Tunku Abdul Rahman staff on Stroke risk factors and warning signs were low. Notably, only 4 (8.16%) of the respondents were able to answer 8-11 risk factors correctly out of 11, and only 1 (2.04%) of them was able to answer more than 9 warning signs correctly out of 13. The lack of knowledge of Stroke warning signs and risk factors appeared in both age groups, in either of the female and male respondents who were below 35 years old and those who were aged 35 and above. The result was different with the study done by Arthur and friends in 1995 which stated that the respondents' age was statistically associated with knowledge about established risk factors. There was also not much difference between the awareness of Stroke risk factors and warning signs among gender. 57% of the male respondents and 64% of the female respondents were having low awareness of Stroke risk factors. This was also similar in the awareness of Stroke warning signs, 76% of male respondents and 71% of female respondents were grouped as having low awareness level.

Although the result of our study showed that Chinese respondent had the lowest awareness level then other races, we could not find the significant relationship

between the awareness level of Stroke risk factors and races because majority (61.22%) of our respondents were Chinese. Malay respondents and Indian respondents only occupied 24.49 % and 8.16% respectively. In our study, we also found that there was no correlation between educational level and the awareness level of Stroke risk factors and warning signs. Participants at the low literacy and high literacy were only able to recognize one to four of all risk factors and warning signs. The result was similar with previous study done in 2009 by Ellis et al on 60 adults Latinos living in Charleston South Carolina which stated that participant at the lowest literacy recognized three of four warning signs more frequently than the participants at higher literacy level. The reason for this phenomenon was unclear.

In our study, most of the respondents were able to identify high blood pressure (81.63%) and high cholesterol level (63.27%) as the major risk factors for Stroke. However, less than half of the respondents were unable to identify increase in age (48.98%), diabetes (34.69%), cigarette smoking (44.9%), family history of Stroke (44.9%), obesity (34.69%), physical inactivity (26.53%) and excessive alcohol consumption (36.73) as the risk factors for Stroke. Only 6.12% and 4.08% of the respondents were aware of male gender and ethnicity as the risk factors of Stroke. The result was better than the study by Kothari et al, only 27% listed high blood pressure, 22% listed stress, 17% listed high cholesterol, 11% listed smoking, and 8% listed alcohol use.

For knowing warning signs of Stroke, 67.35%, 61.22% and 51.02% of the respondents were able to identify weakness or numbness of arm, face and leg respectively. 38.78% listed problems with speaking, 32.65% listed fainting, 28.57% listed loss of balance, 26.53% listed dizziness, 20.41% listed loss of vision and only 14.29% listed severe headache as the common warning signs of Stroke. This is different from the study done by Arthur et al (2003) where only 26% identified dizziness, 36% identified numbness, 19% identified headaches and 20% identified weakness as the warning signs of Stroke.

In our survey, newspaper and television were the major commonly cited source of information about Stroke. Thus, more information about Stroke should be provided to the public through mass media, to educate them about Stroke especially to the high risk group people. This can be proven by a study conducted by Hodgson, where long, intermittent paid television advertising campaigns were effective in increasing the public's awareness of the warning signs of Stroke and may have significant effect on Emergency Department presentations for Stroke.

5.2 Limitations

Throughout the research process, we have encountered some methodological and researchers limitations which may have impacted the findings and conclusions.

First and foremost limitation that we encountered was the sample size. Although we were able to get a total of 118 respondents, but only 49 of them met our inclusion criteria.

Since we were conducting a qualitative research study, our research relied completely on self-reported data. It is limited by the fact that it rarely can be independently verified and potential bias will be caused.

Majority of Universiti Tunku Abdul Rahman staff are from Chinese origin so we were not able to recruit the evenly groups from other races. Therefore, it was difficult to make good comparisons on awareness level of Stroke risk factors and warning signs among races or ethnicity.

Other than that, we also found it was difficult for us to get access to the Universiti Tunku Abdul Rahman staff at Petaling Jaya campus and Setapak campus. This is because the staff are working in an open office; students are not allowed to enter the office. We have to leave our questionnaire at Faculty General Office and wait for the staff to fill it for us, but ended up with only few copies completed. After discussing the problem with our supervisor, we decided to send our questionnaire personally to each staff through email. The online responses are not favourable as well because most of the staff were busy and some of them were on leave during that time.

Although these limitations had caused certain constraints on our research process but acknowledgement of the study's limitations can provide suggestions for further research.

5.3 Recommendations

Having knowledge on Stroke risk factors and warning signs can help in improving the prognosis of patients. However, this study only begins to reveal the awareness level of Stroke risk factors and warning signs on Universiti Tunku Abdul Rahman staff. Further research should be targeted on a bigger population so that considerable education can be taken if the public's awareness level on Stroke is low. This can help in reducing mortality and morbidity rate in our country.

Other than that, more research on factors that is causing low awareness of Stroke risk factors and warning signs should also be focused on so that effective ways can be carried out to increase the awareness level.

Since Malaysia is a multi-racial country, researchers should include also all the races in the study equally to find out the correlation between races and the awareness level of Stroke risk factors and warning signs of stroke.

These recommendations may help to improve the accuracy and reliability of the research in the future. It also can help to prevent the repetition of mistakes in following researches.

5.4 Conclusion

Despite of having high educational level among Universiti Tunku Abdul Rahman staff, the awareness of Stroke risk factors and warning signs was low. From that we can make inference that the public would also have low awareness on Stroke risk factors and warning signs. Thus, Stroke education should be conducted to the public in order to improve awareness of Stroke. Stroke educational effort should target the general public and focus should be given to elderly who have the higher Stroke risk and yet are less aware of Stroke risk factors and warning signs. Educational programs must focus not only on risk factors and warning signs, equally important are the actions to be taken if Stroke symptoms occur. Patients with acute Stroke symptoms are usually unable to communicate their symptoms, thus Stroke education will only be effective if people are aware of the Stroke symptoms so that they can identify these symptoms and facilitate transport of the patient to the hospital.

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APPENDICES

INFORMATION SHEET

Awareness of Stroke Risk Factors and Warning Signs among Universiti Tunku Abdul Rahman Staff.

Dear respondent,

We are undergraduate Physiotherapy (Hons) year 3 students, would like to conduct a survey on “Awareness of Stroke risk factors and warning signs among Universiti Tunku Abdul Rahman staff” as a part of our research project in Setapak, PetalingJaya and Sungai Long campuses. In this research project, you will be given a questionnaire to answer few questions in an attempt to gather information about the awareness of Stroke risk factors and warning signs.

The main intention behind the survey is not to identify any individual response, but group response. Your participation in this study is very important as it would help us to better understand the health behaviour process, particularly Stroke awareness among Universiti Tunku Abdul Rahman staff. There is no right or wrong answers to the questions asked or the statements made; instead, what is desired of you is your truthful and honest response.

The time needed to complete the questionnaire is approximately 5 minutes. Please note that the completion of this questionnaire is entirely voluntary. All information gathered as a result of your participating in this study will be treated with utmost confidentiality. All details that can identify you will be removed before storing the data and before the results of this study can be published.

Please sign in the consent form to express your agreement to participate in this project. Thank you for taking the time to read this information sheet.

Do contact us if you need any further information regarding this study.

Thank you.

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Lecturer

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CONSENT FORM

I have read the Information Sheet and have had the details of the study explained to me.

My questions have been answered to my satisfaction, and I may ask further questions at any time.

I understand I have the right to withdraw from the study at any time and I can decline to answer any questions.

I agree to provide information to the students(s) on the understanding that my details will not be used without my permission.

I agree to participate in this study under the conditions set out in the information sheet.

Name:

Signature:

Date:

Questionnaire on Awareness of Stroke Risk Factors and Warning Signs among Universiti Tunku Abdul Rahman Staff.

Section A: Social Demographic Data

Name (optional): _____

INSTRUCTION: Please tick (✓) the most appropriate.

1) Your Gender

☐ Male

☐ Female

2) Your Age: _____

3) Nationality: _____

4) Your ethnicity:

☐ Malay

☐ Chinese

☐ Indian

☐ Other (please specify): _____

5) Which UTAR campus are you currently working in?

☐ Setapak

☐ Petaling Jaya

☐ Sungai Long

6) Which faculty/ department/ division are you currently working in?

7) Highest education qualification

☐ SPM

☐ Diploma

☐ STPM

☐ Degree

☐ UEC

☐ Master

☐ Foundation

☐ PhD

☐ A-level

☐ Other (please specify): _____

8) Marital status

Single

Widow /widower

Married

Divorced

Separated

☐ Other (please specify): _____

9) Address / contact (optional): _____

10) E-mail: _____

Section B: Information about Stroke

INSTRUCTION: Please tick (✓) the most appropriate.

- 1) Have you heard of a
condition called 'Stroke'?

☐ Yes ☐ No

(If your answer is "No", you need not to proceed. We thank you for your participation. Please provide your contact details if you wish to know more about Stroke.)

- 2) How have you known about Stroke?

☐ Television	☐ Books
☐ Radio	☐ Magazines
☐ Internet	☐ Newspaper
☐ Campaigns	☐ Doctor
	☐ Other (please specify): _____

- 3) Have you ever had Stroke?

☐ Yes ☐ No

- 4) Do you have any family member/ relative/ friend that has had
Stroke before?

☐ Yes ☐ No

- 5) Which part /organ of the body do you think is affected in Stroke?

☐ Heart	☐ Face
☐ Brain	☐ Arm
☐ Liver	☐ Leg
☐ Kidney	☐ Trunk
☐ Lungs	☐ Other (please specify): _____
	☐ Don't know

Section C: Risk Factors

Which of the following are the risk factors of Stroke?

INSTRUCTION: Please tick (✓) the most appropriate. You may tick (✓) more than 1 (ONE) option.

Increase in age	Intake of steroids
Male gender	Factory workers
Kidney stone	Race / ethnicity
Diabetes	High blood pressure
Excessive sun exposure	Obesity
People who work at night shifts	High cholesterol level
Cigarette smoking	Lung infection
History of Stroke among family members	Physical inactivity
Light to moderate coffee consumption (3-4 cups per day)	Excessive alcohol consumption (more than 2 drinks per day) (1 drink = 2 ½ glass of beer or 1 glass of wine or ¼ to ½ glass of liquor)

Section D: Warning Signs

Any individual is most likely to have an attack of Stroke if he/she has one or more of the following sudden onset of warning signs?

INSTRUCTION: Please tick (✓) the most appropriate. You can tick (✓) more than 1 (ONE) option.

Loss of vision in one or both eyes	Cold fingers and toes
Dizziness	Confusion
Shoulder pain	Fainting or loss of consciousness
Problems with speaking or understanding	Severe headache with no known cause
Neck pain	Fits
Fever	Chest pain
Breathlessness	Back pain
Urinary urgency	Calf pain
Vomiting	Profuse sweating
Weakness or numbness of face, especially one side of the body	Loss of balance and coordination
Weakness or numbness of leg, especially one side of the body	Weakness or numbness of arm, especially one side of the body

END

Thank you for participating in this study. If you would like us to contact you with more information on Stroke risk factors and warning signs, please fill in your contact details.

SPSS Output

Scale: Information Source

Case Processing Summary

		N	%
Cases	Valid	49	100.0
	Excluded ^a	0	.0
	Total	49	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.668	9

Scale: Body Parts / Organs which are affected in Stroke

Case Processing Summary

		N	%
Cases	Valid	49	100.0
	Excluded ^a	0	.0
	Total	49	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.136	11

Scale: Risk Factors

Case Processing Summary

		N	%
Cases	Valid	49	100.0
	Excluded ^a	0	.0
	Total	49	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.621	18

Scale: Warning Signs

Case Processing Summary

		N	%
Cases	Valid	49	100.0
	Excluded ^a	0	.0
	Total	49	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.717	22