CHAPTER 5: DISCUSSION

5.1 Introduction

Primary intracerebral haemorrhage is one of the stroke types that affect all domains of a person’s life. The first part of the discussion of this study cover on adaptation to stroke-related disability during early phase and later at three months based on four adaptation modes of post intracerebral haemorrhage patients. A person with ICH may experience physical, psychological, and social disability or changes that affect his or her ability to function as a normal human being. The second part of the discussion describes the factors affecting the early and later (3 month) adaptation to stroke-related disability of post intracerebral haemorrhage patients. The last part describes the difference between early and later adaptation and what are the significant recommendations related to the finding of this study.

5.2 Adaptation to stroke-related disabilities

One hundred and thirteen patients with PICH who received acute recovery care at two different hospitals located in the east region of Malaysia participated in this study. The change, loss or impairment of physiological and psychological function’s impact from a neurological deficit that resulted from intracerebral haemorrhage was viewed as a stress stimulus for individuals (Davis, 2015; Miller, et al., 2010; Leung, et al., 2010 and Oh &Seo, 2010; Dalvandi et al., 2010). In this study, primary intracerebral haemorrhage is defined as bleeding that occurs directly in the brain parenchyma in the absence of secondary causes, such as vascular malformation, vasculitis, moyamoya disease, aneurysm, cortical vein/sinus thrombosis, neoplasm, trauma, postoperative event,
hyperviscosity syndrome, haemorrhagic diathesis or ischemic stroke (Hill, Silver, Austin, & Tu, 2000).

Adaptation after experiencing PICH is perceived as a process through which patients gain independence in performing functional activities, such as self-care activities, mobility, communication, and social interaction, during the recovery phase. Adaptation based on Roy Adaptation model was determined using Functional Independence Measure (FIM) tools. The first way of adaptation is patient adapting in physiological dysfunction that cover in person’s ability in self-care activities, mobility, self-management of bowel and bladder elimination. The second way of adaptation is adapting in self-concept that cover in psychological functions and through the ability to communicate, in remembering and adapting in role function and interdependence mode such as participate in social activities, problem-solving and the ability to make decisions.

Early adaptation is defined as a patient’s response to the physiological, psychological, and social disability resulting from PICH stroke, whereas long-term adaptation is the outcome gained by PICH patients’ achievement of functional recovery during the rehabilitation phase. The adaptation phase in this study was divided into two phases. The early phase refers to the time of hospitalization after surviving the critical period, whereas the long-term recovery phase occurs at home. Positive adaptation at the early and long-term phases refers to the process by which a patient shows positive recovery outcomes towards stroke disability and regains the ability to perform functional activities with minimal dependence on helpers. Positive adaptation outcomes at three months are perceived as a patient’s ability to recover from stroke problems and to function in such activities as self-care, mobility, communication, and social interaction. The finding of this study concurred with suggestions from a previous study, which stated that to achieve positive adaptation to stroke-related disabilities, one has to adjust to physical and
cognitive deficits, overcome limitations to function in activities, and control one’s life effectively (Ostwald, et al., 2008).

5.3 Early adaptation

The effect of PICH depends on the severity of the injury and the essential functions that are affected, such as cognition, communication, and physical function. This study revealed that in the acute recovery phase, the majority of PICH patients were in-adaptive in responding to the sudden stroke-related disabilities. Results show that most PICH patients had scores in the lower categories of early adaptation to function in activities of daily living. This demonstrates that more than two-thirds of patients were highly dependent, whereas almost a quarter of them were in the moderately dependent category during the early recovery phase post PICH. In other words, almost 90% of PICH patients exhibited negative early adaptation. This finding indicates that in the early inpatient recovery phase, most of the patients was unable to be independent in performing functional activities and exhibited deteriorated cognitive performance. PICH was reported by several studies to be associated with severe physical, psychological, and social consequences for patients, as their ability to perform their activities, to communicate effectively, to participate in social activities without assistance, as well as causing immobility, changes in emotional status, and inability to cope with the sudden disability (de Palva, Silva, Valadares, Valente, 2012; Jammal, McInnes, Markus, Fauk et al., 2011; Toyoda, Steiner, Epple, Kern et al. Oh &Seo, 2010; Miller, 2010; Norman 2014; Rathor et al., 2012; Dalvandi et al., 2010; Leung et al., 2010; NINDS, 2011).
5.3.1 Predictors of early adaptation

The finding of this study found that there are factors positively or negatively affect the ability of PICH patients to adapt with their limitations or disabilities in terms of participating in functional activities. In the early phase post PICH, female patients with higher scores in neurological deficit, bleeding in the intracerebral at non-lobar areas of the brain, lower stroke knowledge and respiratory complications at the acute phase had lower abilities to adapt to functional disabilities in the acute phase post PICH. This result concurred with Jammali, et al. (2011), who found that an increased degree of dependency and reduced physical health status among ICH or haemorrhagic stroke patients were related to the severity of neurological deficits and female gender.

5.3.1.1 Gender (female)

This study found that PICH occurs more often in men (58.4%) than in women (41.6 %), and above half (64.6 %) of the patients were below 60 years of age. Female gender was associated with early adaptation to stroke-related functional disability. This result indicates that being a female was correlated with a lower adaptation score relative to sudden stroke disability compared with being a male. The finding revealed that females reported a score lower in the ability to participate in self-care activities, to manage bowel and bladder effectively, to perform movement and transfer, and to communicate effectively. This finding is consistent with a previous report that patients with PICH tended to be male rather than female. However, female patients reported low survival (Zhou, Zhang & Arima et al., 2014; Al-Khaled et al., 2014; Yesilot, Koyuncu, Coban, Tuncay & Bahar 2011). The reasons for the poorer early adaptation and dependence to function among females in this study are worse clinical status upon admission and less
social support than males. In terms of clinical status, being a female was associated with poor physical health after stroke. Female patients were unable to cope with the disabilities and frequently depended on family caregivers to perform self-care activities, such as eating, toileting, bathing, moving, and transferring.

This study found that women who survive a stroke have less favourable outcomes than their male counterparts. Poorer functional abilities occur because of lower physical function, thinking, language, and energy. For example, Almborg, Ulander, Thulin, and Berg (2010), Carod–Artal and Egido (2009), and Gargano and Reeves (2007) reported that females had less health-related quality of life (HRQoL) than men in terms of physical functioning. Kim, Lee, Roh et al. (2010), in their study on patients with mild neurologic deficits, found that poor outcomes were experienced by more females than males at discharge (Carod–Artal, & Egido (2009). Other studies reported that females were likely to have physical impairments and limitations in their ADL and less likely to be discharged for home than males with the same condition. This is because of the higher proportions of females with severe disability at discharge and at follow-up (Jammali et al., 2011).

Other reasons were weak social support among female stroke patients. Zhou, Zhang, Arima and Zhao (2014) found that women are more likely to be dependent in the early phase and had a higher risk of dependency at three and six months after ICH. The worse outcome in females is attributed to having severe ICH upon admission. According to Jaracz, Fudala, Gorna, and Kzubski (2014), family caregivers play an important role in a loved one’s recovery from stroke and are required to provide care, to help in daily living activities, to participate in rehabilitation, to give emotional support, and to motivate the patient in his or her recovery. In this study, the delayed early adaptation among female stroke patients can be attributed to low family caregiver support, especially from their
spouses. In our observation, the stroke patients in this study were not cared for by their spouses. The care responsibilities were given to the children, especially their daughters. This finding is consistent with that by Daniel, Wolfe, Busch, and Mc Kevitt (2009), who noted that many stroke patients experienced family conflict and marital problems after stroke. These problems include separation, deterioration in the spousal relationship, and negative impact on children who are caregivers. Further, Weimar, Ziegler, König, and Diener (2009) and Almborg, Ulander, Thulin et al., (2010), found that low adaptation post stroke was among females with less of social support.

5.3.1.2 Physical dysfunction

In relation to the physical domain of adaptation, the majority of patients were not independently able to perform activities on their own and required a helper to perform self-care activities, such as eating, grooming, bathing, dressing the upper and lower body, and cleaning the body by themselves. They also showed an inability to manage their own bladder and bowel and to transfer from one place to another. Dalvandi et al. (2010) and Oh and Seo (2010) stated that the deficits exhibited by PICH patients had a negative impact on their physical, thus affecting their daily roles and self-management. Adaptations to the physical dysfunction post PICH were depended on several variables such as age of the PICH stroke patients, severity of neurological deficits immediately after ICH, location of brain lesion or development of post stroke complications.

5.3.1.2 (a) Severity of motor neurological deficits

Severity of neurological deficits was the strongest factor that affects the ability of patients to adapt in the early phase post PICH, $\beta =1.91$, 95% CI [ -2.646, -1.189]. Severities of
neurological deficit contribute as stimuli to alter the ability of individual function as normal human being. This result indicates that those who have higher NIHSS scores had a decreased ability to adapt to stroke-related disabilities during the acute recovery phase post PICH. Previous studies reported that neurological function, as measured by the NIHSS, is usually scored during acute-care hospitalization and is used as a predictor of discharge (Ostwald, 2008). The disabilities resulting from sudden neurological deficits included facial palsy (77.9 %), motor function of left arms (63.7%) and legs (65.5 %), motor function of right arms (42.5%) and legs (45.1%), and dysarthria (75.2 %). This finding indicates that most patients were diagnosed as having left hemiparesis with facial palsy, dysphagia, aphasia, apraxia, and dysarthria. The finding indicates that right intracerebral haemorrhage or stroke in the brain presents as left-sided hemiplegic or hemiparesis (NINDS, 2008).

The finding is confirmed that the right intracerebral haemorrhage or stroke in the brain indicates left-sided hemiplegic or hemiparesis. Conversely, a person with a left intracerebral haemorrhage or stroke in the brain will show deficits on the right side of the body (NINDS, 2008). This finding is consistent with that of Dalvandi et al. (2010), Aries and Hunter (2015), Skolaruset al. (2015), and Green and King (2010), who reported that hemiplegia, hemiparesis, sensation dysfunction in the limbs, and balance and coordination impairment caused a deficit in mobility and altered self-management, such as ADL, among ICH patients. In fact, a patient experiences haemorrhagic stroke usually has difficulty in participating in functional activities as a result of the diminished motor cortex in the frontal lobes or the lower parts of the brain, such as the cerebellum, which controls balance and coordination (NINDS, 2008).

The physical deficits of post PICH predicted lower physical activities related to daily living, and the majority of patients demonstrated higher dependency on a helper to meet
basic needs in the early phase post PICH. The most difficult tasks reported were self-care activities (grooming, bathing, dressing the upper and lower body, toileting), control of urinary and bowel movement, and transfer and locomotion (i.e., walking or using a wheelchair or climbing the stairs). The findings on physical disabilities resulting from stroke are comparable to many other relevant studies. For example, Almborg, Ulander, Thulin & Berg, (2010) stated that nearly two third of patients who experienced stroke exhibited a higher neurological deficits which translated to diminished motor strength largely associated with physical disability. Another study also found that about half of the stroke patients had walking disability as well as mild to severe inability to perform self-care functions among others, bathing, attending to toilet needs, walking, and climb up or going down stairs, which necessitated considerable or total dependence on others (Pandian & Arya, 2013). Moreover, Oh & Seo (2010) reported that functional ability increased at various times after ICH. Comparing with the finding of study done at University of Malaya Medical Centre (UMMC) approximately 50% of patients were detected to have motor deficit, also found that the most common motor deficits for primary ICH were weakness (61.8%) and language disorders were present in 45% of patients. Results of this study were compared with the result of study done by Bahou (2009) that found prevailing clinical manifestations of patients in their study were hemiparesis/plegia, impaired level of consciousness and headache/vomiting (Sia, Tan, Waran, 2007).

The conclusion was also compared to the findings of several studies administered by Aries & Hunter (2015), Skolarus et al. (2015), Green & King (2010), Dalvandi, et al. (2010), Leung et al. (2010), and Oh & Seo (2010). They reported that stroke patients were more likely to be dependent in self-care and mobility activities and in most cases to require help with bathing/showering and dressing. Such patients were said to have lower
physical capacities, as well as limitations in their daily physical activities. The loss or limitations regarding physical activities result from damage to the lower part of the brain, the cerebellum, which affects the body's ability to coordinate movements, further associated with body posture, walking, and balance issues. The negative impact on the physical and cognitive abilities of a person after PICH was compared to the findings of Dalvandi et al. (2010), Mollaoglu, Fertelli and Tuncay (2010), Pandian & Arya (2013), Norman (2014), and Rathor et al. (2012). These researchers reported that hemiplegia, hemiparesis, sensational dysfunction in the limbs, balance, and coordination impairment, which caused mobility deficit and alter the self-management capacity, such as ADL, are all common among ICH patients (NINDS, 2008).

The result of this study shows that those who decreased the ability to adapt with stroke-related disabilities during acute recovery phase post PICH were among those who have increased score of NIHSS. This finding was compared with Glymour, Berkman, Ertel, et al., (2007) that was examined the relationships between physical, cognitive, and social participation outcomes across sub populations of stroke survivors on the basis of cortical involvement and lesion lateralization. The result revealed that physical deficit post stroke predicted physical performance, activities of daily living, and IADL independence.

A better rehabilitative in physical performance ability prognosis and higher neurological score at acute was associated with the mechanisms for neurological deficit that may be caused by brain compression. As the hematoma resolves, neurological functions recover and functional status improves but if hematoma not resolves the neurological functions will not recover and functional status were not improved.
5.3.1.2(b)  Location of brain lesion

The second factor affecting physiological domain of adaptation is the location of the brain lesions. As noted earlier, primary intracerebral haemorrhage is defined as bleeding occurring directly into the brain parenchyma (Hill, Silver, Austin & Tu, 2000).

In the present study, the analysis showed that basal ganglia is the most common area (49.5%), followed by bleeding of the thalamus in the non-lobar area (14.1%), in the lobar area (11.5%) of the brain, and reveals that about 65.5% of the bleeding occurs in the right hemisphere of the brain. It indicates that brain lesion in the non-lobar area significantly affects the physiological domain of adaptation, especially the ability to perform functional activities in the early phase of post-PICH. Hypertension was found to be the most important risk factor for spontaneous intracerebral haemorrhage, where’s the majority of patients (95.6 %) in this study had a past health history of hypertension. According to Liebeskind and Kulkarni et al. (2011) stated that the usual mechanism of primary intracerebral haemorrhage is the leakage from small intracerebral arteries damaged by chronic hypertension. The result of this study consistent with the previous study that found the most common location of ICH on CT brain in hypertensive patients was in the BG (61%), 32 with and 39 without intra ventricular extension (IVE), the majority (54 out of 61) were related to hypertension. Similar to previous study also found that lobar hematomas in only 24 out of 100 patients (24%) (Lo Presti et al., 2014; Bahou, 2009). In Malayisa, previous study was reported that hypertension was the most common cause of ICH, accounting for 71.5% to 84.8% of patients, especially in individuals who are non-compliant with antihypertensive medication and those who are smokers (Sia, Tan, & Waran, 2007).
Patients with intracerebral bleeding in the non-lobar area are associated with the lower level of early adaptation. Intracerebral haemorrhage in the non-lobar area significantly contributes to worse quality of life (Christensen, et al., 2009). Compared with many studies previously that have found that the location of the brain lesion is among the factors affecting functional ability (Lo Presti et al., 2014; Patel et al., 2007; Christensen, et al., 2009). However, patients with right-side intracerebral haemorrhage or lesion had poor quality of life compared to those with left-side intracerebral haemorrhage (NINDS, 2008; Haan et al., 1995). Right-sided lesions are additionally associated with neglect, anosognosia, and spatial disorientation, which may have a devastating effect on social functioning and thus on HRQOL. Patients may also have problems with orientation, self-consciousness, physical performance, and prosody. Patients with more severe supratentorial strokes, be it infarct or haemorrhage, experience poorer quality of living in all existential domains except psychological distress (NINDS, 2008; Haan et al., 1995). There was an associated with between stroke severity and physical and social participation (Ostwald, Swank, & Khan, 2008).

Many studies have found that the location of the brain lesion is among the factors affecting functional ability (Lo Presti et al., 2014; Patel et al., 2007; Christensen, et al., 2009). The location of the brain lesion not only affects motor functional outcomes such as locomotion, mobility, and self-care but also non–motor ones like sphincter control and social cognition. For example, large cortical or sub cortical lesions cause not just degeneration in the corticospinal tract, but decline in global neuronal activities as well. Such declines in the global neuronal activities following diffuse brain damage could further impair the cognitive function (Lo Presti et al., 2014). The inability to perform self-care activities in daily life is associated with the lesion in the left side of the brain, while people who have speech problems are usually among the patients with right-side
brain lesion. (Oh, 2010; Leung, 2010; Dalvandi, 2010; Miller, 2010). Further, patients with right-side intracerebral haemorrhage or lesion had poor quality of life compared to those with left-side intracerebral haemorrhage (NINDS, 2008; Haan et al., 1995). Poor capacity to adapt with stroke-related disabilities among patients with right-side lesion is due to neurological deficits such as neglect of the left body space, insufficient awareness of the disease, and spatial disorientation. Right-side brain lesion can also cause communication problems. A haemorrhage that occurs in the left hemisphere may cause the patient to move slowly and cautiously, and to experience right-visual-field deficiency. Right-sided lesions are additionally associated with neglect, anosognosia, and spatial disorientation, which may have a devastating effect on social functioning and thus on HRQOL. Patients may also have problems with orientation, self-consciousness, physical performance, and prosody. Patients with more severe supra-tentorial strokes, be it infarct or haemorrhage, experience poorer quality of living in all existential domains except psychological distress (NINDS, 2008; Haan et al., 1995). Christensen et al. (2009) stated that hypertensive people with intracerebral haemorrhages in the lobar area suffer from bad quality of life too.

The most common reason for intracerebral bleeding in the non-lobar area is hypertension. The findings of this study show that hypertension is among the most considerable risk factors for spontaneous intracerebral haemorrhage. Around 95.6% of the patients in this study have hypertension history. The results of this research determined that the most common location of ICH on CT brain is among hypertensive patients - in the BG up to 61%. The vast majority (54 out of 61) cases were related to hypertension. Literature review by Liebeskind, Kulkarni et al. (2011) states that the usual mechanism of primary intracerebral haemorrhage is thought to involve leakage from small intracerebral arteries damaged by chronic hypertension.
Christensen et al. (2009) stated that hypertensive people with intracerebral haemorrhages in the lobar area suffer from bad quality of life too. The most common reason for intracerebral bleeding in the non-lobar area is hypertension. The findings of this study show that hypertension is among the most considerable risk factors for spontaneous intracerebral haemorrhage. Around 95.6% of the patients in this study have hypertension history. The results of this research determined that the most common location of ICH on CT brain is among hypertensive patients - in the BG up to 61%. The vast majority (54 out of 61) cases were related to hypertension. Literature review by Liebeskind, Kulkarni et al. (2011) states that the usual mechanism of primary intracerebral haemorrhage is thought to involve leakage from small intracerebral arteries damaged by chronic hypertension. In fact, stroke patients usually have difficulty to do and participate in functional activities, occurs as a result from diminish of the motor cortex in the frontal lobes of the brain or lower parts of the brain, such as the cerebellum, which controls balance and coordination (NINDS, 2008). The most difficult tasks reported were; self-care activities (grooming, bathing, dressing upper and lower body, toileting), to control of urinary and bowel defecation, to transfer and locomotion (to walk or using wheelchair or to claim the stair). Damage to a lower part of the brain, the cerebellum, can affect the body's ability to coordinate movement, a disability called ataxia, leading to problems with body posture, walking, and balance (Rathor et al., 2012; Morgenstern et al. 2010; NINDS, 2008).

5.3.1.2 (c) Respiratory infection in acute phase

The third predictor contributes as factor affecting physiological domain of adaptation during early phase post PICH is post stroke complications. The most complications which occurred in the first and second weeks after PICH stroke were respiratory
infections (46.9%), urinary infections (33.6%), and shoulder pains (17.7%). Furthermore, respiratory infections significantly inhibited positive early adaptation to sudden stroke disabilities ($p < .001$) with coefficient, $\beta = -16.71$, 95% CI [-26.205, -7.227]. The results indicated that those who experienced respiratory infections during the acute phase had lower levels of early adaptation towards independence in performing daily routine activities. The reason for the respiratory infections during the early recovery phase is related to the severity of neurological deficits such as hemiparesis, facial palsy, dysphagia, or altered state of consciousness. The severity of the admission stroke was identified as the most important risk factor for developing complications, including respiratory problems (Kumar, Selim and Caplan, 2010; Johnson, Svendsen, Ingeman, 2012; Indredavik, Rohweder, Naalsund, Lydersen, 2008). Respiratory infections and pneumonia have been reported to occur frequently during hospitalization and are associated with poor long-term stroke outcomes (Kumar, Selim and Caplan, 2010; Johnson, Svendsen, Ingeman, 2012; Kuptniratsaikul et al., 2009; Stott, 2009; Vermeij et al., 2009). It was also reported that respiratory infection was the most complications occurred during the first four days after admission (Indredavik, Rohweder, Naalsund & Lydersen, 2008). In addition to that, the results of previous studies stated that post-stroke problems were associated with the occurrence of pneumonia and poor stroke outcome during the three-month recovery stage on all outcome measures (Kuptniratsaikul et al., 2009; Stott, 2009; Vermeij et al., 2009).

5.3.1.3 Adaptation in the cognitive dysfunction

In the cognitive domain of adaptation, the findings indicated that more than half of patients scored low in terms of the ability to communicate effectively, participate in social activities, solve problems, and make decisions at two-week post ICH. Dalvandi et al.
(2010) and Oh and Seo (2010) stated that the deficits exhibited by PICH patients had a negative impact on their physical and cognitive abilities, thus affecting their daily roles and self-management. The cognitive domain of adaptation of this study is deals with psychic and spiritual integrity, including beliefs and feelings, and deals with interpersonal relationships (Roy, 2009; Ordin, 2012). The assessment of cognitive domain of this study covers in terms of self-concept mode (psychological) of adaptation. According to many researchers, cognitive dysfunction occurs due to the inability to communicate effectively or the loss of ability to think, remember or be involved in problem solving (Skolarus, 2014; Taylor, Todman & Broomfield et al, 2011; Oh, 2010; Leung, 2010; Dalvandi, 2010; Vanhook, 2009).

5.3.1.3(a) Adaptation in self-concept (psychological) mode of adaptation

Deficits experienced by PICH patients in this study had a negative impact on cognitive abilities. This finding is consistent with that of Dalvandi et al. (2010), Aries and Hunter (2015), Skolarus et al. (2015), and Green and King (2010), who reported that physical deficits experienced by PICH patients in this study had a negative impact on cognitive abilities.

In addition to displaying cognitive dysfunction, the result shows that 29.2% of the patients have changed in terms of consciousness state, 42.5% are unable to answer the question, and 38.1% are unable to respond to the command. A study conducted by Sia, Tan, and Waran (2007) also found that the loss of consciousness is one of the most common clinical characteristics of primary ICH (58.5%) and is associated with reduced ability to adapt to functional cognitive activities. Regarding the state of consciousness and cognitive deficit (language and dysarthria) of PICH patients, Bahou (2009) also discovered an impaired
level of consciousness and suggested that neurological deficits which patients experienced can lead to certain losses or disabilities.

Cognitive dysfunction was found to be associated with the inability to perform self-care activities, to take part in community occupations, and to depend on others for functional activities. Janice (2006) suggests that high priority of focus should be given to patients with limitations or malfunctions in their cognitive abilities in order for improved communication adaptation, social participation, and total functional recovery to occur.

Skolarus et al. (2015) reported that stroke patients also suffered from aphasia or dysarthria and exhibited poorer performance on word recollection. Their clock drawing abilities were impaired as well. Similarly, a local study by Sia, Tan and Waran (2007) also discovered that loss of consciousness was one of the most common clinical features for primary ICH (58.5%) associated with reduced ability to adapt to functional cognitive activities.

5.3.1.3(b) Psychosocial domain of adaptation

In this study, psychosocial domain of adaptation covers the ability of individual with stroke disability performed their role function to performed activities of daily living and able to participate in social activities that cover the ability to interact with others, solving the problems and make a decision making. In this study, the finding revealed that nearly a majority of patients have more difficulties with social interaction, memory and decision making, and show a high dependence on a helper. Psychosocial dysfunction (role function and interdependence mode of adaptation) was found to be associated with the inability to perform self-care activities, to take part in community occupations, and to depend on
others for functional activities. The finding of this study consistent with finding by Bahou (2009), who found that the prevailing clinical manifestations such as impaired level of consciousness and neurological deficits among ICH patients can lead to problems of losses or disability and needs of others to help in functional activities.

In this study, the findings revealed that 75.2% of the patients experienced symptoms of dysarthria and 63% faced language inadequacy. Further, language and dysarthria significantly decreased the total score of neurological status assessed using NIHSS and affect the cognitive domain of adaptation. The dysarthria and language deficit issues caused more than half of the patients to exhibit inferior abilities to communicate effectively, participate in social activities, solve problems, and remember important elements of their everyday. These results are consistent with the ones reached in the studies of Skolarus (2014), Taylor, Todman, Broomfield et al. (2011), Oh (2010), Leung (2010), Dalvandi (2010), and Vanhook (2009), who found that, in terms of cognitive ability, some stroke patients were unable to communicate effectively or lost their ability to think, use their memory, or be involved in problem solving. Cognitive deficit (language and dysarthria) which patients experience can lead to certain losses or disabilities (Gillespie et al., 2015). Skolarus et al. (2015) reported that stroke subjects also suffered from aphasia or dysarthria and exhibited poorer performance on communication.

5.3.2 Summary

The findings revealed that those female patients with the higher score of neurological deficit, bleeding intra cerebral at non lobar area in the brain, lower stroke knowledge and having respiratory complication at acute phase were associated with the lower abilities to adapt with functional disabilities in acute phase post PICH. A better understanding of the
factors that affect the process of adaptation is essential to develop an adequate stroke education program and specific rehabilitation interventions for patients with strokes related to bleeding intra-cerebral before they are discharged.

5.4 Improvement functional adaptation at three month post PICH

In this study, the result indicates that at three-month follow-up, the majority of PICH patients were able to adapt with stroke-related disabilities and showed high independence in performing functional activities. At three months post PICH, patients exhibited high adaptive outcome in physical adaptation, specifically routine self-care activities, control of bladder and bowel, and mobility.

This study found that there was significant difference in terms of early adaptation in response to stroke-related disability during acute recovery phase and at three months adaptation outcome, \( t (112) = -15.3, p < .05 \) range from 18 to 126. The result indicated that the mean (SD) score improved from 48.1 (30.1) at early phase to 93.2 (34.79) at three months post PICH.

The result obtained shows that in early acute phase after PICH about 64.6% of the subjects suffered with the sudden functional disabilities in a physical and cognitive domain of individual well-being. Compared with of adaptation outcome at three months, the finding shows that among 63.7% of subjects able to adapt with the disability and gain ability to do functional activities in a physical and cognitive domain at three months. However, there were 41 (36.3%) who still did not achieve their ability to do functional activities and still required moderate to full help or assistant from caregivers. This finding was confirmed in the previous finding by Oh & Seo, (2010), reported that the ability to gain
functional activities was significantly increased, the ability to function in activities improved between three and nine months after ICH.

This study found that recovery of physical and cognitive abilities occurred within three-month post PICH. During early phase, rehabilitation was instituted and continued until long term. Thus, this confirmation of rehabilitation helped in their adaptation. Accordingly, a significant improvement of their physical and cognitive functions was demonstrated within three months post PICH compared with previous early adaptation status. Majority of the patients gained adaptation with stroke-related physical disability, and showed minimal dependence on caregivers in performing routine self-care activities, control of bladder and bowel, and relative mobility such as walking. In terms of cognitive domain of adaptation, PICH patients with communication and social disabilities exhibited increased independence and consequently, lower dependence on their caregivers.

The results of this study were compared with previous finding, for example, Macco et al., (2006) and Samsa et al (2007) stated that physical and cognitive dysfunction post ICH significantly improved rapidly in between 3 to 9 month, while Oh & Seo, (2010) found that physical and cognitive dysfunction post ICH significantly had improvement during one to six-month post ICH. The finding of this study confirmed the study that predicted a functional outcome in patients with primary intracerebral hemorrhage using FUNC score (a functional outcome risk stratification scale) that reported, at 90 days post PICH, 162 (26%) patients achieved independence (Rost, et al., 2008).

Another study showed that a similar result from this study by Rost et al., (2008) in predicting functional outcome in patients with primary intracerebral hemorrhage using FUNC score (a functional outcome risk stratification scale). It was found that at three months, 162 (26%) patients achieved independence (Rost, et al., 2008). The result of this
study also compared with the study done by Leung, Cheng, (2010), showed that there were significant differences between the admission and discharge FIM scores.

This indicates that the patients showed significant functional improvement after the rehabilitation training. Rehabilitation programs were significantly able to improve functional recovery and able to return the stroke survivor to society with the abilities to function in cognition and functional activities (Miller, 2010; World Health Organization [WHO], 2010). Similarly, Rost et al. (2008) using FUNC score that is, a functional outcome risk stratification scale reported that 162 or 26% of patients with primary intra-cerebral haemorrhage achieved independence within three months.

With regards to adaptation in the physical recovery domain, the majority of the patients suffered a high degree of inability to adapt to the sudden disability and were unable to perform routine physical activities and basic functions. By contrast, within three months post PICH, patients exhibited high adaptive outcome in physical adaptation, specifically routine self-care activities, control of bladder and bowel, and mobility. The result reveals that a majority of patients gained adaptation with stroke-related physical disability and, accordingly, showed moderate dependence on caregivers. The findings on physical disabilities resulting from stroke are comparable to many other relevant studies. Study also found that about half of the stroke patients had walking disability as well as mild to severe inability to perform self-care functions among others, bathing, attending to toilet needs, walking, and climb up or going down stairs which necessitated considerable or total dependence on others (McNaughton, McPherson, Taylor et al., 2003; Shen, Cordato, Chan et al., 2006). Moreover, Oh & Seo (2010) reported that functional ability increased at various times after ICH.
Moreover, the improved physical abilities resulting from stroke over time were comparable with other studies. Mocco et al. (2006) & Samra et al. (2007) likewise, stated that improvement in functional activities post stroke significantly happens in between one to three months, although his tended to reach the plateau at nine months.

5.5 Predictors of Later Adaptation

In the regression model, six predictors determined significantly as factors affect later (three month) patients ability to gain adaptation in functional activities. The predictors includes age of the PICH patients, total functional ability at baseline (FIM early), total stroke knowledge, urinary tract infection at three months post ICH, total depression at three months post ICH and ICH treatment. The finding was consistent with the previous study found that patients’ age, pre-training functional level during early admission at hospital, and cognitive abilities measured at admission successfully predicted functional gain as measured by the FIM scores (Leung, et al., 2010). The finding is compared with the previous finding that reported baseline demographic and clinical characteristics (age, initial neurological deficit, systolic blood pressure, ICH volume, and deep ICH) and neuro worsening during the acute phase of treatment to all be independent predictors of poor HRQOL (Christensen, Mayer, & Ferran, 2009).

5.5.1 Adaptation to physical dysfunction at three month

In the physical domain, the result revealed that PICH patients gained independence to participate in performing self-care activities of daily living (eating, grooming, bathing, dressing upper and lower body and toileting) in bladder and bowel management, in mobility and in locomotion. The mean (SD) value for physical (motor) activities of
Adaptation Outcome was 65.0 (28.0) range from 13 to 91. The result revealed that at three-month majority of subjects were gaining adaptation with stroke physical disability, they showed moderate dependence on caregiver to perform self-care activities of daily living, to control the sphincter of bladder and bowel, to transfer or walk. In comparison to the study by Green (2010) also reported patient perceived to improve their quality of life during long-term recovery phase, particularly in the early recovery period. During this period, they overcome the physical disability by restructuring of daily living routine to decrease the need of assistance from family.

With regards to adaptation in the physical recovery domain, the majority of the patients suffered a high degree of inability to adapt to the sudden disability and were unable to perform routine physical activities and basic functions. By contrast, within three months post PICH, patients exhibited high adaptive outcome in physical adaptation, specifically routine self-care activities, control of bladder and bowel, and mobility. The result reveals that a majority of patients gained adaptation with stroke-related physical disability and, accordingly, showed moderate dependence on caregivers. The findings on physical disabilities resulting from stroke are comparable to many other relevant studies. Study also found that about half of the stroke patients had walking disability as well as mild to severe inability to perform self-care functions among others, bathing, attending to toilet needs, walking, and climb up or going down stairs which necessitated considerable or total dependence on others (McNaughton, McPherson, Taylor et al., 2003; Shen, Cordato, Chan et al., 2006).

This finding is consistent with the literature, the better a spouse copes with psychological and physical expectations of a disability related to stroke, the better the outcome the patients will have (Kautz & Horn, 2009). It is because life after having disability resulting from stroke is usually difficult. Lack of physical and cognitive function, limitation in
social interaction, experience of post stroke complication, emotional and stress, stroke patients show high dependency on other to help them, especially spouse. Spouses were expected to provide competent physical care for their loved ones. PICH patients with stroke increasingly depend upon their spouse for this continuing care, particularly when they are experiencing advanced deterioration of health and disability after stroke. Spouse or caregivers must learn to help with activities of daily living (ADLs), such as bathing, dressing, grooming, feeding, and toileting. Many research findings stated one family member who needs inpatient acute recovery care and rehabilitation demand support from all family member especially spouse to help them in participating in performing functional activities in all aspects of life (Kautz & Horn, 2009; Dalvandi et al., 2010; Oswald’s (2008).

This result can be used as strategies in promoting carer to involved in providing care for their family member who requires inpatient rehabilitation post PICH. This result will be used as new intervention of involvement family carer of disability patient starting from hospital setting to home and as strategies to help family carer to be able to provide a good care for stroke patient and to ensure carer can cope with change of the patient resulting from PICH. As stated in literature review, it would be necessary to include the patients and caregivers at the team meeting while maintaining the existing time constraints and to establish a baseline to the level of participation that could be achieved. Once the feasibility could be established of having the patient present and able to address these questions, one could begin to increase the degree to which entire approach could be implemented (Ozer 2000). Disability and post stroke complication such as infection and depression resulting from stroke contribute as factors affecting recovery process and also can alter life satisfaction and reduce good family relationship. This finding suggests that it is important to help stroke patients and their family member to adapt with stroke-related
problem and to enable patient with stroke to become reintegrated into their family and the community.

5.5.1.1 Age

In this study, age was also shown to be a significant inverse predictor of adaptation in physical improvement. There was a significant negative relationship between age and later (3 months) adaptation after PICH. It indicates that, younger age was significantly related with better long-term adaptation. The analysis revealed that decrease in one year of age of PICH patients was associated with an increase of FIM score, representing better long-term adaptation. This finding is consistent with previous finding by Denti et al. (2008), stated younger’ age patient was a significant predictor of functional improvement. Moreover, age was negatively related to physical functioning where younger patients had better physical function. A higher improvement in adaptation to stroke-related disability will also likely increase social participation.

Individuals who have higher incidence of survival following a stroke were among those who were under 80 years old as compared to those over 80 years of age (Duncan, 1994, Almborg, et al., 2010). In addition, elderly ICH patients showed the poorer outcome, including higher in-hospital mortality and moderate or severe neurological deficit at the hospital discharged, than younger patients with intracerebral haemorrhage. Saloheimo et al. (2006) found the predictors for long-term (> 6 months) recovery after ICH includes age, the level of consciousness, the severity of disability, and hematoma volume and location. In another study, patients’ age, pre-training functional level, and cognitive abilities measured at admission successfully predicted functional gain as measured by the FIM scores (Leung, et al., and 2010).
Furthermore, Qureshi, Mendelow, & Hanley (2009) found that prevalence of ICH was significantly higher among young and middle-aged groups. It commonly occurs among the blacks compared with the whites of the same age. The difference was mostly found in the incidence of deep intracerebral haemorrhage, most prominent in young and middle-aged people (Qureshi, Mendelow, & Hanley, 2009).

To summarize, patients aged above 60 years with intracerebral haemorrhage showed the poorer outcome, including higher in-hospital mortality and moderate or severe neurological deficit at the hospital discharged, compared with younger patients with intracerebral haemorrhage.

5.5.1.2 Functional status at early phase

A positive significant relationship was found between early and later (three months) adaptation outcomes. An increase in one unit of the early adaptation in the acute score was associated with the increased later (three month) adaptation outcome score by $\beta = .40$, 95% CI [0.25, 0.55]. The total FIM score at the early phase post-stroke onset was associated with an influence on the improvement in the total FIM score at the long-term rehabilitation phase (Hinkle, 2006). The finding was also compared with one by Fong, Chan, and Au (2001), which described a significant association of motor and cognitive deficits with functional participation among stroke patients during stroke rehabilitation. According to Green et al. (2010), patients reported an improvement in perception of adaptation during the early phase post stroke. An overall improvement was found in the ability to function in physical activities and lack of need for family caregivers.
Better adaptation to participate in performing functional activities (physical and cognitive) during the acute recovery phase was associated with gaining positive achievement in later (three months) adaptation outcomes. According to Petrina (2011), a patient who has neurological deficits, such as physical, psychological and social, resulting from stroke may regain the ability to participate independently in functional activities, even if some degree of residual physical alteration remains through rehabilitation training. The analysis also proved that recovery is related to the severity of neurological deficits and low dependence on caregivers in terms of performing functional activities during the recovery phase immediately after and at three-month post PICH. The result revealed significant negative correlations between later (three months) adaptation outcomes of living with stroke disability at three months and the severity of neurological deficit (NIHSS) \((r = -0.419, p < 0.05)\). The result indicated that higher adaptation to participation in functional activities at three months post PICH was significantly related to a lower severity of neurological deficit (NIHSS) determined at the early phase. The findings of this study are consistent with those of a previous study that examined the correlation between the severity of neurological deficits (NIHSS) and functional disability using FIM. This previous study revealed that the degree of alteration in body function related to intracerebral haemorrhage has a direct relationship with the ability to participate in functional activities, whether upon admission or discharge (Roth et al., 1998).

However, according to Roth et al. (1998), haemorrhagic stroke patients demonstrated recovery of body dysfunction faster than those with other types of stroke. Haemorrhagic stroke patients who were observed to gain a high level of participation in functional activities at three months are among those who exhibited a lower ability to perform functional activities at the acute phase \((r = 0.606, p < 0.05)\). The result indicated the existence of relationships between a lower score relative to participation in functional activities at the acute phase and the ability to adapt to disability at three-month post
PICH. This finding confirms the result of a previous study, which stated that positive early and later (three month) adaptation is related to the degree of severity of neurological dysfunction after ICH onset (Hinkle, 2006). In other words, the severity of neurological deficits attributed to ICH is related to the prognosis and the ability to function in daily activities.

The reason behind the significant association between early adaptation in response to stroke-related disability and long-term adaptation outcome is the recovery of neurological deficit. Leung et al. (2010) reported that recovery in the first two months post stroke was determined more by spontaneous neurological recovery and less by the impact of therapy. This is particularly applicable to recovery from haemorrhagic strokes. Neurological functioning could be recovered, particularly when the haematoma has resolved and the oedema has subsided (Kwakkel et al., 2004; Schepers et al., 2008). The specific pattern of recovery of haemorrhagic stroke patient can be described as a quick rebound of functions after the haematoma has resolved, thus laying the path for greater functional gain in patients with low FIM scores upon admission (Kelly, et al., 2003). Moreover, ICH patients had significantly greater recovery than cerebral infarction patients with stroke of similar severity.

However, an inverse relationship was found between pre-training functional level and functional gain after training, thus suggesting that haemorrhagic stroke patients who have poor baseline functional levels may indeed be capable of showing progress in rehabilitation training (Leung et al., 2010). On the other hand, low FIM scores upon admission may be associated with more room for improvement and hence allowed more room for observable treatment effects reflected as FIM gain (Leung et al., 2010).
Fong, Chan, and Au (2001) found a significant association of motor and cognitive deficits with functional participation among stroke patients during stroke rehabilitation. The present finding confirms that the assessment of physical function upon admission using FIM, which measures the extent of disability related to self-care, bowel and bladder continence, mobility and ambulation, was independently associated with significant functional disability and caused delayed discharged. However, pre-training functional level has been shown to be a significant predictor of functional improvement (Tan, Chong, Chua, Heng, & Chan, 2010). Another reason for the improvement in the ability to adapt to sudden physical disability and cognitive disability among patients is the early referral to comprehensive rehabilitation care for advanced training. The patient was given an appointment to participate in rehabilitation training. Before being discharged, the patient was also referred to a district rehabilitation centre nearest to his or her home to continue the training and rehabilitation care.

According to Green et al. (2010), patients reported an improvement in perception of adaptation during the early phase post stroke. An overall improvement was found in the ability to function in physical activities and lack of need for family caregivers.

5.5.1.3 Urinary infection at three months post PICH

In relation to post stroke complications, the descriptive analysis showed that during acute inpatient rehabilitation phase post PICH, the common complication was respiratory infection (46.9 %), urinary infection (33.6 %) and shoulder pain (17.7 %). Most complications occurred during the first and second week after PICH stroke. Compared to the development of post stroke complications at three months, the most common of stroke complications was shoulder pain (63.7%) and only 8.8 % of subject experience urinary
infection. However, the percentage of shoulder pain that occurred among the subjects revealed an increase from 17.7% in acute phase to 63.7 at three-month post stroke. In terms of deep-vein thrombosis and bedsore was rare on post stroke subject, whether during early phase inpatient hospitalization and at three months at home.

The finding is consistent with previous study revealed that the most common complications were pain (23.9%), urinary tract infection (16.0%), chest infections (11.2%), whereas deep venous thrombosis, shoulder pain, and pressure sores were each present in 2.5% of patients and reported that the most complications occurred during the first 4 days after admission (Indredavik, Rohweder, Naalsund & Lydersen, 2008). Longhorne, (2000), also reported the most complications developed within the first 6 weeks after stroke, with an early onset being seen particularly for pressure sores, pain, and infections. While compared with another study regarding post stroke complication that occurred at three months, previous study stated that during the 3-month follow-up, 82.4% experienced at least 1 complication, the most common of which was pain, which occurred in 53.3%, followed by urinary tract infection in 27.9% (Indredavik, Rohweder, Naalsund & Lydersen, 2008). Another finding stated that there also found are relatively low frequencies of the deep-vein thrombosis among stroke patients (Langhorne, Stott, Robertson, 2000).

Regression analysis revealed a significant negative relationship between urinary infections at three months and long-term adaptation. In other words, those with no evidence of urinary infection at three-month post ICH had great positive long-term adaptation outcome scores. The finding highlighted that the improvement in long-term adaptation to stroke-related disability was associated with the absence of UTI during long-term recovery and rehabilitation. As previously mentioned, being prone to UTI before urinary incontinence was reported to be independently associated with poor adaptation after stroke and is a factor of initial stroke severity that is related to long-term
outcomes of quality of life (Kumar, Selim & Caplan, 2010; Patel et al., 2007). Another study by Hamidon et al. (2003) involving patients with acute Ischaemic stroke in UKM Hospital from June 2000 to January 2001 revealed that urinary tract infection served as predictors of negative long-term outcomes. The reasons for UTI during a long-term post stroke include the stroke itself, impaired consciousness, immobility, faecal impaction, or temporary over-distension of the bladder (Doshi et al., 2003).

In preventing risk of UTI, comprehensive CBD care and observation for UTI should be conducted. Knowledge of baseline factors that predict the occurrence of UTI will also assist in the monitoring of patients and the prevention of stroke complications. Thus, comprehensive CBD care and regular observation on conditions leading to UTI are crucial in the prevention of the risk of UTI.

In our hospital setting, strategies used in the prevention of post-stroke UTI and important precautions include the avoidance of unnecessary catheterization. Other ways to prevent catheter-associated UTI include insertion in an aseptic manner, correct positioning of the drainage tubing and collection bag, and maintaining a closed system, which may all help reduce the risks of clinically significant infection. If a urinary catheter is used, the standard guideline on the management of patients with a urinary catheter should be followed and modified catheters coated with antimicrobials should be used to reduce the risk of UTI by implement of early removal. The catheter should only be changed if it begins to crack or deteriorate or if the patient has a UTI. Kumar et al. (2010) also suggested the use of antimicrobial-coated catheters or modified catheters, such as nitrofurazone-coated silicone or silver-coated latex, to minimize catheter-associated UTI.

So, the finding from this study confirmed that the most common complications during the early phase and at three-month post PICH was infections (such as respiratory infection and urinary infection), and deep-vein thrombosis and bedsore are rare occur on post stroke
subject, whether during early phase inpatient hospitalization or at three months at home in community area. The result also found that pressure sores, pain, and infection was commonly developed in between one to six month (Longhorne, 2000). Weimar, Roth Zillessen, Glahn et al, (2002), found, the complications due to prolonged immobilization, such as deep venous thrombosis and pulmonary embolism, were generally rare among post stroke patients.

Previous finding stated that the important risk factors significantly found to have the association with the development of post stroke complications included severity of PICH that determines using GCS, severity of neurological deficit and level of functional disability (Indredavik, Rohweder, Naalsund & Lydersen, 2008). Study found that stroke patient who has a higher risk of infections, falls, pressure sores, pain, anxiety, and depression were significantly associated with those who more dependent patients on a helper (Longhorne, 2000).

5.5.1.4 PICH treatment

Toyoda, Steiner, Epple, and Kern et al. (2013) suggested that all patients with acute ICH should preferably be treated in a stroke unit or in an intensive care unit if the patient condition requires because the stroke care unit reduces mortality and increases the likelihood of good functional outcome of stroke in general. In this study, PICH treatment was associated with long-term adaptation outcomes. PICH patients who received combined surgical and conservative treatments exhibited higher adaptation outcome scores than patients on conservative treatment only. The results indicate that PICH treatment is associated with increased adaptation outcome scores, 95% CI [10.4, 34.5]. This finding means that PICH patients who have gone through combined surgical and
conservative treatment, conservative treatment alone, and neuroscience inpatient rehabilitation care post PICH have shown improvement in their ability to participate in functional activities.

Approximately 13.3% of PICH patients in this study received surgery in combination with conservative treatments. The patients who required surgical intervention are those who were admitted with severe stroke and poor GCS. Surgical management includes craniotomy or burr hole to evacuate the blood clot in the brain parenchyma or in the lobar area or surgery for the insertion of a tracheotomy tube. The study by Wei et al. (2011) revealed that patients with more severe strokes upon presentation, as evidenced by poor GCS scores, were more likely to be surgical candidates. Surgical evacuation of the haematoma, especially for lobar haemorrhage or cerebellar haemorrhage, resulted in improved outcomes (Broderick, 2007; Mendelow, Gregson, Fernandes & Murray et al., 2005). Surgery for brain haemorrhage is an important treatment for an appropriate selection of ICH patients, especially with improved operative techniques, such as minimal invasiveness, safety, and effectiveness of clot evacuation method, such as endoscopic surgery (Nakona, 2005).

Conservative treatment for PICH patients focuses on the regulation and control of blood pressure (Al-Khaled, 2014). More than three-quarters of PICH patients in this study were prescribed a drug for the treatment of hypertension; these drugs include Labetalol (Trandate), Amlodipine, Esmolol (Brevibloc), Nicardipine (Cleviprex), Fenoldopam (Corlopam), sodium nitroprusside, Nitroglycerin (Tridil), and Hydralazine (Apresoline) in combination with other types of drugs, such as those for lowering high cholesterol like Lovastatin. Antibiotics are administered if patients are at risk of respiratory tract infection or UTI and some patients also receive antipyretics, such as Paracetamol. Conservative treatment uses such drugs as anti hypertensive, anti-cholesterol, diabetes mellitus, antibiotic, and analgesic drugs for patients (95.6 %) with high blood pressure upon
admission and with a past health history of hypertension. Other agents used to include osmotic therapy (mannitol, hypotonic saline), anticonvulsion agents (e.g. Diazepam), or antipyretics (e.g. Acetaminophen) that are appropriate for patient conditions and needs (Jauch, Kissels, 2009). All these agents were found to be associated with improving the recovery and ability to adapt to disability.

Another important treatment for patients with PICH is effective neuroscience rehabilitation care. PICH patients often exhibit impaired neurological function immediately after an episode of intracerebral haemorrhage, and this continues for several months. The possibility of patients to gain functional ability at three months is also related to effective rehabilitation training. In our setting, inpatient rehabilitation care is given full attention with the goal of ensuring optimal recovery and adaptation to function in activities of daily living. As stated by Clarke (2013) and Miller (2010), the main focus of PICH stroke rehabilitation is to achieve functional recovery as quickly and as fully as possible to enable patients to adapt to any remaining stroke disability. Thus, patients benefit from early referral to the comprehensive rehabilitation care unit for advanced training during inpatient rehabilitation care. Patient participation in rehabilitation training in a centre nearest to their home should be ensured, and compliance should be warranted.

In the hospital where the study was undertaken, the neuroscience unit is a well-organised setting that offers multidisciplinary services to provide care and treatment for PICH stroke patients. The care includes an early discharge preparation programme and home-based rehabilitation programs. The components of the early discharge preparation programme include the provision of training and support for patients and their caregivers, as well as education for patients and caregivers regarding secondary stroke and post-stroke complication prevention and available resources and funding options. The education
programme for patients and caregivers includes how to change the usual lifestyle, as well as the prevention of stroke complications, depression, and caregivers’ burden. This inpatient neuro rehabilitation unit in our setting is consistent with that suggested by Aries and Hunter (2015), Clarke (2013), and Morgenstern et al. (2010), who stated that all patients with ICH should have access to inpatient rehabilitation management that involves multidisciplinary professionals and that rehabilitation should start as early as possible and should be continued in the community in order to reap the maximum benefits. The rehabilitation inpatient unit is a multidisciplinary integration that involves a team of healthcare professionals who will act together to integrate the physical, mental, emotional, and social aspects of a patient’s health care needs. Morgenstern et al. (2014) also found that the provision of stroke rehabilitation services gives strong evidence of improvement in survival, recovery, and ability to return home compared with conventional non-dedicated stroke wards.

This early discharge preparation programme for patients with PICH has been shown to be associated with effective early and long-term recovery and adaptation. At the three-month follow up, the number of patients who achieved functional independence increased, which resulted from neuroscience rehabilitation care, as well as physiotherapy and speech pathology services. This finding by Morgenstern et al. (2014) revealed that early supported hospital discharge and home-based rehabilitation programme provide benefits for PICH patients.

In summary, functional recovery and adaptation to achieve the ability to participate in activities of daily living resulted from comprehensive treatment and inpatient PICH stroke rehabilitation care, including appropriate nursing care and training, educational program, as well as physiotherapy, speech, and occupational therapy.
5.5.2 Adaptation in cognitive domain of adaptation

In a cognitive domain, the result revealed that PICH patients show high independency to participate in communication and social activities. The total mean (SD) value cognitive functional activities score of Adaptation Outcome was 28.2 (9.3) and range from 5-35. The result indicates that the ability of PICH patients to adapt with the communication and social disabilities was increased and shows lower dependence on caregivers (Table 4.11).

In adapting with psychosocial domain of adaptation, the total cognitive score result revealed that there are significant difference of subtotal cognitive ability score at acute phase and at three-month post PICH, $t = -10.4$, $(112)$, $p < .05)$. In a cognitive domain (FIM social –cognitive subtotal items) at acute was 18.8(11.3) range from 5-35, and the result revealed that majority of subjects was scored at lower adaptation in ability to communicate effectively, participated in social activities and unable to interaction with another person, to solved problem and memories while compared with adaptation outcome at three months for cognitive adaptive ability (FIM social cognitive) the mean (SD) result was 28.2 (9.3) and the median was 33 (range from 5-35). The result revealed that PICH patients show high independency to participate in communication and social activities. The result indicates that the ability of PICH patients to adapt with the communication and social disabilities was increased and shows lower dependence on caregivers. The cognitive deficit that occurred on PICH subject in this study was comparable with many other relevant studies related to stroke deficit and outcome. ICH patients may experience change in cognitive ability such as alteration in attention, awareness to time and place, communication, memory, problem solving, and judgment (Oh, & Seo, 2010; Mocco et al., 2006; Samra et al., 2007). For example, Oh, & Seo (2010) reported that the improvements in cognitive ability were occurred in between one
to three months. However, in the area of problem-solving and safety and social behaviour recovery at six-month post ICH was lower. It is the difference in the ability in getting attention and communication; it showed improvement at six months.

This result was a comparison with previous studies and found congruent with their findings where half of the patients who have sensory motor deficit, cognitive, or behavioural deficits gained adaptation with stroke-related physical disability, and showed minimal dependence on caregivers in performing routine self-care activities, control of bladder and bowel, and relative mobility such as walking.

Later at three months, the ability of patients with PICH to adapt is individuals with PICH response to disability related to stroke and has undergone recovery phase as well. Stroke disability is a functional limitation that requires supervision to perform activities of daily living (ADLs), or limitation in physical, cognitive, or social activities. The goal of a long-term recovery phase after ICH for a patient having undergone rehabilitation is to be able to function in cognition and functional activities (Clarke, 2013; Miller, 2010). The predictors of later adaptation (three month) of psychological domain of adaptation are post stroke depression and in terms of psychosocial (interdependence ), it covers as a social component of adaptation.

5.5.2.1 Depression status at three months post PICH

Depression commonly occurs after a stroke, with an estimated prevalence as high as 30% in the first year after the event (Artal & Egido, 2009). Depression that occurs among stroke patients is related to the inability to accept disabilities and the lack of social support. In this study, depression is one of the independent factors influencing long-term adaptation outcomes. A significant negative relationship was found between total
depression at three-months post PICH with later adaptation outcome. The result revealed that a decrease in one unit of a depression problem among patients at three-month post ICH was associated with a positive increase in later adaptation outcome scores of 0.93 unit. The result indicates that those without depression at three-month post PICH or those with minimal depression symptoms may have a better total score for adaptation outcome at three months. In other words, stroke patients without psychological problems and with no symptom of stress and depression were among those who are able to participate in functional activities of daily living. Hadidi, Treat–Jacobson, and Lindquist (2009) found that post-stroke depression was significantly associated with negative functional adaptation or quality of life of post-stroke survivors. For example, patients with post-stroke depression (PSD) showed far worse recovery from functional impairments compared with non-depressed patients with stroke.

In our local setting, to prevent depression among PICH patients during the early and later (three month) in rehabilitation phases, a routine assessment is performed to identify PICH patients who are at risk of mental stress and depression. The patients diagnosed as having signs and symptoms of depression was referred to a psychiatrist for medication and counseling. Toyoda, Steiner, Epple, and Kern et al. (2013) stated that in the Japanese guidelines, stroke patients should be examined for risk of depression because this condition is a factor that interferes with cognitive and physical function and activities of daily living. They also suggested that drug therapy for a post-stroke depressive state was recommended because it is expected to improve depressive symptoms and physical function. Another finding stated that healthcare providers, such as physicians and nurses, should be experts in the assessment to determine patients with stroke who have stress or depression. They should also be able to suggest specific treatment strategies, such as counseling, cognitive-behavioural therapy, and treatment with anti-depressants to treat depression (Kumar et al., 2010).
The present results confirm that the emotional impairment and depression are common among the PICH stroke patients. Post-stroke depression has been reported in not less than 30% and up to 50% of all stroke survivors (Robinson, 2003; Department of Health, 2007a, Pfeil, Gray, Lindsay 2009). The symptoms of depression that majority of subject experienced were they had little interest or pleasure in doing things, feeling down, depressed, or hopeless. They also reported experience having trouble in sleep pattern such as suddenly falling asleep or always sleepy and always tired or feel no energy.

The result of this study found that majority of the patients is prone to have depression, whether during acute rehabilitation phase or long term, living with disability post PICH. In comparing the findings for depression at acute and depression at three months, the result revealed a significant difference which the, $t(112) = -3.169, p < .001$. The result of this study found that about 70% had experienced depression from mild to severe level of depression during acute phase and similarly at three months post PICH revealed about 72.0% the subject had experience of mild to severe depression. However, the analysis showed that the percentage of subject having moderately severe to severe increased from 12.3% at an acute phase increase to 34.5% at a three-month poststroke. The result indicated that one-third of subjects having the serious problems of depression in living with disability at three months, and the subjects required help and treatment.

The finding of this study is consistent with previous result of study stated that the frequency of depression experienced by stroke patients during acute recovery until three month in rehabilitation phase post stroke estimated about 10% to more than 50% of stroke patients (Johnson, Minarik, Nyström, Bautista &. Gorman, 2006). Buchanan, Elias & Goplen (2000), found among haemorrhagic stroke patients, many of them experience change to negative neurobahavioral even though they achieved good physical recovery
outcome and this change gives negative impact to patients itself and also to their family, for example, experience of a psychological stress.

Among stroke patients, the strongest predictors of post stroke depression were a history of depression, an increased severity of stroke, and post stroke physical or cognitive impairment (Johnson, Minarik, Nyström, Bautista & Gorman, 2006).

5.2.2.2 Patient and family caregiver stroke knowledge

The last domain of adaptation is an interdependence mode which is represented as a social component of adaptation. The regression analysis of this study found that there was a positive significant relationship between total stroke knowledge and later adaptation outcome ($\beta = 2.78$, $p < .001$). The result indicates that 50% of PICH subjects those who have high stroke knowledge score is related to increase total adaptation outcome score by 2.9, 95% CI [1.097, 6.011]. Based on this finding, researcher conclude that in order to ensure the positive long term adaptation outcome post PICH, the patients and their caregivers should have knowledge of risk factors contribute to stroke illness of stroke to stroke illness, lifestyle such as exercise, smoking, diet, weight, alcohol, stress management, is essential to prevention risk of recurrent stroke, post stroke complication and post stroke depression.

In adapting with psychosocial domain of adaptation, the total cognitive score result revealed that there are significant difference of subtotal cognitive ability score at acute phase and at three-month post PICH, $t = -10.4$, $p < 0.05$. In a cognitive domain (FIM social –cognitive subtotal items) at acute was 18.8(11.3) range from 5-35, and the result revealed that majority of subjects was scored at lower adaptation in ability to
communicate effectively, participated in social activities and unable to interaction with another person, to solved problem and memories while compared with adaptation outcome at three months for cognitive adaptive ability (FIM social cognitive) the mean (SD) result was 28.2 (9.3) and the median was 33 (range from 5-35). The result revealed that PICH patients show high independency to participate in communication and social activities. The result indicates that the ability of PICH patients to adapt with the communication and social disabilities was increased and shows lower dependence on caregivers. The cognitive deficit that occurred on PICH subject in this study was comparable with many other relevant studies related to stroke deficit and outcome. ICH patients may experience change in cognitive ability such as alteration in attention, awareness to time and place, communication, memory, problem solving, and judgment (Oh, & Seo, 2010).

A significant positive relationship exists between total stroke knowledge and later (three month) adaptation. Those who have a unit of higher stroke knowledge score exhibited improved total adaptation outcomes. The result revealed that half of the patients in this study exhibited improved later (three month) adaptation in terms of involvement in functional activities. The improved three-month adaptation in terms of functional activities is associated with the level of stroke knowledge. This result indicates that patients with PICH who received general stroke education and rehabilitation before discharge from the hospital setting showed an improvement in stroke knowledge. The finding also showed that good recovery and the associated later (three month) adaptation depends on family caregiver support, as well as patient motivation and ability to learn.

The result of this study was compared with previous study, for example, Ostwald, Davis, Hersch, Kelley, & Goodwin, (2008), suggested in stroke education guidelines that in the prevention strategies, to reduce stroke risk, prevention of recurrent stroke, prevention
stroke complication and stress management should be taught before discharge (Byers, Lamanna, & Rosenberg, 2010). The finding confirms of the previous results of study that suggests the patient and family should be given information regarding stroke illness, stroke risks factors, stroke management and prevention post stroke complications such as depression, post stroke medical complication and recurrent stroke and they should be encouraged to involve in the rehabilitation program suggested properly in order to improve physical and cognitive disability before discharge (Rodgers et al. 1999). The other studies identified information service focus directly on individualized information can lead to better quality of life (Croquelois & Bogousslavsky, 2006; Rodger et al, 2001).

Therefore, to prevent recurrent stroke, post-stroke complications, and depression among stroke patients and their family caregivers, stroke education is provided in our setting to achieve positive early and long-term adaptation outcomes. Stroke education guidelines refer to the prevention strategies aimed at reducing the occurrence of recurrent stroke, stroke complications and stress management, which should be taught before a patient is discharged (Byers, Lamanna, & Rosenberg, 2010). In this study, healthcare professionals and clinicians provide specific stroke education for PICH patients before discharge with a focus on the prevention of risk factors in association with early adaptation to enhance long-term adaptation outcomes associated with stroke-related disability. Rodger (2001) stated that we should be aware that stroke patients have unmet needs on information about their illness. Thus, different kinds of care and treatment must be provided, and professionals must help patients evaluate their alternatives to facilitate decision-making (Rodger et al., 2001).

A better understanding of the factors that affect the process of acute and long-term adaptation is essential in developing an adequate stroke education programme and specific rehabilitation interventions for patients with stroke related to intracerebral
bleeding before being discharged. Some patients and caregivers felt that they were discharged with inadequate information, and this lack of education persisted even two to three years after the stroke (Wachtsers Kaufmann, Schuling, The & Meyboom, 2005).

The proper stroke educational programme given before discharge during the inpatient recovery phase that focuses on stroke illness, stroke risk factors, stroke management and prevention of post-stroke complications, such as depression, post-stroke medical complication, and recurrent stroke, contribute to improve long-term physical and cognitive disability (Rodgers et al., 1999).

The lack of physical and cognitive function, limitations in social interaction, experience of post-stroke complications, as well as emotional stress cause stroke patients to show high dependency on others to help them, especially on their spouses and significant others. Spouses are expected to provide competent physical care for their loved ones. PICH patients with stroke increasingly depend upon their spouse for continuing care, particularly when they are experiencing advanced deterioration of health and disability after stroke. Spouses or caregivers must learn to help with activities of daily living (ADLs). Many research findings stated that a family member who needs inpatient acute recovery care and rehabilitation requires support from all family members, especially spouses, in terms of helping them perform functional activities in all aspects of life (Kautz & Horn, 2009; Dalvandi et al., 2010; Oswald, 2008). Other studies found that information services focused directly on individualized information could lead to a better quality of life (Rodger et al., 2001).

In order to ensure positive long-term adaptation, PICH patients should have knowledge of risk factors contributing to stroke illness. Essentially, a healthy lifestyle that shows a balanced mix of exercise, good diet, weight control, stress management, and particularly
non-smoking and non-alcoholic habits, is essential to prevention of the risk of recurrent stroke, post-stroke complication, and post-stroke depression (Croquelois & Bogousslavsky, 2006). These prevention strategies are part of stroke education guidelines that should be taught before discharge of patients (Byers, Lamanna, & Rosenberg, 2010).

In this study, those PICH patients who have support and care from their spouse have improved their ability to participate in functional activities and reported able to be independence very past. This finding is consistent with the literature, the better a spouse copes with psychological and physical expectations of a disability related to stroke, the better the outcome the patients will have (Kautz & Horn, 2009). It is because life after having disability resulting from stroke is usually difficult. Lack of physical and cognitive function, limitation in social interaction, experience of post stroke complication, emotional and stress, stroke patients show high dependency on other to help them, especially spouse. Spouses were expected to provide competent physical care for their loved ones and should have adequate stroke information. PICH patients with stroke increasingly depend upon their spouse for this continuing care, particularly when they are experiencing advanced deterioration of health and disability after stroke. Spouse or caregivers must learn to help with activities of daily living (ADLs), such as bathing, dressing, grooming, feeding, and toileting. Many research findings stated one family member who needs inpatient acute recovery care and rehabilitation demand support from all family members, especially spouse to help them in participating in performing functional activities in all aspects of life (Kautz & horn, 2009; Dalvandi et al., 2010; Oswald, 2008).

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copes with psychological and physical expectations of a disability related to stroke, the better the outcome the patients will have (Kautz & Horn, 2009).

This result can be used as strategies to promoting carer in have involved in providing care for their family member who requires inpatient rehabilitation post PICH. This result will be used as new intervention of involvement family carer of disability patient starting from hospital setting to home and as strategies to help family carer to be able to provide a good care for stroke patient and to ensure carer can cope with change of the patient resulting from PICH. As stated in literature review, it would be necessary to include the patients and caregivers at the team meeting while maintaining the existing time constraints and to establish a baseline to the level of participation that could be achieved. Once the feasibility could be established of having the patient present and able to address these questions, one could begin to increase the degree to which entire approach could be implemented (Ozer 2000). The finding indicates that those PICH patients who have support and care from their spouse have improved their adaptation with stroke disability and reported able to be independence very past. It is because stroke illness is not only giving negative impact to the person but continues to affect their families, health care setting and community. Disability and post stroke complication such as infection and depression resulting from stroke contribute as factors affecting recovery process and also can alter life satisfaction and reduce good family relationship. This finding suggests that it is important to help stroke patients and their family member to adapt with stroke-related problem and to enable patient with stroke to become reintegrated into their family and the community.
5.6 Conclusion

For PICH patients with disabilities, the predictors of adaptation during the inpatient recovery phase of this group of patients include severity of PICH, unrecovered neurological deficit, risk for post stroke complications, and limited stroke knowledge. For the positive later (three month) adaptation outcomes, contributing factors include age, gender, severity of neurological deficit, location of brain lesion, stroke knowledge, functional ability in the early phase, and respiratory infection in the acute phase, UTI at three months, depression at three months, and spousal support during the rehabilitation phase at home. The results and findings of this study will be used as an evidence base related to factors that affect early adaptation and later (three month) adaptation outcomes of post intracerebral haemorrhage patients and the importance of stroke education among stroke patients and family caregivers.