

**POST-STROKE SHOULDER PAIN AND  
QUALITY OF LIFE AMONG STROKE  
PATIENTS IN HOSPITAL UNIVERSITY SAINS  
MALAYSIA (HUSM)**

**by**

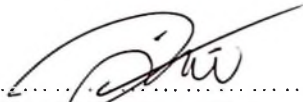
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**Dissertation submitted in partial fulfilment of the  
requirements for the degree of  
Bachelor of Health Sciences (Nursing)**

**JUNE 2015**

## DECLARATION

I certify that this dissertation does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.



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## CERTIFICATE

This is to certify that the dissertation entitled “Post-Stroke Shoulder Pain and Quality of Life among Stroke Patients in Hospital University Sains Malaysia” is the bonafide record of research work done by Zafirah Najwa Binti Zainudin, Matric Number 112083 during the period of September 2014 to May 2015 under my supervision. This dissertation is submitted in partial fulfillment for the degree of Bachelor of Health Science (Nursing). Research work and collection of data belong to Universiti Sains Malaysia.

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## ABBREVIATIONS

|        |   |  |
|--------|---|--|
| HUSM   | - | Hospital University Sains Malaysia                                 |
| PSSP   | - | Post-Stroke Shoulder Pain  |
| VAS    | - | Visual Analogue Scale  |
| QOL    | - | Quality of Life  |
| ICP    | - | International Classification of Functioning, Disability and Health |
| WHO    | - | World Health Organization  |
| SS-QOL | - | Stroke Specific Quality of Life                                    |
| SPSS   | - | Statistical Package Social Sciences                                |
| SD     | - | Standard Deviation   |
| N      | - | Number/Frequency   |

**POST-STROKE SHOULDER PAIN AND QUALITY OF LIFE AMONG  
STROKE PATIENTS IN HOSPITAL UNIVERSITY SAINS MALAYSIA  
(HUSM)**

**ABSTRACT**

Post-stroke shoulder pain (PSSP) is a common complication after stroke. Substantial evidence can be found in the literature to show the occurrence as well as a facts on PSSP including definition, onset, causes and effects, major symptoms and signs, impacts on QOL, and instrumentation. The general objective of the study was to determine PSSP among stroke patients in Hospital University Sains Malaysia (HUSM). This cross sectional study was done on 83 stroke patients as respondents by convenience sampling method and validated questionnaires such as socio-demographic data, Visual Analogue Scale to determine the level of pain, and elements of Stroke-Specific Quality of Life were given to the respondents and only 57 respondents that fits the inclusion criteria that were recruited for this study. The response rate for this study was 68.67%. Data was statistically analyzed using software package SPSS version 22.0. The data was analyzed using descriptive statistic and Chi-square test. The result showed that the occurrence of PSSP among respondents was significantly high (68.67%). As for level of PSSP, most of the respondents (n= 29, 50.9%) were had moderate pain regarding PSSP. Besides that, most of respondents (n=21, 36.8%) had high QOL, followed by respondents (n=19, 33.3%) had moderate QOL, and then respondents (n=17, 29.8%) had low QOL. Accordingly, there was association found between level of PSSP with QOL in respondents with PSSP ( $p<0.05$ ). Therefore, further study need to be done to emphasized on the prevalence, preventive measures, support from health professionals, screening programmes and to provide important information as well as to improved public understanding about PSSP.

# KESAKITAN BAHU DAN KUALITI HIDUP DALAM KALANGAN PESAKIT ANGIN AHMAR DI HOSPITAL UNIVERSITI SAINS MALAYSIA (HUSM)

## ABSTRAK

Kesakitan bahu dalam kalangan pesakit angin ahmar adalah salah satu komplikasi selepas angin ahmar. Pelbagai bukti dapat ditemui berdasarkan kajian lepas mengenai kejadian dan juga definisi, permulaan, sebab dan kesan, tanda-tanda utama, kesan terhadap kualiti hidup, dan juga instrumen berdasarkan PSSP. Objektif umum bagi kajian ini adalah untuk mengenal pasti kesakitan pada bahu selepas angin ahmar dalam kalangan pesakit angin ahmar di Hospital Universiti Sains Malaysia (HUSM). Kajian keratan lintang ini telah dijalankan ke atas 83 pesakit angin ahmar sebagai responden melalui kaedah persampelan secara kebetulan dan set soalan soal selidik seperti soalan sosio-demografik, 'Visual Analogue Scale' untuk mengukur tahap kesakitan, dan elemen 'Stroke-Specific Quality of Life' yang telah disemak dan hanya 57 responden yang memenuhi kriteria yang dimasukkan dalam kajian ini. Kadar tindak balas bagi kajian ini adalah 68.67%. Data telah dianalisis menggunakan pakej perisian SPSS versi 22.0. Data dianalisis dengan menggunakan statistik deskriptif dan Chi-square test. Keputusan yang telah dianalisis menunjukkan tahap kejadian masalah sakit bahu selepas angin ahmar adalah tinggi iaitu sebanyak 68.67%. Manakala bagi tahap kesakitan sakit bahu selepas angin ahmar, kebanyakannya daripada responden (n= 29, 50.9%) telah mengalami kesakitan sederhana. Sebahagian besar daripada responden (n = 21, 36.8%) mempunyai skor yang tinggi dalam QOL, diikuti oleh responden (n = 19, 33.3%) mempunyai nilai skor sederhana dalam QOL, dan kemudian diikuti oleh responden (n = 17, 29.8%) mempunyai skor yang rendah dalam QOL. Sehubungan itu, terdapat perkaitan antara tahap kesakitan sakit bahu selepas angin ahmar dengan skor QOL ( $p < 0.05$ ). Oleh yang demikian, kajian lanjut diperlukan untuk mengenal pasti prevalens, langkah pencegahan, sokongan dari professional kesihatan, program saringan dan untuk memberi maklumat penting serta untuk memantapkan kefahaman orang awam mengenai kesakitan pada bahu selepas angin ahmar.

# CHAPTER 1

## INTRODUCTION

### 1.1 Background of the Study

Stroke is the third leading cause of mortality and the major cause of long-term disabilities, such as hemiparesis, language problems and cognitive deficits in the developed world (Klit et al., 2011). According to World Health Organization (WHO), stroke is defined as a clinical syndrome characterized by rapidly developing clinical symptoms or signs of focal, and at times global, loss of cerebral function, with symptoms lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin (Nazifah et al., 2012).

In America, it is the third leading cause of death and it is attack by a sudden loss of neurological function caused by interruption of blood flow to brain (Rajak et al., 2013). In the UK, stroke is one of the most common causes of death and disability, an estimated 300,000 people have moderate to severe impairments as a result of stroke. It is estimated that 150,000 people have a stroke each year in the UK (Smith, 2012). In Singapore, stroke is a significant cause of death and disability. In 2012, stroke was the fourth highest cause of death and account for 9.0% of total deaths in Singapore. Hence, this report highlights the trends in stroke incidence, mortality and morbidity for the period 2007 to 2011, as well as the risk factors for stroke (Ministry of Health Singapore, 2013). In Malaysia, stroke is one of the top five leading causes of death and one of the top 10 causes for hospitalization and it is the top five diseases with the greatest burden of disease, based on disability-adjusted life years (Loo & Gan, 2012).

There are several types of stroke such as ischaemic stroke and haemorrhagic stroke. The most common type of stroke is ischaemic stroke that have affected 80% patients. Patients with haemorrhagic stroke accounts the largest number of deaths with mortality rate is about 38% at one month while mortality rate of ischaemic stroke is 8 to 12% at one month (Rajak et al., 2013). Stroke is the most common cause of chronic disability as records prove that one third of total population will be functionally dependent after one year. With the abnormality, the motor deficits represent themselves as weakness termed hemiparesis while paralysis is termed hemiplegia. Loss of voluntary movement and immobility contribute to decrease range of motion, contractures, disused atrophy

and muscle weakness. So, these signs are early and too prominently reflected in shoulder reflected as pain, restricted flexion, abduction and external rotation. Other factors include spasticity, right hemispheric cerebrovascular lesion (Rajak et al., 2013).

A common complication after stroke is post-stroke shoulder pain (PSSP). A precise definition of PSSP does not exist and consensus has not been reached about a time span for pain onset, pain characteristics and localization (Price, 2002). Many synonyms are available for shoulder signs especially pain, shoulder pain in hemiplegia, hemiplegic shoulder pain and PSSP (Rajak et al., 2013). Patients may present with varying degrees of paralysis (hemiplegia), which commonly affects the arm. As a consequence, the stability of the shoulder may be compromised with subsequent risk of damage to the soft tissue structures. Hence, patients with more severe paralysis of the arm are increasingly likely to develop shoulder pain after stroke. It is reported that pain is common after stroke as many as 42% of patients and this pain is directly attribute to the brain damage caused by stroke and is termed central post-stroke pain (CPSP) (Smith, 2012). Currently, PSSP interferes with the rehabilitation and contributes to increase hospital stay along with depression and decreased quality of life. 80% of patients who recovered from PSSP and stroke is very disabling and psychologically damaging condition (Rajak et al., 2013).

PSSP is a common clinical entity and depending on the study cited, incidence rates range from 34% to 84% and 53% in his geographical area. Onset of this pain typically is present after 2 to 3 months. However, in some cases it may present earlier, meaning within the first 2 weeks after the stroke (Murie-Fernandez et al., 2012). Other study in Malaysia stated that, its prevalence ranges between 5% to 84% with 17% of patients experienced shoulder pain within the first week, 55% within two weeks, 87% within two months, and 75% within the first year after stroke (Akhavan Hejazi & Mazlan, 2012). The factors attributed to shoulder pain after stroke are glenohumeral subluxation, spasticity of shoulder muscles, impingement, soft tissue trauma, rotator cuff tears, glenohumeral capsulitis, bicipital tendinitis, and shoulder hand syndrome (Lee et al., 2012). Besides, there are major symptoms and signs of patients with PSSP such as the main symptoms were described as shoulder pain (100%), limit of shoulder mobility (98.1%), adhesion of scapula (56.6%), depression inferior to acromion (17.9%), swelling in the arm, wrist and fingers of the affected side (17.0%), abnormal skin

temperature and hyperhidrosis (19.8%), altered skin color (13.2%), and limit of finger flexion (92.4%) (Zhu et al., 2013).

Many factors are proposed to contribute to PSSP, but these are not well understood and this limits the effective management of this disabling condition. So, clinicians need a thorough understanding of the factors that increase the risk of PSSP in order to identify patients at risk and implement strategies to prevent and manage this disabling condition (Blennerhassett et al., 2010). The 'Management Tool for Acute Hemiplegic Shoulder' was developed to assess risk during acute hospital settings (Nicks et al., 2007) and these tools include passive range of motion, subluxation, pain, limited shoulder function, and altered muscle tone (Blennerhassett et al., 2010). Normally, physiotherapy is often the first line of management for PSSP. So, it is necessary to understand the cause of PSSP to determine the most effective treatment protocol.

Recovery after a stroke is associated with many factors such as rehabilitation process. Stroke affects the whole body, as well as causes problems such as perception deficiencies, sensory problems, post-stroke shoulder pain, and difficulty in performing the activities of daily living independently. So, rehabilitation must be performed by a health care staff member for survivor patients with hemiplegia shoulder pain or PSSP such as medical physical therapist and nurse rehabilitation to enhance recovery (Desrosiers et al., 2002). Besides, the family member also plays an important role in rehabilitation. Relevant and resourceful family is an important factor that can provide care that will affect the rehabilitation process positively. Each kind of problems for patient experience and affect the patient should be explained to family members. This way, it will be easier for the family to find solutions after hospital discharge (Koc, 2012). Furthermore, informal caregivers have been reported to be willing to participate in patient care. Family support has been emphasized to be important in the publications, despite its limitations. So, more comprehensive research that can clarify this issue may be proposed (Koc, 2012).

PSSP may occur at onset but most often several months or years later (Snels, et al., 2002). PSSP affected stroke patients' disability and functioning because of the pain and it had influenced their everyday life and quality of life (Chae et al., 2007). According to World Health Organization (WHO), Quality of Life (QOL) is defined "as the individuals' perceptions of their position in life in the context of the culture and value

systems in which they live, and in relation to their goals, expectations, standards, and concerns. It is a broad ranging concepts affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationship, and their relationship to salient features of the environment (Oort, 2005). PSSP has been reported to be associated with physical disability in the elderly but in other cases it seems to have minimal physical impact. However, it may impair the person's function, socially, vocationally and psychologically (Hooten et al., 2013).

Besides, PSSP can negatively affect rehabilitation outcomes as good shoulder function is a prerequisite for successful transfers, maintaining balance, performing activities of daily living and for effective hand function. The natural progression of PSSP over time is characterized by changes in muscle tones, weakness, and limitation of normal range of movement. All these have an effect on normal shoulder posture and render the shoulder vulnerable to contractures and soft tissue damage from inappropriate handling (Suethanapornkul et al., 2008). So, the impact of PSSP on QOL is part of this study to evaluate and communicate the impact of PSSP on the basic activities of the daily life. This information can provide a basis for more effective treatment and help to measure progress over time. The scale in this tool is provided to help individuals' to measure activity level (Hooten et al., 2013).

## **1.2 Problem Statement**

Stroke is a common neurological problem in our developing country. There are many complications that may arise after stroke. PSSP is one major complication among stroke patients (Murie-Fernandez et al., 2012). Painful sensation will deficit the physical and cognitive function as a consequence of stroke is often profound, and can be expected to affect the QOL of patients and their families dramatically (Kim, 2009). It can disturb the activity limitations by difficulty in working, carrying out daily routines, doing housework, using transportation, taking part in recreational and leisure activities. Unfortunately, an assistant is needed for care of survivors with shoulder pain problem as they are unable to do their daily activities on their own. Some of the family caregivers may need to stay at home or quit from their job to take care of the post-stroke shoulder patient because some family cannot afford the cost for the available facilities such as home care. This is because family caregivers are the primary source for ongoing



care and support. A study done by Oupra et al. (2010) illustrate that family caregivers report that they suffer both physically and psychologically and find themselves overwhelmed with strain, experiencing burden and exhaustion (Oupra et al., 2010).

Day by day, the number of stroke patient is increasing in different area. The increase incidence of PSSP and prolonged hospitalisation among stroke patients require a high cost for treatment and rehabilitation. It is estimated that stroke patients occupied 20% of the acute hospital beds available in the UK, and about 25% of long-term beds. In USA, it has been estimated to cost US\$90,981 per patient for rehabilitation and contributes to hospital stay. However, in Australia, the annual cost was assessed at about \$40,000 per patient and the costs increase when complications occur (Vuagnat & Chantraine, 2003). In Thailand, it is estimated that the management of stroke costs at least 15 000 million Thai baht (THB) per year (500 million USD). This is because stroke survivors usually stay in hospital until their medical condition is stable approximately 3 days to 2 weeks. So, the cost management will increase when the incidence is increase every 4 minutes (Oupra et al., 2010). Several studies had found that women who survive stroke regarding PSSP had less favorable outcomes than their male counterparts. This is because women are less likely to be discharged home than men and are more likely to have physical impairments and limitations in their activities daily life (Gargano et al., 2007). In addition, increase incidence of survivors in PSSP lead to work over load among the health workers such as physiotherapy, nurse and nurse rehabilitation to provide treatment and also rehabilitation.

Apart from that, low public awareness and knowledge regarding PSSP prevention and treatment option cause public not to view PSSP as a serious complication after stroke. This study helps to highlight the knowledge about the problem to increase the recovery by aided proper and early management for PSSP patients to reduce its incidence (Rajak et al., 2013). As such, early and ongoing rehabilitation may help prevent complications and promote the best possible outcomes for the person. Some family members are not aware about the right technique in handling PSSP patients. So, appropriate and sufficient knowledge is a key support to prepare people for their new role as family members and it can be achieved by a specific teaching programme. This programme could benefit both survivors and family members by helping them feel more confident in their caring role and help to reduce their strain. Besides, it is an effective way to ensure that stroke survivors receive the rehabilitation required to promote QOL and

restore maximum function (Oupra et al., 2010). Some study reported that family caregivers have insufficient information concerning the care of people following stroke and they lack the knowledge and training to take care of their post-stroke relatives (Jullamate et al., 2006).

In UK, pain is common after stroke and it is reported as many as 42% suffer from pain (Smith, 2012) and another study in Malaysia reported the prevalence of PSSP after stroke from 5% and 84% after stroke (Akhavan Hejazi & Mazlan, 2012). The cause of PSSP is notified to factors such as reduced muscle tone and prolonged immobilization leading to tightness and contractures. Such a high incidence puts light on lack of awareness and delayed management of PSSP by the survivors and those in charge (Rajak et al., 2013). Early identification and intensity of pain must be measure early to provide recovery of survivors. Sometimes, health care providers are not aware about the PSSP management of patient after stroke. They do not apply the proper management like proper handling. The staffs should position patients whether lying or sitting to minimize the risk complication of shoulder pain. They are not aware that careful positioning can provide support to the affected arm, correct body alignment, increase body awareness of the arm and provide comfort. The preventive techniques should be initiated by the entire rehabilitation team, including nurses, therapists, rehabilitation aides, nurse aides, and physicians to prevent shoulder pain after stroke and maximize potential for motor recovery at the onset of shoulder pain after stroke (Zeferino & Aycock, 2010).

Apart from that, little attention has been given to PSSP as compared with the other consequences, and PSSP has been reported to be a neglected and difficult area within health care, especially in community health (Turner & Jackson, 2002). PSSP may occur at onset but most often several months or years later, still related to the stroke (Snels, et al., 2002). From the previous studies on PSSP have described the persons` disability and functioning, how the pain is experienced and how it influences their everyday life and QOL (Chae et al., 2007). So, the impacts of PSSP on QOL will be determined in this study to evaluate and communicate its impact on basic activities of the daily life. This information can provide a basis for more effective treatment and help to measure progress over time. The scale in this tool is provided to help individuals` measure activity level (Hooten et al., 2013).

### **1.3 Research Objectives**

#### **1.3.1 General Objectives**

- To determine post-stroke shoulder pain among stroke patients in Hospital University Sains Malaysia (HUSM).

#### **1.3.2 Specific Objectives**

- To determine occurrence and onset of post-stroke shoulder pain among stroke patients in Hospital University Sains Malaysia (HUSM).
- To determine level of post-stroke shoulder pain among stroke patients in Hospital University Sains Malaysia (HUSM).
- To determine quality of life in patients with post-stroke shoulder pain among stroke patients in Hospital University Sains Malaysia (HUSM).
- To determine association between level of pain in patients with post-stroke shoulder pain in Hospital University Sains Malaysia (HUSM) with their quality of life.

### **1.4 Research Questions**

- What are the occurrence and onset of post-stroke shoulder pain among stroke patients in Hospital University Sains Malaysia (HUSM)?
- What is the level of post-stroke shoulder pain among stroke patients in Hospital University Sains Malaysia (HUSM)?
- What is the quality of life in patients with PSSP among stroke patients in Hospital University Sains Malaysia (HUSM)?
- Is there any association between levels of pain in patients with post-stroke shoulder pain in Hospital University Sains Malaysia (HUSM) with their quality of life?

### **1.5 Hypothesis**

1.  $H_{01}$  = There is no significance association between level of pain in patients with post-stroke shoulder pain in Hospital University Sains Malaysia (HUSM) with their quality of life.

$H_{A1}$  = There is a significant association between level of pain in patients with post-stroke shoulder pain in Hospital University Sains Malaysia (HUSM) with their quality of life.

## **1.6 Definition of Operational Terms**

### **1.6.1 Post-Stroke**

A medical condition in which a person suffers from physical, social, mental, and spiritual components resulting from an experience and complication after stroke (Hornby, 2005). In this study, post-stroke is defined as the experience and complication that occurs after stroke which is shoulder pain.

### **1.6.2 Shoulder Pain**

Pain in the shoulder is called shoulder pain where it arises in or around the shoulder from its joints and surrounding soft tissues. The joints include the glenohumeral, acromioclavicular, and sternoclavicular joints while bursae and motion planes include the subacromial bursa and scapulothoracic plane (Murphy & Carr, 2010).

### **1.6.3 Post-Stroke Shoulder Pain**

Even if PSSP is one of the most common forms of pain after stroke, a precise definition does not exist and consensus has not been reached about a time span for pain onset, pain characteristics and localization (Price, 2002). One reason is probably that several underlying causes may contribute to the development and maintenance of PSSP. Another challenge when trying to define PSSP is that shoulder pain and shoulder problems are common in the general population. PSSP is a most common problem after stroke. Its prevalence varies in up to 70% of patients and it often appears in the first few days. It is an indicator of stroke severity, and 75% of patients complain of pain at some time in the first 12 months following a stroke (Ward, 2006) and 72% still complain of PSSP at 16 months (Lindgren et al., 2012). It is also difficult to evaluate if individuals with shoulder pain prior to stroke are predisposed to PSSP. In this study, PSSP is defined as the first appearance of shoulder pain within the onset of sixteen months after stroke. From the journal reviews, majority of researchers conducted their study within at

period. This is because the median of occurrence PSSP in the previous study is 14 months post-stroke (Lindgren et al., 2012).

#### **1.6.4 Quality of Life of Post-Stroke Shoulder Pain**

QOL is defined by the WHO as the individuals' perceptions of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards, and concerns. It is a broad ranging concepts affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationship, and their relationship to salient features of the environment" (Oort, 2005). In this study, the researcher defines the QOL as PSSP patients' perceptions of their position in life in the context of the culture and value systems in which they live that has better health achievement with related to their physical, emotional and social health dimensions.

#### **1.6.5 Stroke Patient**

A person who is diagnosed as a stroke and receiving medical treatment either in hospital or clinic (Hornby, 2005). In this study, stroke patients refer to the patients that are diagnosed as first-ever stroke which is ischaemic stroke and haemorrhagic stroke.

### **1.7 Significance of Study**

From the analysis, interpretation and implications of data gathered will provide an actual and practical understanding nursing practice by focusing on the resulting strategies for better nursing care management for stroke patients that have shoulder pain problem after stroke. As we know that PSSP interfere the physical functional ability of patients and decrease QOL among them. For nursing practice, this study will benefit for patients as well as the healthcare professionals who involves directly with care of PSSP patient. At the same time, it is hope that the study helps to improve patient's knowledge and raise their awareness regarding PSSP and the findings served on the basis information for future PSSP research. Besides that, it will help the nurses to plan their nursing care plan for such patients that will be undergoing treatment such as rehabilitation to enhance recovery of PSSP. When the nurses know the problems cause PSSP, the nurse will be able to plan the nursing care to provide that complementary

therapies as needed. So, the level of PSSP will be reduced towards nursing care provided and automatically can increase physical functional ability among stroke patients with shoulder pain problem after stroke and at the same time it will help increase QOL among them. Apart from that, the research would contribute to the health care system as references for the future study and will help improve the strategies for stroke patients that had shoulder pain problem after stroke such as increases of rehabilitation program for post-stroke patients and also implementation of health education for patients and family members to enhance recovery of PSSP.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter reviews the current literature related to PSSP in stroke patients with the intention to justify as well as determine the research design and tools required to achieve its objectives. Aspects that were covered in this chapter include the definition of PSSP, occurrence of PSSP, onset of PSSP, causes and effects of PSSP, major symptoms and signs with PSSP, impacts of PSSP on QOL, and instrumentation.

#### 2.2 Review of Literature

##### 2.2.1 *Definition of PSSP*

From the previous study, PSSP is a well-known complication after stroke, but data on prevalence, predictors, and outcome in unselected stroke populations are limited (Lingdgren et al., 2007). Even if PSSP is one of the most common forms of pain after stroke, a precise definition does not exist and consensus has not been reached about a time span for pain onset, pain characteristics and localization (Price, 2002). One reason is probably that several underlying causes may contribute to the development and maintenance of post-stroke shoulder pain. Another challenge when trying to define PSSP is that shoulder pain and shoulder problems are common in the general population. PSSP is most common problem after stroke. Its prevalence varies in up to 70% of patients and often appears in the first few days. It is an indicator of stroke severity, and 75% of patients complain of pain at some time in the first 12 months following a stroke (Ward, 2006) and 72% still complain of PSSP at 16 months (Lindgren et al., 2012).

It is also difficult to evaluate if individuals with shoulder pain prior to stroke are predisposed to PSSP. We recently reported that pain of any type and location is common in patients after a stroke. The aim of this report is to provide more detailed data about PSSP, including prevalence, characteristics, influence on daily life, and predictors in a population-based group of first-ever stroke patients (Lingdgren et al., 2007). In other study, PSSP is commonly localised to the affected upper extremity and

regarded as peripheral nociceptive pain. According to Lindgren et al. (2009) study, they used some parts of the diagnostic assessment for neuropathic pain in 19 patients with chronic post-stroke shoulder pain, however none of whom could be classified as having Central Post-Stroke Pain (CPSP). In the study, they strongly suggest that central pain mechanisms have an essential role in PSSP, even in patients who cannot be classified as having CPSP (Lindgren et al., 2009).

### ***2.2.2 Occurrence of PSSP***

Pain is a common impairment after stroke and has been reported in more than one third of stroke survivors. Shoulder pain, referred to as PSSP, is one common pain type, other types are headache, central pain, and spasticity related pain and musculoskeletal pain. PSSP is reported to occur in around 10% to 40% and central pain is reported to affect about 3-10 % of the stroke population (Klit et al., 2011). However, there is a difficulty in differentiating these pain types, as for example PSSP might be caused by as well musculoskeletal pain as spasticity and central pain (O'Donnell et al., 2013).

In other study, PSSP is reported by about one third of the individuals with PSSP and also one third describe a moderate to severe impact on daily life. PSSP is more common in individuals with severe stroke (Hansen et al., 2012). However, from the previous study, increase with ages has been reported to be a high factor for development of PSSP (Klit et al., 2011). The reported prevalence in a general population has in studies varied between 7% and 30%, with the highest prevalence in the 50-70 years of age, where ages in which stroke is prevalent (McBeth & Jones, 2007).

Besides, the prevalence of PSSP varies hugely from 5% to 84% in previous study. The logical reasons for these wide discrepancies are differences in definitions, time span after stroke, assessments or studied population. However, differences in care and rehabilitation may also contribute to the variety in prevalence (Langhorne et al., 200). The incidence of PSSP in some studies been reported to be associated with age and one study has reported higher prevalence of PSSP in women (Aras et al., 2004).