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# PREVENTION OF CEREBRAL STROKE AND REHABILITATION OF CEREBRAL STROKE PATIENTS

– nursing perspective

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# PREVENTION OF CEREBRAL STROKE AND REHABILITATION OF CEREBRAL STROKE PATIENTS

## – nursing perspective

Stroke is defined as a kind of fast developed clinical syndrome of focal cerebral dysfunction, and the symptoms can last for 24h or longer or even cause death. The epidemiology of stroke indicates that stroke become the second leading cause of death and the third leading cause of disability in the world. And it is guided that the sooner the stroke patient gets specialized treatment, the better the patient will survive from stroke.

The aim of this thesis is to find the best practice of prevention and rehabilitation for stroke patient. Hence the research questions of this thesis include: 'What is the evidence-based recommendation for stroke prevention according to the literature?', 'What is the best practice in rehabilitation for stroke patients in clinical work according to the literature?', and 'What is the nurse role for stroke patients in China and in Finland according to the literature?' The methodology of this thesis is literature review. The authors use Pubmed, EBSCOhost, CINAHL, CINAHL Complete, WHO library database and also journals to search the topic relevant to their research questions.

From the evidence-based literature, it is guided that stroke prevention can help to improve the survivor rate and avoid the secondary stroke. Stroke risks can be reduced by positive measures. It is also guided that the rehabilitation of the stroke patient should begin as soon as possible. The searching results of nurse's role indicates that nurse plays an multiple role in stroke ward. Nurse work as a caregiver, educator, coordinator, planer and advocator in the stroke ward. This thesis also compare the different nurse's role in China and in Finland.

KEYWORDS:

stroke, stroke patients, prevention, rehabilitation, nurse's role

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## **LIST OF ABBREVIATIONS (OR) SYMBOLS**

<b>ACE</b>	<b>Acetylcholinesterase</b>
<b>AF</b>	<b>Atrial fibrillation</b>
<b>AVH</b>	<b>Aivoverenkiertohäirtöt</b>
<b>BP</b>	<b>Blood pressure</b>
<b>CIMT</b>	<b>Constraint induced movement therapy</b>
<b>LBW</b>	<b>Low birth weight</b>
<b>LDL</b>	<b>Low density lipoprotein</b>
<b>m-CIMT</b>	<b>modified Constraint induced movement therapy</b>
<b>PRISMA</b>	<b>Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement</b>
<b>rt-PA</b>	<b>Recombinant tissue Plasminogen Activator</b>
<b>TIA</b>	<b>Transient ischemic attack</b>
<b>TCM</b>	<b>Traditional Chinese Medicine</b>
<b>t-PA</b>	<b>Tissue plasminogen activator</b>

## 1 INTRODUCTION

Stroke is defined as a kind of fast developed clinical syndrome of focal cerebral dysfunction, and the symptoms can last for 24h or longer or even cause death. Transient ischemic attack (TIA) is defined as no more than 24h duration. Angiogenic cerebral is the reason causing the stroke, cerebral ischemic stroke is incurred by the blood clot in the cerebral artery, and cerebral hemorrhagic stroke is incurred by the bleeding of blood vessels inside the brain (Clare 2017); both of them can cause the death of brain tissues for lack of blood supply. Ischemic stroke is the most common type, and can occupy about 80% of all strokes. Ischemic stroke can restrict or disturb the blood supply, and will often occur when the blood is blocked as it flows through the artery that supplies oxygen-enriched blood to the brain(Canadan Nursing Home. 2010).

Stroke is the main reason causing the long-term disease and disability of adults, and only 50-70% stroke survivors can restore independent functions, while 15-30% stroke replacement patients become permanently disabled. Thus, the WHO has emphasized on the importance of stroke prevention and rehabilitation( Chuenjairuang, Sritanyarat 2012).

Stroke is related to bad social economic status and life styles, including smoking, poor diet, excessive drinking, and limited sports activities. The dangerous factors include the age, genetic factors, race, nationality and low birth weight (LBW). The controllable risk factors include diabetes, hypertensive heart disease (heart atrial fibrillation), carotid artery stenosis, high blood cholesterol, smoking, drinking, obesity, unhealthy life styles and habits ( Clare 2017). High blood pressure is one of the most important dangerous factors, and it is applicable to decrease the danger of stroke through controlling the blood pressure (Xu, Wen 2015).

## 2 GENERAL SITUATION OF STROKE

### 2.1 The epidemiology of stroke

Recently, cerebrovascular disease has become the main reasons causing adult death; stroke is the second largest death reason for global people at the age of 60 and above, and also the fifth largest death reason for people aging from 15 years old to 59 years old. (Sun and Wang 2018.) The high incidence rate, high disability rate and high death rate have become the global public health issues. The average age for stroke has been obviously decreased to 69.2 years old from 71.2 years old. The stroke rate for people under the age of 55 has been increased to 18.6% from 12.9%. According to the regression model, as time goes by, the stroke will transfer towards a younger age. (Dawn, Jane and Charles 2010.)

According to the world health organization's global health estimate in 2012, stroke has become the second leading cause of death and the third leading cause of disability worldwide. (Lijing, Chaoyun, Jie, Rong, Janet, Yishan, Valery, Martin, Jaime, Dong and Yangfeng 2017.). From 1990 to 2010, the age-standardized incidence of stroke declined significantly by 12% in high-income countries, while it increased by 12% in low - and middle-income countries. Mortality was 37% in high-income countries and 20% in low - and middle-income countries, resulting in a significant decrease in mortality. (Valery, Mohammad, Rita, George, Myles, Derrick, Andrew, Ralph, Laurie, Thomas, Martin, Narayanaswamy, Suzanne, Carlene, Wenzhi, Yukito, Emma, Majid, Mohsen and Christopher, 2014.)

In the epidemiological investigation of stroke in Kuopio and Turku regions of Finland, the registration results of FINMONICA and FINSTROKE from 1983 to 1997 showed that the incidence, mortality and fatality rate of stroke were significantly reduced during this period. (Sivenius, Torppa, Tuomilehto, Immonen-Räihä, Kaarisalo, Sarti, Kuulasmaa, Mähönen, Lehtonen and



Salomaa, 2009.). In all the hospitals in the Finnish mainland that treated acute stroke, the number of patients aged 18-64 nationwide between 2004 and 2005 and 2013 and 2014 was reduced, showing both cerebral hemorrhage and subarachnoid hemorrhage. On the IS side, hospital admissions fell 6.3 percent for men and not for women. However, the number of hospitalized men aged 35-44 increased by 37.5%. IS patients declined by 20.8% in length of stay, while ICH and SAH patients had no significant change in length of stay. At the same time, the in-hospital mortality rate for IS patients decreased by 42.8%, while there was no significant change in ICH and SAH patients. (Sipila, Posti, Ruuskanen, Rautava and Kyto 2018.)

In China, the burden of stroke has increased significantly over the past 20 years, and accounting for the most years of life lost in 2010. (Lijing, Chaoyun et al., 2017.) The largest stroke burden in the world for Chinese recipients, a 2017 study showed that the age-standardized prevalence rate was 1114.8/100,000, incidence was 246.8/100,000, and mortality rate was 114.8/100,000 among adults over the age of 20 in the past 30 years. Male patients at 40 were significantly higher than female patients. The study also showed regional differences in stroke epidemiology in China, with rural areas higher than urban areas. Stroke morbidity and mortality were highest in northeast China and lowest in south China. (Wenzhi, Bin, Haixin, Xiaojuan, Dongling, Linhong, Limin, Yong, Yichong, Yilong, Zhenghong, Shengping, Yazhuo, David, Yongjun and Valery 2017.)

## **2.2 Main treatment of stroke**

Stroke is a serious life-threatening disease that occurs when blood is cut off from the brain and can cause a series of symptoms that affect your ability to speak, see, move, or feel. Emergency treatment is therefore essential. The sooner a person is treated for a stroke, the less harm he gets. The American Stroke Association has developed quick guidelines to help people understand the typical symptoms of stroke. These include: numbness or weakness of a leg,

confusion or difficulty of understanding, dyskinesia, dizziness, and unexplained severe headache. (Stephan, Joan, Falko, Vera, Helen, Richard, Madeleine, Gary, Martin and Martin, 2013. Darren, Gary, Helen, Christopher, Nick and Richard, 2014.) If you suspect yourself or someone else with a stroke, call an emergency number immediately. In Finland the emergency call is 112 (Aivoinfarkti ja TIA. 15.11.2016.), in China it is 120 or 999.

The main strategies for **ischaemic strokes** treatment include:

**Thrombolytic therapy** is most effective as soon as possible after stroke (Michael, Rivkin, Timothy, Michael and Catherine 2016.). Most strokes are caused by clots that clog the arteries in the brain. Timely use of thrombolytic drugs can restore blood flow before serious brain damage and improve recovery after stroke in some people. However, thrombolytic drugs can also cause severe brain bleeding, which can be fatal. A drug called Recombinant tissue Plasminogen Activator (rt-PA) was approved for use in selected patients within 4.5 hours and 3 hours of stroke in Europe and the United States. (Wardlaw, Murray, Berge and Zoppo 2014, Stephan, Joan et al 2013, Darren, Gray et al 2014). Thrombolytic therapy is no longer recommended if the stroke exceeds 4.5 hours, because it is not clear how much. (Michael, Rivkin, Timothy et al 2016.)

**Thrombectomy** can be used as an emergency surgical treatment for a small number of severe ischemic strokes. Because of proximal anterior intracranial circulation occlusion in patients with acute ischemic stroke, the recovery functional independence was less than 40% after treatment with intravenous tissue plasminogen activator (t-PA). In addition to intravenous t-PA, thrombectomy with a stent collector increases reperfusion rates and may improve long-term functional outcomes. (Jeffrey, Mayank, Alain, Hans-Christoph, Elad, Vitor, Gregory, Christophe, David, Werner, Olav, Tudor, Heinrich, Raul, Adnan, Dileep, Blaise, Thomas, Demetrius, Vivek, Richard, Oliver, Reza 2015.) Current guidelines recommend endovascular thrombectomy after

acute ischemic stroke within 6 hours of symptoms. (Conan, Naveed, Dheeraj, John and Melissa 2018) This process involves inserting the catheter into the artery, usually in the groin, through the catheter into the artery of the brain. The device is used to remove clots by suction. The operation can be performed locally or under general anesthesia.

**Antiplatelet** is the main drug to prevent secondary stroke. The most commonly used antiplatelet drug is aspirin. (Olga. and Natan 2011.) Aspirin remains the preferred antiplatelet drug for the secondary prevention of stroke due to intracranial atherosclerotic stenosis. (Maria, Imama, Asha and Ayeesha, 2011.) Antiplatelet therapy has the importance of paying attention to individualized therapy.

The main strategies for **hemorrhagic strokes** treatment include:

**Surgical treatment** of hemorrhagic stroke. As with ischemic stroke, emergency surgery is sometimes required in addition to medication. In hemorrhagic strokes, hematoma can lead to brain edema, causing life-threatening patients. The surgery, commonly called craniotomy, involves surgeons removing blood from the brain and repairing broken blood vessels to ensure that no clots limit blood flow. (Chen, Wang, Huang, Lai, Tang, Yang, Wu, Zeng and Qu, 2014.)

### **3 THE AIM OF THE RESEARCH AND RESEARCH QUESTION**

This thesis aims to explore the nursing methods of stroke rehabilitation, nursing practice of stroke prevention and the role of nurses in prevention and rehabilitation. The role of nurses in the prevention, treatment and rehabilitation of stroke is diversified and multifaceted.

The research questions are:

What is the evidence-based recommendation for stroke prevention according to the literature?

What is the best practice in rehabilitation for stroke patients in clinical work according to the literature?

What is the nurse role for stroke patients in China and in Finland according to the literature?

#### **4 METHODOLOGY**

Methodology of this thesis is systematic literature review. A systematic literature review tries to contradistinguish all relevant articles to answer special question (Liberati, Altman, Tetzlaff, Mulrw, Peter, Ioannidis, Clarke, Kleijene and Moher 2009). Systematic review makes sure the validity and reliability of the thesis. The authors will get a depth knowing of the current state about their research question through systematic literature review. Liberati, Altman et al (2009) also indicated that main features of systematic review include: 1) a specific object, 2) a systematic research according to the setting object, 3) assess the validity and reliability when choosing the suitable material, 4) summarize the research articles.

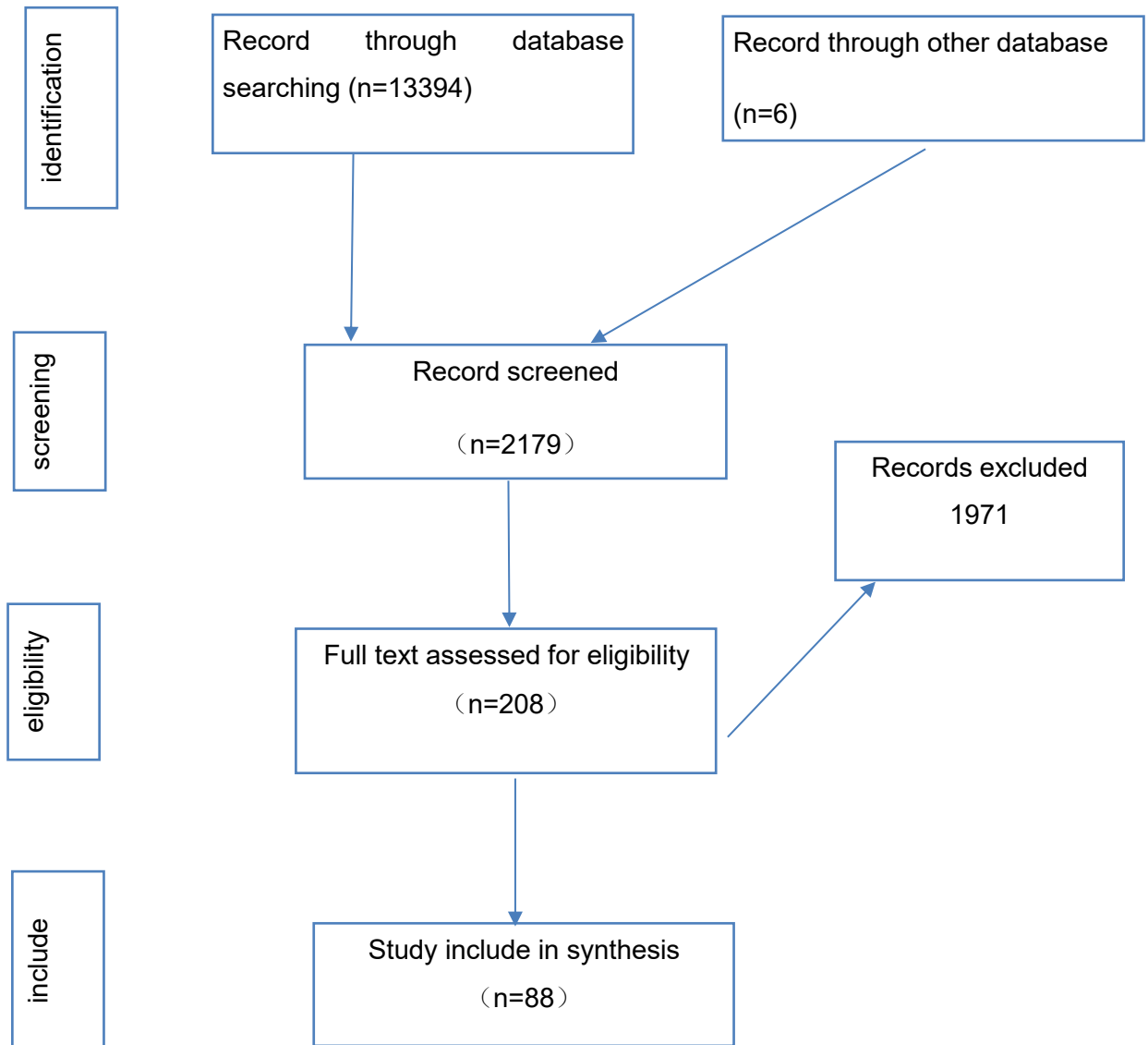
When doing this review is all according to requirements of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement (Koch, Harder, Kries, Rüdiger and Wichmann; Saito, Gilder, Nosten, Guerin and McGready; Vijverberg, Ferdinand, Beekman and Meijel; 2017). PRISMA makes sure that the authors conclude the literature in a bright and complete way. Systematic literature review can give a comprehensive point from an important reason to identify a next step (Mcdougall 2014). Thus the authors will get the answers to their research questions from the process of searching the material but they will also always think of the limitation of their research.

#### 4.1 Search strategies and databases:

In the beginning, the authors are screening all titles of all articles (Bouck and Deardorff 2018) when they search the key words 'stroke' in the databases. It is easy to find out which is useful and which is unuseful to this thesis according to screening the titles. In order to find the useful articles, the authors used search terms "OR" and "AND" (Mallinger, Gaines-Day and Gratton 2017). The authors combine the key words like 'stroke patients or stroke survivors' and 'prevention', 'stroke patients or stroke survivors' and 'rehabilitation', 'stroke patients or stroke survivors' and 'nurse's role'. The authors use Pubmed, EBSCOhost, CINAHL, CINAHL Complete, they also limit the time from 2008-2018. Since the authors want to know the information about China, they will also search journal articles in international journal. But they just use journal articles printed in English (Gaykong, Seungyeop, Hyunjong, Byungjoon, Seungchul, Kihun and Wanhee 2017). The authors also use WHO library database in order to find the detail of stroke epidemiology.

Then the next step is to read the abstract to find out which article should be read full text (Bouck and Deardorff 2018). After reading all the abstracts, authors limit full articles to their relevant studies (Oh and LaPointe 2017). If at least one of the authors points out that an abstract should have been read, then all the authors should read (Hoedjes, Stralen, Joe, Rookus, Leeuwen, Michi, Seidell, Kampman, Stralen, Joe, Leeuwen and Seidell 2017). After they analyze all full-text articles (Mertz, Kahrass and Strech 2016 and Palla, Karaolanis, Katafigiotis and Anastasiou 2017), they choose which they want. **Figure 1** shows the detail about research process.

**Figure 1: the research process**



#### 4.2 Inclusion and exclusion criteria

Inclusion criteria included all published (Gottlieb 2017) literature. **Table 1** gives the details about inclusion and exclusion criteria.

**Table 1 Inclusion and exclusion criteria**

Inclusion criteria	Exclusion criteria
Research article in English, Chinese and Finnish language	Research article in other language which the authors do not know
Research article from 2008	Research article before 2008
Research article can be read full text	Research article can be read only abstract
Research article available to Turku university of Applied Science, WHO library and journals	Research article cannot be read in free

### 4.3 Data analysis

After reading all the choosed literatures, the authors will choose the literatures which gives them the answers to their research questions. Main outcome measures are from quality and quantity of retrieved articles (Clark and Marshall 2017). In order to increase personal bias, the authors are divided into two groups, two authors work as a team. They cross checking and discussing each article, the other two authors supervised the procedure (Panagopoulon, Hancock and Tziaferi 2017). The authors will read not only one time in order to get a deep understanding of the article and mark the important part (Cuman and Gastmans 2017) and at last the authors all agree the present study with all

selected articles (Errani, Mavrogenis, Cevolani, Spinelli, Piccioli, Maccauro, Baldini and Donati 2017).

The authors want to find out some recommendations about prevention and rehabilitation for the readers according to literatures. The author makes note in each article such as highlight the important sentence or paragraph when reading the article in order to make the other authors easier and more quickly get the major idea of the article since there are 208 articles need to be read full text. Then the authors will discuss about after reading the full text.

When analyzing the articles about nurse's role, the authors agree that they will not only read the researched articles but also discuss about their own experience in their previous jobs in China and previous practice in Finland. This makes the authors believe that nurse's role can be more clearly described in this kind way.

## **5 HEALTH PROMOTION**

Health promotion is an important aspect of nursing practice. Nurses provide healthy lifestyle, behavioral information and health education for stroke patients. Primary health care institutions track the intervention measures initiated at the hospital.

If the cause of the first stroke is an embolus caused by a heart or carotid stenosis, the second stroke is most likely to occur within 1-2 weeks after the first stroke, so the risk of a second stroke is greater, and may be cause severe disability. Stroke patients are susceptible because they have inappropriate lifestyle choices, such as poor nutrition strategies, smoking and drinking, and lack of exercise. These factors have a negative impact on the health of stroke patients (Lawrence, Kerr ,Watson,Jackson,Brownlee. 2009).



Among stroke patients, complications include contracture, spasm and pressure sores, as well as depression and isolation feelings and the psychological social adaptation for isolation and environmental issues.

## **6 THE RECOMMENDATION METHODS OF STROKE PREVENTION**

Stroke is still a major global health issue. Due to continuous change in population structure, the population of developing countries is transforming to aging and healthiness, and the effect of stroke on the future may be enhanced (Lawrence, Kerr et al.2009). Stroke is the second cause of disease and death in the world, and also the main reason to obtain disability for adults (Sakakibara, Kim, Eng. 2017). The effective prevention strategy is the best way for alleviating the serious consequences and burden of stroke.

### **6.1 The prevention methods of primary prevention**

Primary prevention is an individual-based clinical method to disease prevention designed to prevent the occurrence of disease in other healthy people. Primary prevention and health promotion recommendations related to stroke strengthen lifestyle and risk factor management. The importance of screening and monitoring high-risk patients for the first stroke is emphasized (Yan, li, Chen, lu, Janet, Zhu, Valery, Martin, Miranda, zhao, Wu.2017)

#### **6.1.1 Cerebral stroke risk factors**

High incidence rate and easy reoccurrence of cerebrovascular disease are the important reasons leading to clinical disease and invalidism. There are many dangerous factors causing cerebrovascular disease. Among them, aging, gender, low birth weight, race and inheritance etc. are unforeseeable factors; hypertension, diabetes, atrial fibrillation and other cardiac diseases, dyslipidemia, asymptomatic carotid artery stenosis, obesity, smoking, unhealthy lifestyle,

drinking, metabolic syndrome, hyperhomocysteinemia etc. are foreseeable factors. Hypertension is the most important independent dangerous factor of them. Effect intervention and management of cerebrovascular disease and other dangerous factors can reduce or delay the occurrence of the cerebrovascular disease (Xu, Wen 2015).

Smoking and blood pressure are the most important risk factors that can be adjusted in the risk factors for stroke with great association, high prevalence rate and intervention between them (Yan, Li et al. 2017). The elevation of blood pressure is the most important risk factor of ischemic stroke. With elevation of blood pressure level, there is steady increase in stroke risk, doubled stroke risks and decrease in threshold value (Amelia, Charles, Mitchell. 2018).

The targeted intervention measures are taken to reduce the risk factors for decreasing blood pressure and smoking while promoting physical exercise and healthy diet to greatly alleviate stroke burden. Therefore, changing lifestyle is the primary prevention measure for stroke (Charles, Jose. 2015).

### **6.1.2 Lifestyle and risk factor management**

Healthy and balanced diet: Various dietary factors can affect stroke, including intake of saturated fats, fruits and vegetables, oils, sodium, potassium and B vitamins (Elena, Xin, Mary, Pooja. 2015). These dietary factors can work by affecting the development of hypertension and atherosclerosis. Preventing stroke requires a healthy and balanced diet such as fresh fruits and vegetables, low-fat dairy products, and soluble fiber (Barbara, Chair, Harleah, Victoria, Sandra, Christopher, Terry, Joann, Judith, Diane, David.2017). The diet shall be low in saturated fat, including two servings per week (one of which should be oily) and at least five servings of fruit or vegetables per day. As the intake of fruits and vegetables increases, the age-adjusted risk of stroke decreases. This effect is unaffected by body mass index, smoking, glucose intolerance, physical activity, blood pressure, serum cholesterol and energy intake, ethanol and fat.

**Sodium:** Hypertension is associated with long-term intake of high sodium, which is well documented. High sodium intake has a direct negative effect. It is recommended to reduce the salt content of the diet, and the intake shall not exceed 6 grams of salt per day. The source of daily recommended sodium intake is called as adequate intake (Pinzon, Furie 2009). For people between the ages of 9 to 50, the appropriate intake is 1.5 grams. The appropriate amount of vitamins for people at the age of 51 to 70 can be reduced to 1.3 grams, and for those who are over 70 years old can be reduced to 1.2 grams. The daily intake of any age group shall not exceed 2.3 grams. (Lindsay, Bayley, Hill, Woodbury, Phillips. 2008).

**Quitting smoking:** Quitting smoking and avoiding the contamination of second-hand tobacco and smoke is an important strategy to prevent stroke and stroke recurrence. Nurses shall play an important role in raising smoking/quitting smoking issues (Lawrence Kerr et al. 2009). Smoking doubles the risk of stroke, destroys the blood vessel wall, accelerates arterial blockage, elevates blood pressure, and makes heart work difficult. This thickens the blood and increases the accumulation of plaque in the artery, causing the formation of blood clots.

**Exercise:** Physical exercise is an important, adjustable lifestyle approach that can affect the primary prevention of stroke. In order to stay healthy, individuals shall have moderate-intensity aerobic exercise every week, such as walking (preferably brisk walking), jogging, cycling, and swimming. In addition, resistance exercise is performed at least twice a week to maintain or improve muscle strength. These activities can be used as a supplement to daily activities. Stroke patients are encouraged to exercise regularly (Lawrence Kerr et al. 2009).

**Weight:** Overweight can become a burden on the circulatory system. Exercising five times a week can maintain low salt, low calorie, low saturated fat, low trans-fat and low cholesterol diet, eat fruits and vegetables every day, and maintain healthy weight. Extra weight is prone to high blood pressure, heart

disease and diabetes, which may increase the risk of stroke (Charles, Jose. 2015). Losing weight can reduce stress to lower blood pressure. Active exercise can also help lower cholesterol and control diabetes, thereby improving overall health.

**Drinking:** Individuals have one or two cups a day and are at risk of ischemic stroke. Drinking more than 5 cups per day is the most dangerous. Drinking has a dose-dependent effect on the risk of hemorrhagic stroke. Heavy drinking is associated with a hemorrhagic stroke risk. Irregular alcohol abuse increases the risk of hemorrhagic stroke (Elena, Xin et al. 2015): the standard daily alcohol consumption for men is limited to 2 cups or less, and the standard daily alcohol consumption for un-pregnant women is limited to 1 cup (Morris, Carter, Martin.2017).

### **6.1.3 Blood pressure management**

Hypertension is a major problem in almost all countries of the world, it is the risk factor for stroke's most important adjustable risk factor of more than 80%, including high blood pressure, current smoking, abdominal obesity, diet and physical activity. Among these risk factors, hypertension is the most important risk factor for stroke. Hypertension has a more significant effect on stroke than on heart disease (Elena, Xin et al. 2015).

The relationship between blood pressure and cardiovascular risk is “continuous, consistent”, independent of other risk factors (Amelia, Charles et al. 2017). Treating hypertension helps prevent stroke, and blood pressure lowering is usually more important than the agent used to help achieve this goal. Hypertensive patients with a history of cerebrovascular disease have a particularly high risk of stroke recurrence. Antihypertensive therapy can reduce the risk of vascular events over a wide range of initial blood pressures. People with stroke should always measure their blood pressure. (Charles, Jose 2015).

In particular, treatment based on ACE inhibitors or angiotensin receptor blockers has been shown to be effective in preventing stroke. The overall goal of blood pressure management is <140/90 mmHg. However, the target for stroke or myocardial infarction is <130/80 mmHg. In addition, patients with diabetes and kidney disease have a target <130/80 mm Hg or even a lower proteinuria > 1 g / day. The treatment goal is not dependent on age, but can be over eighty years old. Elderly patients should consider the possibility of pseudohypertension (hard venous thrombosis) and the risk of orthostatic hypotension. (Aivoverenkiertohäiriöiden sekundaaripreventio. 2015).

Arranging and completing a specific follow-up can assess and diagnose high blood pressure after the initial increase in blood pressure. Patients with refractory hypertension shall be fully investigated for the secondary onset causes of hypertension.

#### **6.1.4 Blood lipid quality assessment**

The causal relationship between dyslipidemia and atherosclerosis has been well documented (Elena, Xin et al .2015). In the primary prevention of coronary artery disease, peripheral vascular disease and stroke, it is necessary for health care providers to screen and properly manage dyslipidemia. Emphasis is placed on the need to balance lifestyle and risk factor changes. The behavioral changes and drug interventions can maximize treatment and improve cardiovascular outcomes and stroke outcomes.

Treatment of dyslipidemia can effectively prevent atherosclerotic complications. The main goal of the treatment is to lower LDL-cholesterol levels. The primary goal of current treatment guidelines for dyslipidemia is <5 mmol/L, LDL-cholesterol <3 mmol/L total serum cholesterol concentration, especially for high-risk patients, <1.8 mmol/L LDL cholesterol level target or reduction at least 50%. The goal is to take the necessary medical measures to achieve the goal, considering the overall risk of the patient. There are no controlled studies that

can affect dyslipidemia, and only lifestyle changes can reduce the number of brain infections. However, lifestyle changes have always been the basis for the treatment of dyslipidemia. (Aivoverenkiertohäiriöiden sekundaaripreventio. 2015).

Dyslipidemia can reduce ischemic stroke. This has been shown to be able to use statins. In a group of coronary arteries, intensive statin therapy is more effective in lowering LDL cholesterol levels and reducing ischemic stroke than conventional statin therapy. However, age or cholesterol levels in baseline treatment do not affect treatment outcomes. High doses of atorvastatin also can reduce the risk of new ischemic stroke in patients already with AVH.

Blood lipid medications can reduce ischemic strokes. This has been shown to work with statins. Enhanced statin therapy can effectively lower LDL cholesterol levels and reduce ischemic stroke. For most patients with high global cardiovascular risks, statins drugs are used for primary prevention of cardiovascular events, including stroke. Statin drug therapy provides a high level of protection against all-cause mortality and non-hemorrhagic stroke. And strengthens the need to consider extending statin therapy in patients at high risk for major vascular events, but caution is still needed for the patients at risk of bleeding (Daniel, Edward, Anne, Myriam, Mary, George, Brett, Steven, Judith, Lynda, Lee, Eric, Amytis. 2014).

### **6.1.5 Blood glucose control**

Diabetes is an independent hazard for stroke disease. Stroke and diabetes are two independent conditions. With increase in the prevalence rate of the two diseases, both of them are diseases that affect blood vessel, and related to other blood vessel risk factors, such as hypertension and dyslipidemia. Diabetes is an abnormal glucose regulation with representation, and can be shown in as much as two thirds of the patients with acute stroke. The positive glucose management after acute stroke hasn't shown that the prognosis can be

improved or further stroke incidence rate can be reduced. An even more rewarding result is that positive management of other cardiovascular risk factors has been proved to prevent stroke disease and improve the prognosis after stroke of the patients with diabetes. With these diseases becoming more common, appropriate primary prevention treatment must be provided for the patients with diabetes to prevent diseases and minimize the disability (Hewitt, Castilla, Fernández-Moreno, Maria, Sierra 2012).

Lifestyle changes, including weight control, reducing total fat intake, especially saturated fat intake, increasing fiber intake and increasing physical activity, can reduce the incidence of diabetes in high-risk groups.

Diabetes is an important qualifiable risk factor for stroke, especially ischemic stroke. Hyperglycemia in acute stroke is associated with poor prognosis in ischemic stroke and hemorrhagic stroke. It needs to be energetically corrected, but the best management is still unknown. Active control of blood sugar through lifestyle changes or pharmaceutical and other associated risk effect factor such as blood pressure and dyslipidemia are key step in the effective prevention of stroke (Chen, Bruce, Feng 2017).

## **6.2 Secondary Prevention Method**

Due to high recurrence rate of stroke, the secondary prevention of stroke is particularly important. About one third of stroke survivors will have stroke recurrence within five years (Yan, Li et al 2017). The secondary prevention highlights the healthy lifestyle, including healthy diet, appropriate sports and non-smoking etc. It is similar to the primary prevention. (clare 2017)

### **6.2.1 Blood pressure control and management**

Blood pressure (BP) plays a crucial role in stroke management and prevention. There is a recognized association between hypertension and increase in stroke risk. Blood pressure is considered as the most important modifiable risk factor, including today's smoking, abdominal obesity, diet and sports, with the most significant impact on the hypertension treatment and control effect as found. As the stroke risk in hypertension population rises, the stroke risk increases with the increase in smoking, diabetes and other hazards. At least three fourths of hypertension patients only can avoid stroke through appropriate treatment. Stroke is not caused by single risk, but by various hazards resulting from interaction (Pinzon, Furie 2009).

The non-pharmacological methods to decrease and control blood pressure includes following healthy diet, regular sports, appropriate drinking, reduction of sodium intake in food, avoiding from being contact with cigarettes and tobacco and management of high stress level. The recommended goal for blood pressure for current hypertension medicine treatment <140/90 mg/Hg (or <130/80 for the patients with diabetes and nephropathy). Meanwhile, it is recommended that the combined use of angiotensin converting enzyme (ACE) inhibitor and diuretic is a priority (Pinzon, Furie 2009).

### **6.2.2 Blood lipid control and management**

Due to the well-established causal relationship between dyslipidemia and the development of atherosclerosis, appropriate management is important for primary and secondary prevention of stroke. In order to maximize treatment and improve cardiovascular disease, the current strategy is to balance lifestyle and risk factors through behavioral changes and pharmacological intervention (Malewezi 2011).



Hyperlipidemia leads to an increased risk of stroke secondary to atherosclerosis. Stroke can be prevented by aggressively lowering cholesterol levels, and statin therapy can reduce the risk of secondary ischemic stroke in patients with a history of stroke or TIA. It is recommended to use statins in ischemic stroke or TIA patients. For patients with stroke caused by bleeding, lipid-lowering therapy is not recommended. Patients with acute stroke are not recommended to start statin therapy immediately (Amelia, Charles et al. 2018).

For patients with moderate cardiovascular risks, statins shall be considered for prevention of cardiovascular events, including stroke. Statins cannot prevent cerebral hemorrhage. For patients with cerebral hemorrhage with a defined cholesterol-lowering treatment accompanying with indication, statin therapy shall be personalized, and the overall risk of thrombosis and statin therapy shall be considered to increase the risk of cerebral hemorrhage (Zhao, Zhang, Dong, Wen, Cui 2014).

### **6.2.3 Control of atrial fibrillation**

Atrial fibrillation (AF) is a common arrhythmia. It is related to increased ischemic stroke risks. It is very important in detection after AF stroke or TIA, because it can be effectively treated once being identified. However, due to insufficient treatment of AF, and due to its frequent paroxysmal and asymptomatic features, the patients shall not be subject to regular long-term screening (Lindsay, Bayley et al. 2008).

Patients with suspected transient ischemic attacks or ischemic stroke shall use a multi-channel ECG to evaluate heart rhythm and determine atrial fibrillation, tremor, or structural heart disease (e.g., myocardial infarction, left ventricular hypertrophy).

For acute embolic ischemic stroke or unidentified source TIA, ECG monitoring is recommended for at least 24 hours as part of an initial examination in stroke to detect paroxysmal atrial fibrillation in patients who may receive anticoagulant therapy.

The medicine regimen is an antiplatelet compound such as aspirin for the treatment of low to moderate risk thrombosis in patients with atrial fibrillation. Anticoagulation with vitamin K antagonism can reduce the risk of stroke and moderate-to-high thrombosis (Wilson 2013).

#### **6.2.4 TIA risk factors and management**

Transient ischemic attack (TIA) is the onset of transient neurological dysfunction caused by focal brain, spinal cord or retinal ischemia without acute infarction. Generally, the patient's medical history, neurological examination, or neuroimaging is CT head scanning diagnosis. Typical symptoms of TIA include speech impairment, unilateral weakness or loss of sensation, blindness of one eye, visual field defect, or ataxia.

TIA is most common in embolism or thrombosis of atherothrombotic disease, with its pathological mechanism similar to cardiovascular disease. In addition to the etiology, there are common potential risk factors for cerebrovascular and cardiovascular diseases. Vascular disease can alter risk factors including smoking, excessive drinking, lack of physical activity, dietary factors, high blood pressure, dyslipidemia, diabetes and obesity (Heron 2017).

After TIA acute diagnosis, the patient shall take 75mg aspirin as the preventive dosage, and can be assisted with other medicines, such as dipyridamole and clopidogrel. These medicines can reduce blood clots as well as the chance to form clots in the blood circulation. The patient shall start take statins to reduce

cholesterol level, take appropriate dose of antihypertensive agents to control the blood pressure (Shelagh 2017) .

### **6.3 Prevention of stroke risk in Chinese traditional Qigong.**

Eight trigrams boxing is a traditional Qigong of China, and has been existed as an exercise both mind and body of China's elder people in communities. With a very long history in China, eight trigrams boxing is a comprehensive exercise both mind and body involved body postures and actions, breathing exercises and relaxing, and it has been recommended by the Chinese Health Qigong Association to be widely used in society (Zheng , Fang, Chen, Yi, Qiu, Chen 2015). As a complex integral "exercise both mind and body", eight trigrams boxing has obvious TCM characteristics, and may be related to greater health potential. Its scientific and medical advantages have received special attention in recent decades. An increasing number of studies have investigated that for osteoporosis in middle-aged women, the regular eight trigrams boxing exercises reduce oxidative stress, increase antioxidant enzymes, and improve the quality of life and sleep quality of the elderly, and moreover promote multiple system or organ functions (such as digestion and circulatory system), increase immunity and relaxes the body, and also improve mood and confidence. Eight trigrams boxing has a potential to promote the physical and mental health of the population of elderly communities, and can be used as an exercise both mind and body for health promotion in the elderly communities. This leads to effective improvement in balancing strength and promoting physical flexibility of healthy adults, and also reduces their blood pressure, insulin resistance, glycosylated hemoglobin, blood glucose level and other cardiovascular and cerebrovascular diseases.

However, the positive effects of eight trigrams boxing have not been fully confirmed by rigorous prospective trials. Its scientific and medical advantages have received special attention in recent decades (Zheng, Chen, Fang, Yi, Qiu, Chen, Tao, LI, Zheng, Li, Lan 2015).

## **7 THE BEST PRACTICE OF REHABILITATION FRO STROKE PATIENTS**

### **7.1 Several recommendations for stroke rehabilitation**

Stroke rehabilitation is a process that stroke patients can again balance their own bodies, get their brains working normally and achieve their social function (National Stroke Foundation 2010). Langhorne, Bernhard and Kwakkel 2011 describe stroke rehabilitation including four part: 1) evaluation, to find what the stroke patients need, 2) achievement setting, to find what kind of goal can be reach after rehabilitation, 3) action taking, to do rehabilitation in order to reach the achievement, 4) evaluation again, to evaluation does the setting goal be reached in the end (Langhorne, Bernhard and Kwakkel 2011). According to the European Stroke Organization Executive Committee (2008), early stroke rehabilitation including speech therapy, occupational therapy and physical therapy. Hence the process of rehabilitation needs a multidisciplinary care. A physiotherapist will help the patients to get balance and coordinate ability again, get the muscle strength, and guide the patients how to stand and move in a safety way (Gregory, Galloway 2017). The occupational therapist will help the patients re-learn the everyday activities e.g. writing or eating by using their unaffected hand(Gregory, Galloway 2017).

There is a study indicating that 80% of the stroke patients can regain their own functions best in 6 weeks after the patients suffer from stroke and 95% of stroke patients can regain their own functions in 12.5 weeks after the patients suffer from stroke (Scherbakov, Ebner, Sandek, Meisel, Haeusler, Haehling, Anker, Dirnagl, Joebges and Doehner 2016). And it is guided that rehabilitation for stroke patients should start as early as possible (National Stroke Foundation 2010, The European Stroke Organization Executive Committee 2008). It is also reported that early rehabilitation can lead to a better result of activity of daily living (Kinoshita, Nishimura, Nakamura, Hashizaki, Kojima, Kawanishi, Uenishi, Arakawa, Ogawa, Kamijo, Kawasaki and Tajima 2017). Hence it is recommended that stroke patients should begin their rehabilitation exercise

early in the stroke unit (Nijland, Wegen, Krogt, Bakker, Buma, Klomp, Kordelaar and Kwakkel 2013).

It is reported that patient will recover better if the stroke patient (and his family) has strong motivation and engagement (Langhorne, Bernhardt et al. 2011) and some stroke patients considered home as their own, peaceful place to do rehabilitation (Lou, Carstensen Møldrup, Shahla, Zakharia and Nielsen 2017). Moreover, early supported discharge is regarded to help stroke patients and their partners re-adapt their lives (Lou, Carstensen et al. 2017). Hence it is recommended that stroke patients can stay a short time in hospital then go back to home to do rehabilitation. But Langhorne, Bernhardt et al. (2011) indicate that a multidisciplinary team including physiotherapist, occupational therapist and nurses should work together to help the patients to survive from the activities of daily living at home. In addition, it is suggested that rehabilitation should begin meanwhile the stroke patient discharge from the hospital (Scherbakov, Ebner et al. 2016).

## **7.2 Constraint induced movement therapy (CIMT) and modified Constraint induced movement therapy (m-CIMT) used in stroke rehabilitation**

It is estimated that approximately 43%-69% stroke patients have the upper-extremity problem after they suffer from stroke and 67% still fell non-use of the side which they suffer from stroke after 4 years (Siebers, Öberg and Skargren 2010). Since upper-extremity dysfunction is a normal appearance after stroke (Aloraini, MacKay-Lyons, Boe and McDonald 2014), Constraint-induced Movement therapy (CIMT) is effective in improving the upper-extremity function showed in both the European Stroke Organization Executive Committee 2008 and National Stroke Foundation 2010 guidelines. Several studies also confirm the effective result (Jeong-hui, Moon-young 2018, Abdullahi, Shehu and Dantani 2014, Aloraini, MacKay-Lyons et al. 2014).

CIMT is usually used to help chronic stroke patients regain upper function involving intensive training with different kinds of exercise (Siebers, Öberg and Skargren 2010). Stroke patients should do the exercise by using the impaired limb for 6 hours 5 days in one week and it will continue 2 weeks (Siebers, Öberg and Skargren 2010). Although CIMT is useful in developing the upper limb function, there are also studies showing that patients feel uncomfortable when doing CIMT maybe because of the use of the gloves (Eun-Kyn, Sang-Heon 2016, Juhyung, Nayun, Yongho and Yeongae 2015). Hence modified constraint induced movement therapy (m-CIMT) is created to decrease the restriction of CIMT (Juhyung, Nayun et al 2015) and to shorter the time in arm exercise (Rutuja, Asmita and Sujata 2013).

It is reported that many chronic stroke patients show the better situation in upper limb function, activities of daily living and quality of life when doing m-CIMT (Juhyung, Nayun et al 2015). Both CIMT and m-CIMT are effective in upper-extremity function, Nijland, Wegen et al (2013) suggest that m-CIMT can also be used in acute rehabilitation to decrease the upper limb impairment.

### **7.3 Acupuncture in stroke rehabilitation**

Stroke rehabilitation techniques grows quickly (Liu, Li, Jiang and Chen 2014). Acupuncture, used as one of the treatments in Chinese traditional medicine (Wu, Mills, Moher and Seely 2010) in China for more than 2000 years (Li, Zhang, Meng and Qian 2014, Wu, Mills et al 2010, Huang, McCaskey, Yang, Ye, Tao, Jiang, Schuster-Amft, Balzer, Ettlin, Schupp, Kulke and Chen 2015, Liu, Li et al 2014), has been proved the effect in stroke rehabilitation (Zhang, Li, Ren, Cui, Xie, Shin, Tan, Tang, Bai and Zou 2014, Li, Zhang et al 2014, Wu, Mills et al 2010). Acupuncture is also recommended by World Health Organization(WHO) (Li, Zhang et al 2014, Chavez, Huang, MacDonald, Lin, Lee and Chen 2017, Chen, Wang, Huang, Lai, Tang, Yang, Wu, Zeng and Qu 2014) in order to supply stroke patients with another treatment different from normal treatment (Chen, Wang et al 2014), relief the pain in stroke rehabilitation (Sung, Junghee,

Euiju, Hyun, Seungwon, Gajin and Hyeong 2015) and promote the body functions (Li, Zhang et al 2014).

The procedure of acupuncture does not use any drug (Jung, Si-Woon Pil, Sung, Sejeong, Kyung and Kyoung 2012). Acupuncture procedure is to insert a sterile, single-used needle into skin or deeper tissue (Chavez, Huang et al 2017, Zhang, Li et al 2014, Chen, Wang et al 2014). Though the theory of how acupuncture works effectively remains unknown (Jung, Si-Woon et al 2012), it is thought that acupuncture take the effective role on improving stroke rehabilitation (Wu, Mills et al 2010, Chavez, Huang et al 2017) because acupuncture makes the energy flow change (Chen, Wang et al 2014) to achieve the aim such as relieving shoulder pain (Jung, Si-Woon et al 2012) and getting better cognitive situation after stroke (Liu, Li et al 2014) when the acupuncturist inserts the needle into special points (Zhang, Li et al 2014, Bai and Lao 2013). It is also thought that acupuncture is a process of getting energy (de qi) (Bai and Lao 2013).

It is said that Baihui (GV20), Zusanli (ST36), Quchi (LI11), Shuigou (GV26), Dazhui (GV14) and Hegu(LI14) are used as acupoints normally (Chavez, Huang et al 2017). It is also proved that Yanglingquan (GB34) is effective in treating hemiplegia and improving function after stroke (Bai, Tao, Wang, Wang, Sun, Hao, Chen, and Lao 2014, Zhang, Li et al 2014). All acupuncture procedures will be done by a professional doctor called acupuncturist (Bai, Tao et al 2014).

It is also mentioned that acupuncture can be used treat acute and semiacute stroke (Sung, Junghee et al 2015). Since the authors just find one review, whether it is effective in treating stroke should get the conclusion after further study.

## **8 NURSE'S ROLE IN NURSING STROKE PATIENTS IN STROKE WARD**

### **8.1 Nurse as a caregiver in nursing stroke patients**

Nurses in stroke ward play an important role in caring stroke patients (Zhao, Yue, Li, Lang, Wang, Du, Deng, Wu and Yuan 2018) since stroke patients may need much specific help due to their special situation.

It is said that nurses as a caregiver should supply stroke patients with basic nursing care (Antczak-Komotersha, Filipaska and Raszka 2017). Normally, it is thought basic nursing care includes: supplying patients with a suitable environment, making the sleeping environment quite to make sure that patient gets enough rest, supplying patients with enough nutrition (Zhao, Yue et al. 2018), doing multiple assessment.

Since there is reported that environment is important to disability patient (Ziejka, Skrzypek-Czerko and Karowice 2015), nurses have the responsibility to provide stroke patients with a comfortable environment. It is guided that nursing care should be effective in helping patient to get used to the environment which he does not familiar with.

Though the nursing role in nutrition is not well described, nurses are advised to take part in the nutrition more actively (Perry, Hamilton, Williams and Jones 2013) since bad condition of nutrition can cause much complication and Catangui, Slark thought that bad nutrition condition will increase the stroke patient's hospitalization. Perry, Hamilton et al (2013) also indicated in their study that nurses have the responsibility to put the patients into a comfortable and safety position, guide the patients with eating or drink and meanwhile nurses can do the observation and assessment. During mealtime nurses can identify the problem with eating such as swallow problem (Theofanidis 2015), check the oral hygiene (Perry, Hamilton et al 2013), nurses also can assess the nutrition situation of the patients.

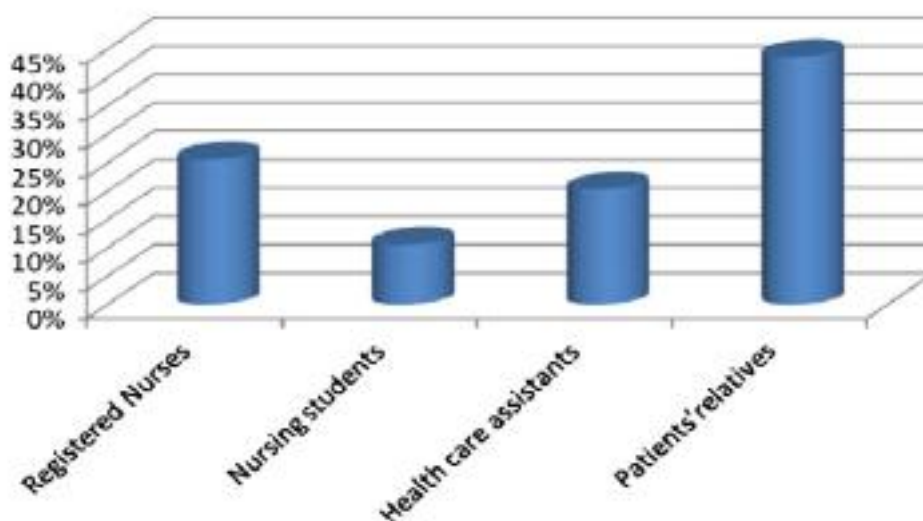
Nurses should (1) assess the vital signs such as blood pressure, temperature and blood glucose, (2) assess the bowel function to figure out if the stroke



patient has constipation (Theofanidis 2015), (3) assess the bladder function and find out the reason caused bladder problem (Nazarko 2010) if necessary the patient will be inserted a urine catheter (Catangui, Slark 2012), (4) assess the skin condition to prevent the pressure ulcer (Catangui, Slark 2012), (5) identify the early emotion problem such as depression (6) assess the stroke patient's knowledge about stroke. After nurses have done the assessment, they also should find out why the patients have problems and try to find out the solution for the problems. Nurses should also assess the patient's condition in order to prevent the complications such as pressure ulcer (Ziejka, Skrzypek-Czerko et al. 2015) since many stroke complication can be prevented by early identification and early treatment (Catangui, Slark 2012).

Since family members play an important role when caring the stroke patients in stroke ward in China (Jiang, Li, Ma and Gu 2015), nurses will not do all the basic care exactly themselves. The relatives will supply any help to what patients want, this is quite different from any other countries (Jiang, Li et al 2015). **Figure 2** also shows that register nurses do only a little part of nursing care and family member do a lot of part of non-technical nursing care for the patients. Beatrice and Yilan 2009 point out that nurses in China are in all full-time jobs and the bed-to-nurse ratio is just 1:0.5. This maybe the reason why nurses in China just focus on medical treatment and such as administrating medicine (Jiang, Li et al 2015). Because they do not have enough time to do some basic care procedure. It also should mention that nurses administrating medicine in China but nurses just check the medicine (the medicine is prepared by the pharmacy workers) if the medicines are in a right dose, frequency, time, route of administration, name and deliver it to the patients. Nurses have not the right to prescribe the medicines e.g. if a patient says that he/she is painful, the nurse should tell the doctor then give the medicine according to doctor's order.

**Figure 2 Percentage of direct nursing workload by four different providers. (Source from Jiang, Li et al 2015. Nurses' role in direct nursing care delivery in China)**



In Finland, it is showed that patient will not do a full wash every day, they will have a full wash every four days (Lawson 2009). Since all the authors have their practices in elderly people's house and one of them also has practice in rehabilitation ward, they agreed with the fact that there are not always relatives companying with the patients or clients when the patients or clients are in the ward and the nurses do a lot of basic care procedure such as feeding or supervising eating (Perry, Hamilton et al 2013), guiding patients how to wash, how to go to the toilet then encourage them to do anything which they can do by themselves (Antczak-Komoterska, Filipaska et al 2017) and do the assessments. Lawson (2009) also indicates that night shift nurses administrate the medicines for the patients in their ward since every ward has own pharmacy board. The authors agree with the fact that nurses administrate the medicines for the patients in their ward but may be by the morning shift nurse and other shift nurse will check if they are correct it is according to the ward rules. Nurses in Finland have been awarded the right to prescribe some medicines e.g. if a patient says that he/she is painful, the registered nurse can prescribe the painkiller to the patient without asking the doctor.

## 8.2 Nurse as an educator in nursing stroke patients

Hartigan said in his study that nurse providing knowledge to patients is a core component in nursing care and it is guided that nurse should supply stroke patients and their family members with stroke information and education about healthy lifestyle (Lawrence, Kerr, Watson, Jackson and Brownlee 2009). Theofanidis (2015) indicated that education to stroke patients and their family members can help to reduce unnecessary hospitalization. Hence nurse play an important role as an educator in stroke ward.

There is a fact that stroke patients and their family member do not have enough knowledge about stroke (Antczak-Komoterska, Filipka et al 2017) and stroke patients and their family members requires more information to do things independently without nurses (Hartigan 2012). Since family members or relatives have an effective influence on the rehabilitation when the patients discharge to home (Antczak-Komoterska, Filipka et al 2017), both stroke patients and family members should be given not only the basic knowledge about stroke such as the risk factors of stroke, methods for alleviation of risk factors (Babkair 2017) but also the professional knowledge about how to do if the patient has a stroke at home (Babkair 2017), how to help the patient do the rehabilitation at home such as positioning the in-bed patient, helping the patients moving from bed to wheelchair, supervising patient eating food (Antczak-Komoterska, Filipka et al 2017), how to dress with an unaffected hand (Matthews, 2009), how to take the medicines correctly (Matthews 2009). Since the nutrition status is also important to the patients, Perry, Hamilton et al (2013) point out in their study that nurses also should supply the nutrition information. Babkair also point out that both family members and patients should be given the knowledge about mental health since there is a fact that depression is a common mental health problem after people have a stroke (Pfeil, Gray and Lindsay 2009) and there is reported that family members have some mental health problems when caring stroke patients for a long time (Chow, Tiwari 2014). Hence enough information and support for stroke patients and

their family members can help them to detect the mental health problem early and get a better recovery since Pfeil, Gray et al (2009) shows in their study that early detect of depression can help to increase the recovery from impaired functions.

Theofanidis (2015) indicates in his research that nurse should also educate any other staff in the hospital. It makes the authors think that nurses as an educator they also have the responsibilities to educate the new coming staff and nursing student who comes to the ward to do practice. The education to any other nursing staff can not only improve the nursing skills for the nursing staff but also increase the quality of nursing care.

In China, there is also evidence show that nurse do the education about the stroke disease (Zhao, Yue et al. 2018, Jiang, Li et al 2015). Although nurses in stroke ward are not enough as it mentioned in before, they try their best to do health education as much as possible. Nurses also tell in detail about the medicine such as which medicine is in the cup and what is function. It also should be mentioned that nurses will tell more details about healthy lifestyle than the details about the disease. Since family members almost always care patients around the bed whenever the patients need help (Jiang, Li et al 2015) and the occupational therapists teach patients how to do everyday activities (Gregory, Galloway 2017), nurses do not give much guides to the patients. But when the patients need help, nurse always try their best to guide and encourage the patients do the activities by themselves in a safety way. Furthermore the stroke ward has many posters to help to educate the patients and their family with the stroke disease and healthy lifestyle, alleviate the risk factors when the patients and their family members have a short visit around the ward.

In Finland, education to the patients can be found in many parts. During everyday morning, the patients will have a quick wash (Lawson 2009), nurses will guide them how to dress, how to wash and what is the next step to do

instead of helping them do it (Antczak-Komoterska, Filipaska et al 2017). Patients are encouraged to have their meals in the ward's dining room (Lawson 2009) and nurses will supervise the eating and if necessary they will feed the patient (Perry, Hamilton et al 2013). Nurses also tell in detail about the medicines as nurses do in China. Since the family members are not always in the ward to care the patients, education to the family members is not quite often as in China. In the stroke ward there are also many posters to help to educate the patients with the rehabilitation process such as how to do daily activities.

### **8.3 Nurse as a coordinator and planner in nursing stroke patients**

Hartigan indicated that nurses connect the patient with the process when designing the aim for the patients. It is also shown that nurses connect the stroke patients with their family members (Hartigan 2012) and connect the patients with multidisciplinary rehabilitation team. Hence nurses play an important role as a coordinator and planner in stroke ward.

It is reported that most of the stroke patients have problems with speaking and communication with others (Ziejka, Skrzypek-Czerko et al 2015), thus communicating with stroke patients then try to understand what patients want is the core skill of the nurse (Ziejka, Skrzypek-Czerko et al 2015). When nurses understand what stroke patients want, nurses can do further such as set objectives with the patients for their rehabilitation. Because setting objectives is thought to be the main part in rehabilitation (Hartigan 2012) and this action can lead to a good relation with patients (Hartigan 2012). Nurses as coordinator and planner have the responsibility to have a continuous communication with stroke patients and help them find and set the objectives.

During rehabilitation, multidisciplinary team members will do their own works such as physiotherapist help stroke patients get the body balance again, occupational therapist will help stroke patients to learn daily activities again (Gregory, Galloway 2017). Nurses as the coordinator are thought to make the

rehabilitation process more clearly to the stroke patient (Hartigan 2012), make the stroke patients always remember their objectives, reinforce the patient's motivation on rehabilitation ((Hartigan 2012), encourage the stroke patient to do activities (Ziejka, Skrzypek-Czerko et al 2015) and promise their safe during their rehabilitation (Hartigan 2012). Hartigan also thought that a good comprehension of the rehabilitation progress will lead to a better recovery of the stroke patient.

When the condition of the stroke patient is good, he should not stay at the hospital any more, the nurse as a coordinator and planer also has the responsibility to do the discharge plan (Kerr 2012). It is thought that nurses should guarantee all the medications, follow up appointments, all need tools and moving be prepared well before the patient leave the ward (Matthews 2009). Except the things Matthews 2009 shows, Kerr thought discharge plan should also include making sure the family members know about the discharge information, getting all the documentation ready before the patient discharge.

In China, nurses and doctors will communicate with the family members more frequently than with the patient according to the traditional culture of China. Family members will do many decisions for the patient if the patient cannot express his own idea. Thus nurse as a coordinator to connect the stroke patient and the process when making the aim (Hartigan 2012) is not good. Family member play a unique role in the ward because they do a lot of non-professional nursing care (Jiang, Li et al 2015) and this fact may weak the nurse's coordinator role. Since family member are dependent on heavy care work, there is a fact that the quality of nursing care may be decreased (Jiang, Li et al 2015). It may also decrease the quality of rehabilitation because the stroke patient cannot train his affected part totally with the too much help from his relatives. In discharge plan, the nurses will prepare the medication, documentation which will show the detail about the patient's disease, follow up application (Matthews 2009, Kerr 2012), the patient's family members are well informed about the discharge information but they will prepare the transfer tools

such as wheelchair which the patient's family member should prepare. There is the fact that most stroke patients will go straightly back home after discharge from home, they will continue their rehabilitation through single-discipline therapy based home rehabilitation or day-hospital rehabilitation (Wong, Yeung 2015).

In Finland, nurses have a skilled therapeutic input in patient's nursing process (Lawson 2009). Nurses demonstrate coordinator role well. They communicate with the stroke patients frequently, observe the patients (Matthews 2009) and talking to the doctors and family members if they have some questions. The nursing team will discuss with multidiscipline team every week (Catangui, Slark 2012) about what has happened in the past week, during the meeting, everyone to talk about how the rehabilitation went in his part, they will also talk about what and how to do with the patient in the future with their own professional view. Almost stroke patients are recommended to go to where is well-equipped to help the rehabilitation instead of going straightly back home (Babkair 2017) as transitional care because there is fact that the stroke patient lead to the financial change in his family (Chow, Tiwari 2014) and the family may not endure all cost which needs to change to help the stroke patient in their home. Nurses will prepare the medicines and document for the patient, inform the family member about the discharge information, contact where the patient will go to and give the information.

#### **8.4 Nurse as an advocator in nursing stroke patients**

It is thought that after nurses communicate with the stroke patients, understand well the idea of the stroke patient, nurses should also advocate his own idea (Hartigan 2012). Hence nurses play an important role as an advocator of the patient in the stroke ward.

Nurses communicate with the stroke patients when they do nursing care for him by guiding or encouraging the patients do as much as possible himself. Nurses

make stroke patient eager to do daily activities by reminding the patients many times about their setting objective. Nurses observe the stroke patient when he does daily activities or help him with daily activities when necessary such as feeding or changing positions. After a serious nursing process, nurses will know well what the stroke patient wants and where is the stroke patient can do maximum and can advocate the patients well. During the multidiscipline team meeting, all members of multidiscipline team tell in detail about the stroke patient's present condition, nurses not only tell in detail the current situation of the stroke patient but also advocate the stroke patient's rights (Catangui, Slark 2012).

In China, it is also thought that nurses should guarantee the rights of the patient (Jiang, Li et al 2015). Nurses check all the information when doing professional nursing care e.g. When administrating medicine, cannulation, nurses check the patient's name, identified number, dose of the medicine, time, method according to the doctor's order. Nurse respect the patient's special custom such as a Moslem does not eat any meat from pork. Nurse are required to keep secret for the patient. It should be mentioned that do not need resuscitation in China is done not regularly according to traditional culture in China. This means that if there is a conflict between the patient and his family: the patient signs do not need resuscitation earlier, his family wants the resuscitation when the patient is facing life threaten, finally, the clinical physicians and nurses will do resuscitation for the patient.

In Finland, nurses also give a reaction to patient's needs and support the patient's rights (Hartigan 2012). During nurses' daily nursing process, they also respect patient's special custom. It should be mentioned that do not need resuscitation in Finland is done normally as needed by the patient. This mean if there is a same situation as in China, the clinical physicians and nurses will not do the resuscitation for the patient according to the patient's will.



### **8.5 Summary of the nurse's role in nursing stroke patients in stroke ward**

As a series of analyzing the literature, the authors find that nurses play a multiple role during stroke patient hospitalization and the nurse's role in nursing stroke patients in stroke ward is a little different when comparing what the nurses do in China and in Finland. From **table 2**, it can be seen that what nurses do as a caregiver and an educator in China and in Finland is a bit different but the difference is not so big. Nurses as an educator in China and in Finland is also quite same, the different maybe just the education content. In China, the education content is focus on the disease knowledge and how to prevent. In Finland, the education content is focus on the rehabilitation process. The difference of nurses as an advocator between two countries is about do not rescue as it shows in the previous content.

What nurses do as coordinator, planer is quite same in China and in Finland. The little difference is the fact that the content of discharge plan is different because stroke patient will go to different place (in China, most patients will go straightly back home, in Finland, most patient will go first to rehabilitation house).

**Table 2 comparison of nurse's role in nursing stroke patient in stroke ward in China and in Finland**

	Nurse's role in nursing stroke patients in stroke ward in China	Nurse's role in nursing stroke patients in stroke ward in Finland
Nurse as a caregiver:		
1) Basic life care	Family members do a lot, nurses do a little	Nurses do all basic life care
2) Do assessment	Nurses do	Nurses do
3) Prescribe medicine	Nurses cannot prescribe themselves	Nurses can prescribe some medicine themselves
Nurse as an educator:	Same	
1) Educate other nursing staff		
2) Educate patient		
Content of education	Focus on the disease and how to prevent	Focus on the rehabilitation process
Nurse as an advocator	Nurses respect patient and relative's choice	Nurses respect patient's choice

## **9 VALIDITY, RELIABILITY AND ETHICAL ASPECTS OF THIS THESIS**

As it mentioned in previous methodology, the thesis is a systematic literature review, the validity and the reliability should be taken into account whenever the authors doing the process of their research or writing the thesis. Since the meaning of validity is that what kind of survey tool the authors use and how the it can be showed its truth (Yesilot, Oz 2016). It is also indicated that give specific the inclusion and exclusion criteria can make the aim of the research more clearly. The fact that authors use the search machine available for Turku University of Applied Science to search the literature which they need and give their exclusion and inclusion criteria clearly in the methodology makes the validity of this thesis. In data analysis of the methodology, it also mentioned that if the authors do not reach the agreement of one article, then the article should be read once more or more times just to confirm that the authors understand what is the meaning of original article. The fact that all the authors agree that they will use their own words to expound the meaning of the original article (Cronin, Ryan and Coughlan 2008) but not changing the meaning of the article when they write the thesis makes the reliability of the thesis.

Ethical respect is the essential in researching (Doody, Noonan 2016). Since the this is a literature review, all the resources are from the literature and the authors do not do any questionnaire to any participators. Hence they do not need the approval from ethical committee or institutional review board. But the authors all agree that they will mark the reference briefly in the thesis according to the request format of the university. Another important of ethical respect in this thesis is that all the authors agree the fact that limitation of the thesis should be taken into account since their research articles just present a little fact. Hence further study need to be done.

## 10 RESULTS AND CONCLUSION

First of all, stroke prevention shall reduce the risk factors to effectively improve the patients' survival rate and avoid secondary reoccurrence of stroke. As a nurse, you shall encourage your patients, and give them psychological support and comfort. It is vital important for stroke prevention. Early discovery and early prevention of it can effectively reduce the recurrence rate of the patents' stroke. Stroke risks can be reduced by positive measures. Nurses shall take effective nursing and preventive measures for the patients through the effective suggestions in this paper.

It is agreed that rehabilitation plays a key role on stroke prognosis. All stroke patients and their family members should pay attention to their rehabilitation. Several recommendations presented in the thesis include 1) a support from a multidisciplinary team 2) early beginning of rehabilitation 3) early discharge from hospital 4) family member's support. In detail for the stroke rehabilitation, the authors find that CIMT and m-CIMT is useful for the stroke patient with upper-extremity functions. But any other rehabilitation details should be found in the further study. Acupuncture as an old Chinese traditional medicine treatment is found be effective in stroke rehabilitation but it also needs more studies.

Nurse plays a multiple role in patient's rehabilitation (Babkair 2017). As it mentioned in the thesis, nurse as a caregiver, he/she provides patients with not only basic nursing care such as supplying a comfortable environment but also professional nursing care such as a series of nursing assessment. Nurse as an educator, he/she provides health promotion, knowledge of disease and disease prevention to both stroke patient and patient's family members. Nurse also guides stroke patient with activities of daily living during the process of nursing care. Nurse as a coordinator, he/she connects the multidisciplinary team and the stroke patient. Nurse provides stroke patient with a comprehensive understanding of rehabilitation and ensure the patient's safety. Nurse as a planer, he/she plans several things for the stroke patient e.g. make a rehabilitation for the stroke patient as an important member of the

multidisciplinary team, plan patient's discharge such as preparing all the medications. Nurse as an advocator, he/she always pay attention to patient's rights. Nurse protects patient's own idea during the multidisciplinary team meeting. As it mentions in the thesis, although there is difference when nurse works between in Finland and in China, nurse's role is the same. They all do nursing care for the patient, educate the patient and the patient's family members, make the bridge for the patient and the clinical medical care team, plan for the patient, ensure the patient's rights.

## **11 DISCUSSION**

According to WHO's report in 2012, stroke has become the second leading cause of death and the third leading cause of disability worldwide (Lijing et al 2017). This makes the authors are interested in 'What is the evidence-based recommendation for stroke prevention according to the literature'. Thus the authors find some studies and relevant knowledge in health promotion for stroke and prevention knowledge for stroke.

The purpose of this thesis is also to find out 'What is the best practice in rehabilitation for stroke patients in clinical work according to the literature?' and there is a fact that rehabilitation in China starts later than western country. The authors find that although the rehabilitation starts later in China, but acupuncture as a Chinese traditional medicine technology does an effective result in stroke rehabilitation. Though the effective result of acupuncture is almost from China, the authors suggest that further study can be focus on the effective result of acupuncture if it done all over the world. Since the acupuncture points are different to different patients and also different according to different doctor's order, the result maybe different should be also taken into account. It should also be furthermore study to find out what can the nurses do during the process when the doctor doing acupuncture.

Another purpose of this thesis is compare the different role of the nurse in China and in Finland. The authors find that nurses in China do not have the right of medicine prescription. It is said that the right of medicine prescription of nurse has experienced a long time in different countries (Ling, Lyu, Liu, Xiao and Yu 2018). Hence the authors think that nurses in China maybe also can have the right of medicine prescription. Because nurses as the caregiver of the patient, they know the first time when the patient has some problem and if nurses can prescribe some kind of medicine such as painkiller, it will make the nursing process high efficiency. Content of education to patient is also quite different in China and Finland, the authors think that it is better to combine the content in China and in Finland. Because when combining the content, it seems that the patient can know more detail about the disease. But futhermore study about education content (such as what is good content, what the patient really wants to know and needs to know) should be done.

Since the authors summarize the result from literature searched from the database and do not do any other quantitative research, its limitation should be taken into account. Further study should be done.

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## Appendices

### Appendix 1. The list of choosing for the results.

Authors	Year	Key words	Title	Database
Amelia, Charles et al	2018	Stroke risk	Stroke Risk Factors, Genetics, and Prevention	PubMed
Antczak- Komoterska, Filipska et al.	2017	Stroke patients and nurse's role or nursing role	Problems of families of patients after ischemic stroke	CINAHL Complete
Babkair	2017	Stroke patients and nurse's role or nursing role	Cardioembolic Stroke: a case study	Academic Journal
Barbara, Chair et al	2017	Stroke Prevention	Self-Care for the Prevention and Management of Cardiovascular Disease and Stroke	PubMed
Beatric and Yilan	2009	Stroke patients and nurse's role or nursing role	Comparision of nursing: China and the United States	EBSCOhost
Catangui and Slark	2012	Stroke patients and nurse's role or nursing role	Nurse-led ward rounds: a valuable contribution to	CINAHL Complete

			acute stroke care	
Canadian Nursing Home	2010	Stroke prevention	Managing the 3rd most common disease in LTC...an exception from 'Cutting through the foggy myths using best practice guidelines in long term care,' and Internet blog by Mary-Lou van der Horst and Tara Harvie	EBSCOhost
Charles, Jose et al	2015	Secondary stroke prevention	Secondary stroke prevention: challenges and solutions	PubMed
Chen, Bruce, Feng 2017	2017	Diabetes Stroke	Diabetes and Stroke: Epidemiology, Pathophysiology, Pharmaceuticals and Outcomes	PubMed
Chow and Tiwari	2014	Stroke patients and nurse's role or nursing role	Experience of family caregivers of community-dwelling stroke	Journal

			survivors and risk of elder abuse	
Chuenjairuang, Sritanyarat	2012	Stroke Primary prevention	Development of Primary Health Care Services for Stroke Prevention in Persons with Warning Signs of Stroke	EBSCOhost
Clare, Christopher Stephen	2017	Stroke prevention	The role of community nurses in stroke prevention	EBSCOhost
Daniel, Edward et al.	2014	Stroke Blood Lipid	Factors Influencing the Decline in Stroke Mortality	PubMed
Dawn, Jane et al	2010	Stroke Prevention	Stroke Incidence is Decreasing in Whites, but Not in Blacks	PubMed
Elena, Xin et al	2015	Stroke prevention	Epidemiology and prevention of stroke: a worldwide perspective	PubMed
Zhao, Yue et al	2018	Stroke patients and nurse's role or nursing role	Clinical practice guidelines for post-stroke	PubMed

		and China	depression in China.	
Zhao, Zhang et al	2014	Stroke Blood Lipid	The Many Roles of Statins in Ischemic Stroke	PubMed
Zheng, Chen et al	2015	Stroke Qigong	Primary prevention for risk factors of ischemic stroke with Baduanjin exercise intervention in the community elder population: study protocol for a randomized controlled trial	PubMed
Hartigan	2012	Stroke patients and nurse's role or nursing role	Goal setting in stroke rehabilitation: part 2. How do health professional set goals and what is the nurse's role?	CINAHL
Heron	2017	TIA Secondary prevention	Optimising secondary prevention in the acute period following a TIA of	PubMed

			ischaemic origin	
Hewitt, Castilla et al	2012	Diabetes Stroke	Diabetes and Stroke Prevention: A Review	EBSCOhost
Jiang, Li et al	2015	Stroke patients and nurse's role or nursing role and China	Nurses' role in direct nursing care delivery in China	Journal
Kerr	2012	Stroke patients and nurse's role or nursing role	Stroke rehabilitation and discharge planning	CINAHL
Lawson	2009	Stroke patients and nurse's role or nursing role	Different approaches to stroke care in Finland and in the UK	Academic Journal
Lawrence, Kerr et al	2009	Stroke patients and nurse's role or nursing role	A Survey of stroke nurses' knowledge of secondary prevention lifestyle issues	CINAHL Complete
Lawrence, Kerr Et al	2009	Stroke secondary prevention	A survey of stroke nurses' knowledge of secondary prevention	EBSCOhost

			lifestyle issues	
Lijing, Chaoyun et al	2017	Stroke	Stroke. Cardiovascular, Respiratory, and Related Disorders	PubMed
Lindsay, Bayley et al	2008	Stroke recommendations	Canadian best practice recommendations for stroke care	EBSCOhost
Malewezi	2011	Stroke prevention guidelines	Stroke policy and secondary prevention: how well are we adhering to these guidelines?	EBSCOhost
Matthews	2009	Stroke patients and nurse's role or nursing role	Interventions for rehabilitation post-stroke and the contribution of the nursing staff	CINAHL Complete
Morris, Carter et al	2017	Stroke: Secondary prevention  Drinking	Stroke: Secondary prevention of ischemic events	EBSCOhost
Nazarko	2010	Stroke patients and nurse's role	Enabling bladder control following	CINAHL

		or nursing role	stroke	Complete
Pfeil, Gray et al	2009	Stroke patients and nurse's role or nursing role	Depression and stroke: a common but often unrecognized combination.	CINAHL Complete
Perry, Hamilton et al	2013	Stroke patients and nurse's role or nursing role	Nursing intervention for improving nutritional status and outcomes of stroke patients: descriptive reviews of processes and outcomes	CINAHL Complete
Pinzon, Furie	2009	Stroke Secondary prevention	Secondary prevention of ischemic stroke	EBSCOhost
Rong, Bruce et al	2017	Diabetes Stroke	Diabetes and Stroke: Epidemiology, Pathophysiology, Pharmaceuticals and Outcomes	PubMed
Sakakibara, Kim et al	2017	Stroke risk	A Systematic Review and Meta-Analysis on Self-Management	EBSCOhost

			for Improving Risk Factor Control in Stroke Patients	
Shelagh	2017	Stroke Transient Ischemic Attack	Diagnosis and Management of Transient Ischemic Attack	PubMed
Sun, Wang	2018	cerebrovascular disease	A nationwide epidemiological sample survey on cerebrovascular disease in China	EBSCOhost
Theofanidis	2015	Stroke patients and nurse's role or nursing role	Nursing stroke patients in Greece in Austerity Times	CINAHL Complete
Wilson	2013	stroke AF	Pharmacological treatments for stroke prevention in AF	EBSCOhost
Wong and Yeung	2015	Stroke patients and nurse's role or nursing role and China	Effects of a 4-week transitional care programme for discharged stroke survivors in Hong Kong	Academic Journal
Xu, Wen	2015	Stroke risk	Risk factors of cerebrovascular	EBSCOhost

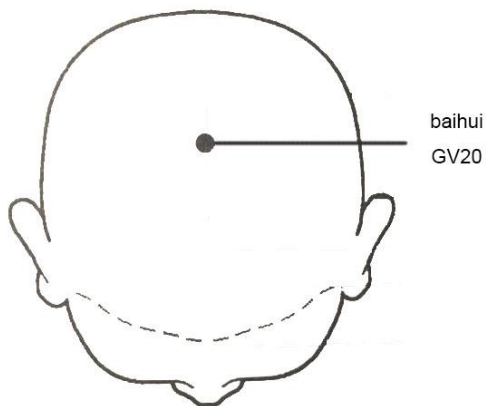


			diseases and their intervention and management	
Yan, Li et al. 2017	2017	Stroke	Stroke. Cardiovascular, Respiratory, and Related Disorders	PubMed
Ziejka, Skrzypek-Czerko et al	2015	Stroke patients and nurse's role or nursing role	The importance of stroke rehabilitation to improve the functional status of patients with ischemic stroke	CINAHL Complete
Zheng, Fang et al	2015	Stroke Qigong	Qualitative Evaluation of Baduanjin (Traditional Chinese Qigong) on Health Promotion among an Elderly Community Population at Risk for Ischemic Stroke	EBSCOhost
Zheng, Chen et al	2014	Stroke Qigong	Primary prevention for risk factors of	PubMed

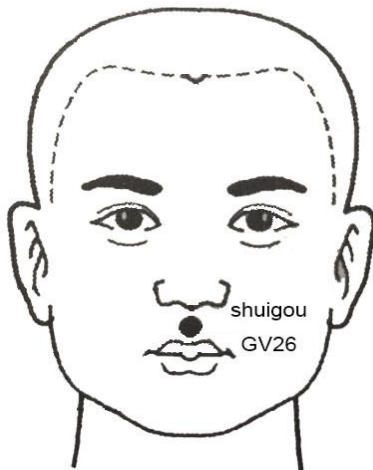
			<p>ischemic stroke with Baduanjin exercise intervention in the community elder population: study protocol for a randomized controlled trial.</p>	
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## Appendix 2. The acupoints' figures.

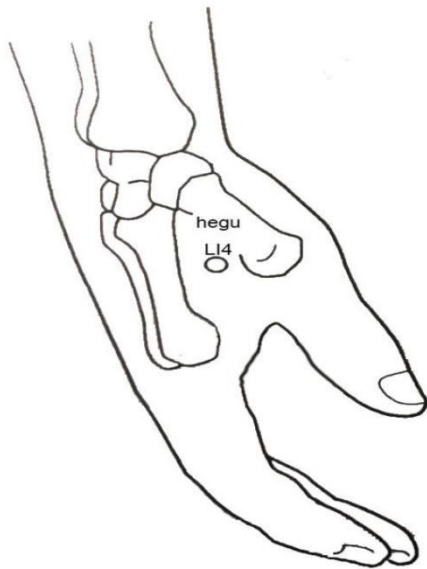
All acupoints' figures sourced from Liang, Shen et al. 2017. *Acupuncture*. Chapter 3.



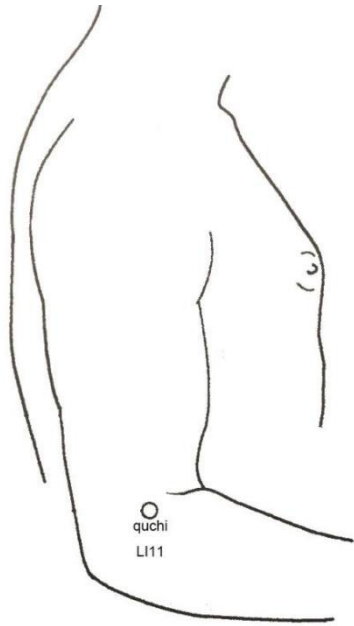
Baihui(GV20): Meeting point of the midline with the top of the ears



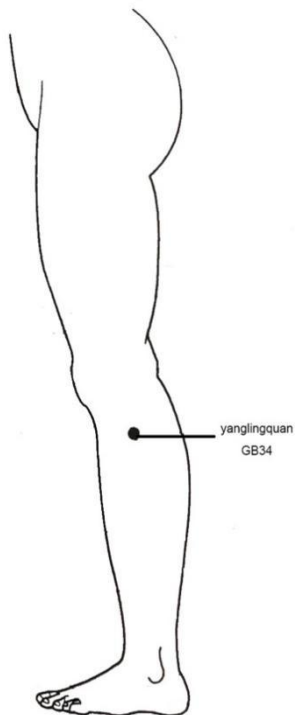
Shuigou (GV26): In the first third of the distance between the nose and the upper lip



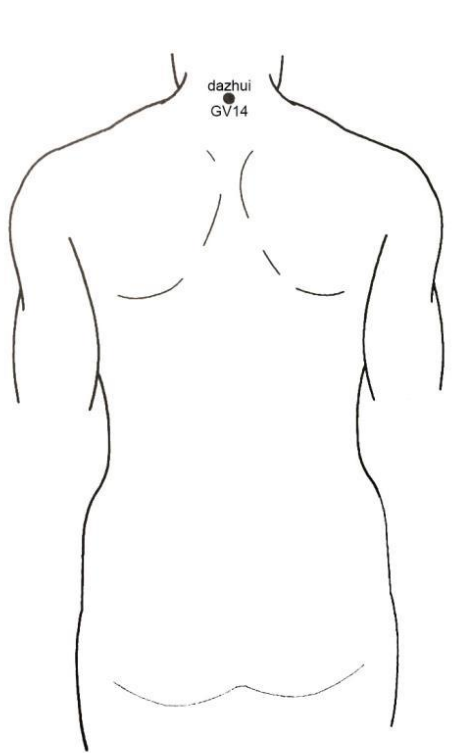
Hegu(LI14): In the middle of the 2nd metacarpal bone on the radial side



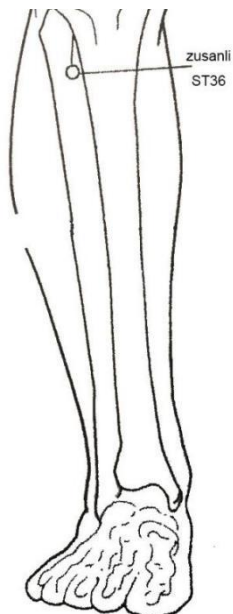
Quchi (LI11): At the lateral end of the transverse cubital crease midway between LU5 and the lateral epicondyle of the humerus.



Yanglingquan (GB34): In a depression anterior and inferior to the head of the fibula



Dazhui (GV14): On the midline, below C7



Zusanli (ST36) : 3 cun below the lower border of the patella, one finger width lateral from the anterior border of the tibia