



# Nursing guidance for preventing the recurrence of ischemic stroke

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**Nursing guidance for preventing the  
recurrence of ischemic stroke**

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Stroke is one of the leading causes of disability and mortality worldwide. Statistics from the WHO indicate that stroke is not only the second leading cause of death globally, but also the third leading cause of disability worldwide. Stroke is a dangerous disease that can reoccur, and survivors of stroke and transient ischemic attack are still at high risk of recurrent stroke, recurrent strokes usually have more severe symptoms and higher rates of mortality and disability than the first stroke event.

We used the databases EBSCO/host, Google Scholar, EMBASE, Medic, CINAHL, ProQuest, Cochrane Library, and China National Knowledge Infrastructure (chkd-cnki) to search the literature subsequent to and including January 2010, 897 articles were obtained. Of these, 17 studies were included in the review. We have reviewed and summarized these articles using a qualitative method. Review studies on the risk factors and preventive care strategies for stroke recurrence, we used deductive approach demonstrating that factors affecting stroke can be modified by giving nursing guidance to stroke patients, thus reducing the risk of stroke recurrence.

The occurrence of stroke is inseparable from the patient's own underlying metabolic disorders, weight, lifestyle and dietary habits. Therefore, it is particularly important to guide and instruct the living and eating habits of patients, as well as to intervene in the life care of post-stroke patients.

The results of our review suggest that better prevention and management of stroke recurrence can be achieved through lifestyle management to modify the main risk factors influencing stroke recurrence.

Keywords: ischemic stroke, recurrence, prevention, nursing guidance, hypertension

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## 1 Introduction

Stroke is one of the diseases of the nervous system, the onset is sudden and the risk is extremely high. This is a high-risk disease that seriously damages the quality of life of the patients. Each year, there are over 13.7 million new strokes in the world (WSO 2016). Stroke is the world's second leading cause of death and the third most common cause of death in Finland. It is a common disease among middle-aged and elderly people, also is the third leading cause of disability in the world (WHO 2020).

With the development of the aging society and the increasingly irregular lifestyles of people, the incidence of stroke is on the rise. Although due to the development of medical technology and the advancement of treatment methods, the fatality rate of stroke has been reduced (Meierwati 2011). However, the recurrence rate of stroke is still high, according to research shows that the risk of recurrence stroke within 90 days is 3.4%, the risk of recurrence stroke within 1 year is 7.4%, and the risk of recurrence stroke within 5 years is 19.4% (Stahmeyer & Stubenrauch & Geyer & Weissenborn & Eberhard 2019). Recurrent strokes result is usually in more severe disability, higher mortality, and more expensive costs than first strokes. Ischemic strokes are more common in recurrent strokes (Hankey 2013).

Every year about 24,000 people suffer from cerebrovascular diseases in Finland (Atula 2019). Most of them have multiple risk factors and are at high risk of stroke attack. Most studies have shown that the symptoms of stroke recurrence are severe than new stroke, the treatment effect is not good, and the prognosis is poor. Stroke is usually an emergency medical situation that requires urgent treatment and care, long-term rehabilitation and home care, which not only brings suffering to patients, but also consumes a lot of resources, and is a significant health care challenge (Hankey 2013).

According to the American Stroke Association's patient health education, "up to 80% of all strokes in adults may be preventable." (ASA 2020) Therefore, exploring the influencing factors and preventive measures of recurrent stroke is of great significance to prevent the recurrence of stroke, alleviate the suffering of patients, and reduce the mortality caused by stroke.

The purpose of our study is through studying the factors that affect the stroke and the nursing guidance for preventing the secondary stroke, help people with stroke to reduce the chance of another brain attack, reduce the suffering and burden of patients, thereby improving the quality of life of patients.

The aim is through reasonable and effective nursing guidance for patients suffering from cerebrovascular diseases, to reduce the recurrence rate of stroke and decrease the consumption of medical resources, promote the well-being and health of the people.

## 2 The significant risk factors for recurrence of ischemic stroke

Factors that influence the risk of stroke recurrence include both intervenable and non-intervenable factors. They are both risk factors for stroke recurrence, but the difference is that non-intervention factors are difficult to change, while intervention factors can be changed to prevent stroke recurrence. Non-intervenable risk factors are predetermined and they are difficult to change or even unchangeable. Such as age, gender, heredity, race, regionality, seasonality, heredity and family factors (Meierwati 2011).

We reviewed the intervenable factors affecting stroke recurrence, mainly hypertension, atrial fibrillation, hyperlipidemia, diabetes, and use of tobacco and alcohol. These risk factors often interact and often coexist, increasing the risk of stroke recurrence and possibly a poorer prognosis. The risk of stroke recurrence will be minimized if interfering factors can be identified and modified early so that the threat is reduced.

### 2.1 Hypertension

Hypertension is most common in stroke patients and is a major risk factor for stroke. Studies have shown that controlling blood pressure levels to <150/90 mmHg reduces the risk of stroke. (Wajngarten & Silva 2019). High blood pressure is caused by an increase in vascular pressure that occurs on a continuous basis. Vascular spasm, arterial wall damage, and some instability will occur as a result of the increase in blood pressure and excessive contraction of blood vessels in the brain. When the plaque breaks down, blood clots block blood vessels, brain tissue becomes necrotic due to a lack of oxygen, and patients experience stroke-related symptoms such as speech disorder, limb disorder, vision disorder, facial paralysis, and other symptoms (ASA 2020).

Normal blood pressure is defined as systolic blood pressure less than 120mmHg and diastolic blood pressure less than 80mmHg, whereas hypertension has systolic blood pressure greater than 140mmHg and diastolic blood pressure greater than 80mmHg. When blood vessel pressure rises, it causes damage to the blood vessels and organs. "About 87% of strokes are caused by narrowed or clogged blood vessels in the brain that cut off the blood flow to brain cells." (ASA 2020).

### 2.2 Hypercholesterolemia

Hypercholesterolemia: human's body needs some cholesterol to make hormones and digest high-fat foods. But too much increases the risk of heart disease and other cardiovascular problem, When there is too much cholesterol in the blood vessels of the human body, it will accumulate on the arterial wall and cause the arterial wall to become narrow, causing atherogenesis, increasing the risk of poor blood circulation, and increasing the possibility of causing thrombosis, causing stroke (Ibrahim & Asuka & Jialal & Corcione 2021).

Hypercholesterolemia :Refers LDL- cholesterol>190mg/dl, over 160>mg/dl, and have one of major factor over 130mg/dl as well as two danger's factors, including:

- a. age, man over 45, women a little bit higher >55.
- b. The family history of cardiovascular diseases ( man <55, women<65)

Hypertension ,obesity, diabetes ,smoking, Lower HDL level of cholesterol (men<40mg/dl, women<55mg/dl) (Ibrahim et al. 2021)

Patients with hypercholesterolemia should pay attention to weight control, dietary intervention, the importance of exercise, quit cigarettes and alcohol, control blood pressure, and consider taking lipid-lowering drugs. (Mytilinaiou & Kyrou & Khan & Grammatopoulos & Randeve 2018)

### 2.3 Atrial fibrillation

Atrial fibrillation is an arrhythmia disease characterized by arrhythmia, rapid heart rate, and palpitations. The serious risk of atrial fibrillation now is thromboembolism. When atrial fibrillation occurs, the blood flow in the left atrial appendage is significantly slowed down. Blood can easily form clots and move with the heartbeat, which can lead to strokes.

Recent research (Shames & Weitzman & Nechemya & Porath 2018) has demonstrated that the prevalence of stroke for non-AF members is 3.5 (female, 45-54 years old) to 74.1. (male, over 85 years old), 29 (male, 45-54 years old) to 165 (male, age 85+) Atrial fibrillation Patients per thousand. In all age groups, AF patients have significantly more strokes than non-AF patients. The prevalence of stroke increases with age and is significantly higher in men.

### 2.4 Obesity and type 2 diabetes

Diabetes is one of the major known risk factors for stroke. Compared with non-diabetics, adults with diabetes have a two to three times higher risk of stroke (Hewitt & Guerra & Fernández-Moreno & Sierra 2012). Studies of hospitalized patients with stroke indicate that approximately one-third of stroke patients have diabetes, and up to two-thirds of acute stroke patients will find stress-related hyperglycemia. Diabetes is not only associated with longer hospital stays in stroke patients, but also increases the severity of stroke, mortality, and stroke recurrence rate(Lau & Lew & Borschmann & Thijs & Ekinci 2018).

Hyperglycemia can directly or indirectly affect the cardiovascular system and cause stroke. The possible mechanisms leading to stroke include vascular endothelial dysfunction, early arterial stiffness increase, systemic inflammation, and capillary basement membrane thickening(Chen & Ovbiagele & Feng 2016). These may accelerate the process of atherosclerosis, promote vasoconstriction, promote inflammation and promote the formation of thrombosis. In hospitalized patients with acute stroke, it was found that patients with

diabetes who used hemoglobin glycosylated (HbA1c) threshold definition  $\geq 6.5\%$  (48 mmol/mol) had a higher rate of ischemic stroke than hemorrhagic stroke (Lau et al. 2018).

Overweight and obesity ( $BMI > 25 \text{ kg/m}^2$ ) are also risk factors for cardiovascular disease. Studies have shown that the average age of stroke in obese patients is younger, but are more likely to have metabolic risk features, including hypertension, diabetes, and hyperlipoproteinemia. The occurrence of these basic metabolic diseases makes obese patients more prone to stroke. However, studies have found that although obesity is the main influencing factor for the first stroke, it has a low correlation with the recurrence of stroke (Doehner & Schenkel & Anker & Springer & Audebert 2013).

At present, due to the aging of the population and the increasingly serious problem of obesity, the prevalence of diabetes is increasing significantly. Diabetes has entered the top ten causes of death in the world since 2019 (WHO 2020). As the number of diabetic patients increases, the incidence of stroke has also been obviously affected.

## 2.5 Use of tobacco and alcohol

"Smoking is an important independent risk factor for the first ischemic stroke, and it will increase the risk of asymptomatic cerebral infarction." The harm of secondhand smoke will also increase the risk of stroke. Prolonged use of tobacco and alcohol is prone to dependence. Patients with ischemic stroke should be advised to quit smoking or avoid excessive inhalation of second-hand smoke. (AHA 2020).

This may increase the risk of stroke recurrence Heavy drinking (more than two drinks a day) and binge drinking (sitting more than four drinks at a time) (Oza & Rundell & Garcellano 2017). Usually, alcohol consumption has a certain impact on the recurrence of a stroke, and there are data showing that the risk of a stroke is increased within an hour of alcohol drinking, (Mostofsky & Burger & Schlaug & Mukamal & Rosamond & Mittleman 2010.)

## 2.6 Polypharmacy

Multi-drugs are very common in the elderly. It refers to the elderly taking multiple drugs to treat diseases at the same time. Taking various drugs will cause potential risks. For example, the correlation between various drugs and negative results. The side effects on various diseases are difficult to predict and judge.

According to a cross-sectional study of 1,424,378 participants 18 years and older, including information about stroke and other diseases, a total of 35,690 people (2.5%) were diagnosed with a stroke. Among the 39 comorbidities examined, 35 were It is more common in stroke patients. Among them, the proportion of patients with one or more other diseases (94.2%) is almost twice that of the control group (48%) (the ratio adjusted for age, gender, and



socioeconomic poverty) compared with undiagnosed stroke patients, The incidence of diagnosed stroke patients and the frequency of polypharmacy treatment are obviously higher(Gallacher & Batty & McLean & Mercer & Guthrie & May & Langhorne & Mair 2014).

Stroke patients often have complications from various underlying diseases and have a high proportion of polypharmacy, Multiple medications can increase the risk of adverse drug reactions and mortality in the elderly. There is no direct article and evidence showing that there is a close relationship between polypharmacy and stroke, but there is no article that can be ruled out. Therefore, the management of polypharmacy in elderly patients with stroke should be treated with caution (Hajjar & Cafiero, & Hanlon 2007).

### 3 Nursing guidance for the prevention of ischemic stroke

It is very important to actively treat basic diseases such as hypertension, hyperlipidemia, and atrial fibrillation. These conditions are related to the recurrence of stroke. Take medicines on time, make plans with your doctor, learn self-test, self-management, and develop a healthy lifestyle: such as quitting smoking and drinking, exercising more, and getting enough sleep can help prevent and reduce the recurrence rate. The most important thing is that doctors, patients, and family members complement each other and work together.

#### 3.1 Active treatment of underlying diseases

##### 3.1.1 Management and control of hypertension

Stroke can be avoided by treating hypertension. It is clear that controlling the controllable factors is critical in reducing the onset of stroke. Physical therapy and chemotherapy are two methods for lowering and controlling blood pressure. Physiotherapy: Monitor your blood pressure at all times, keep it within the normal range. Patients should learn to monitor their blood pressure in order to understand their own blood pressure values, to make plans with their doctors, to live a healthy lifestyle, to control their weight, to eat more fresh vegetables and fruits, to control sodium intake, and to limit smoking and alcohol consumption.

Chemotherapy: Take anti-hypertension medications as directed by your doctor. Angiotensin-converting enzyme inhibitors (ACE inhibitors), calcium channel blockers, and diuretics It is used to treat patients who have hypertension (ASA 2020). It's very important that follow the doctor's orders and do not stop taking the medication without authorization. (AHA 2016).

##### 3.1.2 lower cholesterol

Many studies related to cardiovascular protection have confirmed the benefits of lowering cholesterol in preventing stroke disease. Lowering blood cholesterol may reduce the risk of atherosclerosis in adults, thus preventing strokes. Patients with recurrent stroke or TIA of

presumed atherosclerotic origin should receive high intensity statin therapy regardless of LDL cholesterol levels, to prevent recurrence of stroke(Oza et al. 2017)

### 3.1.3 Anticoagulants for atrial fibrillation

Using oral anticoagulants (OAC) is very effective in preventing strokes associated with atrial fibrillation. The most important principle for stroke prevention in patients with atrial fibrillation is long-term use of oral anticoagulants, which means that poor patient adherence will significantly increase the risk of stroke and death (Freedman & Potpara & Lip 2016.).

### 3.1.4 Maintaining normal blood sugar levels

We know that strokes are common in people with diabetes. Diabetes is an important modifiable risk factor for stroke, especially ischemic stroke. Many studies have demonstrated that active management and control of the process of diabetes can effectively influence the length of hospital stay, prognostic function, mortality, and recurrence rates of stroke(Lau et al.2018).

We have found that stress hyperglycaemia (stress hyperglycaemia) is often present during the acute phase of stroke. It is associated with early neurological deterioration, poorer functional prognosis and higher mortality. Therefore managing and controlling blood glucose levels is of great importance for stroke prevention and prognosis(Chen et al.2016).

## 3.2 Unhealthy lifestyle modifications to reduce the impact of risk factors

Post-stroke care and guidance are very important for the patient to reduce and prevent the possibility of a second stroke. Regarding stroke, stroke patients should follow the following methods to reduce the chance of a second stroke.

### 3.2.1 Daily exercise to promote physical movement and circulatory capacity

Stroke is long-term harmful to the human body. It can cause a series of problems such as cardiovascular problems, decreased mobility, secondary strokes, etc. Therefore, it is particularly important for post-stroke exercise management, especially some light aerobic exercises. It is very suitable for the elderly after a stroke, to improve the body's movement and circulation ability through exercise.

The first exercise for patients after a stroke should be managed by experienced professionals. Avoid strenuous activities 24 hours before the test, do not take caffeine or nicotine after the test, and the whole process should not exceed 8-10 minutes. During the whole exercise process, it is very important to observe and measure whether the patient's vital signs are normal to assess the cardiovascular status and make exercise plans.( MacKay-Lyons & Billinger

& Eng & Dromerick & Giacomantonio & Hafer-Macko & Macko & Nguyen & Prior & Suskin & Tang & Thornton & Unsworth 2019)

Hypoxic exercise recommends that patients start with their own conditions and gradually increase the frequency, time and intensity, about 2 times a week, each time about 20 minutes. (MacKay-Lyons et al. 2019)

### 3.2.2 Healthy eating lowers the risk of stroke

The previous cohort study and the 2006 meta-analysis reported that eating fruits, vegetables, grains, folic acid, fish, olive oil, and a Mediterranean diet can reduce the risk of stroke. (Hankey 2013)

For daily diet intake: First: fruits and vegetables should account for 1/3 per day. Starchy food should occupy 1/3 per day and eat more whole-grain food. Take more protein every day, such as: fish, beans, nuts, tofu. Reduce the solid fat intake each day, for example: cream, whole-fat milk, cheese, fatty meat. Control the salt consumption, do not over 6 grams per day, including hidden salt in ready-made and processed foods. (Rodríguez-Campello & Jiménez-Conde & Ois & Cuadrado-Godia & Giralt-Steinhauer & Schroeder & Romeral & Llop & Soriano-Tárraga & Garralda-Anaya & Roquer 2014)

### 3.2.3 Adequate sleep facilitates the management of underlying diseases

Improved sleep quality is critical for stroke prevention. Obstructive sleep breathing disorder (OSBD), sleep-related breathing disorder (SDB), and sleep-wake disorder (SWD) are all linked to stroke in some way, including an increased risk of recurrence.

Obesity, big neck circumference, nasal congestion, large tonsils, hypothyroidism, hypoxemia during sleep, decreased cerebral blood flow, metabolic problems, and other symptoms associated with an increase in stroke risk are common in SDB patients. (Dib & Ramos & Wallace & Rundek 2012)

Continuous positive airway pressure (CPAP) is the preferred method of treatment for obstructive SDB. Dopaminergic medications, such as REM sleep behavior disorder and clonazepam, can be used to treat sleep-related movement abnormalities following a stroke. Dopaminergic medications, such as REM sleep behavior disorder and clonazepam, can be used to treat sleep-related movement abnormalities following a stroke. Dopa-minergic medications can be used to treat sleep-related movement abnormalities following a stroke, as well as REM sleep behavior disorder and clonazepam. (Hermann & Bassetti 2009)

### 3.3 Fall prevention is extremely important for the elderly population

Falling after a stroke is one of the common complications. A study found that more than 50% of the first falls within six months after a stroke occurred in the first two months, which is useful for preventing falls to improve and improve the rehabilitation of elderly people after a stroke. It is very important. Although there is currently no direct evidence to show effective interventions to prevent falls, the first thing to be clear is that changes in physical function after a stroke, damage, psychological, and cognitive impairments will increase the likelihood of falls. One study found that the fall rate and percentage of elderly female stroke patients supplemented with VD were significantly reduced, and no significant impact was found in the remaining included studies. VD supplementation can increase muscle strength and reduce the risk of falls. (Batchelor & Mackintosh & Said & Hill 2010)

Secondly, for exercise to prevent falls, exercise programs need to be combined with balance training at least twice a week for 25 weeks to reduce falls. However, the evidence for stroke population is still unclear. In general, it seems that exercises for stroke patients to prevent falls should include strength and balance or agility training. (Batchelor et al.2010)

### 3.4 Patient education

The high risk of recurrent attacks is an important feature of stroke disease, so education and guidance for stroke patients is particularly important. Stroke patients are prone to recurrent strokes after discharge due to adverse lifestyle habits or poor treatment adherence, and the recurrence of stroke will increase the risk of disability and death (Xie 2017).

#### 3.4.1 Nursing guidance for patients and families is of important significance in preventing the recurrence of stroke

Refer to a study in China on giving nursing guidance to 50 stroke patients. The results show that during the two-year guidance period, guidance and education were given to medication care, daily life care, diet and exercise care. Except for one patient died of other diseases and only three people suffered a recurrence of stroke, with a recurrence rate of 6%. This suggests that effective patient education and nursing guidance for stroke patients can lead to better prevention and control of stroke recurrence (Xie 2017).

#### 3.4.2 Educational needs of patients and families

Providing good guidance and education to patients and carers about stroke is an important aspect of caring for people who have had a stroke. Research show that both patients and caregivers want to be educated on stroke, the causes, symptoms, prevention and treatment of stroke. Patients and caregivers also identified their nursing guidance needs for physical care, functional changes, movement and exercise. In addition, guidance on psychological

issues and guidance on nutritional care were also noted as important educational needs ( Hafsteinsdóttir & Vergunst & Lindeman & Schuurmans 2010).

### 3.5 Smoking cessation and moderate alcohol consumption

Smoking and stroke disease are a very dangerous combination, both for first strokes and recurrent strokes. Smoking cessation and avoidance of secondhand smoke should be encouraged for all people, regardless of whether or not they have had a stroke. Moderate alcohol consumption is equally important for stroke and non-stroke patients to stroke prevention. Smoking cessation and moderate alcohol consumption should be encouraged for all users and should be part of routine clinical nursing. (Hewitt et al. 2012).

The AHA has a lot of data to show that mild drinking is protective against ischemic stroke, and moderate and severe drinking can increase the risk of stroke. It is well known that alcohol will have dependence, and it is not recommended to drink, but for those who choose to drink, the best standard is that men have less than 2 cups of wine per day, and pregnant women have less than 1 cup of wine per day (ASA 2010) .

## 4 Literature review

### 4.1 Research objectives

Our objectives are to review studies on the risk factors and preventive care strategies for stroke recurrence, demonstrating that factors affecting stroke can be modified by giving nursing guidance to stroke patients, thus reducing the risk of stroke recurrence. Summarize the nursing guidance for stroke patients to prevent recurrence of stroke.

The aim is through reasonable and effective nursing guidance for patients suffering from cerebrovascular diseases, to reduce the recurrence rate of stroke and decrease the consumption of medical resources, promote the well-being and health of the people.

### 4.2 Implementation methods

Defined our research questions based on research objectives, our research questions:

1. What are the significant risk factors for recurrence of ischemic stroke?
2. What are the nursing guidance for preventing ischemic stroke recurrence?

We used the databases EBSCO/host, Google Scholar, EMBASE, Medic, CINAHL, ProQuest, Cochrane Library, and China National Knowledge Infrastructure (chkd-cnki) to search the literature subsequent to and including January 2005, 897 articles were obtained. We three

authors aggregated all the literature obtained and then discussed together the exclusion according to our selection criteria, of these, 16 studies were included in the review.

Table1: Search strategy and selection criteria

Search terms	Databases	Inclusion criteria	Exclusion criteria
Ischemic stroke, Stroke recurrence, Prevention, Risk factors, Hypertension, Hyperlipidemia, Obesity, Diabetes, Nursing guidance, Lifestyle, Exercise, Health diet, Patient education.	EBSCO/host, Google Scholar, EMBASE, Medic, Cochrane Library, ProQuest, China National Knowledge Infrastructure (chkd- cnki).	After 2010, Academic Journals, Dissertations, Stroke recurrence, Risk factors, Prevention, Nursing guidance, English language, Chinese language, Finnish language.	Before 2010, Teenagers and children, Stroke rehabilitation, Medication Treatment, Repeat, Other: abstracts and comments, Other language.

#### 4.3 Methods of literature review

We three authors reviewed these articles together, using a qualitative method of induction, analysis and overview to analyse and summarize these articles. The three of us authors discussed together, discussing and analyzing together when we encountered differences of thought, looking for more theory and data to support the discussion, and finally unifying our opinions to reach a conclusion.

We have discussed and analyzed the main risk factors affecting stroke and stroke recurrence, demonstrated and reasoned deductively about the relationship between lifestyle and prevention of stroke recurrence, and then summarized and concluded the nursing guidelines that can influence the prevention of stroke recurrence. We present the results of the study in narrative form.

Table2: Literature Review data chart

Author, year, country	Purpose of the study	Participants (n)	Data collection method	Data analysis method	Main results
Hankey,G, 2013, Australia	Review the treatment and rehabilitation of recurrent stroke, and the prevention of stroke, and summa the proof of the best of prevention of ischemic stroke	Patients with initial and recurrent strokes	Citing study data from references	Qualitative analysis, inductive analysis approach, comparative analysis	The best way to prevent recurrency of stroke is that rapid diagnose of TIA and first stroke at the first time, and continuous to treat the underlying cardiovascular diseases and other risk factors.
Meierwati, 2011,China	Discuss the recurrent stroke of ideological distribution and other risk factor.	Patients with initial and recurrent strokes	The data of 218 hospitalized stroke patients were reviewed	Retrospective analysis, Logistic regression statistical method	The most recurrent of stroke factor are diarrhea, atrial fibrillation, high-fiber proprotein, carotid atherosclerotic plaque. To protect the inside of vessel, control blood pressure and blood sugar, anti-coagulant.
Ibrahim,M., Asuka,E., Jialal,I. Corcione,J.  2021, America	Recall the risk factor of hypercholesterol,. Depict the evaluation of patient with high-cholesterol. Summarize the treatment plan for hypercholesterolemia Explore and improvement the nursing cooperation of group member to improve the result of high cholesterol.	Hypercholesterolemia patients	Citing study data from references	Qualitative analysis	The weight and hypertension, diarrhea will get obvious improvement if life style changes. Plenty of evidence to show that it's will get better effective when high-cholesterol under control.
Wajngarten, M. Silva,G.  2019,Brazil	provide an updated review of arterial hypertension care in order to prevent the initial episode and recurrence.	Patients with strokes	Citing study data from references	Qualitative analysis, comparative analysis, Inductive Analysis	Blood pressure is a strong predictor of ischemic stroke and cerebral hemorrhage risk, and there is evidence that keeping blood pressure below 150/90 mmHg reduces the risk of stroke.

					we found that stroke patients had much greater rates of multiple morbidity and drug use than non-stroke patients. Combination drugs can be viewed as a direct reflection of one aspect of treatment burden. Stroke patients should learn about the relative benefits of their medications so that they can make informed treatment decisions.
Gallacher,K., Batty,G., McLean, G., Mercer,S., Guthrie,B., May,C., Langhorne, P. Mair.F.  2014,Scotland	To prove the new comments management of arterial hypertension, which means to prevent first stroke and recurrent stroke. Muti-pharmacy is the main sign to evaluate various diseases and the burden of treatment.	A cross-sectional study was done on 1,424,378 adults aged 18 and up from 314 primary care institutions in Scotland that are demographically representative of Scotland's adult population. The material includes information on stroke and 39 other long-term diseases, as well as prescriptions for traditional medications.	This entirely anonymous data collection contains clinical data from all living patients in Scotland who were registered in 314 primary care institutions on March 31, 2007.	Qualitative analysis , cross-sectional study.	We discovered that stroke patients had considerably higher rates of multiple morbidity and drug use than non-stroke patients in this study. Combination medications might be thought of as a direct indicator of one facet of treatment burden. We urge that stroke patients learn about the relative benefits of their drugs so that they can make well-informed treatment decisions.
Hajjar,E., Cafiero,A., Hanlon, J.  2007,America	Describe observational research that have looked into the epidemiology of multiple drug usage.	From the Medline database, stroke patients >65 years old	Citing study data from references	Literature review, qualitative analysis, Inductive Analysis	Various dosages of drugs have been linked to bad health consequences. To avoid numerous drugs, healthcare professionals should be aware of the hazards and thoroughly examine all medications at each patient visit.
Harugeri,A., Joseph,J., Parthasarathi, G., Ramesh,M., Guido,S.  2010, India	The purpose of this study was to evaluate prescribing patterns in the elderly population in two Indian teaching hospitals,	The study used medical records of 814 inpatients from two hospitals, with data from inpatients aged 60 to 95 years	Data on drug prescriptions for inpatients from admission to discharge were reviewed. Concordance with the U.S.	Bivariate analysis and multivariate logistic regression analysis, Qualitative	Reducing high levels of polypharmacy during hospitalization in hospitalized elderly patients in India can be an intervention that



	to identify predictors of high levels of multidrug therapy in the elderly.	on internal medicine wards.	Hospital Prescribing Service Drug Information 2007 was compared. Determined the prevalence and factors influencing high levels of polypharmacy in elderly patients.	analysis	should focus on older patients with diagnoses greater than or equal to three times, angina and, or length of stay greater than or equal to ten days.
MacKay-Lyons,M., Billinger,S., Janice J Eng,J.,Dromerick,A., Giacomantonio, N.,Hafer-Macko, C., Macko,R., Nguyen,E., Prior,P., Suskin,N.,Tang, A., Thornton,M.& Unsworth,K.  2019,America	Updating AEROBICS 2013 with the latest high quality evidence, discusses aerobic exercise recommendations for optimizing post-stroke care that can be practiced after stroke	Patients with strokes	Review of data related to aerobic exercise after stroke using multiple databases with data containing articles from 2012-2018	Quantitative analysis	Aerobic exercise is a crucial part of stroke rehabilitation care. Clinicians should make greater use of aerobic exercise prescriptions in their practice, and clinical implementation can help reduce uncertainty about the role of aerobic exercise in stroke rehabilitation.
Stahmeyer,J., Stubenrauch,S., Geyer,S., Weissenborn,K. Eberhard,S.  2019, German	To ensure the timing of stroke recurrence and the frequency of stroke recurrence.	Inpatients with strokes	The data used were hospitalization bills and diagnostic data from the Federal Lower Saxony AOK statutory health insurance fund.	Kaplan-Meier analysis and Cox regression  Qualitative analysis	It is important for acute stroke patients to be able to receive treatment at a specialized center. Stroke patients should be followed up after discharge to address any risk factors that may affect the recurrence of stroke.

<p>Hewitt,J., Guerra, L., Fernández- Moreno,M., Sierra,C.</p> <p>2012, Spain</p>	<p>Discusses the relationship between diabetes and stroke and offers advice on preventing severe disease</p>	<p>Diabetic patients hospitalised for stroke</p>	<p>Citing study data from references</p>	<p>Qualitative analysis, comparative analysis</p>	<p>There is no evidence that aggressive treatment of hyperglycemia has a significant preventive effect on stroke disease. However, aggressive treatment of hypertension and cholesterol lowering has been shown to be effective in diabetic patients. Management of stroke risk factors has also been shown to be effective in diabetic patients.</p>
<p>Chen,R., Ovbiagele,B., Feng,W.</p> <p>2016, America</p>	<p>To examine the epidemiology of diabetes and stroke, as well as the pathophysiology of diabetes and stroke patterns and outcomes in diabetics. summarize the impact of hyperglycemia on post-stroke outcomes and hyperglycemia management during the acute phase of stroke</p>	<p>Diabetic patients who have had a stroke</p>	<p>Citing study data from references</p>	<p>Qualitative analysis, comparative analysis</p>	<p>Diabetes is a significant modifiable risk factor for stroke, particularly ischemic stroke. In both ischemic and hemorrhagic strokes, hyperglycemia during the acute stroke phase is associated with poor outcomes. It must be actively remedied. Stroke prevention requires aggressive glucose control through lifestyle changes or medications, as well as modification of other associated risk factors.</p>
<p>Lau,L., Lew,J., Borschmann,K., Thijs,V., Ekinci,E.</p> <p>2018,American</p>	<p>The goals of this review were to: (1) estimate the prevalence of recognized and unrecognized diabetes in stroke populations from included studies using a meta-analysis; (2) investigate the associations between acute hyperglycemia and diabetes and outcomes after ischemic or hemorrhagic</p>	<p>Diabetic patients who have had a stroke</p>	<p>Citing study data from references</p>	<p>The meta-analysis, comparative analysis, qualitative analysis,</p>	<p>Diabetes affects roughly one-third of all stroke patients. To identify individuals with diabetes and design interventions aimed at reducing poor outcomes in this high-risk population, uniform methods for screening for diabetes after stroke are required.</p>

	stroke; and (3) evaluate the value of HbA1c compared with admission serum glucose-based tests in predicting stroke outcomes.				
Doehner, W., Schenkel, J., Anker, S., Springer, J. & Audebert, H. 2013, German	The study's goal was to look at the relationship between BMI and mortality as well as non-fatal functional outcomes in patients with acute stroke or transient ischaemic attack (TIA).	In total, 4428 patients were included in the study. There were 3101 patients (70 percent) with ischaemic cerebral infarctions, 373 (8 percent) with intracranial hemorrhage, and 954 (22 percent) with TIA.	The Telemedical Project for Integrative Stroke Care collected data from 4428 patients with acute stroke or transient ischaemic attack (TIA) (TEMPiS).	Statistical analyses, Quantitative Analysis	Overweight and obese stroke or TIA patients have better survival and combined outcomes of survival and non-fatal functional status than patients with a BMI of 25 kg/m <sup>2</sup> .
Hafsteinsdóttir, T., Vergunst, M., Lindeman, E., Schuurmans, M. 2010, Netherlands	To conduct a systematic review of the research on the educational needs of stroke patients and caregivers.	Patients with a stroke and their caregivers	Data extraction forms were used to record the characteristics of the selected studies.	Literature review, qualitative analysis	To conduct a systematic review of the research on the educational needs of stroke patients and caregivers. Stroke patients' and caregivers' educational needs focused on clinical aspects of stroke, prevention, treatment, and functional recovery. Caregivers' most frequently reported needs included patients' moving and lifting, exercises, psychological changes, and nutritional issues.
Xie Hua 2017, China	To observe the role of home care guidance in preventing recurrence of cerebral infarction.	Discharged stroke patients	Fifty patients with cerebral infarction who were admitted to the hospital for treatment between March 2013 and March 2014 and voluntarily received home care guidance at the time of discharge were	Quantitative analysis, Statistical analyses,	The possibility of recurrence after cerebral infarction treatment is high due to a variety of factors, and effective home care guidance after hospital discharge can achieve better prevention and control of recurrence.

			chosen for the study, and all patients were given home care guidance for two years to monitor disease recurrence.		
Mostofsky,E., Burger,M., Schlaug,G., Mukamal, K., Rosamond,W., Mittleman,M.  2010, USA	We used a case-crossover design to test the hypothesis that alcohol consumption affects the acute risk of ischemic stroke, to determine the time between alcohol consumption and the onset of symptoms (induction time), and to see if the risk varies by type of alcohol.	Patients with a stroke	Between January 2001 and November 2006, 390 patients (209 men and 181 women) were interviewed (median 3 days after stroke). Alcohol consumption in the hour before stroke symptoms was compared to the expected frequency based on previous year's alcohol consumption.	Quantitative analysis Statistical analysis	The risk of stroke onset is temporarily increased in the hour following alcohol consumption.

#### 4.4 Ethical statement

Our thesis is a study of the major risk factors affecting stroke and nursing guidelines to prevent stroke recurrence. This is a thesis involving medical research, but it is a literature review based on the analysis of other relevant research results. The authors had no direct contact or operate patients, and had not involve the issues of patient privacy and exposure. We respect and appreciate the patients who participated in the research trial and understand that patients do have the right to informed consent.

We used published dissertations or academic journals and also confirmed that the authors allowed the articles to be used as long as the articles were properly cited. We respect the research results of other researchers, we adhere to the principles of author citation in accordance with Laurea's criterias.

#### 4.5 Reliability

The subject of our study is the prevention of stroke recurrence, which is currently a global concern and a very important issue. There is an adequate theoretical research base and a large number of data studies as reference.

We use published papers or academic journals with sufficient reliability, and review and analyze the target groups, data collection and research methods for the articles studied. Our three authors discuss and analyze together to draw conclusions.

#### 4.6 Result

There are many risk factors that influence the recurrence of stroke, including non-interventional and interventional factors. Non-interference factors are difficult or even impossible to change, such as age gender race and so on (Meierwati 2011). And intervening on the factors that can be intervened on is an important means of preventing stroke recurrence.

It can be found from the article that stroke is closely related to the existence of many underlying diseases, such as: Hypertension, hyperlipidemia, diabetes mellitus, atrial fibrillation, obesity and smoking are important risk factors for stroke recurrence, and they are independent risk factors and can influence and interact with each other. Their combined combination is also common, which increases the risk of stroke recurrence and brings more mortality and disability.

Therefore, the occurrence of stroke is inseparable from the patient's own potential metabolic disorders, weight, lifestyle and eating habits. Instruct and guide patients' living and eating habits, and cultivate patients to form a healthy lifestyle, such as: light aerobic exercise 2-3 times a week to improve cardiopulmonary health, improve activity ability, and intervene in the life care of patients after stroke is important.

The common feature of hypertension, hyperlipidemia, diabetes and atrial fibrillation is the need for adherence to medication treatment, and poor adherence to medication can significantly increase the recurrence of stroke. So it is necessary to provide nursing guidance to stroke patients.

#### 5 Conclusion

The main intervenable risk factors affecting stroke recurrence are hypertension, hyperlipidemia, hyperglycemia, atrial fibrillation, obesity, smoking and alcohol consumption. Treating and controlling these risk factors can effectively prevent the recurrence of stroke. And changing unhealthy lifestyle is very helpful for the prevention and control of these underlying diseases, which is great significant for the effective prevention of stroke recurrence. Stroke patients need nursing guidance and interventions after discharge from hospital, it should be formed part of routine clinical nursing. This has far-reaching implications for the design of health services and clinical guidelines.

## 6 Discussion

The major intervenable risk factors affecting stroke recurrence studied in this article do not include all factors affecting stroke. This is because the recurrence of stroke can be effectively prevented by giving care instructions to stroke patients to change the major risk factors.

When we reviewed, we found that hypertension, hyperlipidemia and diabetes are the main risk factors affecting the recurrence of stroke, while they are also the most common underlying diseases, and they influence each other and interact with each other, all having characteristics that affect blood vessels and atherosclerosis. In addition to normal medication treatment, many studies have proven that a healthy lifestyle can prevent and influence the course of these underlying conditions, while effectively preventing strokes and stroke recurrences.

The risk of stroke in people with diabetes is at least twice that of non-diabetics, and the risk increases by 3% for each year of diabetes duration. This is why managing and treating diabetes is important for stroke prevention. We have found that stress hyperglycaemia (stress hyperglycaemia) is often present during the acute phase of stroke. It is associated with early neurological deterioration, poorer functional prognosis and higher mortality. It requires aggressive correction, but optimal management remains unknown (Chen et al. 2016). In conclusion maintaining good blood glucose levels, through the control of the disease process of diabetes, is also an important measure to prevent stroke and other complications.

We know that overweight and obesity can easily cause hypertension, hyperlipidemia and diabetes, which can lead to stroke, so weight control is also an important measure to prevent stroke. However, studies have shown that overweight (BMI 25 to <30.0) or obese (BMI 30 to <35) patients do not have a higher risk of stroke recurrence than those of normal weight (BMI 18.5 to <25) and that weight management is more important in the guidance of first stroke prevention (Doehner et al. 2013). The authors believe that although obesity is not a higher risk than normal weight for recurrence stroke, but it is itself a major risk factor for hypertension, hyperlipidemia and diabetes. So weight control is still a very necessary preventive measure from the point of view of control and prevention of underlying diseases.

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