Prevalence Trends and Influencing Factors of Post-Stroke Cognitive Impairment in China: A Meta-Analysis (Postprint)

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Abstract

Post-stroke cognitive impairment (PSCI) is a common sequela in stroke patients, severely affecting their quality of life and often being overlooked. The high incidence, insidious symptoms, and heavy social burden of PSCI have made it a research priority. Understanding the prevalence and related factors of PSCI is crucial for developing prevention and treatment strategies for stroke.

Objective To systematically evaluate the current prevalence and development trends of PSCI in China from 2014 to 2024, and to summarize the related risk factors and protective factors of PSCI.

Methods A systematic search was conducted on PubMed, Web of Science, Embase, China National Knowledge Infrastructure (CNKI), Wanfang Data, VIP Chinese Science and Technology Journals Database, and China Biology Medicine disc (CBM) to collect studies on the prevalence and risk factors of PSCI in China, with the search period from November 2014 to November 2024. Stata 16.0 and SPSS 26.0 software were used to analyze the current status and trends of PSCI, and RevMan 5.4 software was used to analyze related factors.

Results A total of 59 studies were included. Meta-analysis results showed that the overall prevalence of PSCI in China was 51% (95%CI=48%~55%). The prevalence of PSCI was 50% (95%CI=46%~54%) in males and 56% (95%CI=51%~60%) in females; 47% (95%CI=40%~55%) in patients <60 years and 59% (95%CI=50%~67%) in those $ 60years;theprevalenceratesinEastChina, SouthChina, NorthChina, weeks, 2 weeks to 3 months, 3 months to 6 months, >6 months), the prevalence rates were 52% (95%CI=45%~58%), 52% (95%CI=45%~58%), 40% (95%CI=35%~44%), and 56% (95%CI=43%~70%), respectively; the prevalence was 63% (95%CI=55%~71%) in those with primary school education or below; 57% (95%CI=46%~68%) in married individuals and 64% (95%CI=52%~75%)

in unmarried individuals; 64% (95%CI=44%~84%) in employed individuals and 71% (95%CI=56%~87%) in unemployed individuals; 48% (95%CI=33%~64%) in mental laborers and 53% (95%CI=30%~76%) in manual laborers; 62% (95%CI=43%~82%) in those living with family and 71% (95%CI=62%~81%) in those living alone. The prevalence of PSCI in China increased with age (2 =73.805, P<0.01); individuals with higher education levels had lower PSCI prevalence (2 trend =164.711, P<0.01); there were statistically significant differences in PSCI prevalence among different regions (2 =74.701, P<0.01). The prevalence showed an upward trend with longer assessment time (2 trend =186.504, P<0.05); there were statistically significant differences in PSCI prevalence among different time periods (2 trend=325.964, P<0.01), but no linear correlation was observed (P=0.259). Advanced age, female sex, hypertension, diabetes mellitus, hyperlipidemia, history of stroke, carotid plaque, hyperhomocysteinemia, elevated C-reactive protein levels, smoking, alcohol consumption, and high NIHSS score were risk factors for PSCI in Chinese stroke patients, while high education level and physical exercise were protective factors.

Conclusion The overall prevalence of PSCI in China is relatively high at 51%, with significant differences among different regions and provinces, and showing dynamic changes over time. Female sex, advanced age, and low education level are associated with higher PSCI prevalence. Additionally, hypertension, diabetes mellitus, hyperlipidemia, etc. are risk factors for PSCI onset. Medical institutions at all levels should focus on these high-risk populations, accelerate the formulation and implementation of comprehensive PSCI prevention and treatment strategies to reduce the social care pressure and economic burden in China.

Full Text

Prevalence Trends and Influencing Factors for Post-Stroke Cognitive Impairment in China: A Meta-Analysis

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Abstract

Background: Post-stroke cognitive impairment (PSCI) is a common sequela of stroke that severely impacts patients' quality of life and is often overlooked. The high incidence, subtle symptoms, and substantial social burden of PSCI make it a research priority. Understanding the prevalence and associated factors of PSCI is crucial for improving stroke prevention and treatment strategies.

Objective: To systematically evaluate the prevalence and trends of PSCI in China from 2014 to 2024 and summarize the related risk and protective factors.

Methods: Relevant studies on the prevalence and influencing factors of PSCI in China were retrieved from PubMed, Web of Science, Embase, CNKI, Wanfang Data, VIP, and CBM, covering the period from November 2014 to November 2024. Stata 16.0 and SPSS 26.0 software were used to analyze the current status and trends of PSCI, and RevMan 5.4 software was employed to analyze related factors.

Results: A total of 59 studies were included in this analysis, revealing that the overall prevalence of PSCI in China was 51% (95%CI=48%-55%). The prevalence of PSCI among males and females was 50% (95%CI=46%-54%) and 56% (95%CI=51%-60%), respectively. Patients aged under 60 years and those aged 60 years and above exhibited prevalence rates of 47% (95%CI=40%-55%) and 59% (95%CI=50%-67%), respectively. The prevalence in East China, South China, North China, Central China, Northeast China, Northwest China and Southwest China was 49% (95%CI=42%-56%), 48% (95%CI=36%-61%), 53% (95%CI=44%-62%), 48% (95%CI=40%-56%), 57% (95%CI=54%-60%), 42% (95%CI=32%-52%) and 51% (95%CI=43%-59%), respectively. Furthermore, the prevalence of hemorrhagic and ischemic stroke was 54% (95%CI=41%-67%) and 52% (95%CI=48%-56%), respectively. At different time points ($ 2weeks, 2weeks − 3months, 3 − 6months, > 6months), theprevalencerateswere52{2}= 73.805, P < 0.01), andwasnotablyhigheramongindividualswithlowereducationlevels trend=164.711, P<0.01). There were significant differences among different regions (2=74.701, P<0.01). With the extension of assessment periods, the prevalence showed an upward trend (2 trend=186.504, P<0.05). Although a significant difference in prevalence rates was observed across different periods (2 trend=325.964, P<0.01), no linear correlation was identified (P=0.259). Factors such as age, female gender, hypertension, diabetes, hyperlipidemia, a history of stroke, carotid plaque, hyperhomocysteinemia, C-reactive protein levels, smoking, drinking and NIHSS score were identified as risk factors for PSCI in China, whereas education level and physical exercise emerged as protective factors.

Conclusion: The overall prevalence of PSCI in China is notably high, exhibiting significant regional and provincial variations, as well as a dynamic trend over time. The prevalence is particularly elevated among females, the elderly, and individuals with lower educational attainment. Additionally, hypertension, diabetes, and hyperlipidemia are identified as risk factors for PSCI. It is imperative for medical institutions at all levels to prioritize these high-risk groups, and expedite the development and implementation of comprehensive prevention and control strategies for PSCI to alleviate the social care burden and economic strain in China.

Keywords: Stroke; Cognitive impairment; Prevalence; Root cause analysis; Meta-analysis

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Introduction

Post-stroke cognitive impairment (PSCI) is a common complication following stroke, referring to a series of cognitive disorder-related syndromes that occur within 3-6 months after a stroke event[1], with an overall incidence ranging from 13.6% to 80.0%[2]. Depending on the specific cognitive domains affected, patients may experience attention deficits, executive dysfunction, slowed processing speed, memory impairment, or other forms of cognitive damage, sometimes accompanied by abnormalities in behavior, personality, and mental state[3]. Based on severity, PSCI encompasses a spectrum from post-stroke cognitive impairment no dementia (PSCIND) to post-stroke dementia (PSD)[3], representing a major cause of lifelong disability, reduced survival, increased disease burden, and decreased quality of life for stroke patients, imposing a heavy burden on individuals, families, and society[1,3–4]. Moreover, the symptoms of cognitive impairment are often insidious and easily overlooked by patients, families, and healthcare providers, resulting in many stroke survivors being unable to return to normal life due to cognitive deficits even after physical function recovery[5]. Therefore, understanding the prevalence trends and related influencing factors of PSCI in China is crucial for advancing stroke prevention and treatment efforts. However, comprehensive reports on the prevalence trends and influencing factors of PSCI in China remain lacking. In light of this, this study aims to systematically evaluate the current status and development trends of PSCI in China from 2014 to 2024 through meta-analysis, summarize the influencing factors of PSCI, and provide data support and reference for relevant departments to formulate targeted stroke prevention and treatment strategies.

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1. Materials and Methods

This study follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) reporting guidelines[6].

1.1 Search Strategy Using a combination of MeSH terms and free-text terms, we systematically searched PubMed, Web of Science, Embase, CNKI, Wanfang Data, VIP, and CBM for studies on the prevalence and risk factors of PSCI in China, with the search period spanning from November 2014 to

November 2024. We also manually searched the reference lists of included studies using a "snowballing" approach to identify additional relevant literature. English search terms included: Stroke*, Cerebrovascular Accident*, Apoplexy, Cognitive Dysfunction*, Cognitive Deficit*, Cognitive Decline*, Cognitive Disorder*, Cognitive Impairment*, Morbidity, Epidemi*, Prevalence*, Incidence, Influencing Factor*, Affecting Factor*, Risk Factor*, China, Inner Mongolia, Sinkiang, Chinese, Hong Kong, Macao, Taiwan, etc. Chinese search terms included: stroke, apoplexy, cerebral infarction, cerebrovascular accident, cognitive disorder, cognitive dysfunction, cognitive decline, cognitive impairment, cognitive damage, incidence, prevalence, epidemiology, current status, risk factors, influencing factors, related factors, etc. The specific search strategy for PubMed is shown in Table 1 .

1.2 Inclusion Criteria

(1) Study subjects were Chinese patients aged $ $18 years who met stroke diagnostic criteria; (2) Study designs included cross-sectional studies, case-control studies, and cohort studies; (3) Cognitive function was screened using the Mini-Mental State Examination (MMSE) or Montreal Cognitive Assessment (MoCA); (4) Outcome measures were PSCI prevalence and/or its influencing factors; (5) Only Chinese and English literature was included.

1.3 Exclusion Criteria

(1) Abstracts, conference papers, reviews, and study protocols; (2) Studies unable to provide valid data or with incomplete data; (3) Studies where full text could not be obtained; (4) Sample size <150 cases; (5) Animal experiments; (6) Studies with unreasonable design, poor quality, or statistical errors; (7) Studies that did not exclude pre-stroke cognitive impairment; (8) Duplicate data.

1.4 Literature Screening and Data Extraction Two researchers independently screened literature, extracted data, and cross-checked results, with disagreements resolved through discussion or consultation with a third party. Extracted data included: (1) Basic information: first author, publication year, study location, etc.; (2) Study subject characteristics: stroke type, sample size, age, education level, etc.; (3) Outcome measures: assessment time, tools, number of patients, influencing factors, etc. Supplementary data were obtained from authors via email when necessary.

1.5 Quality Assessment of Included Studies Two researchers independently assessed the risk of bias in included studies and cross-checked results, with disagreements resolved through discussion or with the assistance of a third party. Cross-sectional studies were evaluated using the Agency for Healthcare Research and Quality (AHRQ) recommended tool for cross-sectional studies[7], which comprises 11 items scored as 1 point for "yes" and 0 points for "no" or "unclear." Total scores of 8-11 indicate high quality, 4-7 indicate moderate quality, and 0-3 indicate low quality[8]. Case-control and cohort studies were evaluated using the Newcastle-Ottawa Scale (NOS)[9], where 1-3 points indicate low quality, 4-6 points indicate moderate quality, and 7-9 points indicate high quality[10].

1.6 Statistical Methods Stata 16.0 was used to analyze prevalence status and trends, while RevMan 5.4 was used to analyze influencing factors. Pooled effect sizes were expressed as odds ratios (OR) with 95% confidence intervals (95%CI). Heterogeneity was analyzed using ^{2} test (α=0.1) and I^2 test. A fixed-effects model was used when I^2<50% and P$ 0.1; $whenI^{\{2\}\$\$ 50}$ {2}$ test was used to compare PSCI prevalence across different patient groups, and trend ^{2} test was performed using SPSS 26.0 software. P<0.05 was considered statistically significant.

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2. Results

2.1 Literature Screening Results The initial search yielded 10,819 relevant articles. After screening, 59 studies[11–69] were ultimately included, covering 24 provinces/autonomous regions/municipalities in China, with a total sample size of 21,704 cases, including 11,504 PSCI patients. The literature screening process is shown in Figure 1 [Figure 1: see original paper].

2.2 Basic Characteristics of Included Studies The basic characteristics of included studies are shown in Table 2 . Among the 32 cross-sectional studies[11],[13–15],[17–28],[30],[32–33],[35–36],[41],[43–44],[52],[57],[59],[61],[63],[65],[68–69], AHRQ scores ranged from 7-11 points; 21 cohort studies[12],[16],[29],[31],[34],[37–40],[42],[45],[47],[49–51],[53–54],[58],[62],[66–67], had NOS scores of 6-9 points; and 6 case-control studies[46],[48],[55–56],[60],[64] had NOS scores of 8-9 points.

2.3 Meta-Analysis Results of PSCI Prevalence in China

2.3.1 Overall PSCI Prevalence Significant heterogeneity was observed among the 59 studies (I^2=97.4%, P<0.001). Using a random-effects model, the meta-analysis revealed that the overall prevalence of PSCI in China was 51% (95%CI=48%-55%), as shown in Figure 2 [Figure 2: see original paper].

2.3.2 Subgroup Analysis Subgroup analyses were conducted by gender, age, geographic region, stroke type, assessment time, assessment tools, education level, marital status, employment status, occupational type, and living situation. The results showed that the prevalence of PSCI was 50% among males and 56% among females; 47% in patients <60 years and 59% in those $ $60 years; 49$ $2 weeks, 2 weeks-3 months, 3-6 months, >6 months), respectively; 46% when using MMSE alone, 55% when using MoCA alone, and 49% when using both; 63%, 50%, and 42% for primary school and below, middle/high school, and college and above education levels, respectively; 57% and 64% for married and unmarried individuals, respectively; 64% and 71% for employed and unemployed individuals, respectively; 48% and 53% for mental and manual workers, respectively; and 62% and 71% for those living with family and living alone, respectively. These results are detailed in Table 3 .

2.3.3 Trend Analysis This study comprehensively analyzed the development trends of PSCI prevalence in China from multiple perspectives. The results indicated that: (1) From an age distribution perspective, PSCI prevalence in China increased significantly with age (^{2}=73.805, P<0.01). (2) From an educational background perspective, higher education levels were associated with lower PSCI prevalence (^{2} trend=164.711, P<0.01). (3) From a spatial distribution perspective, significant differences existed in PSCI prevalence among the seven geographic regions (42%-57%) (^{2}=74.701, P<0.01), as well as among various provincial-level administrative regions (26%-80%) (^{2}=495.373, P<0.01). (4) From an assessment time perspective, PSCI prevalence showed a linear upward trend with extended assessment periods (^{2} trend=186.504, P<0.05). (5) From a publication time perspective, comparing PSCI prevalence from January 2014 to November 2024 (32.4%-53.9%) revealed significant differences (^{2} trend=325.964, P<0.01), but no linear correlation (linear association=1.272, P=0.259), making it impossible to determine a consistent year-by-year increasing trend. These findings are presented in Tables 3 through 5 .

2.3.4 Sensitivity Analysis Sensitivity analysis results showed no significant changes in effect size, indicating that the study findings possess strong robustness.

2.3.5 Publication Bias A funnel plot was constructed to assess publication bias for PSCI prevalence in China. The plot showed roughly symmetrical distribution (Figure 5 [Figure 5: see original paper]), and combined with Egger' s test (t=-1.04, P=0.304), indicated no significant risk of publication bias.

2.4 Meta-Analysis Results of PSCI Influencing Factors A meta-analysis of influencing factors was conducted on 46 studies[12–19],[21–25],[27],[29–30],[32–33],[35–37],[40],[42–46],[48–51],[53–56],[59–
The results showed that advanced age (OR=1.08), female gender (OR=1.65), hypertension (OR=2.01), diabetes (OR=2.03), hyperlipidemia (OR=1.55), history of stroke (OR=2.56), carotid plaque (OR=1.76), hyperhomocysteinemia (OR=1.10), elevated C-reactive protein (OR=1.14), smoking (OR=1.63), alcohol consumption (OR=2.11), and high NIHSS score (OR=1.20) were risk factors for cognitive impairment in Chinese stroke patients (P<0.05), while higher education level (OR=0.71) and physical exercise (OR=0.71) were protective factors (P<0.05). Details are provided in Table 6 .

3. Discussion

This study summarized and analyzed 59 studies, including 32 cross-sectional studies, 21 cohort studies, and 6 case-control studies. Quality assessment results showed AHRQ scores of 7-11 for cross-sectional studies, NOS scores of 6-9 for cohort studies, and NOS scores of 8-9 for case-control studies, indicating moderate to high-quality literature and reliable research findings.

3.1 High PSCI Prevalence Requires Enhanced Early Screening and Prevention The meta-analysis results revealed a high overall PSCI prevalence of 51% in China, consistent with Zhao and Wan' s study[70]. Subgroup analysis identified several key findings: (1) **Gender:** Female PSCI prevalence was higher than male prevalence. Combined with our influencing factor analysis, this indicates that women constitute a high-risk population for cognitive impairment among stroke patients in China. This may be attributed to significantly higher follicle-stimulating hormone (FSH) levels in women, which can bind to FSH receptors on neuronal surfaces, activate the C/EBPβ/AEP pathway, and promote Aβ and Tau pathology, thereby increasing cognitive impairment risk[71]. Healthcare providers should pay special attention to cognitive changes in female stroke patients, conduct early screening and assessment, and strengthen health education for female PSCI patients, focusing on monitoring cognitive function during intervention to delay decline. (2) **Age:** Patients
$ 60*yearsshowedhigherPSCIprevalence*(59{72}.*Withaging, brainstructuregraduallyatrophies, brainweightandvolumedecr*
26},{28},{36}.*Additionally, thebrain′scompensatorycapacitynaturallydeclineswithage, andolderpopulationsh*
repaircapacity.Afterstrokeevents, whitematterdemyelinationandcerebrovasculardamageworsen, amyloidpr
and A$ 42*concentrationsinthehippocampusandentorhinalcortexincreasecognitiveimpairmentrisk*{32-33},{44
modifiablefactor, earlyidentificationandinterventioncaneffectivelydelaycognitivedecline.Futureresearch
termcognitivechangesandclinicaloutcomesmustfullyconsiderageeffectsoncognitivefunction.(3)∗
∗*Education* : ∗∗*Individualswith*"*primaryschoolandbelow*"*educationshowedthehighestPSCIprevalence, follo*
inducedneuronaldamage, therebyloweringPSCIincidence{18},{27}.*Highereducationalsoincreasescognitiver*
∗*Stroketype* : ∗∗*HemorrhagicstrokepatientsshowedslightlyhigherPSCIprevalence*(54 2*weeks*"*and*"2*weeks*−
3*months*, "*higherthanthe*40{74}, *ourfindingsalignwiththehigherprevalenceat*" > 6*months.*"*However, anotherrecentstudyshowe*
*yearlongitudinalstudyfoundcognitivefunctionchangedfastestandwasmostunstablewithin*3−
6*monthspost*−*stroke, withhighestPSCIincidenceat*3*months, lowestat*6*months, thenplateauingat*12*and*24*mo*
∗*Maritalstatus* : ∗∗*UnmarriedindividualsshowedhigherPSCIprevalence*(64{8}, *andlong*−*termsolitarylivingincre*
∗*Assessmenttools* : ∗∗*PSCIprevalencewashigherwhenusingMoCAalonecomparedtoMMSEaloneorbothtool*
∗*Spatialdistribution* : ∗∗*SignificantdifferencesexistedinPSCIprevalenceamongthesevengeographicregion*
tests showed no linear correlation between years, preventing determination of a consistent year-by-year increase. Regardless of trends, the overall PSCI prevalence remains high, requiring continuous strengthening of stroke prevention knowledge dissemination and steady advancement of prevention efforts to reduce stroke and PSCI incidence and promote national brain health.

3.2 PSCI is Influenced by Multiple Factors This study identified advanced age, female gender, hypertension, diabetes, hyperlipidemia, stroke history, carotid plaque, hyperhomocysteinemia, elevated C-reactive protein, smoking, alcohol consumption, and high NIHSS score as risk factors for PSCI in Chinese stroke patients, while higher education level and physical exercise were protective factors.

(1) **Hypertension:** Chronic hypertension can cause vascular narrowing, decreased compliance, and cerebrovascular endothelial injury, promoting atherosclerosis, reducing cerebral blood flow, causing protein denaturation, and affecting cognitive function[25–26],[36],[43–44],[78]. Maintaining blood pressure below 140/90 mmHg helps preserve cerebral blood flow, reduce cardiovascular and cerebrovascular damage, and protect cognitive function to prevent dementia[79–80]. Healthcare providers should strengthen education for hypertensive stroke patients, emphasizing the importance of continuous antihypertensive medication to reduce cognitive impairment risk.

(2) **Diabetes:** Diabetes can reduce hippocampal neuron density[81], disrupt neural information transmission between the hippocampus and cortex, decrease neurotrophic Aβ while increasing neurotoxic Aβ release, promote neural injury, and worsen senile plaques and neurofibrillary tangles[82]. Chronic inflammation in diabetes exacerbates neuronal and vascular endothelial cell damage, further affecting cognitive function[33]. Insulin resistance can also cause abnormal brain energy metabolism, increasing PSCI risk[23]. Stroke patients with diabetes should undergo regular blood glucose monitoring and reasonable glycemic control to prevent PSCI.

(3) **Hyperlipidemia:** Hyperlipidemia promotes atherosclerosis, causes vascular narrowing, affects cerebral perfusion, increases neuron-related neurofibrillary tangles, and promotes amyloid protein accumulation in the brain, triggering PSCI[83].

(4) **Stroke history:** SIBOLT et al.[84] found PSCI incidence was about 10% in first-ever stroke patients but up to 30% in recurrent stroke patients, indicating significantly increased cognitive impairment risk after repeat stroke events, consistent with our findings. The mechanism involves cumulative brain damage from repeated injuries, affecting neural conduction, blocking neural signal transmission pathways, weakening intercortical neural connections, and ultimately impairing cognitive function[23]. Stroke can also cause cortical atrophy, reducing brain volume and function, affecting memory, visual discrimination, and information processing[23]. Healthcare providers should prioritize early cognitive assessment and monitoring in patients with stroke history for timely intervention and improved outcomes.

(5) **Carotid plaque:** Carotid atherosclerotic plaque formation causes vascular stenosis, insufficient cerebral blood perfusion, ischemia and hypoxia,

leading to neural information conduction 障碍 and neuronal damage, promoting capillary malformation, tangles, and amyloid plaque formation, causing temporary or permanent cognitive impairment[85]. Additionally, unstable plaques are prone to detachment, blocking cerebral vessels and worsening cerebral ischemia and hypoxia, further increasing cognitive impairment risk. Therefore, carotid plaque is an important risk factor requiring intensive short-term and long-term monitoring and management.

(6) **Hyperhomocysteinemia:** Research shows that every 5 mol/L increase in blood homocysteine level increases Alzheimer' s disease risk by 15%[86]. Elevated homocysteine exacerbates oxidative stress, causes vascular endothelial dysfunction, arterial smooth muscle cell proliferation, and reduced fibrinolytic function[19],[33],[45], increasing cognitive impairment risk. Further studies show elevated homocysteine is closely related to periventricular white matter and cortical white matter damage, suggesting hyperhomocysteinemia may affect cognitive function by promoting cerebral atherosclerosis[87]. Additionally, hyperhomocysteinemia can cause cerebral microarteriosclerosis and neurotoxic reactions, leading to hippocampal neuronal apoptosis, impaired DNA repair capacity, and enhanced neuronal toxicity to Aβ, accelerating cognitive decline[88]. Healthcare providers should monitor and intervene early in hyperhomocysteinemia patients to reduce cognitive impairment risk.

(7) **C-reactive protein:** C-reactive protein is an important inflammatory marker[89]. In acute stroke, C-reactive protein helps activate immune defense and provides protective effects, but sustained elevation may be detrimental[90]. C-reactive protein can promote macrophage uptake of LDL-C, causing foam cell formation, damaging endothelial cell function, and potentially promoting cerebral atherosclerosis and cerebral microvascular disease, disrupting frontal-subcortical circuit integrity and causing cognitive decline. Elevated C-reactive protein is also associated with increased stroke recurrence risk and may accelerate metabolic disease progression, further worsening cognitive impairment.

(8) **Smoking:** Tobacco nicotine and carbon monoxide can directly stimulate vascular walls, causing vasospasm and contraction, and increase catecholamine and angiotensin secretion through vascular endocrine pathways, raising blood pressure and PSCI risk[43–44]. These substances can also induce oxidative stress, accelerate arteriosclerosis, cause cerebral blood flow insufficiency, and affect cognitive function[43–44].

(9) **Alcohol consumption:** Long-term heavy drinking damages neurons and brain cells, and exacerbates inflammatory factor expression during acute cerebral infarction, increasing cognitive dysfunction risk[61].

(10) **NIHSS score:** The NIHSS score reflects acute stroke patients' neurological function severity. Higher scores indicate greater neurological deficits, more severe conditions, and typically larger lesions or lesions in critical

brain areas[91]. For example, ischemic damage in frontal lobe, temporal lobe, thalamus, basal ganglia, and brainstem regions can disrupt cognitive information transmission networks, impairing information processing and multiple cognitive functions[43]. Severe stroke patients (NIHSS>10) have 50 times higher dementia incidence than the general population[92]. Early neurological impairment or severe deterioration not only affects patients' cognitive ability and survival but also increases activity limitations and rehabilitation costs, imposing greater economic and psychological burdens on patients and caregivers[93]. Healthcare providers should promptly assess disease severity and actively intervene in primary diseases to prevent further neurological deterioration and reduce PSCI incidence.

(11) **Physical exercise:** Regular physical exercise helps improve mental activity, mood, and reduce cerebrovascular perfusion stress responses, thereby reducing cognitive impairment risk and serving as an important protective factor after acute cerebral infarction[61]. A 12-month randomized controlled trial showed exercise training can improve cognitive function in adult chronic stroke patients[94]. Healthcare providers should encourage appropriate physical exercise when developing comprehensive nursing intervention plans.

Conclusion

This study demonstrates that PSCI prevalence in China is high overall, with significant regional and provincial differences and dynamic changes over time. Women, the elderly, and individuals with low education levels show particularly high PSCI prevalence. Additionally, hypertension, diabetes, hyperlipidemia, stroke history, carotid plaque, hyperhomocysteinemia, elevated C-reactive protein, smoking, alcohol consumption, and high NIHSS score are risk factors for PSCI. Therefore, we recommend that healthcare institutions at all levels focus on high-risk groups and expedite the development and implementation of comprehensive PSCI prevention and control strategies, such as controlling blood pressure, blood glucose, and homocysteine levels, quitting smoking and alcohol, promoting healthy lifestyles and physical exercise, to reduce cognitive impairment incidence and alleviate social care pressure and economic burden for stroke patients in China.

Author Contributions: ZHAO Xuejiao was responsible for conceptualization, design, data collection, manuscript writing, and revision; LI Yujie, LU Ting, and YAN Huan were responsible for literature search, data extraction, quality assessment, and data analysis; LI Juan was responsible for manuscript review, quality control, and funding support.

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