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# Efficacy of reminiscence therapy with different media on cognitive function and mental health for elderly patients with stroke: protocol of a network meta-analysis

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Keywords:	Stroke < NEUROLOGY, MENTAL HEALTH, Delirium & cognitive disorders < PSYCHIATRY



# Title page

## Title

Efficacy of reminiscence therapy with different media on cognitive function and mental health for elderly patients with stroke: protocol of a network meta-analysis

## List of all authors

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#### Authors' contributions

Qian Liu designed this study with oversight by Xiuying Hu and Hong Cheng. Qian Liu drafted the protocol, and the draft was modified by Li Liu, Fang Wang and Xiuying Hu. Qian Liu and Lixia Tan will search, select, and identify studies and extract data independently, while Li Liu will be the third reviewer for study selection and data extraction. Qian Liu will be responsible for the methodology. All authors have approved the publication of this protocol.

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This study is funded by a project from the West China Hospital of Sichuan University (Grant

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## **Conflict of Interest**

The authors have no conflicts of interest to disclose.

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# Abstract

Introduction: Cognitive impairment and mental problems are both risk factors for long-term death among elderly stroke survivors. Managing them in elderly patients with stroke is crucial for improving their well-being. Some studies have focused on the effects of reminiscence therapy with different media on stroke survivors. However, there is a lack of research to determine which is the best medium. Therefore, this protocol aims to identify the best medium for reminiscence therapy by using a network meta-analysis.

Methods and analysis: Published randomized controlled trials will be included if reminiscence therapy plus usual care was applied in elderly stroke patients in the experimental group and usual care was applied in the control group. Six electronic databases will be searched from their inception to August 2023, including the Cochrane Library, CINAHL, PubMed, Web of Science, Medline, and Embase. The media of reminiscence therapy may include (but not restricted to) old photos, music or movies. Outcomes will be cognitive function and mental health (such as anxiety and depression). Study selection, data extraction and quality assessment will be performed independently by two reviewers. The risk of bias of the included studies will be evaluated in accordance with the Cochrane Collaboration's risk of bias tool. The

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evidence quality will be measured based on the Grading of Recommendations Assessment, Development and Evaluation. To compare the efficacy of reminiscence therapy with different media, standard pairwise meta-analysis and Bayesian network meta-analysis will be conducted. The probabilities of intervention for all outcomes will be ranked based on the surface under the cumulative ranking curve.

Ethics and dissemination: Ethical approval is not required for reviewing published studies. The findings will be submitted to a peer-reviewed journal for review and publication to provide important evidence for clinicians and guideline developers to determine interventions for elderly stroke patients

PROSPERO registration number: CRD42023447828.

Key words: reminiscence therapy; stroke; network meta-analysis; cognitive function; mental health

# Strengths and limitations of this study

1. This network meta-analysis will integrate the evidence and allow the comparison of different media of reminiscence therapy in one model.

2. For the first time the cognitive function and mental health outcomes of reminiscence therapy with different media for elderly patients with stroke will be comprehensively assessed in a network meta-analysis.

3. Network meta-analysis will promote precision of medium of reminiscence therapy, and provide evidence for the decisions of intervention and the development of guidelines.

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# Introduction

With the rapid development of global population aging, the number of elderly patients with chronic diseases is also increasing. Stroke is still a common cause of death and disability in the elderly,<sup>1 2</sup> with a high incidence, high disability rate, high mortality, high recurrence rate, and high economic burden.<sup>3</sup> With the progress of medicine, the emergency medical systems and innovative treatment methods have improved, and the mortality rate of stroke patients has been reduced to a certain extent. However, more and more stroke survivors are struggling with post-stroke complications. <sup>4-6</sup> In particular, stroke increases the risk and severity of cognitive impairment.<sup>7</sup> More than 70% of stroke survivors have cognitive deficits related to disability, dependency and morbidity, posing a significant burden on patients, caregivers, and the health care system.<sup>8</sup> Moreover, the decline in stress and cognitive abilities can easily cause psychological problems (such as anxiety and depression) among stroke survivors when facing physical discomfort and the financial burden of treatment, leading to decreased quality of life in patients. Importantly, post-stroke cognitive impairment and psychological disorders are important risk factors for poor prognosis and low survival rate.<sup>9-11</sup> Therefore, efforts to relieve cognitive impairment and psychological problems in stroke survivors have never been stopped.

Reminiscence therapy was proposed by Butler in 1963 based on Eric Erickson's

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theory of psychosocial development, which first emphasized the importance of nostalgia and life review for the elderly to successfully adapt to aging.<sup>12</sup> Nursing Interventions Classification defines reminiscence therapy as helping people improve their sense of well-being, quality of life, and adaptability to existing surroundings by recalling the past events, thoughts, and emotions.<sup>13</sup> Reminiscence therapy uses familiar objects, such as old photos, music, and food, to trigger people's memories of the past in a safe and comfortable environment and to encourage them to share and discuss their life experiences. A randomized controlled trial suggests that reminiscence therapy has a positive effect on cognitive impairment, anxiety and depression in patients with acute ischemic stroke, and can be used as a supplementary rehabilitation plan for post-stroke treatment.<sup>14</sup> Similarly, another study also indicates that reminiscence therapy has the same effect, demonstrating its potential for post-stroke management.<sup>15</sup> However, in the current studies on reminiscence therapy, scholars induced patients to have a sense of nostalgia through various media such as photos, music, and movies, thereby achieving therapeutic effects. It can be seen that there is no unified medium of reminiscence therapy at present. For this reason, we would like to conduct a network meta-analysis, which can summarize the direct and indirect evidence and provide the ranking of intervention options. To date, no network meta-analysis has been conducted to systematically compare which medium for reminiscence therapy have the best effect on cognitive function and mental health in elderly stroke patients. Therefore, the objective of the current protocol is to synthesize all evidence and provide clinicians with reliable medium references of reminiscence

therapy.

# Methods and analysis

This protocol will be developed following the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols<sup>16</sup> and was registered on the PROSPERO platform (CRD42023447828).

# Eligibility criteria

Type of participants

Elderly stroke patients will be included. Patients with other major diseases, such as malignant tumors and organ failure, will be excluded.

Type of intervention

Reminiscence therapy that is combined with usual care and implemented in elderly patients with stroke will be included. However, multi-component interventions will be excluded. Reminiscence therapy may be aimed at improving cognitive function and mental health (such as depression and anxiety). Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

## Comparison

Comparator will be considered the usual care of elderly patients with stroke, including medication management, diet, rehabilitation care and complication prevention, or reminiscence therapy with another medium plus usual care.

## Type of outcomes

The outcomes will focus on cognitive function and mental health. Cognitive function may be measured by the Mini-Mental State Examination (MMSE) or Montreal Cognitive Assessment (MoCA). Mental health will include depression and

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anxiety. Depression may be measured by the Geriatric Depression Scale (GDS) or the Cornell Scale for Depression (CSDD). Anxiety may be calculated by the Rating of Anxiety in Dementia (RAID) or the State Trait Anxiety Inventory (STAI). If the studies have more than one time of outcome evaluation, we will choose the longest time point.

Type of studies

Only randomized controlled trials written in English will be included. Cluster randomized controlled trials and cross-over randomized controlled trials will be excluded. Trials without a control group or in which the control group did not receive usual care will be excluded.

## Data sources and search strategy

The professional search will use the Medical Subject Headings (MsSH) and free words. The search items will include stroke, apoplexy, cerebrovascular accident, CVA, brain vascular accident, subarachnoid hemorrhage, reminiscence therapy, life review, nostalgia therapy, and randomized controlled trial. We will search electronic databases to identify published studies, including the Cochrane Library, CINAHL, PubMed, Web of Science, Medline, and Embase. The retrieval time will be from inception to August 2023. In addition to the database search, the references of the included studies and relevant reviews of reminiscence therapy implemented in stroke patients will be scanned to identify additional eligible studies.

## **Study selection**

NoteExpress software will be used to download references of all retrieved studies.

Duplicate studies will be removed. Two reviewers will independently screen the titles and abstracts of the remaining studies to exclude studies that obviously do not meet the inclusion criteria. The preliminary results will be cross-checked. Then, the same two reviewers will independently examine the full-text studies to determine their eligibility. If there are disagreements, the third reviewer will be asked to evaluate the full text. The discrepancies will be resolved through discussion. Figure 1 shows the processes of study selection.



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Fig. 1 The processes of study selection

**Data extraction** 

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First, a standard form for data extraction will be designed through a group discussion among all researchers. Then, two reviewers will independently extract data according to the standard form, which may include author (s), year of publication, sample size, characteristics of patients (such as age and sex), type of stroke, medium of reminiscence therapy, frequency and duration of intervention, outcome (s) and measurement (s). The results of data extraction will be crosschecked. The discrepancies will be resolved through discussions.

## **Risk of bias assessment**

We will use the revised version of the Cochrane tool (RoB 2) to evaluate the risk of bias for all included studies.<sup>17</sup> RoB 2 includes five domains, including bias arising from the randomization process, bias due to deviations from intended interventions, bias due to missing outcome data, bias in the measurement of the outcome and bias in the selection of the reported result. The assessment of each domain will be rated as 'low risk of bias', 'some concerns' or 'high risk of bias'. The response options for an overall risk-of-bias judgment are the same as those for individual domains. The risk of bias for each study will be independently examined by two reviewers, and then the results will be cross-checked. Differences will be resolved through team discussion with the third reviewer.

## Statistical analysis

Pairwise and network meta-analysis

We will use the Review Manager 5.3 software to conduct a pairwise meta-analysis. Standardized mean differences with 95% confidence intervals will be used for continuous outcomes. The  $\chi^2$  test will be used to assess heterogeneity. A fixed-effects

model will be used to synthesize the standardized mean difference if the *p* value is  $\geq 0.1$ . Conversely, if the *p* value is < 0.1, a random-effects model will be used. Due to the expected heterogeneity between studies, the effects of different art therapies will be compared by conducting a random-effects network meta-analysis within a Bayesian framework using Markov Chains Monte Carlo in R software (version 4.1.3). Brooks-Gelman-Rubin diagnosis and potential scale reduction factor will be used to ensure the convergence of the model.<sup>18</sup> The surface under the cumulative ranking curve with its 95% confidence interval and rank-heat plot will be used to evaluate the hierarchy of each art therapy.<sup>1920</sup>

Dealing with missing data

The missing data will be obtained by contacting the corresponding authors whenever possible. We will try to calculate the missing data based on availability factors if there is no reply. Sensitivity analysis will be used to examine the potential impact of missing data on the results of this study.

Assessment of publication bias

If this network meta-analysis includes more than nine studies, funnel plots and Egger's regression tests will be used to evaluate the presence of publication bias in Stata software (version 15.0).<sup>21 22</sup>

Assessment of inconsistency and subgroup analysis

Based on a loop-special method within each loop of the network,<sup>23</sup> the local inconsistency and global inconsistency will be measured in Stata software (version 15.0)<sup>Error! Reference source not found. 24</sup> If heterogeneity or inconsistency exists, the sources

of heterogeneity will be explored by network meta regression. Subgroup analysis will be performed in accordance with age, sex, type of disease or duration of intervention. Sensitivity analysis

We will perform a sensitivity analysis for all outcomes to verify the robustness of the findings. After excluding the selected studies that are judged to be at high risk of bias and with missing data, whether the results are changed and whether the transitivity (consistency and model fit) is affected will be examined.

Quality of evidence

 We will also evaluate the quality of evidence conducing to all outcomes based on the Grading of Recommendations Assessment, Development and Evaluation framework, according to the limitations of study, imprecision, heterogeneity, inconsistency, indirectness and publication bias.<sup>25</sup>

# Discussion

Aging has become one of the major contributors to the increased mortality from stroke.<sup>26</sup> The world faces more and more challenges in reducing the disease burden from stroke. The symptoms, such as cognitive impairment, depression and anxiety will seriously increase the risk of adverse outcomes in stroke survivors, which will bring enormous burdens to caregivers and society. Reminiscence therapy can guide people to review past events and thoughts, thereby enhancing their sense of happiness, improving their cognitive function and the ability to adapt to existing life, and reducing their psychological burden. In recent years, various media have been applied in reminiscence therapy applied to stroke patients. For instance, a previous study

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suggests that reminiscence therapy using photos can help to improve cognitive function and relieve negative mood states.<sup>27</sup>

However, to date, no network meta-analysis has been conducted to assess the comparative efficacy of reminiscence therapy with different media. This means that, in order to identify the effects of various media of reminiscence therapy, it is necessary to perform a network meta-analysis. To the best of our knowledge, this is the first network meta-analysis to analyze the effects of reminiscence therapy with different media in elderly stroke patients. In accordance with the comparative effectiveness evidence, the findings are expected to provide a ranking of these media used for reminiscence therapy to improve cognitive function and mental health in elderly stroke patients. The results could help clinicians and guideline setters choose the appropriate intervention and develop guidelines for elderly stroke patients.

## Ethics and dissemination

This study is based on published data, so ethical approval is not a requirement. We plan to publish the findings of this study in a peer-reviewed journal. This work will start on 1st September 2023. The expected end time is 29 February 2024. The results will be reported based on the PRISMA-compliant guidelines.

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# Authors' contributions

Qian Liu designed this study with oversight by Xiuying Hu and Hong Cheng. Qian Liu drafted the protocol, and the draft was modified by Li Liu, Fang Wang and Xiuying Hu. Qian Liu and Lixia Tan will search, select, and identify studies and extract data independently, while Li Liu will be the third reviewer for study selection

and data extraction. Qian Liu will be responsible for the methodology. All authors have approved the publication of this protocol.

# **Funding statement**

This study is funded by a project from the West China Hospital of Sichuan

University (Grant No. HXDZ21003).

# **Competing interests statement**

The authors have no conflicts of interest to disclose.

# **Patient and Public Involvement**

This study is based on published data, so patients or the public were not involved in

the design, conduct, reporting, and dissemination plans of our research.

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address in a systematic	c review	protocol*		
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Identification	1a	Identify the report as a protocol of a systematic review		
Update	1b	If the protocol is for an update of a previous systematic review, identify as such		
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration		
Authors:				
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide화k & cal mailing address of corresponding author		
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review		
Amendments	4	If the protocol represents an amendment of a previously completed or published protection, dentify as such and list changes; otherwise, state plan for documenting important protocol amendments		
Support:		≥ ¥		
Sources	5a	Indicate sources of financial or other support for the review		
Sponsor	5b	Provide name for the review funder and/or sponsor		
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the proposition		
INTRODUCTION		and a mice		
Rationale	6	Describe the rationale for the review in the context of what is already known	_	
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to $\beta$ to $\beta$ tricipants, interventions, comparators, and outcomes (PICO)		
METHODS		hnol		
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the reviews		
Information sources	9	Describe all intended information sources (such as electronic databases, contact with stude authors, trial registers or other grey literature sources) with planned dates of coverage		
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including panned limits, such that it could be repeated		
Study records: Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the regiew		

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Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	6
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, doin independently, in duplicate), any processes for obtaining and confirming data from investigators	7
Data items	12	List and define all variables for which data will be sought (such as PICO items, fund a sources), any pre-planned data assumptions and simplifications	7
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of the and additional outcomes, with rationale	5
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including the this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	8
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	8-9
	15b	If data are appropriate for quantitative synthesis, describe planned summary measure by the synthesis of handling data and methods of combining data from studies, including any planned exploration of consistency (such a grad Kendall's τ)	8-9
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, a gregression)	8-9
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	NA
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studes)	8-9
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	10
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# Efficacy of reminiscence therapy with different media on cognitive function and negative moods for older adult patients with stroke: protocol of a network meta-analysis

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<b>Primary Subject Heading</b> :	Nursing
Secondary Subject Heading:	Nursing
Keywords:	Stroke < NEUROLOGY, Delirium & cognitive disorders < PSYCHIATRY, MENTAL HEALTH

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12	4	negative moods for older adult patients with stroke: protocol of a network
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20	/	Qian Liu <sup>1</sup> , Li Liu <sup>1</sup> , Fang wang <sup>1</sup> , Lixia Tan <sup>1</sup> , Hong Cheng <sup>2</sup> , Xiuying Hu <sup>1</sup> ,
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46	17	Authors' contributions
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48 49	18	Qian Liu designed this study with oversight by Xiuying Hu and Hong Cheng. Qian
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4 5	1	and data extraction. Qian Liu will be responsible for the methodology. All authors
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7	2	have approved the publication of this protocol.
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11	4	This study is funded by a project from the West Chine Hegnital of Siehuan
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Efficacy of reminiscence therapy with different media on cognitive function and negative moods for older adult patients with stroke: protocol of a network meta-analysis

# Abstract

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6 Introduction: Stroke is a common cause of death and disability in the older adult 7 and increases the risk and severity of cognitive impairment, which is a factor for 8 long-term death among stroke survivors. Some studies have focused on the effects of 9 reminiscence therapy with different media on stroke survivors. It is currently unclear 10 which is the best medium. This protocol aims to deal with this problem by using a 11 network meta-analysis.

12 Methods and analysis: Published randomized controlled trials will be included if reminiscence therapy plus usual care was applied in older adult patients with stroke in 13 the experimental group and usual care was applied in the control group. Six electronic 14 15 databases will be searched from their inception to August 2023, including the Cochrane Library, CINAHL, PubMed, Web of Science, Medline, and Embase. The 16 media of reminiscence therapy may include (but not restricted to) old photos, music or 17 movies. Outcomes will be cognitive function and negative moods. Study selection, 18 19 data extraction and quality assessment will be performed independently by two reviewers. The risk of bias of the included studies will be evaluated in accordance 20 21 with the Cochrane Collaboration's risk of bias tool. The evidence quality will be measured based on the Grading of Recommendations Assessment, Development and 22

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1	Evaluation. To compare the efficacy of reminiscence therapy with different media,
2	standard pairwise meta-analysis and Bayesian network meta-analysis will be
3	conducted. The probabilities of intervention for all outcomes will be ranked based on
4	the surface under the cumulative ranking curve.
5	Ethics and dissemination: Ethical approval is not required for reviewing published
6	studies. The findings will be submitted to a peer-reviewed journal for review and
7	publication to provide important evidence for clinicians and guideline developers to
8	determine interventions for older adult patients with stroke.
9	PROSPERO registration number: CRD42023447828.
10	Key words: reminiscence therapy; stroke; network meta-analysis; cognitive
11	function; negative mood
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12 13	Strengths and limitations of this study
12 13 14	Strengths and limitations of this study 1. Network meta-analysis allows for the simultaneous comparison of multiple
12 13 14 15	Strengths and limitations of this study 1. Network meta-analysis allows for the simultaneous comparison of multiple interventions in a single model.
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12 13 14 15 16 17	Strengths and limitations of this study <ol> <li>Network meta-analysis allows for the simultaneous comparison of multiple interventions in a single model.</li> <li>Network meta-analysis can improve precision of intervention effect estimates and rank interventions based on their effectiveness and assess the</li> </ol>
12 13 14 15 16 17 18	Strengths and limitations of this study <ol> <li>Network meta-analysis allows for the simultaneous comparison of multiple interventions in a single model.</li> <li>Network meta-analysis can improve precision of intervention effect estimates and rank interventions based on their effectiveness and assess the</li> <li>Due to the retrospective nature of this study, the findings may be influenced by</li> </ol>
12 13 14 15 16 17 18 19	<ul> <li>Strengths and limitations of this study</li> <li>1. Network meta-analysis allows for the simultaneous comparison of multiple interventions in a single model.</li> <li>2. Network meta-analysis can improve precision of intervention effect estimates and rank interventions based on their effectiveness and assess the</li> <li>3. Due to the retrospective nature of this study, the findings may be influenced by the quantity and quality of the included studies.</li> </ul>
12 13 14 15 16 17 18 19 20	<ul> <li>Strengths and limitations of this study</li> <li>1. Network meta-analysis allows for the simultaneous comparison of multiple interventions in a single model.</li> <li>2. Network meta-analysis can improve precision of intervention effect estimates and rank interventions based on their effectiveness and assess the</li> <li>3. Due to the retrospective nature of this study, the findings may be influenced by the quantity and quality of the included studies.</li> </ul>
12 13 14 15 16 17 18 19 20 21	Strengths and limitations of this study <ol> <li>Network meta-analysis allows for the simultaneous comparison of multiple interventions in a single model.</li> <li>Network meta-analysis can improve precision of intervention effect estimates and rank interventions based on their effectiveness and assess the</li> <li>Due to the retrospective nature of this study, the findings may be influenced by the quantity and quality of the included studies.</li> </ol> Introduction

patients with chronic diseases is also increasing. Stroke is still a common cause of death and disability in older adult,<sup>1 2</sup> with a high incidence, high disability rate, high mortality, high recurrence rate, and high economic burden.<sup>3</sup> With the progress of medicine, the emergency medical systems and innovative treatment methods have improved, and the mortality rate of stroke patients has been reduced to a certain extent. However, more and more stroke survivors are struggling with post-stroke complications. <sup>4-6</sup> In particular, stroke increases the risk and severity of cognitive impairment,<sup>7</sup> such as sensory perception, memory, thinking, imagination, and language. More than 70% of stroke survivors have cognitive deficits related to disability, dependency and morbidity, posing a significant burden on patients, caregivers, and the health care system.<sup>8</sup> Moreover, the decline in stress and cognitive abilities can easily cause negative moods among stroke survivors when facing physical discomfort and the financial burden of treatment, leading to decreased quality of life in patients. Negative moods includes depression, anxiety, stress, and fatigue, which are very common in old adult patients with stroke.<sup>9-12</sup> Importantly, post-stroke cognitive impairment and negative moods are important risk factors for poor prognosis and low survival rate.<sup>13-15</sup> Therefore, efforts to relieve cognitive impairment and negative moods in stroke survivors have never been stopped. 

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19 Reminiscence therapy was proposed by Butler in 1963 based on Eric Erickson's 20 theory of psychosocial development, which first emphasized the importance of 21 nostalgia and life review for the older adult to successfully adapt to aging.<sup>16</sup> Nursing 22 Interventions Classification defines reminiscence therapy as helping people improve

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> their sense of well-being, quality of life, and adaptability to existing surroundings by recalling the past events, thoughts, and emotions.<sup>17</sup> Reminiscence therapy uses familiar objects, such as old photos, music, and food, to trigger people's memories of the past in a safe and comfortable environment and to encourage them to share and discuss their life experiences, which can help reduce negative memories and increases positive ones, and alleviate negative moods.<sup>18</sup> A randomized controlled trial suggests that reminiscence therapy has a positive effect on cognitive impairment and negative moods (anxiety and depression) in patients with acute ischemic stroke, and can be used as a supplementary rehabilitation plan for post-stroke treatment.<sup>19</sup> Similarly, another study also indicates that reminiscence therapy has the same effect, demonstrating its potential for post-stroke management.<sup>20</sup>

> However, in the current studies on reminiscence therapy, scholars induced patients to have a sense of nostalgia through various media such as photos, music, and movies, thereby achieving therapeutic effects. It can be seen that there is no unified medium of reminiscence therapy at present. For this reason, we would like to conduct a network meta-analysis, which can summarize the direct and indirect evidence and provide the ranking of intervention options. To date, no network meta-analysis has been conducted to systematically compare which medium for reminiscence therapy have the best effect on cognitive function and negative moods in older adult patients with stroke. Therefore, this study will evaluate the effects of reminiscence therapies with different media on cognitive function and negative moods in older adult patients with stroke through a network meta-analysis.

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# 1 Methods and analysis

This protocol will be developed following the Preferred Reporting Items for
Systematic Review and Meta-Analysis Protocols<sup>21</sup> and was registered on the
PROSPERO platform (CRD42023447828).

- 5 Eligibility criteria
- 6 Type of participants

Older adult patients (60 years old and above) with stroke will be included. The
disease duration should be less than 6 months and it should be the initial stroke. The
condition of stroke patients should be in a stable or recovery phase. Patients with
other major diseases, such as malignant tumors and organ failure, will be excluded.

11 Type of intervention

Reminiscence therapy that is combined with usual care and implemented in older adult patients with stroke will be included. However, multi-component interventions will be excluded. Reminiscence therapy may be aimed at improving cognitive function and negative moods. Enseignement Superieur (ABES) Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

16 Comparison

Comparator will be considered the usual care of older adult patients with stroke,
including medication management, diet, rehabilitation care and complication
prevention, or reminiscence therapy with another medium.

20 Type of outcomes

The outcomes will focus on cognitive function and negative moods. Cognitivefunction outcomes mainly includes sensory perception, memory, thinking,

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imagination, and language. Cognitive functionmay be measured by the Mini-Mental State Examination (MMSE) or Montreal Cognitive Assessment (MoCA), which covers 9 cognitive domains including attention, concentration, executive functions, memory, language, visuospatial ability, conceptual thinking, calculations, and orientation. The Trail Making Test (TMT) Parts A and B may be used to assess executive function, which has been shown to correlate with processing speed and cognitive fluidity.<sup>22</sup> Negative moods mainly include depression, anxiety, stress, and fatigue. Depression may be measured by the Geriatric Depression Scale (GDS), the Cornell Scale for Depression (CSDD), or the Depression-Anxiety-Stress Scale-21. Anxiety may be calculated by the Rating of Anxiety in Dementia (RAID), the State Trait Anxiety Inventory (STAI), or the Depression-Anxiety-Stress Scale-21. Stress may be measured by Depression-Anxiety-Stress Scale-21 or Chinese Perceived Stress Scale. Fatigue may be measured by Fatigue Assessment Scale, Brief Fatigue Inventory, or Fatigue Severity Scale. If the studies have more than one time of outcome evaluation, we will choose the longest time point.

16 Type of studies

Only randomized controlled trials written in English will be included. Cluster randomized controlled trials and cross-over randomized controlled trials will be excluded. Trials without a control group or in which the control group did not receive usual care will be excluded.

- 21 Data sources and search strategy
  - 22 The professional search will use the Medical Subject Headings (MsSH) and free

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words. The search items will include stroke, apoplexy, cerebrovascular accident, CVA, brain vascular accident, subarachnoid hemorrhage, reminiscence therapy, life review, nostalgia therapy, and randomized controlled trial. We will search electronic databases to identify published studies, including the Cochrane Library, CINAHL, PubMed, Web of Science, Medline, and Embase. The retrieval time will be from inception to August 2023. In addition to the database search, the references of the included studies and relevant reviews of reminiscence therapy implemented in stroke patients will be scanned to identify additional eligible studies. 

9 Study selection

NoteExpress software will be used to download references of all retrieved studies. Duplicate studies will be removed. Two reviewers will independently screen the titles and abstracts of the remaining studies to exclude studies that obviously do not meet the inclusion criteria. The preliminary results will be cross-checked. Then, the same two reviewers will independently examine the full-text studies to determine their eligibility. If there are disagreements, the third reviewer will be asked to evaluate the full text. The discrepancies will be resolved through discussion. Figure 1 shows the processes of study selection. 

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18 Data extraction

First, a standard form for data extraction will be designed through a group discussion among all researchers. Then, two reviewers will independently and carefully read the eligible full text and extract data according to the standard form, which may include author (s), year of publication, sample size, characteristics of

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patients (such as age and sex), type of stroke, medium of reminiscence therapy, frequency and duration of intervention, outcome (s) and measurement (s). The dichotomous and continuous outcomes will be directly extracted. The results of data extraction will be crosschecked. The discrepancies will be resolved through discussions.

## **Risk of bias assessment**

We will use the revised version of the Cochrane tool (RoB 2) to evaluate the risk of bias for all included studies.<sup>23</sup> RoB 2 includes five domains, including bias arising from the randomization process, bias due to deviations from intended interventions, bias due to missing outcome data, bias in the measurement of the outcome and bias in the selection of the reported result. The assessment of each domain will be rated as 'low risk of bias', 'some concerns' or 'high risk of bias'. The response options for an overall risk-of-bias judgment are the same as those for individual domains. The risk of bias for each study will be independently examined by two reviewers, and then the results will be cross-checked. Differences will be resolved through team discussion with the third reviewer. In addition, Cohen's kappa values will be calculated to measure agreement between reviewers. 

- 18 Statistical analysis
- 19 Pairwise and network meta-analysis

We will use the Review Manager 5.3 software to conduct a pairwise meta-analysis. Standardized mean differences with 95% confidence intervals will be used for continuous outcomes. The  $\chi^2$  test will be used to assess heterogeneity. A fixed-effects model will be used to synthesize the standardized mean difference if the *p* value is

 $\geq 0.1$ . Conversely, if the p value is <0.1, a random-effects model will be used. Due to the expected heterogeneity between studies, the effects of different art therapies will be compared by conducting a random-effects network meta-analysis within a Bayesian framework using Markov Chains Monte Carlo in R software (version 4.1.3). Brooks-Gelman-Rubin diagnosis and potential scale reduction factor will be used to ensure the convergence of the model.<sup>24</sup> The surface under the cumulative ranking curve with its 95% confidence interval and rank-heat plot will be used to evaluate the hierarchy of each art therapy.<sup>25 26</sup> Dealing with missing data The missing data, such as outcome scores and type of medium, will be obtained by contacting the corresponding authors whenever possible. We will try to calculate the missing data based on availability factors if there is no reply. Sensitivity analysis will be used to examine the potential impact of missing data on the results of this study. Assessment of publication bias If this network meta-analysis includes more than nine studies, funnel plots and Egger's regression tests will be used to evaluate the presence of publication bias in Stata software (version 15.0).<sup>27 28</sup> Assessment of inconsistency and subgroup analysis Based on a loop-special method within each loop of the network,<sup>29</sup> the local inconsistency and global inconsistency will be measured in Stata software (version 15.0)<sup>30</sup> If heterogeneity or inconsistency exists, the sources of heterogeneity will be explored by network meta regression. Subgroup analysis will be performed using the 

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same methods described above. The priori hypothesis is as follows: ≥80 years old and with a poorly cognitive function at baseline. Sensitivity analysis We will perform a sensitivity analysis for all outcomes to verify the robustness of the findings. After excluding the selected studies that are judged to be at high risk of bias and with missing data, whether the results are changed and whether the transitivity (consistency and model fit) is affected will be examined. Quality of evidence We will also evaluate the quality of evidence conducing to all outcomes based on the Grading of Recommendations Assessment, Development and Evaluation framework, according to the limitations of study, imprecision, heterogeneity, inconsistency, indirectness and publication bias.<sup>31</sup> Patient and Public Involvement This study is based on published data, so patients or the public were not involved in the design, conduct, reporting, and dissemination plans of our research. Discussion Aging has become one of the major contributors to the increased mortality from stroke.<sup>32</sup> The world faces more and more challenges in reducing the disease burden from stroke. The symptoms, such as cognitive impairment, depression and anxiety

20 will seriously increase the risk of adverse outcomes in stroke survivors, which will

21 bring enormous burdens to caregivers and society. Reminiscence therapy can guide

22 people to review past events and thoughts, thereby enhancing their sense of happiness,

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improving their cognitive function and the ability to adapt to existing life, and reducing their psychological burden. In recent years, various media have been applied in reminiscence therapy applied to stroke patients. For instance, a previous study suggests that reminiscence therapy using photos can help to improve cognitive function and relieve negative moods.<sup>33</sup>

However, to date, no network meta-analysis has been conducted to assess the comparative efficacy of reminiscence therapy with different media. This means that, in order to identify the effects of various media of reminiscence therapy, it is necessary to perform a network meta-analysis. To the best of our knowledge, this is the first network meta-analysis to analyze the effects of reminiscence therapy with different media in older adult patients with stroke. In accordance with the comparative effectiveness evidence, the findings are expected to provide a ranking of these media used for reminiscence therapy to improve cognitive function and negative moods in older adult patients with stroke. The results could help clinicians and guideline setters choose the appropriate intervention and develop guidelines for older adult patients with stroke. 

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17 Ethics and dissemination

This study is based on published data, so ethical approval is not a requirement. We plan to publish the findings of this study in a peer-reviewed journal. This work will start on 1st September 2023. The expected end time is 29 February 2024. The results will be reported based on the PRISMA-compliant guidelines.

22 Authors' contributions

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Qian Liu designed this study with oversight by Xiuying Hu and Hong Cheng. Qian 1 Liu drafted the protocol, and the draft was modified by Li Liu, Fang Wang and 2 3 Xiuying Hu. Qian Liu and Lixia Tan will search, select, and identify studies and extract data independently, while Li Liu will be the third reviewer for study selection 4 and data extraction. Qian Liu will be responsible for the methodology. All authors 5 have approved the publication of this protocol. 6 7 **Funding statement** This study is funded by a project from the West China Hospital of Sichuan 8 9 University (Grant No. HXDZ21003). **Competing interests statement** 10 The authors have no conflicts of interest to disclose. 11 L.C.Z 12 Fig. 1 The processes of study selection 13 14 References 15 1. Lindley RI. Stroke Prevention in the Very Elderly. Stroke 2018;49(3):796-802. 16 2. Wang W, Jiang B, Sun H, et al. Prevalence, Incidence, and Mortality of Stroke in 17 China: Results from a Nationwide Population-Based Survey of 480 687 Adults. 18 Circulation 2017;135(8):759-771. 19 3. Wang LD, Peng B, Zhang HQ, et al. Brief report on stroke prevention and 20 treatment in China, 2020. Chinese Journal of Cerebrovascular Diseases 21 2022;19(2):136-144. 22 4. Chowdhury SZ, Baskar PS, Bhaskar S. Effect of prehospital workflow 23 optimization on treatment delays and clinical outcomes in acute ischemic stroke: A 24 systematic review and meta-analysis. Acad Emerg Med 2021;28(7):781-801. 25 5. Muresanu DF, Strilciuc S, Stan A. Current Drug Treatment of Acute Ischemic 26 Stroke: Challenges and Opportunities. CNS Drugs 2019;33(9):841-847. 27 28 6. Zhang S, Xu M, Liu ZJ, et al. Neuropsychiatric issues after stroke: Clinical significance and therapeutic implications. World J Psychiatry 2020;10(6):125-138. 29

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PRISMA-P (Preferred	l Reporti	BMJ Open ing Items for Systematic review and Meta-Analysis Protocols) 2015 carecellist: recommended items to	Page 18 c
address in a systematic	<u>c review</u> Item N	protocol* <u> </u>	Раде
ADMINISTRATIVE INFORM	IATION		
Title:			
Identification	1a	Identify the report as a protocol of a systematic review	1
Update	1u 1b	If the protocol is for an update of a previous systematic review identify as such	NA
Registration	2	If registered provide the name of the registry (such as PROSPERO) and registration studies	2
Authors:			
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide $\vec{a}$ and $\vec{b}$ address of corresponding author	1
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review $\frac{1}{2}$	11
Amendments	4	If the protocol represents an amendment of a previously completed or published protec, Additional such and list changes; otherwise, state plan for documenting important protocol amendments	NA
Support:			
Sources	5a	Indicate sources of financial or other support for the review	11
Sponsor	5b	Provide name for the review funder and/or sponsor	11
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protection	11
INTRODUCTION		and :	
Rationale	6	Describe the rationale for the review in the context of what is already known	2-4
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to $\beta$ to $\beta$ articipants, interventions, comparators, and outcomes (PICO)	2-4
METHODS		hnol 1	
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	4-5
information sources	9	Describe all intended information sources (such as electronic databases, contact with stude authors, trial registers or other grey literature sources) with planned dates of coverage	4-5
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including punned limits, such that it could be repeated	6
Study records:			
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	7
		For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml	

		BMJ Open BMJ	
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	6
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, dore independently, in duplicate), any processes for obtaining and confirming data from investigators	7
Data items	12	List and define all variables for which data will be sought (such as PICO items, fund a sources), any pre-planned data assumptions and simplifications	7
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of the and additional outcomes, with rationale	5
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including the the this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	8
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	8-9
	15b	If data are appropriate for quantitative synthesis, describe planned summary measure by the synthesis of handling data and methods of combining data from studies, including any planned exploration of consistency (such and Kendall's τ)	8-9
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, are gression)	8-9
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	NA
(ata biag(ag)	14	Specify any planned assessment of meta bias(as) (such as publication bias across stu <b>lie</b> selective reporting within studies)	8-
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# Efficacy of reminiscence therapy with different media on cognitive function and negative moods for older adult patients with stroke: protocol of a network meta-analysis

Journal:	BMJ Open
Manuscript ID	bmjopen-2023-078526.R2
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Keywords:	Stroke < NEUROLOGY, Delirium & cognitive disorders < PSYCHIATRY, MENTAL HEALTH

# SCHOLARONE<sup>™</sup> Manuscripts

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12	4	negative moods for older adult patients with stroke: protocol of a network
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45	. –	
46	17	Authors' contributions
47		
48 49	18	Qian Liu designed this study with oversight by Xiuying Hu and Hong Cheng. Qian
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51	19	Liu drafted the protocol, and the draft was modified by Li Liu, Fang Wang and
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53 54	20	Xiuying Hu. Qian Liu and Lixia Tan will search, select, and identify studies and
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56	21	extract data independently, while Li Liu will be the third reviewer for study selection
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4 5	1	and data extraction. Qian Liu will be responsible for the methodology. All authors
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7	2	have approved the publication of this protocol.
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9	3	Funding Statement
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11	4	This study is funded by a project from the West Chine Hegnital of Siehuan
12	4	This study is funded by a project from the west China Hospital of Stendard
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15	5	University (Grant No. HXDZ21003).
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17	6	Conflict of Interest
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19	7	The authors have no conflicts of interest to disclose
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Efficacy of reminiscence therapy with different media on cognitive function and negative moods for older adult patients with stroke: protocol of a network meta-analysis

# Abstract

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6 Introduction: Stroke is a common cause of death and disability in the older adult 7 and increases the risk and severity of cognitive impairment, which is a factor for 8 long-term death among stroke survivors. Some studies have focused on the effects of 9 reminiscence therapy with different media on stroke survivors. It is currently unclear 10 which is the best medium. This protocol aims to deal with this problem by using a 11 network meta-analysis.

12 Methods and analysis: Published randomized controlled trials will be included if reminiscence therapy plus usual care was applied in older adult patients with stroke in 13 the experimental group and usual care was applied in the control group. Six electronic 14 15 databases will be searched from their inception to August 2023, including the Cochrane Library, CINAHL, PubMed, Web of Science, Medline, and Embase. The 16 media of reminiscence therapy may include (but not restricted to) old photos, music or 17 movies. Outcomes will be cognitive function and negative moods. Study selection, 18 19 data extraction and quality assessment will be performed independently by two reviewers. The risk of bias of the included studies will be evaluated in accordance 20 21 with the Cochrane Collaboration's risk of bias tool. The evidence quality will be measured based on the Grading of Recommendations Assessment, Development and 22

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1	Evaluation. To compare the efficacy of reminiscence therapy with different media,
2	standard pairwise meta-analysis and Bayesian network meta-analysis will be
3	conducted. The probabilities of intervention for all outcomes will be ranked based on
4	the surface under the cumulative ranking curve.
5	Ethics and dissemination: Ethical approval is not required for reviewing published
6	studies. The findings will be submitted to a peer-reviewed journal for review and
7	publication to provide important evidence for clinicians and guideline developers to
8	determine interventions for older adult patients with stroke.
9	PROSPERO registration number: CRD42023447828.
10	Key words: reminiscence therapy; stroke; network meta-analysis; cognitive
11	function; negative mood
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12 13	Strengths and limitations of this study
12 13 14	Strengths and limitations of this study 1. Network meta-analysis allows for the simultaneous comparison of multiple
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12 13 14 15 16 17 18 19 20	<ul> <li>Strengths and limitations of this study</li> <li>1. Network meta-analysis allows for the simultaneous comparison of multiple interventions in a single model.</li> <li>2. Network meta-analysis can improve precision of intervention effect estimates and rank interventions based on their effectiveness and assess the</li> <li>3. Due to the retrospective nature of this study, the findings may be influenced by the quantity and quality of the included studies.</li> </ul>
12 13 14 15 16 17 18 19 20 21	Strengths and limitations of this study <ol> <li>Network meta-analysis allows for the simultaneous comparison of multiple interventions in a single model.</li> <li>Network meta-analysis can improve precision of intervention effect estimates and rank interventions based on their effectiveness and assess the</li> <li>Due to the retrospective nature of this study, the findings may be influenced by the quantity and quality of the included studies.</li> </ol> Introduction

patients with chronic diseases is also increasing. Stroke is still a common cause of death and disability in older adult,<sup>1 2</sup> with a high incidence, high disability rate, high mortality, high recurrence rate, and high economic burden.<sup>3</sup> With the progress of medicine, the emergency medical systems and innovative treatment methods have improved, and the mortality rate of stroke patients has been reduced to a certain extent. However, more and more stroke survivors are struggling with post-stroke complications. <sup>4-6</sup> In particular, stroke increases the risk and severity of cognitive impairment,<sup>7</sup> such as sensory perception, memory, thinking, imagination, and language. More than 70% of stroke survivors have cognitive deficits related to disability, dependency and morbidity, posing a significant burden on patients, caregivers, and the health care system.<sup>8</sup> Moreover, the decline in stress and cognitive abilities can easily cause negative moods among stroke survivors when facing physical discomfort and the financial burden of treatment, leading to decreased quality of life in patients. Negative moods includes depression, anxiety, stress, and fatigue, which are very common in old adult patients with stroke.<sup>9-12</sup> Importantly, post-stroke cognitive impairment and negative moods are important risk factors for poor prognosis and low survival rate.<sup>13-15</sup> Therefore, efforts to relieve cognitive impairment and negative moods in stroke survivors have never been stopped. 

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19 Reminiscence therapy was proposed by Butler in 1963 based on Eric Erickson's 20 theory of psychosocial development, which first emphasized the importance of 21 nostalgia and life review for the older adult to successfully adapt to aging.<sup>16</sup> Nursing 22 Interventions Classification defines reminiscence therapy as helping people improve

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> their sense of well-being, quality of life, and adaptability to existing surroundings by recalling the past events, thoughts, and emotions.<sup>17</sup> Reminiscence therapy uses familiar objects, such as old photos, music, and food, to trigger people's memories of the past in a safe and comfortable environment and to encourage them to share and discuss their life experiences, which can help reduce negative memories and increases positive ones, and alleviate negative moods.<sup>18</sup> A randomized controlled trial suggests that reminiscence therapy has a positive effect on cognitive impairment and negative moods (anxiety and depression) in patients with acute ischemic stroke, and can be used as a supplementary rehabilitation plan for post-stroke treatment.<sup>19</sup> Similarly, another study also indicates that reminiscence therapy has the same effect, demonstrating its potential for post-stroke management.<sup>20</sup>

> However, in the current studies on reminiscence therapy, scholars induced patients to have a sense of nostalgia through various media such as photos, music, and movies, thereby achieving therapeutic effects. It can be seen that there is no unified medium of reminiscence therapy at present. For this reason, we would like to conduct a network meta-analysis, which can summarize the direct and indirect evidence and provide the ranking of intervention options. To date, no network meta-analysis has been conducted to systematically compare which medium for reminiscence therapy have the best effect on cognitive function and negative moods in older adult patients with stroke. Therefore, this study will evaluate the effects of reminiscence therapies with different media on cognitive function and negative moods in older adult patients with stroke through a network meta-analysis.

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# 1 Methods and analysis

This protocol will be developed following the Preferred Reporting Items for
Systematic Review and Meta-Analysis Protocols<sup>21</sup> and was registered on the
PROSPERO platform (CRD42023447828).

- 5 Eligibility criteria
- 6 Type of participants

Older adult patients (60 years old and above) with stroke will be included. The
disease duration should be less than 6 months and it should be the initial stroke. The
condition of stroke patients should be in a stable or recovery phase. Patients with
other major diseases, such as malignant tumors and organ failure, will be excluded.

11 Type of intervention

Reminiscence therapy that is combined with usual care and implemented in older adult patients with stroke will be included. However, multi-component interventions will be excluded. Reminiscence therapy may be aimed at improving cognitive function and negative moods. Enseignement Superieur (ABES) Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

16 Comparison

Comparator will be considered the usual care of older adult patients with stroke,
including medication management, diet, rehabilitation care and complication
prevention, or reminiscence therapy with another medium.

20 Type of outcomes

The outcomes will focus on cognitive function and negative moods. Cognitivefunction outcomes mainly includes sensory perception, memory, thinking,

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imagination, and language. Cognitive functionmay be measured by the Mini-Mental State Examination (MMSE) or Montreal Cognitive Assessment (MoCA), which covers 9 cognitive domains including attention, concentration, executive functions, memory, language, visuospatial ability, conceptual thinking, calculations, and orientation. The Trail Making Test (TMT) Parts A and B may be used to assess executive function, which has been shown to correlate with processing speed and cognitive fluidity.<sup>22</sup> Negative moods mainly include depression, anxiety, stress, and fatigue. Depression may be measured by the Geriatric Depression Scale (GDS), the Cornell Scale for Depression (CSDD), or the Depression-Anxiety-Stress Scale-21. Anxiety may be calculated by the Rating of Anxiety in Dementia (RAID), the State Trait Anxiety Inventory (STAI), or the Depression-Anxiety-Stress Scale-21. Stress may be measured by Depression-Anxiety-Stress Scale-21 or Chinese Perceived Stress Scale. Fatigue may be measured by Fatigue Assessment Scale, Brief Fatigue Inventory, or Fatigue Severity Scale. If the studies have more than one time of outcome evaluation, we will choose the longest time point.

16 Type of studies

Only randomized controlled trials written in English will be included. Cluster randomized controlled trials and cross-over randomized controlled trials will be excluded. Trials without a control group or in which the control group did not receive usual care will be excluded.

- 21 Data sources and search strategy
  - 22 The professional search will use the Medical Subject Headings (MsSH) and free

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words. The search items will include stroke, apoplexy, cerebrovascular accident, CVA, brain vascular accident, subarachnoid hemorrhage, reminiscence therapy, life review, nostalgia therapy, and randomized controlled trial. We will search electronic databases to identify published studies, including the Cochrane Library, CINAHL, PubMed, Web of Science, Medline, and Embase. The retrieval time will be from inception to August 2023. In addition to the database search, the references of the included studies and relevant reviews of reminiscence therapy implemented in stroke patients will be scanned to identify additional eligible studies. 

9 Study selection

NoteExpress software will be used to download references of all retrieved studies. Duplicate studies will be removed. Two reviewers will independently screen the titles and abstracts of the remaining studies to exclude studies that obviously do not meet the inclusion criteria. The preliminary results will be cross-checked. Then, the same two reviewers will independently examine the full-text studies to determine their eligibility. If there are disagreements, the third reviewer will be asked to evaluate the full text. The discrepancies will be resolved through discussion. Figure 1 shows the processes of study selection. 

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18 Data extraction

First, a standard form for data extraction will be designed through a group discussion among all researchers. Then, two reviewers will independently and carefully read the eligible full text and extract data according to the standard form, which may include author (s), year of publication, sample size, characteristics of

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> patients (such as age and sex), type of stroke, medium of reminiscence therapy, frequency and duration of intervention, outcome (s) and measurement (s). The dichotomous and continuous outcomes will be directly extracted and submitted to the admission Excel sheet. The results of data extraction will be crosschecked and discrepancies will be resolved through discussions. After extracting the outcomes, dichotomous outcomes will be labeled, such as 0 for males and 1 for females. Continuous outcomes will not be processed and will be directly input into statistical software for analysis.

9 Risk of bias assessment

We will use the revised version of the Cochrane tool (RoB 2) to evaluate the risk of bias for all included studies.<sup>23</sup> RoB 2 includes five domains, including bias arising from the randomization process, bias due to deviations from intended interventions, bias due to missing outcome data, bias in the measurement of the outcome and bias in the selection of the reported result. The assessment of each domain will be rated as 'low risk of bias', 'some concerns' or 'high risk of bias'. The response options for an overall risk-of-bias judgment are the same as those for individual domains. The risk of bias for each study will be independently examined by two reviewers, and then the results will be cross-checked. Differences will be resolved through team discussion with the third reviewer. In addition, Cohen's kappa values will be calculated to measure agreement between reviewers. 

- 21 Statistical analysis
- 22 Pairwise and network meta-analysis
- 23 We will use the Review Manager 5.3 software to conduct a pairwise meta-analysis.

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1	Standardized mean differences with 95% confidence intervals will be used for
2	continuous outcomes. The $\chi^2$ test will be used to assess heterogeneity. A fixed-effects
3	model will be used to synthesize the standardized mean difference if the $p$ value is
4	$\geq 0.1$ . Conversely, if the <i>p</i> value is <0.1, a random-effects model will be used. Due to
5	the expected heterogeneity between studies, the effects of different art therapies will
6	be compared by conducting a random-effects network meta-analysis within a
7	Bayesian framework using Markov Chains Monte Carlo in R software (version 4.1.3).
8	Brooks-Gelman-Rubin diagnosis and potential scale reduction factor will be used to
9	ensure the convergence of the model. <sup>24</sup> The surface under the cumulative ranking
10	curve with its 95% confidence interval and rank-heat plot will be used to evaluate the
11	hierarchy of each art therapy. <sup>25 26</sup>
12	Dealing with missing data
13	The missing data, such as outcome scores and type of medium, will be obtained by
14	contacting the corresponding authors whenever possible. We will try to calculate the
15	missing data based on availability factors if there is no reply. Sensitivity analysis will
16	be used to examine the potential impact of missing data on the results of this study.
17	Assessment of publication bias
18	If this network meta-analysis includes more than nine studies, funnel plots and
19	Egger's regression tests will be used to evaluate the presence of publication bias in
20	Stata software (version 15.0). <sup>27 28</sup>
21	Assessment of inconsistency and subgroup analysis
22	Based on a loop-special method within each loop of the network,29 the local

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inconsistency and global inconsistency will be measured in Stata software (version
15.0)<sup>30</sup> If heterogeneity or inconsistency exists, the sources of heterogeneity will be
explored by network meta regression. Subgroup analysis will be performed using the
same methods described above. The priori hypothesis is as follows: ≥80 years old and
with a poorly cognitive function at baseline.

6 Sensitivity analysis

We will perform a sensitivity analysis for all outcomes to verify the robustness of
the findings. After excluding the selected studies that are judged to be at high risk of
bias and with missing data, whether the results are changed and whether the
transitivity (consistency and model fit) is affected will be examined.

11 Quality of evidence

We will also evaluate the quality of evidence conducing to all outcomes based on the Grading of Recommendations Assessment, Development and Evaluation framework, according to the limitations of study, imprecision, heterogeneity, inconsistency, indirectness and publication bias.<sup>31</sup>

16 Patient and Public Involvement

This study is based on published data, so patients or the public were not involved inthe design, conduct, reporting, and dissemination plans of our research.

# 19 **Discussion**

Aging has become one of the major contributors to the increased mortality from stroke.<sup>32</sup> The world faces more and more challenges in reducing the disease burden from stroke. The symptoms, such as cognitive impairment, depression and anxiety

will seriously increase the risk of adverse outcomes in stroke survivors, which will bring enormous burdens to caregivers and society. Reminiscence therapy can guide people to review past events and thoughts, thereby enhancing their sense of happiness, improving their cognitive function and the ability to adapt to existing life, and reducing their psychological burden. In recent years, various media have been applied in reminiscence therapy applied to stroke patients. For instance, a previous study suggests that reminiscence therapy using photos can help to improve cognitive function and relieve negative moods.<sup>33</sup> However, to date, no network meta-analysis has been conducted to assess the comparative efficacy of reminiscence therapy with different media. This means that, in order to identify the effects of various media of reminiscence therapy, it is necessary to perform a network meta-analysis. To the best of our knowledge, this is the first network meta-analysis to analyze the effects of reminiscence therapy with different media in older adult patients with stroke. In accordance with the comparative effectiveness evidence, the findings are expected to provide a ranking of these media used for reminiscence therapy to improve cognitive function and negative moods in 

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older adult patients with stroke. The results could help clinicians and guideline setters
choose the appropriate intervention and develop guidelines for older adult patients
with stroke.

20 Ethics and dissemination

This study is based on published data, so ethical approval is not a requirement. We plan to publish the findings of this study in a peer-reviewed journal. This work will

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1	start on 1st September 2023. The expected end time is 29 February 2024. The results
2	will be reported based on the PRISMA-compliant guidelines.
3	Authors' contributions
4	Qian Liu designed this study with oversight by Xiuying Hu and Hong Cheng.
5	Xiuying Hu is the guarantor. Qian Liu drafted the protocol, and the draft was
6	modified by Li Liu, Fang Wang and Xiuying Hu. Qian Liu and Lixia Tan will search,
7	select, and identify studies and extract data independently, while Li Liu will be the
8	third reviewer for study selection and data extraction. Qian Liu will be responsible for
9	the methodology. All authors have approved the publication of this protocol.
10	Funding statement
11	This study is funded by a project from the West China Hospital of Sichuan
12	University (Grant No. HXDZ21003).
13	Competing interests statement
14	The authors have no conflicts of interest to disclose.
15	
16	Fig. 1 The processes of study selection
17	
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PRISMA-P (Preferred	l Reporti	BMJ Open ing Items for Systematic review and Meta-Analysis Protocols) 2015 carecellist: recommended items to	Page 18 c
address in a systematic	<u>c review</u> Item N	protocol* <u> </u>	Раде
ADMINISTRATIVE INFORM	IATION		
Title:			
Identification	1a	Identify the report as a protocol of a systematic review	1
Update	1u 1b	If the protocol is for an update of a previous systematic review identify as such	NA
Registration	2	If registered provide the name of the registry (such as PROSPERO) and registration studies	2
Authors:			
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide $\vec{a}$ and $\vec{b}$ address of corresponding author	1
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review $\frac{1}{2}$	11
Amendments	4	If the protocol represents an amendment of a previously completed or published protec, Additional such and list changes; otherwise, state plan for documenting important protocol amendments	NA
Support:			
Sources	5a	Indicate sources of financial or other support for the review	11
Sponsor	5b	Provide name for the review funder and/or sponsor	11
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protection	11
INTRODUCTION		and :	
Rationale	6	Describe the rationale for the review in the context of what is already known	2-4
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to $\beta$ to $\beta$ articipants, interventions, comparators, and outcomes (PICO)	2-4
METHODS		hnol 1	
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	4-5
information sources	9	Describe all intended information sources (such as electronic databases, contact with stude authors, trial registers or other grey literature sources) with planned dates of coverage	4-5
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including punned limits, such that it could be repeated	6
Study records:			
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	7
		For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml	

		BMJ Open BMJ	
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	6
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, dore independently, in duplicate), any processes for obtaining and confirming data from investigators	7
Data items	12	List and define all variables for which data will be sought (such as PICO items, fund a sources), any pre-planned data assumptions and simplifications	7
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of the and additional outcomes, with rationale	5
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including the the this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	8
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	8-9
	15b	If data are appropriate for quantitative synthesis, describe planned summary measure by the synthesis of handling data and methods of combining data from studies, including any planned exploration of consistency (such and Kendall's τ)	8-9
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, are gression)	8-9
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	NA
(ata biag(ag)	14	Specify any planned assessment of meta bias(as) (such as publication bias across stu <b>lie</b> selective reporting within studies)	8-
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<ul> <li>Confidence in cumulative evidence</li> <li>* It is strongly recommended that the items. Amendments to a revidistributed under a Creative Conformation Shamseer L, Moher D, Clameta-analysis protocols (PRISM)</li> </ul>	at this c iew pro nmons	Describe how the strength of the body of evidence will be assessed (such as GRADE) the strength of the body of evidence will be assessed (such as GRADE) the strength of the body of evidence will be assessed (such as GRADE) the strength of the body of evidence will be assessed (such as GRADE) the strength of the body of evidence will be assessed (such as GRADE) the strength of the body of evidence will be assessed (such as GRADE) the strength of the body of evidence will be assessed (such as GRADE) the strength of the body of evidence will be assessed (such as GRADE) the strength of the body of evidence will be assessed (such as GRADE) the strength of the body of evidence will be assessed (such as GRADE) the strength of the body of evidence will be assessed (such as GRADE) the strength of the body of evidence will be assessed (such as GRADE) the strength of the body of evidence will be assessed (such as GRADE) the strength of the body of evidence will be assessed (such as GRADE) the strength of the body of evidence will be assessed (such as GRADE) the strength of the body of evidence will be assessed (such as GRADE) the strength of the body of evidence will be assessed (such as GRADE) the strength of the body of evidence will be assessed (such as GRADE) the strength of the s	10