Effectiveness of interventions for people living with dementia and their carers in Chinese communities: protocol for a systematic review and meta-analysis of randomised controlled trials

Cheng Shi,1,2 Shuangzhou Chen,1 Maximilian Salcher-Konrad,3 Jacky C P Choy,1 Hao Luo,1,2 Dara Kiu Yi Leung,2,1 Xinxin Cai,1 Yue Zeng,1 Ruizhi Dai,4 Adelina Comas-Herrera,3 David McDaid,3 Martin Knapp,3 Gloria Wong1

ABSTRACT

Introduction As the largest and most rapidly ageing population, Chinese people are now the major driver of the continued growth in dementia prevalence globally. The need for evidence-based interventions in Chinese communities is urgent. Although a wide range of pharmacological and non-pharmacological interventions for dementia have been trialled in Chinese populations, the evidence has not been systematically synthesised. This systematic review and meta-analysis aims to map out the interventions for people living with dementia and their carers in Chinese communities worldwide and compare the effectiveness of these interventions.

Methods and analysis This protocol followed the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols checklist. We will search Chinese (China National Knowledge Infrastructure, WanFang DATA) and English bibliographical databases (MEDLINE, EMBASE, PsycINFO, CINAHL Plus, Global Health, WHO Global Index Medicus, Virtual Health Library, Cochrane CENTRAL, Social Care Online, BASE, MOdelling Outcome and cost impacts of interventions for DEMentia (MODEM) Toolkit, Cochrane Database of Systematic Reviews), complemented by hand searching of reference lists. We will include studies evaluating the effectiveness of interventions for dementia or mild cognitive impairment in Chinese populations, using a randomised controlled trial design, and published between January 2008 and June 2020. We will use a standardised form to extract data and Version 2 of the Cochrane risk-of-bias tool for randomised trials to assess the risk of bias of the included studies. Collected data will be fully interpreted with narrative synthesis and analysed using pairwise and network meta-analyses to pool intervention effects where sufficient information is available. We will perform subgroup analysis and meta-regression to explore potential reasons for heterogeneity.

Ethics and dissemination No formal ethics approval is required for this protocol. The findings will facilitate the development of studies on interventions for dementia and timely inform dementia policymaking and practice. Planned dissemination channels include peer-reviewed publications, conference presentations, public events and websites.

Strengths and limitations of this study

- This systematic review and meta-analysis will be the first review of randomised controlled trials (RCTs) on the effectiveness of both pharmacological and non-pharmacological interventions for people living with dementia and their carers in Chinese communities worldwide.
- We will use a comprehensive search strategy of publications in both Chinese bibliographical databases (China National Knowledge Infrastructure, WanFang DATA) and English bibliographical databases (MEDLINE, EMBASE, PsycINFO, CINAHL Plus, Global Health, WHO Global Index Medicus, Virtual Health Library, Cochrane CENTRAL, Social Care Online, BASE, MOdelling Outcome and cost impacts of interventions for DEMentia (MODEM) Toolkit, Cochrane Database of Systematic Reviews).
- We will narratively synthesise the collected data to map out the dementia-related interventions studied in Chinese communities and conduct pairwise and network meta-analyses to compare the effectiveness of interventions.
- This review will be limited by the number and quality of RCTs conducted in Chinese communities.

INTRODUCTION

Around 50 million people currently live with dementia worldwide, of whom 20% are Chinese populations. Chinese population refers to people of Chinese ethnicity or national heritage, regardless of their nationality or region of residence. As the largest and most rapidly ageing population, the Chinese
are now the major driver in the continued growth of global dementia prevalence. Due to the physical and emotional challenges involved in caring, dementia affects not only people living with the condition but also their families, formal carers and other supporters. With a culture emphasising filial piety, coupled with insufficient care services, family care is often the main supporting resource for people living with dementia (PLwD) in Chinese communities worldwide. Dementia has been recognised as one of the most burdensome diseases among Chinese populations.

There is currently no cure for dementia, although symptoms can be managed with effective intervention and good care. China recently launched its national dementia strategy, one of whose main tasks is to improve the well-being of PLwD by increasing service provision. Taiwan updated its dementia policy in 2017, promoting dementia research, innovation and development as one of its seven strategies. In Macau’s 10-year Plan of Action on Dementia Services published in 2016, strengthening community services and caregiver support comprises one of its five strategies. In Hong Kong, a government service review and programme plan published in 2017 highlighted the need to strengthen services for PLwD and recommended a seven-stage model for dementia service following the WHO and Alzheimer’s Disease International’s framework. The need for evidence-based interventions and care services in Chinese populations is urgent.

Studies on dementia interventions appear to be scarce in Asian populations. Most evidence on drug treatment and non-pharmacological interventions has been generated in Western countries, with questionable relevance for Chinese populations. For example, cognitive stimulation therapy (CST) used alone or in combination with medication was shown to be effective and even cost-effective in improving cognition and quality of life, leading to a recommendation for routine use by England’s National Institute for Health and Care Excellence and by Alzheimer’s Disease International. In contrast, preliminary findings from a study applying CST with Hong Kong Chinese suggest that a larger number of participants needed to be treated to achieve clinically significant improvement in cognition. Such discrepancies in an intervention’s effect, possibly due to cultural differences, highlight the importance of generating evidence on the effectiveness of dementia-related interventions relevant to local populations.

There is now increasing evidence on a wide range of interventions for dementia undertaken in Chinese populations. A few reviews have been published, focusing on specific interventions and subtypes of dementia, such as the efficacy of donepezil in Chinese with Alzheimer’s disease, Chinese herbal medicine as adjunctive therapy for vascular dementia and traditional Chinese mind-body exercise (baduanjin) in older adults with mild cognitive impairment (MCI). Growing evidence also suggests that the therapeutic response to dementia intervention (eg, donepezil) might differ between Chinese and Western populations due to pharmacogenetic factors, thus emphasising the need for more accurate evaluations of interventions tailored to Chinese populations.

Some existing and ongoing studies aim to synthesise evidence for dementia intervention and care, including the Modelling Outcome and Cost Impacts of Interventions for Dementia (MODEM) project with a dementia evidence toolkit covering dementia interventions in English literature and the Strengthening Responses to Dementia in Developing Countries (STRiDE) project with an ongoing systematic review and meta-analysis on the evidence in seven low- and middle-income countries. There is no comprehensive evidence synthesis on the effectiveness of dementia or dementia-related interventions that cover different types of dementia (eg, Alzheimer’s disease, vascular dementia, frontotemporal dementia, Lewy body disease and mixed dementia) and interventions (eg, pharmacological treatment, psychosocial intervention and traditional Chinese medicine) conducted in Chinese populations. Existing systematic reviews have focused mainly on the English literature, where evidence from high-income areas such as Hong Kong and Taiwan can be found. Although Chinese academic databases have been recognised as a valuable resource for dementia-related studies, they have not been fully explored.

To our knowledge, this will be the first systematic review and meta-analysis to comprehensively synthesise and assess the evidence on the effectiveness of interventions for PLwD and their carers among Chinese populations in Chinese and English bibliographical databases. We aim to (1) map out interventions for dementia studied in Chinese communities, and (2) compare the effectiveness of those interventions for achieving desired outcomes. This study will contribute to shape the understanding of existing evidence on effectiveness of dementia-related interventions, improve quality of life of PLwD and their carers and provide valuable information for practice, policymaking and further research. As part of a research project, Tools to Inform Policy: Chinese Communities Actions in Response to Dementia (TIP-CARD; www.tip-card.hku.hk/), this study also aligns with the above-mentioned dementia evidence synthesis effort by the STRiDE project.

METHODS AND ANALYSIS

Protocol and registration

This protocol for this systematic review and meta-analysis followed the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols checklist. This study has been registered on the PROSPERO platform (www.crd.york.ac.uk/prospero).

Eligibility criteria

Population

We will include studies conducted among adults (aged 18 years and over) living with dementia or MCI and their
carers in Chinese populations. We will include relevant studies conducted in any type of care settings, such as home, community, residential homes, clinics, hospitals and other care settings. Participant characteristics such as gender, education and age at diagnosis will not be used for excluding studies.

We will include studies covering people living with any type and stage of dementia. Dementia, as a major neurocognitive disorder, describes a group of symptoms of cognitive decline, including, but not limited to, Alzheimer’s disease, vascular dementia, frontotemporal dementia, Lewy body disease and mixed dementia. Studies conducted among people living with MCI, mild neurocognitive disorder, vascular cognitive impairment and no dementia will be eligible for inclusion due to the higher risk of developing dementia in later years.29

We will also include studies conducted among people with diseases cooccurring with dementia or MCI, and people with dementia or MCI with unknown subtype, as long as the diagnostic criteria for dementia or MCI were explicated.

Our definition of dementia carer refers to persons involved in care provision and management and will not depend on whether or not the carer is paid, lives with the person they care for or provide direct or indirect care. Therefore, dementia carers include health and social care professionals, care managers, care workers, administrative staff of care facilities, family carers, other unpaid carers and family members assisting with care decisions. We will focus on studies conducted among people of Chinese ethnicity or national heritage regardless of their nationality or location of residence. Studies without explicating the proportion of Chinese participants over 50% or studies without a specific subgroup analysis for Chinese participants will be excluded.

**Intervention**

Based on the effectiveness perspective,24 30 any type of interventions for improving desired outcomes will be eligible. We will include studies on pharmacological treatment, non-pharmacological intervention (eg, cognitive intervention, technological intervention, training and exercise) or multicomponent interventions. We will exclude studies: (1) where no clear intervention was described, (2) on primary prevention of dementia and (3) on non-interventional studies.

**Comparison**

Given the broad range for interventions of interest, any comparisons within the context of eligible study design will be acceptable for inclusion, such as active comparators, treatment as usual, placebo and no treatment.

**Outcomes**

Any type of outcomes of dementia-related intervention will be eligible for inclusion from the perspective of effectiveness, which may affect individuals, families, the dementia care workforce, wider society and social or healthcare systems. Dementia often triggers complex problems in many domains.22 According to the MODEM dementia evidence toolkit (https://www.modem-dementia.org.uk/), outcomes measured in existing studies may include (1) cognition, behavioural and psychological symptoms, functional status, physical health and quality of life of PLwD, (2) carer burden, carer’s mental health, quality of life and other carer outcomes (eg, financial burdens), (3) service use, cost reduction (including hospital use reduction and care home admission delay) and service satisfaction, (4) risk reduction (of dementia and comorbidities) and prevention or management of comorbidities. To capture the diversity of interventions trialled in Chinese communities, we will accept all outcome measures that reflect intervention effectiveness.

**Study design**

To identify potential causal relationships, we will only include studies using randomised controlled trial (RCT) or cluster RCT designs. To control study quality, we will only include RCTs with a low risk of bias (RoB) in the process of evidence generation. According to Version 2 of the Cochrane RoB tool for randomised trials,31 methods, used for generating random allocation sequence indicating low RoB, include computer-generated random numbers, a random number table, coin tossing, shuffling cards or envelopes, throwing dice or drawing lots. Studies that use no random element or provide no information on the generation process of the random allocation sequence will be excluded.

To minimise small-study effects,32 33 we will exclude studies with a sample size of less than 50 in either the intervention group or comparison group(s) for the eligible population. For studies conducted with a population of mixed ethnicity, the sample size of each study arm for Chinese subgroup analysis should be greater than 50 participants. For studies in which more than 50% of participants are Chinese and all participants are randomly grouped, the sample size of each study arm is expected to be greater than 50 participants regardless of ethnicity.

**Publication type**

We will include the primary publications of intervention studies and grey literature evaluating the effectiveness of dementia-related interventions in Chinese populations. Relevant systematic reviews or scoping reviews will be included in the first step of screening and then will be used to complement the primary publications by hand searching of reference lists. Conference abstracts will be included if they contain sufficient information to assess eligibility for inclusion.

**Publication period**


**Language**

Studies will be limited to English and Chinese publications.
Information sources
We will search two major Chinese bibliographical databases (China National Knowledge Infrastructure and WanFang DATA) and English bibliographical databases (MEDLINE, EMBASE, PsycINFO, CINAHL. Plus, Global Health, WHO Global Index Medicus, Virtual Health Library, Cochrane CENTRAL, Social Care Online, BASE, MODEM Toolkit, Cochrane Database of Systematic Reviews). Hand searching of reference lists among review studies will complement the database searches.

Search strategy
We will adapt an established search strategy protocol24 used to search for English language literature. Corresponding Chinese search terms have been translated and adapted by three bilingual researchers (GW, SC and CS) experienced in dementia/ageing research with a training background in psychology, psychiatry, translation, social work and social policy from Hong Kong and mainland China. Search terms in English and Chinese are listed in table 1. In studies published in English, the search terms related to Chinese populations include ‘China’, ‘Chinese’, ‘Sino’, ‘Hong Kong’, ‘Taiwan’, ‘Taiwanese’, ‘Macau’ and ‘Asian’.

For studies published in English, we will first extract eligible study records identified from an ongoing systematic review,24 which used the same search strategy and search terms for dementia intervention and covered studies published between 2008 and 2018. Then, we will search these terms for Chinese populations in the title, abstract and keywords. Second, we will repeat the English bibliographical database search mentioned above to identify studies published between January 2019 and June 2020.

For studies published in Chinese, we will use Python,34 a programming language, to facilitate Chinese bibliographical database searching by using dementia-related search terms (search items number 1–4 in table 1). This is because of the technical challenge posed by limitations on the number of search terms and exported records per time in the two Chinese bibliographical databases. The search results for dementia-related study records will be exported in a Microsoft Excel spreadsheet. Then, we will search the intervention-related terms (search items number 5–53) in the title and abstract.

Duplicate publications will be checked based on title, author, journal and year using Microsoft Excel, and the ‘Find duplicates’ function in Rayyan and Covidence. Multiple publications from the same study will be identified based on the key information (e.g., authors’ names, study design, intervention and outcomes) from the full texts or by contacting authors for clarification if needed. Once confirmed, included multiple publications will be linked on Covidence.

Study selection
Study selection will be a two-step process, with detailed explanations for inclusion and exclusion criteria in each step. First, two researchers will independently screen the title and abstract and determine the study’s inclusion or exclusion on Rayyan. A justification (criterion) will be required for any exclusion decision. Studies with insufficient information in the title and abstract to enable a decision to be made will be included at this stage. The Rayyan machine learning-based classifier35 will be considered to facilitate the title and abstract screening, given the potentially work overload. Using a certain number of manually screened studies as a training data set, Rayyan will generate a relevance rating for each study, ranging from 0.5 (lowest) to 5 (highest).35 We may use a low relevance score (e.g., below 1.5) as a threshold to guide study exclusion.

Second, studies included after title and abstract screening will be uploaded to Covidence for full-text review by two independent reviewers, who will provide a justification for each excluded study. Review studies will be excluded at this stage, although their reference lists will be used to complement the database search results.

All disagreements in each step will be resolved through discussion between the two reviewers. If consensus is unreachable, a third reviewer will be consulted for a final decision.

Reviewers for title and abstract screening and full-text review will be able to read and understand inclusion/exclusion criteria for publications in both English and simplified Chinese.

On completion of the selection process, we will generate a Preferred Reporting Items for Systematic Reviews and Meta-Analyses flowchart36 to illustrate the inclusion and exclusion of studies at each stage in study selection.

Data collection process
We will use a standardised form based on the template available from Covidence for data extraction that will be pilot tested using included studies. To ensure data consistency across reviewers, we will organise exercises and group discussions for reviewer training. Due to the anticipated large number of potentially eligible studies, the data extraction form will be completed by one reviewer and verified by the second reviewer. We will keep all records of corrections or amendments to the data extraction. For studies that do not report the required information, we will contact the authors to request information.
Table 1  Search terms related to dementia and intervention in English and simplified Chinese

<table>
<thead>
<tr>
<th>Search number</th>
<th>Search terms in English</th>
<th>Search terms in simplified Chinese</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dementia</td>
<td>帕金森或失智或认知症</td>
</tr>
<tr>
<td>2</td>
<td>Cognitive disorder</td>
<td>认知障碍或认知功能障碍或认知混乱或认知功能紊乱</td>
</tr>
<tr>
<td>3</td>
<td>Alzheimer</td>
<td>激素或失智症</td>
</tr>
<tr>
<td>4</td>
<td>(cognit* or memory or cerebr*) adj3 (impair* or los* or declin* or deteriorat* or degenerat*).mp.</td>
<td>(认知或记忆或脑)(损伤或缺乏或下降或退化或恶化或损害)或(退行)</td>
</tr>
<tr>
<td>5</td>
<td>Intervention* or therap* or treatment* or program* or manage* or prevent* or diagnosis* or (polic*) .mp.</td>
<td>干预或介入或治疗或疗法或方案或处理或预防或诊断或控制或手段或政策或应用或支持或效果或疗效或观察或价值或临床或分析</td>
</tr>
<tr>
<td>6</td>
<td>Cognitive therapy</td>
<td>认知或治疗</td>
</tr>
<tr>
<td>7</td>
<td>Cognitive stimulation</td>
<td>认知或刺激或促进</td>
</tr>
<tr>
<td>8</td>
<td>Cognitive training</td>
<td>认知训练</td>
</tr>
<tr>
<td>9</td>
<td>Cognitive rehabilitation</td>
<td>认知(复健或康复)</td>
</tr>
<tr>
<td>10</td>
<td>Drug therapy or pharmacotherapy</td>
<td>药物或药物治疗或药物或药理或药物或药物治疗</td>
</tr>
<tr>
<td>11</td>
<td>Cholinesterase inhibitors</td>
<td>胆碱酯酶抑制剂或胆碱酯酶抑制剂</td>
</tr>
<tr>
<td>12</td>
<td>Cholinesterase agent</td>
<td>胆碱酯酶或胆碱酯酶抑制剂或胆碱酯酶分解剂</td>
</tr>
<tr>
<td>13</td>
<td>(Sedative or tranquil* adj3 (agent* or drug*) ).mp.</td>
<td>(镇静或镇定或安神或安定)(药或药)</td>
</tr>
<tr>
<td>14</td>
<td>Antipsychotic or neuroleptic (agent* or drug*)</td>
<td>抗精神病(药或药)</td>
</tr>
<tr>
<td>15</td>
<td>exp Serotonin Reuptake Inhibitors or sski</td>
<td>血清素或5-羟色胺(再摄取或再吸收或回收)抑制剂</td>
</tr>
<tr>
<td>16</td>
<td>Benzodiazepines</td>
<td>苯二氮卓</td>
</tr>
<tr>
<td>17</td>
<td>(memantine or donepezil or rivastigmine or galantamine or souvenaid or risperidone or haloperidol or olanzapine or quetiapine or catilopram or dextromethorphan or carbamazepine or mirtazapine or sertraline or moclobemide or trazodone or melatonin or ramelteon or methylphenidate) .mp.</td>
<td>(美金刚或依达普仑或利伐普林或盐酸多奈哌齐或卡巴拉汀或利培酮或氯丙嗪或奥氮平或喹硫平或卡马西平或米特拉普或盐酸普罗卡米松或普罗卡米松或米托氮平或西酞普兰或褪黑素或拉莫三嗪或美多巴或利培酮)或(美金刚或利培酮)(镇静或镇定或安定或安定)(药或药)</td>
</tr>
<tr>
<td>18</td>
<td>Movement Therapy</td>
<td>(运动或动作)</td>
</tr>
<tr>
<td>19</td>
<td>(Physical activit* or physical training).*mp.</td>
<td>(运动或体育或身体)(活动或训练)</td>
</tr>
<tr>
<td>20</td>
<td>(social adj3 activit*).mp.</td>
<td>社交活动或社会活动</td>
</tr>
<tr>
<td>21</td>
<td>Psychotherapy</td>
<td>心理(治疗或疗法)</td>
</tr>
<tr>
<td>22</td>
<td>(behavior?* adj3 therap*).mp.</td>
<td>行为(治疗或疗法)</td>
</tr>
<tr>
<td>23</td>
<td>Counseling</td>
<td>辅导或咨询</td>
</tr>
<tr>
<td>24</td>
<td>(Psychosocial or psycho social) adj3 (support or interven* or care*) .t,ab.</td>
<td>(社会心理或社交心理)(支撑或治疗或干预或介入或照顾)</td>
</tr>
<tr>
<td>25</td>
<td>Alternative medicine</td>
<td>(辅助或另类)(治疗或疗法或医学或医疗)</td>
</tr>
<tr>
<td>26</td>
<td>Chinese medicine</td>
<td>中医或中药</td>
</tr>
<tr>
<td>27</td>
<td>Acupuncture</td>
<td>针灸或针灸或电针</td>
</tr>
<tr>
<td>28</td>
<td>herb* adj3 (tea or remedy or remedies or medicine”).t,ab.</td>
<td>药草或药或药用植物或草本或茶疗</td>
</tr>
<tr>
<td>29</td>
<td>Gingko</td>
<td>桂香或肉桂</td>
</tr>
<tr>
<td>30</td>
<td>homeopathy</td>
<td>(顺势或同病或同种)</td>
</tr>
<tr>
<td>31</td>
<td>(music or art or aroma or light or photo or pet or pets) adj3 therap*.t,ab.</td>
<td>(音乐或艺术或香薰或光照或光线或宠物或动物或舞蹈)</td>
</tr>
<tr>
<td>32</td>
<td>Massage</td>
<td>按摩或推拿</td>
</tr>
<tr>
<td>33</td>
<td>Mind Body Therapy</td>
<td>身心或身心或正念或冥想</td>
</tr>
<tr>
<td>34</td>
<td>Advance directives</td>
<td>预设医疗指示或预设指示或预期目标或预期目标或预期方向</td>
</tr>
<tr>
<td>35</td>
<td>(Advance? adj3 (care or medical or healthcare) adj3 plan*).mp.</td>
<td>(预设或预设)或(护理或计划或临终或计划或医疗或治疗)</td>
</tr>
<tr>
<td>36</td>
<td>(decision* adj3 (aid* or support*).mp.</td>
<td>决策或援助或决策支持或决策支持</td>
</tr>
<tr>
<td>37</td>
<td>Case Management</td>
<td>个案管理</td>
</tr>
<tr>
<td>38</td>
<td>(communicati* adj3 skill* adj3 training).mp.</td>
<td>沟通技巧(训练或培训)</td>
</tr>
<tr>
<td>39</td>
<td>(dementia care adj3 map*).mp.</td>
<td>认知障碍症护理地图或老年痴呆症护理地图或失智症护理地图</td>
</tr>
<tr>
<td>40</td>
<td>(person* or patient*) adj3 cent* adj3 care).mp.</td>
<td>(人为本或人为中心或以人为本)或(照护或照护或护理或治疗或治疗)</td>
</tr>
<tr>
<td>41</td>
<td>(caregiver or carer) adj3 educat*.mp.</td>
<td>(照护者或家属或家庭或照护者或照护者)教育</td>
</tr>
<tr>
<td>42</td>
<td>Support Groups</td>
<td>(支援或支持或帮助)(小组或组织)</td>
</tr>
<tr>
<td>43</td>
<td>Self-Help Techniques</td>
<td>自助法或自助法或自助技巧或自我</td>
</tr>
</tbody>
</table>
We will prepare the data extraction form in English. For studies in Chinese, our bilingual reviewers will complete data extraction using the original expression in Chinese full texts except for the outcome name and brief introduction of the intervention, which will be recorded in English based on the English abstract if available or manual translation. The final extracted evidence from both the English and Chinese studies will be verified by one bilingual researcher (CS) to ensure consistent translation.

**Data items**

We will extract information on items listed in box 1 from the included studies.

**Outcomes and prioritisation**

In line with our research aims, we will first record all types of outcome and outcome measures stated in the included studies to map out the dementia-related interventions conducted in Chinese communities. Due to the anticipated number of Chinese studies from an ongoing review,22-24 we will prioritise the following outcomes of interest when extracting outcomes from included studies.

As dementia is a condition affecting cognition by definition, we will prioritise outcome on changes in cognition. Common assessments for measuring cognitive impairment level or performance include the Mini–Mental State Examination (MMSE), the Montreal Cognitive Assessment (MoCA) and the Alzheimer’s Disease Assessment Scale-Cognitive Subscale (ADAS-Cog). Given the effects of dementia on the ability to organise activities,22 we will also focus on changes in functional ability following treatment. For example, the Disability Assessment for Dementia is designed for evaluating functional ability to complete activities of daily living (ADL) and instrumental ADL among PLwD.

Caring for a person living with dementia can be very stressful, which may lead to a higher level of depression or health issues.37 For studies conducted among carers of PLwD, we will focus on changes in quality of life and carer burden,38 39 as measured by tools such as the
EUROHIS-QOL 8-item index and the Zarit Burden Interview, respectively.

If the outcome of interest or its measure is not reported in included studies, we will extract the outcome results that are reported as the primary outcome in the original included study. Where feasible, we will also be open to examining other outcomes evaluated in the included studies. We will extract results of outcomes of interest measured at each time point reported in included studies. Nevertheless, we will afford preference to the endpoint of the study in the main data synthesis. Results at multiple time points will be used for subgroup analysis and meta-regression to explore the short-term and long-term effects of outcomes.

**RoB in individual studies**

We will use the Cochrane Collaboration’s recently updated RoB tool to assess the quality of included studies in Covidence. Two reviewers will make independent judgements based on the criteria for judging the RoB. Disagreement will be resolved by discussion and arbitrated by a third reviewer if consensus is unachievable. For studies that do not provide sufficient information in full texts for RoB assessment, we will search for the study’s protocol, trial registry information or other relevant materials to facilitate the judgement. The absence of a prespecified analysis plan may raise some concerns in the domain for bias in selection of the reported result.

**Data synthesis**

Evidence on dementia-related interventions in PLwDs and carers will be analysed separately. Studies of family-based or dyadic interventions involving both PLwDs and carers will be categorised according to the subject of each outcome.

**Narrative synthesis**

To map dementia-related interventions conducted in Chinese communities, we will undertake a narrative synthesis to fully interpret the extracted evidence from all included studies. We will first describe and summarise disease characteristics, features of the intervention, number of participants, participant characteristics, outcomes, outcome measures and indication of RoB assessment in a tabular form. In line with the Guidance on the Conduct of Narrative Synthesis in Systematic Reviews, we will then explore the relationship among types of interventions (or details of pharmacological, non-pharmacological and multicomponent interventions), outcomes and outcome measures conducted in Chinese populations. Idea webbing will be used to visually describe conceptual linkages through examination of extracted data if feasible. The key questions here are what (types of) interventions have been conducted in Chinese communities, what specific outcomes those interventions target and what measures are used for those outcomes. We expect to identify research gaps in this field for future studies and practices.

**Meta-analyses**

To compare the effectiveness of interventions for outcomes of interest (described in the Outcomes and prioritisation section), we will conduct quantitative synthesis of treatment effects through meta-analyses where sufficient information is available. For a specific outcome, we will perform a series of pairwise meta-analyses for all direct comparisons (eg, one comparison between an intervention group and a control or another intervention group). Due to the underlying difference between studies in terms of participants, intervention details and care settings, a random-effects pooling model will be conducted by default for an overall summary estimate by weighting studies using a combination of within-study and between-study variance. When the included studies use different instruments to evaluate the same outcome (eg, MMSE, MoCA and ADAS-Cog for measuring cognition), we will use standardised mean difference (the absolute mean difference between the intervention group and control group divided by the SD in the control group) for continuous outcomes and relative risks for dichotomous outcomes to compute the effect size for each study.

To compare the effectiveness for multiple interventions, we will use network meta-analysis to combine direct and indirect evidence for relevant treatment effects. In network meta-analyses, different comparisons among two or more of the treatments can be included in one analysis. We will generate network geometry to visualise and assess the treatment networks and estimate and combine comparative effects from direct and indirect evidence. In examining the transitivity hypothesis of network meta-analysis, we will use ‘loop-specific approaches’ to detect the inconsistency of a network of interventions, including local inconsistency test to evaluate the loop inconsistency in regions of network separately and global inconsistency test to evaluate the incoherence in the overall network. Sensitivity analyses will be conducted to explore the robustness of the meta-analysis results by varying the analytic data or methods, including analysing studies only with a low RoB and trials using a placebo as a comparator.

**Dealing with missing data**

When there are missing data, we will attempt to obtain these by contacting the study author(s). If unsuccessful, we will consider using imputation methods to impute the missing value or exclude studies with missing data from the quantitative analysis. We will use sensitivity analysis to evaluate the potential influence on the overall treatment effects of included studies that use per-protocol analysis or suggest that the result was biased by missing outcome data (ie, high RoB) based on the RoB 2 assessment tool.

**Subgroup analysis and meta-regression**

We will calculate Cochrane’s Q statistic and the I² statistic to estimate the heterogeneity of the included studies. If statistical heterogeneity is observed, we will conduct subgroup analysis and meta-regression to explore the
potential reasons for the differences. Potential candidate covariates for subgroup analysis and meta-regression include intervention characteristics (eg, types of intervention, intervention dosage and duration), participant characteristics (eg, age, gender, education, severity of dementia and type of dementia), care settings, follow-up period (eg, at 3, 6 and 12 months) and locations (eg, mainland China, Hong Kong, Taiwan, Macau and other Chinese communities worldwide).

Meta-bias(es)
For each meta-analysis, we will use a funnel plot asymmetry assessment to detect meta-biases. Statistical tests for funnel plot asymmetry will be performed when at least 10 studies included in the meta-analysis. Statistical tests for funnel plot asymmetry will be performed when at least 10 studies included in the meta-analysis. Contour lines indicating various statistical significance will be used to aid visual interpretation of funnel plots. If funnel plot asymmetry is observed, we will also consider other possible reasons apart from non-reporting bias such as poor methodological quality and true heterogeneity of the included studies.

Confidence in cumulative estimate
We will use the Grading of Recommendations Assessment, Development and Evaluation approach to assess the quality of evidence. The domains of the assessment include RoB, inconsistency, indirectness of evidence, imprecision and publication bias.

Patient and public involvement
Neither patients nor the public will be involved in the design or development of this review protocol. However, stakeholders, including PLwD, family members, care staff, healthcare professionals and policymakers, will be engaged in the dissemination plan as described below.

ETHICS AND DISSEMINATION
This protocol for a systematic review and meta-analysis describes the methods to identify and synthesise published evidence on the effectiveness of interventions for PLwD and their carers in Chinese communities. No formal ethics approval is required for this protocol. The findings from this study will facilitate the development of studies on interventions for dementia and provide timely information for dementia policymaking and practice. We will target both professionals and non-specialist audiences in disseminating the outcomes of the review through proceedings and events, including peer-reviewed publications, conference presentations, public events, and publicly accessible websites.

Contributors
GW, CS, SC, JCPC, AC-H and MK defined the scope of the review and review question. GW, CS, SC and MS-K developed inclusion/exclusion criteria.

Funding
This work is conducted as part of the ‘Tools to Inform Policy: Chinese Communities of Action in Response to Dementia’ (TIP-CARD) project, supported by the Hong Kong Research Impact Fund of the Research Grants Council (Project Reference Number: R7017-18). MS-K, DMD, MK and AC-H’s contributions were supported by the UK Research and Innovation’s Global Challenges Research Fund (ES/P010938/1) as part of the ‘Strengthening Responses to Dementia in Developing Countries’ (STRIDE) project.

DISCLAIMER
The funders were not involved in the development of this protocol.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES


40 Popay J, Roberts H, Sowden A. Guidance on the conduct of narrative synthesis in systematic reviews. A product from the ESRC methods programme 2006:1;b92.


45 Centre for Reviews and Dissemination. CRD’s guidance for undertaking reviews in healthcare: CRD. University of York, 2009.


