
**1Mediterranean-DASH Intervention for Neurodegenerative Delay (MIND) Diet to Improve
2Cognitive Function in Mild Stroke Patients (MINDICOMS): Rationale and design of two
3replicate, pilot randomized control trials**

4

5Qing Lin^{1#}, Hui Chen^{2#}, Jie Shen², Yang Tao³, Lili Tang¹, Tao Zhang⁴, Xiaoran Liu⁵, Ping Zeng⁶, Fang
6He⁷, Chengjia Liu⁸, Xin Xu², Changzheng Yuan^{2,10*}, Lu-sha Tong^{1*}

7¹ Department of Neurology, the Second Affiliated Hospital, Zhejiang University School of
8Medicine, Hangzhou, China

9² School of Public Health, Zhejiang University School of Medicine, Hangzhou, China

10³ Cancer Epidemiology Unit, Nuffield Department of Population Health, Oxford University, Oxford,
11UK

12⁴ Department of Biostatistics, School of Public Health, Shandong University, Jinan, China

13⁵ Rush Institute for Healthy Aging, Rush University Medical Center, Chicago, Illinois

14⁶ Key Laboratory of Geriatrics, Beijing Hospital & Beijing Institute of Geriatrics, Ministry of Health,
15Beijing, China

16⁷ Department of Nutrition, the Second Affiliated Hospital, Zhejiang University School of Medicine,
17Hangzhou, China

18⁸ Department of Radiology, the Second Affiliated Hospital, Zhejiang University School of
19Medicine, Hangzhou, China

20⁹ Department of Pharmacology, Yong Loo Lin School of Medicine, National University of Singapore

21¹⁰ Department of Nutrition, Harvard T. H. Chan School of Public Health, Boston, Massachusetts

22[#] Qing Lin and Hui Chen contributed equally as co-first authors.

23* Corresponding authors: Lu-sha Tong, Department of Neurology, the Second Affiliated Hospital,
24Zhejiang University School of Medicine, Hangzhou, Zhejiang, 310058, email:
252310040@zju.edu.cn; Changzheng Yuan, School of Public Health, the Second Affiliated Hospital,
26Zhejiang University School of Medicine, Hangzhou, Zhejiang 310058 and Department of
27Nutrition, Harvard T.H. Chan School of Public Health, Boston, MA 02115, email:
28chy478@zju.edu.cn.

29

30**Main text word count:** 3949

31**Display elements:** 5 tables and 1 figure

32**Running title:** MIND Diet for Cognition Improvement in Stroke

33ABSTRACT

34

35**Introduction:** Approximately one-third of stroke survivors develop post-stroke cognitive
36impairment (PSCI), yet effective preventive strategies remain limited. The Mediterranean-DASH
37Intervention for Neurodegenerative Delay (MIND) diet was originally developed to promote
38cognitive health, but its effect on changes in cognitive function among mild stroke patients
39remains unclear. In this study, we aimed to explore the effect of MIND intervention on cognitive
40function among mild stroke patients. By implementing the same protocol in two independent
41samples, we aimed to examine whether the results are reproducible across different recruitment
42waves and refine protocols for future large-scale trials.

43

44**Methods:** The MIND Diet to Improve Cognitive Function in Mild Stroke Patients (MINDICOMS)
45and MINDICOMS II are two replicate, pilot, two-arm RCTs, each enrolling 60 patients aged 35 to
4670 years with acute ischemic stroke and signs of newly onset cognitive impairment but no
47dementia. The participants will be randomly assigned to the MIND diet intervention group or a
48control group. We adapted the MIND diet for the Chinese population, recommending eleven food
49groups and restricting four food groups. During the 26-week intervention phase, participants in
50the control group will receive standard medical care along with weekly health education
51messages. The intervention group will receive a structured MIND diet education program,
52including in-hospital provision of MIND-compliant meals for seven days, and post-discharge
53supplies of nuts, olive or camellia oil, whole grains, and green tea. Personalized dietary guidance
54and regular feedback from dietitians will be delivered via an online platform. The primary
55outcome measure is change in global cognitive function measured using a neuropsychological
56test battery at Weeks 0, 13, and 26. Secondary outcomes include changes domain-specific
57cognitive function, brain imaging markers, dietary behavior, the ability of daily living, mental
58health indicators, plasma biomarkers, and the gut microbiota composition.

59

60**Conclusion:** The MINDICOMS trials will generate preliminary evidence to optimize dietary
61strategies for cognitive improvement in stroke survivors. The comprehensive set of outcome
62measures will also offer a unique opportunity to explore potential biological mechanisms and
63generate new hypotheses for future research.

64

65**Keywords:** randomized control trial, diet, cognitive function, mild stroke

66

67HIGHLIGHTS

68

69*What is already known on this topic*

70Stroke patients have a high risk of post-stroke cognitive impairment and dementia, but effective
71preventive strategies are still limited. The Mediterranean-DASH Intervention for
72Neurodegenerative Delay (MIND) diet was promoted for potential cognitive benefits, but the
73adherence and efficacy of MIND intervention among stroke patients are unknown.

74

75*What this study adds*

76We designed two replicate, pilot randomized control trial to explore the potential efficacy of a
77Chinese localized MIND diet intervention program on cognitive function among mild stroke
78patients.

79

80*How this study might affect research, practice or policy*

81Our research will serve as a start point to design dietary prevention strategies for PSCI and add
82novel evidence to the role of a diet change on brain health in individuals at risk of cognitive
83impairment.

84INTRODUCTION

85Stroke is one of the most common diseases among middle-aged and older adults and affects 12.2
86million individuals worldwide.[1] Approximately one-third of stroke survivors experience post-
87stroke cognitive impairment (PSCI), posing considerable burdens on healthcare systems and
88impairing the life quality of patients.[2,3] Since effective drug and specified intervention targets
89for PSCI are still limited,[3] exploring non-pharmacological preventive strategies, such as dietary
90intervention, for PSCI is important.

91 Dietary factors may play essential roles in cognitive decline.[4,5] Designed by Morris et al.,[6]
92The Mediterranean-DASH Intervention for Neurodegenerative Delay (MIND) diet combined
93characteristics of Mediterranean and DASH diets and further incorporated the emerging evidence
94in the field of nutritional neurocognitive science, featuring 10 healthy foods and restricting 5
95unhealthy foods. For example, the MIND diet uniquely emphasized berry intake and limited fast
96fried food intake. In the Rush Memory and Aging Project (MAP), higher adherence to the MIND
97diet was associated with slower cognitive decline[6] and lower Alzheimer's disease risk.[7] Two
98recent meta-analyses showed that the MIND diet was associated with lower risk of dementia[8]
99and better cognitive function,[9] respectively. In the post-stroke population, specifically, a small-
100scale community cohort study showed that higher adherence to the MIND diet was related to a
101reduced rate of cognitive decline after stroke.[10]

102 The MIND diet also holds promises to address multiple risk factors for dementia
103simultaneously, such as hypertension and diabetes, in addition to its own potential primary
104effects to reduce markers of underlying biological mechanisms for Alzheimer's Disease and
105vascular dementia, which are the most common forms of dementia. However, several aspects in
106this area remain unclear. First, causal evidence from randomized control trial is scarce.[4] A three-
107year RCT in the US overweight population with a family history of dementia showed that the
108MIND diet did not have additional cognitive benefits as compared with the control diet
109emphasizing mild caloric restriction.[11] To date, no study has assessed the direct effect of diet
110on cognition among stroke patients, who may be at significantly higher cognitive impairment risk
111and have distinct risk factor profiles compared with community individuals.[3] Furthermore, the
112MIND diet is originally designed for the Western population, and whether it could benefit
113individuals from diverse backgrounds is largely unknown.

114 To address these gaps, we designed a 26-week, pilot, single-center, two-arm, single-blind RCT
115to test the effects of the Mediterranean-DASH Intervention for Neurodegenerative Delay (MIND)
116diet + standard medical care versus standard medical care on the rate of cognitive change and
117several other secondary outcomes. In addition, we will explore the effect of this dietary
118intervention program on a wide range of mental, metabolic outcomes and potential biological
119pathways through multi-omics analyses.

120

121METHODS

122Study design overview

123The MIND Diet to Improve Cognitive Function in Mild Stroke Patients (MINDICOMS) I and II are
124two replicate, pilot, two-arm, single-blinded, randomized intervention trial. It is designed to test
125the effects of the MIND diet on cognitive change and several other secondary outcomes.
126MINDICOMS and MINDICOMS II will each enroll 60 individuals (total n=120) between the ages of
12735 and 70 who experience a mild stroke with signs of cognitive decline. They will follow identical

inclusion/exclusion criteria, implementation plan, and statistical analysis plan and differ only in the time frame of recruitment and implementation. We focus on mild rather than more severe cases out of the safety considerations. We will conduct two pilot trials with the primary aim of assessing the preliminary efficacy of the MIND dietary intervention among mild stroke patients, as well as evaluating adherence, which are essential for informing the design of future larger-scale and longer-duration trials. The 26-week period was selected based on the subacute phase of stroke recovery, during which neurorehabilitation efforts are most effective and behavioral interventions are likely to be most impactful.[12] The reporting of this study follows the Consolidated Standards of Reporting Trials (CONSORT) guidelines ([Supplementary file](#)).

Eligible subjects will be randomly allocated to either control group or the MIND diet intervention group for 26 weeks. The primary outcome measure is change in global cognitive function measured using a neuropsychological test battery at weeks 0, 13±1, and 26±2, consistent with the recommendations from the Chinese expert consensus on the management of post-stroke cognitive impairment.[13] Secondary outcome measures include changes in domain-specific cognitive function, brain imaging markers, dietary behavior, the ability of daily life, mental health indicators (including depression and anxiety), plasma metabolic profiles, plasma inflammatory biomarkers, and gut microbiota composition. The flow chart of screening, randomization, and intervention is shown in [Figure 1](#).

The proposed study is sited at the Second Affiliated Hospital of Zhejiang University School of Medicine, Hangzhou. The trial is approved by ethics committee of the Second Affiliated Hospital of Zhejiang University (ethical approval No. 20230520) and registered at [clinicaltrials.gov](#) (NCT05921084 & NCT06331247). All participants will provide written informed consent before enrollment. The study will follow the rules of the Helsinki Declaration.

151

152 *Study population eligibility*

In-hospital patients aged 35–70 years with an acute mild ischemic stroke confirmed by diffusion-weighted imaging (DWI) with a National Institutes of Health Stroke Scale (NIHSS) score of 0–6 will be screened for eligibility, with no restriction on etiology, location, or laterality. The detailed criteria for inclusion and exclusion are shown in [Table 1](#). Briefly, the major inclusion and exclusion criteria ensure that the included participants have a suboptimal diet (baseline modified MIND diet score of ≤10 out of 15), show signs of cognitive decline but do not have dementia, and have no major medical conditions that will interfere with the intervention. The threshold of the MIND diet score is adapted from the original MIND trial in the United States[14] to identify persons who might benefit more from dietary modifications.

The recruiting neurologist will conduct a structural conversation that increases potential participants' awareness of this study and assess their potential compliance of the intervention strategies and willingness to attend follow-up visits.[15] Eligible patients will sign the informed consent and be randomized.

166

167 *Randomization*

Candidates meeting the criteria will be randomly allocated 1:1 to the intervention and control group. We adopt Maximally-Tolerated-Imbalance (MTI) Randomization to maintain between-group sample size balance over time. Using the Clinical Trial Randomization Tool provided by the National Cancer Institute's Division of Cancer Prevention (NCI-DCP), we will generate a

randomized arm allocation sequence of participants, with the MTI being 3. The details can be found on the NCI-DCP website.[16]

174

175 *Localized MIND diet*

176 The original MIND diet is a hybrid of the Mediterranean diet and DASH diet, emphasizing the
177 consumption of green leafy vegetables, nuts, beans, whole grains, fish, and poultry, cooking with
178 olive oil, and limiting the consumption of red meat, butter, cheese, fried foods, and fast foods.
179 Based on the *Dietary Guidelines for Chinese Residents (2022)*, *Dietary Guide for stroke patients*
180 (WS/T 558—2017), current dietary intake levels of the Chinese adults[17] and the empirical
181 studies conducted among Chinese,[9] the dietitians in the team designed a localized MIND diet,
182 with the specific targets shown in Table 2. Briefly, the localized diet incorporated the
183 recommendations on dark red/yellow vegetables that are rich in carotenoids,[18] green tea in
184 substitution of wine as a polyphenol source,[19] and camellia oil as an accessible alternate for
185 extra virgin olive oil and expanded the category of butter and margarine to animal fat to further
186 reduce intake of saturated fat.[19] Of note, we incorporated camellia oil because of its similar
187 fatty acid composition as olive oil (high oleic oil) and richness in polyphenols. We also adjusted
188 the frequency goals of each food group to fit in the Chinese dietary background and according to
189 feedback from an external expert panel consisting of registered dietitians and neurologists.

190

191 *Intervention*

192 The project team consists of several neurologists for disease management and registered
193 dietitians trained to deliver dietary counseling. The intervention program is developed by
194 registered dietitians following the behavior change wheel (BCW) model to encourage behavioral
195 changes through capability, opportunity, motivation-behavior enhancement.[20] It will consist of
196 an intensive in-hospital phase, typically spanning 7-10 days, followed by a multi-channeled
197 discharge phase lasting 26 weeks. To mitigate potential barriers to adherence, individuals with
198 severe dysphagia or significant cognitive impairment will be excluded from participation.

199 During the intensive in-hospital phase, the intervention group will be provided whole meals
200 designed according to the localized MIND goals, while the control group will maintain their usual
201 diet. Both groups will receive about 5 minutes of daily health education videos on stroke at the
202 same frequency. The intervention group will additionally receive MIND diet education program
203 through online videos, including overview of the MIND diet, grains, soybeans, nuts, vegetables,
204 fruits, meat, olive oil / camellia oil and green tea.

205 At discharge, the intervention group will receive a meal plate, kitchen scale, MIND diet
206 brochure and record forms at discharge, whereas the control group will receive a kitchen scale, a
207 portion-control oil jar and leaflet of *Dietary Guidelines for Chinese Residents (2022 Edition)*. After
208 discharge, the intervention group will be supplied of nuts, olive or camellia oil, whole grains, and
209 green tea at each follow-up visit to encourage their adherence to the MIND diet. WeChat, a
210 widely used mobile messaging app, will be used to implement and monitor the discharge
211 intervention process. Both groups will receive weekly health education messages during the 26-
212 week intervention phase and can optionally raise their questions on daily diet and other aspects
213 in the WeChat group and receives immediate feedback from the neurologists and the dietitians.
214 We will manage medication for the two groups according to the post-stroke care guidelines[21]
215 and taper down the dosages according to the blood pressure and glycemia levels based on the

status of each individual.[22] In addition, the intervention group will be guided to take photos as food diary and upload them to the WeChat group. This enables the dietitians to measure and track the intake of foods and provide immediate feedback, including personalized modifications such as texture-adapted meals. The encouraged frequency is every day within 2 weeks after discharge, 3 days per week during 2-4 weeks after discharge, and 3 days per week during 4-26 weeks after discharge. Caregivers (usually family members) will be invited to attend dietary education sessions alongside participants and will be instructed to assist in monitoring dietary adherence of the participants during the follow-up period.

224

225 *Assessment of adherence*

226 We will adopt multiple strategies to maintain the dietary adherence of participants: (1) Whole meal preparation and provision during hospitalization; (2) a MIND diet education program in the hospital and online video push via WeChat; (3) online communications with dietitians and nutritional counseling; (4) food provision as incentives, including nuts, olive oil or camellia oil, whole grains, and green tea. We will formally assess the adherence of the MIND diet using the 15-point MIND diet score measured by a 36-item food frequency questionnaire (FFQ) and the MIND diet adherence screener (MIDAS). The patients and informants will be interviewed by trained staff to reduce the potential influence of post-stroke cognitive decline on recalling ability. FFQ assessment will be carried out by trained staff at Weeks 0 and 26 $\pm$ 2, and MIDAS at Weeks 0, 13 $\pm$ 1, and 26 $\pm$ 2. The 36-item FFQ collects information on the frequency and portion sizes of 36 foods or food groups consumed over the past 6 months, using a pictorial guide to aid in quantification. Average daily intake of each food item will be calculated by multiplying the frequency (converted to daily frequency) by the average intake per time. Then, the 36 food items will be grouped to the classification of the MIND diet. The MIDAS contains 15 questions on the 15 components of the MIND diet and will be easier to implement than FFQ. Each diet component will be rated a score of 0, 0.5, or 1 based on the frequency of intake of each food, with a total MIND diet score ranging 0-15 points, as shown in [Table 2](#). Adherence to the MIND diet will also be evaluated by plasma biomarkers such as fatty acid profiles, carotenoids, folate, and tocopherol at Weeks 0, 13 $\pm$ 1, and 26 $\pm$ 2.

245

246 *Measurements*

247 [Table 3](#) shows the measurement schedule for each outcome variable. The primary adherence indicator is change in MIND diet score at week 0 and 26 assessed using FFQ. The primary efficacy outcome measure is the change in global cognitive function assessed using a neuropsychological test battery (NTB) measured at week 0, 13 $\pm$ 1, and 26 $\pm$ 2, as shown in [Table 4](#). The NTB is based on the National Institute of Neurological Disorders and Stroke and Canadian Stroke Network (NINDS-CSN) 60-minute protocol and assesses global and domain-specific cognitive functions. The NINDS-CSN 60-minute protocol has been extensively validated among Chinese older population[23] and stroke patients.[24,25] Cancellation test and clock drawing test, which were also validated among Chinese populations with stroke,[26,27] further assess attention and visuospatial function, respectively. Eighteen individual test scores in the NTB will be normalized and standardized to z-scores, and averaging z-scores across tests will yield a composite score for global cognitive function. Similarly, averaging z-scores across tests in each domain will yield four domain-specific

cognitive scores, each consisting of at least two tests. The outcome assessors will be blinded from the allocation of participants.

Secondary and exploratory outcome measures include: 1) changes in cognitive screening scores, as measured by the Montreal Cognitive Assessment (MoCA) and the Mini-Mental State Examination (MMSE); 2) changes in the domain-specific cognitive scores; 3) changes in brain MRI markers, including total brain volume (cubic centimeters) and hippocampal volume (cubic centimeters) and white/grey matter, regional grey matter, white matter lesions, the thickness of segmented cortical areas, microbleeds, perivascular spaces, brain atrophy, micro-infarcts, white matter hyperintensities, and functional connectivity change; 4) changes in the Activities of Daily Living Scale (ADL) and Instrumental Activities of Daily Living Scale (IADL) scores; 5) changes in the Patient Health Questionnaire (PHQ-9, for depression status) and General Anxiety Disorder-7 (GAD-7, for anxiety status) scores. 6) changes in plasma metabolic profiles measured using metabolome. 7) changes in plasma inflammatory biomarkers. 8) changes in the intestinal microbiome biodiversity and abundance in specific species in fecal samples. Semi-structured qualitative interviews will be conducted at the end of follow-up under the Theoretical Domains Framework to understand the facilitators of and barriers to dietary change.[28] Both theory-informed and data-driven approaches will be used to identify relevant behavioral and contextual factors that influence the dietary change process.

We will not impose restrictions on medication use in the study participants, except for that cholinesterase inhibitors and NMDA receptor antagonists will not be prescribed for either arm. Detailed information on prescribed medications and rehabilitation-activities will be collected at baseline and updated during follow-up assessments. These data will be used to describe treatment patterns and, where appropriate, adjust for potential confounding effects of key medications in post-hoc analyses.

283

Study size and population characteristics

To estimate the required sample size, we utilized data from the Rugao Longevity and Ageing Study (RuLAS), a cohort study in China designed to examine the biological, psychological, and social determinants of longevity and aging-related phenotypes.[29] In RuLAS, a 4-point increase in the MIND diet score (expected MIND score difference post intervention in this study) was associated with a 0.198-unit higher global cognition z-score after multivariable adjustments. Based on findings from the MIND trial in the United States, the standard deviation of the global cognition score during follow-up was 0.588. Assuming a between-group difference of 0.20 points, an alpha of 0.05 and a statistical power of 85%, the estimated sample size required for a fully powered randomized controlled trial (RCT) is 392 participants. Accordingly, for this pilot study, we aimed to enroll approximately 60 participants in each of the MINDICOMS I and II trials, representing 15% of the projected sample size per study and 30% combined, to assess adherence and inform the design of the confirmatory RCT.[30]

As of March 17, 2024, the MINDICOMS I recruited and randomized 60 patients (mean [SD] age, 57.9 [7.6] years; 18 females [30.0%], Table 5) to either MIND diet intervention (n=30) or control group (n=30). Among them, the major subtypes were large artery atherosclerosis (43.3%) and small artery occlusion (41.7%). The mean (SD) of baseline MIND diet score was 7.6 (1.3). The mean (SD) of baseline MMSE and MoCA scores were 24.0 (3.7) and 19.4 (4.0), respectively. The baseline characteristics did not significantly differ between the two groups. Similarly, the

MINDICOMS II recruited and randomized 60 patients (mean [SD] age, 60.0 [7.0] years; 17 females [28.3%]) to MIND diet intervention (n=30) or control group (n=30), and the baseline characteristics did not significantly differ between the two groups.

306

307 *Analysis plan*

308 Data from the MINDICOMS I and II will be analyzed separately, and the estimates will be pooled
309 with random-effect models. Data distribution for continuous variables will be assessed using the
310 Shapiro-Wilk test. Normally distributed continuous variables will be described by mean
311 (standard deviation, SD), and non-normally distributed continuous variables will be described as
312 median (interquartile range, IQR). Categorical variables will be described by number
313 (percentage).

314 The primary objective of our current research is to investigate whether the MIND diet
315 intervention can improve cognitive function in mild stroke patients during the 26-week
316 intervention phase following their discharge compared to those receiving standard care. The
317 primary outcome is changes in global cognition measured using NTB administered at the 0, 13,
318 and 26-week since discharge. We will employ Mixed Models for Repeated Measurements
319 (MMRM) to compare the differences in the cognitive change between the two groups over the
320 26-week timeframe.[31] The treatment effect will be quantified through the coefficient of a
321 cross-product term involving the intervention indicator and the follow-up time indicator[11].
322 Other variables that exhibit baseline disparities between the groups will be considered potential
323 confounders and included in the model for necessary adjustments. We will conduct these
324 analyses based on an intention-to-treat (ITT) approach, including participants who were
325 randomized. We will address missing data using multiple imputation. The significance level
326 threshold is set at 0.05. The statistician will be independent from intervention implementing to
327 maintain objectivity and impartiality.

328 Similarly, we will perform secondary analyses for each cognitive domain as secondary
329 outcomes, with the same model specifications outlined above. In cases where the outcome
330 variables do not exhibit a normal distribution, we will apply log-transformation before z-
331 standardization. Similar approaches will be applied for other secondary outcomes that consider
332 intra-individual correlations when calculating the pre-to-post-treatment differences.

333 Several sensitivity analyses will be conducted to assess the robustness of the findings. For
334 variables showing significant baseline imbalances, covariate adjustment will be incorporated
335 into the regression models.

336 In these analyses, we will assess the significance level at 0.05 for each test without adjusting
337 for multiple testing, given the exploratory nature of these investigations.

338

339 **DISCUSSION**

340 Given the current lack of effective therapeutic strategies for PSCI, it is crucial to explore potential
341 preventive approaches by lifestyle modification. As the first RCT to evaluate a dietary pattern
342 intervention for the prevention of PSCI, the MINDICOMS trials will generate valuable data to
343 support future large-scale intervention studies and provide causal evidence for the role of dietary
344 strategies in mitigating cognitive decline.

345 The MIND diet integrates core principles from both the Mediterranean and DASH diets and
346 places emphasis on foods with potential neuroprotective effects, such as green leafy vegetables,

347berries, and olive oil, while limits foods associated with faster cognitive decline (e.g., red and
348processed meats, butter and margarine, cheese, and sweets and pastries).[6] Accumulating
349population-based evidence supports the potential benefits of the MIND diet for brain health[32]
350manifested by cognitive function and Alzheimer's disease,[6,7,9] brain structural imaging
351markers,[33] and pathological measures.[34] A meta-analysis of cohort studies reported that
352highest versus lowest adherence to a MIND diet was associated with a lower risk of dementia in
353middle-aged and older adults by 13%.[8] So far, two RCTs on cognitive effects of the MIND diet
354intervention presented inconsistent findings. Barnes et al.[11] showed that a 3-year MIND diet
355intervention (combined with caloric restriction) among overweight older participants with a
356family history of dementia did not have additional beneficial effect when compared with a caloric
357restriction control strategy (N=603). The direction of the point estimate indicates that future
358research requires more protracted intervention and follow-up. In another RCT among 40 obese
359women, Arjmand et al.[35] discovered that compared with the control group, the MIND diet
360intervention group had better working memory, speech recognition memory, and attention and
361increased surface area of the inferior frontal gyrus after the 3-month phase. Although the MIND
362diet were not originally developed specifically for stroke survivors, emerging evidence suggests it
363may confer cognitive benefits that are particularly relevant for this high-risk population.[10] This
364trial will deliver preliminary evidence for non-pharmacological therapies for PSCI.

365 The MIND diet contains multiple Individual nutrients that may improve cognitive health, such
366as vitamins,[36] polyphenols,[37] carotenoids,[18] and unsaturated fatty acids.[38] Moreover,
367food groups restricted in the MIND diet contain certain nutrients that may impair cognitive
368function. For example, high levels of saturated and trans fatty acids may lead to blood-brain
369barrier and brain vascular dysfunction.[39] Sweets and pastries, often high in sugar, can increase
370insulin resistance, impairing neuroplasticity and the release of neurotransmitters in neurons,
371leading to impaired cognitive function.[40] Acrylamide, often contained in fried foods and
372processed foods, may induce nerve ending degeneration and therefore cause damage to the
373learning and memory functions.[41]

374 One of the innovative strengths of the MINDICOMS is the localized MIND diet. For example,
375rather than simply excluding the wine component from the diet intervention as in the MIND trial
376in the US,[11] we included green tea to offer similar beneficial effect from polyphenols.[42]
377Secondly, we recommend olive oil or camellia oil as edible oil instead of only olive oil because
378Chinese residents are less accustomed to consuming olive oil, and camellia oil has similar
379nutritional properties[43] and showed protective effect on cognitive function in animal
380experiments.[44] We recommend green tea, a widely consumed beverage in China, as a
381substitute on polyphenols for wine, because alcohol intake may increase the risks of multiple
382adverse event and was limited by current recommendations for post-stroke care.[3] In addition,
383we modified the recommendations of the vegetables to further emphasize dark red/yellow
384vegetables and included citrus fruits in the recommendations to encourage carotenoid intake.
385Finally, we made several adjustments to the recommended intake frequencies to adapt to the
386current levels of Chinese.[17]

387

388*Strengths and Limitations*

389To the best of our knowledge, this is the first RCT for whole-food diet intervention on cognitive
390changes after stroke. We will apply multiple scales, biological samples, and brain MRI to assess

391participants' adherence and cognitive outcomes. While significant changes in global structural
392volumes over a 26-week period are unlikely, we aim to explore more sensitive indicators such as
393the appearance of new microinfarcts, white matter hyperintensity progression, and potential
394changes in functional connectivity. Our study has several limitations that should be considered
395when interpreting the results. First, participants are required to recall multiple foods frequencies
396and quantities within 26 weeks or a year, which is inevitably subject to recall bias, even though
397informant being involved in interview may reduce the issue. Second, dietary education may
398inherently increase social contact for the intervention group, although we aim to achieve a
399relatively balanced frequency on other aspects such as stroke education. As the intervention
400spans a relatively long period, participant adherence may also be a challenge despite efforts to
401maximize it. Third, repeated cognitive assessments may introduce training effects due to
402familiarity with the NTB. While the assessments are conducted at the same time points for both
403the intervention and control groups, which should help mitigate differential effects, the potential
404influence of practice effects should be considered when interpreting within-group changes.

405

406CONCLUSION

407In conclusion, the MINDICOMS will assess the effect of the MIND diet on cognitive change in mild
408stroke patients, who are at substantially higher cognitive impairment risk. Our research will serve
409as a start point to design dietary prevention strategies for PSCI and add novel evidence to the role
410of a healthy diet on brain health in stroke patients.

411DECLARATIONS

412**Acknowledgements:** The authors would like to express sincere gratitude to the staff and all
413potential participants of the MINDCOMS.

414

415**Statement of Ethics:** The trial is approved by ethics committee of the Second Affiliated Hospital
416of Zhejiang University (ethical approval No. 2023-0357). All participants will provide written
417informed consent before enrollment. They will be informed about the study's purpose,
418procedures, potential risks and benefits, and their right to withdraw at any time without penalty.
419In studies involving vulnerable participants, additional steps will be taken to ensure that the
420consent process is thorough and understandable. These steps will include detailed verbal
421explanations, the use of simple language, and the provision of consent forms in multiple
422languages, as needed.

423

424**Conflict of Interest Statement:** The authors have no conflicts of interest to declare.

425

426**Funding Sources:** This study was supported by the National Natural Science Foundation of China
427(81971155, granted to LST) and the Chinese Nutrition Society (CNS-NNSRG2021-61, granted to
428CY). The funders had no role in study design, implementation, or manuscript writing and
429submission.

430

431**Author Contributions:** Dr. Changzheng Yuan and Dr. Lusha Tong are the principal investigators of
432the MINDICOMS trial and acquired funding for this project. Qing Lin and Hui Chen drafted the
433manuscript and oversaw the recruitment and implementation of the trial, Jie Shen, Yang Tao, Lili
434Tang, and Chengjia Liu contributed to the study design, site field work, and provided critical
435feedback to manuscript preparation. Tao Zhang, Xiaoran Liu, Ping Zeng, and Fang He provided
436expertise in biostatistics, nutrition, and neurology. They contributed to the development of the
437study protocol and provided input on the manuscript. Xin Xu assisted with data collection and
438management. All authors have intellectually contributed to the manuscript and agreed with the
439submission.

440

441**Data Availability Statement:** The data supporting the findings of this study are available upon
442reasonable request. Data sharing is subject to ethical restrictions to protect participant
443confidentiality. Requests for data access should be directed to the corresponding authors (Prof.
444Lusha Tong, 2310040@zju.edu.cn and Prof. Changzheng Yuan chy478@zju.edu.cn).

445

446References

- 4471 Feigin VL, Stark BA, Johnson CO, Roth GA, Bisignano C, Abady GG, et al. Global, regional, and
448 national burden of stroke and its risk factors, 1990–2019: a systematic analysis for the Global
449 Burden of Disease Study 2019. *The Lancet Neurol.* 2021 Oct;20(10):795–820.
- 4502 Mok VCT, Lam BYK, Wong A, Ko H, Markus HS, Wong LKS. Early-onset and delayed-onset
451 poststroke dementia — revisiting the mechanisms. *Nat Rev Neurol.* 2017 Mar;13(3):148–59.
- 4523 Rost NS, Brodtmann A, Pase MP, Van Veluw SJ, Biffi A, Duering M, et al. Post-Stroke Cognitive
453 Impairment and Dementia. *Circ Res.* 2022 Apr;130(8):1252–71.
- 4544 Yassine HN, Samieri C, Livingston G, Glass K, Wagner M, Tangney C, et al. Nutrition state of
455 science and dementia prevention: recommendations of the Nutrition for Dementia
456 Prevention Working Group. *The Lancet Heal Longev* 2022 Jul;3(7):e501–12.
- 4575 Kivipelto M, Mangialasche F, Ngandu T. Lifestyle interventions to prevent cognitive
458 impairment, dementia and Alzheimer disease. *Nat Rev Neurol.* 2018 Nov;14(11):653–66.
- 4596 Morris MC, Tangney CC, Wang Y, Sacks FM, Barnes LL, Bennett DA, et al. MIND diet slows
460 cognitive decline with aging. *Alzheimers & Dement.* 2015 Sep;11(9):1015–22.
- 4617 Morris MC, Tangney CC, Wang Y, Sacks FM, Bennett DA, Aggarwal NT. MIND diet associated
462 with reduced incidence of Alzheimer’s disease. *Alzheimers & Dement.* 2015 Sep;11(9):1007–
463 14.
- 4648 Chen H, Dhana K, Huang Y, Huang L, Tao Y, Liu X, et al. Association of the Mediterranean
465 Dietary Approaches to Stop Hypertension Intervention for Neurodegenerative Delay (MIND)
466 Diet With the Risk of Dementia. *JAMA Psych.* 2023 May DOI:
467 10.1001/jamapsychiatry.2023.0800
- 4689 Huang L, Tao Y, Chen H, Chen X, Shen J, Zhao C, et al. MIND diet and cognitive function and
469 its decline: A prospective study and meta-analysis of prospective cohort studies. *Am J Clin*
470 *Nutr.* 2023 Apr DOI: 10.1016/j.ajcnut.2023.04.025
- 47110 Cherian L, Wang Y, Fakuda K, Leurgans S, Aggarwal N, Morris M. Mediterranean-Dash
472 Intervention for Neurodegenerative Delay (MIND) Diet Slows Cognitive Decline After Stroke. *J*
473 *Prev Alzheimers Dis.* 2019;6(4):267–73.
- 47411 Barnes LL, Dhana K, Liu X, Carey VJ, Ventrelle J, Johnson K, et al. Trial of the MIND Diet for
475 Prevention of Cognitive Decline in Older Persons. *N Engl J Med.* 2023 Jul;NEJMoa2302368.
- 47612 Lo JW, Crawford JD, Desmond DW, Godefroy O, Jokinen H, Mahinrad S, et al. Profile of and
477 risk factors for poststroke cognitive impairment in diverse ethnoregional groups. *Neurology.*
478 2019 Dec;93(24):e2257–71.
- 47913 Chinese Stroke Association VCIB. Expert consensus on the management of post-stroke

-
- 480 cognitive impairment, 2021 Ver. Chin J Stroke. 2021 Apr;16(4):376–89.
- 48114 Liu X, Morris MC, Dhana K, Ventrelle J, Johnson K, Bishop L, et al. Mediterranean-DASH
482 Intervention for Neurodegenerative Delay (MIND) study: Rationale, design and baseline
483 characteristics of a randomized control trial of the MIND diet on cognitive decline. Contemp
484 Clin Trials. 2021 Jan;102:106270.
- 48515 Lichtenstein AH, Petersen K, Barger K, Hansen KE, Anderson CAM, Baer DJ, et al. Perspective:
486 Design and Conduct of Human Nutrition Randomized Controlled Trials. Adv Nutr. 2021
487 Jan;12(1):4–20.
- 48816 Clinical Trial Randomization Tool [Internet]. [cited 2025 Jan 16]. Available from:
489 <https://ctrandomization.cancer.gov/>
- 49017 He Y, Li Y, Yang X, Hemler EC, Fang Y, Zhao L, et al. The dietary transition and its association
491 with cardiometabolic mortality among Chinese adults, 1982–2012: a cross-sectional
492 population-based study. The Lancet Diabetes & Endo. 2019 Jul;7(7):540–8.
- 49318 Yuan C, Chen H, Wang Y, Schneider JA, Willett WC, Morris MC. Dietary carotenoids related to
494 risk of incident Alzheimer dementia (AD) and brain AD neuropathology: a community-based
495 cohort of older adults. Am J Clin Nutr. 2020 Nov DOI: 10.1093/ajcn/nqaa303
- 49619 Charisis S, Yannakoulia M, Scarmeas N. Diets to promote healthy brain ageing. Nat Rev
497 Neurol. 2024 Nov;1–12.
- 49820 Michie S, van Stralen MM, West R. The behaviour change wheel: A new method for
499 characterising and designing behaviour change interventions. Implementation Sci. 2011
500 Apr;6(1):42.
- 50121 Chinese Society of Neurology, Chinese Stroke Society. Chinese guidelines for diagnosis and
502 treatment of acute ischemic stroke 2023. 2024 Jun;57(06):523–59.
- 50322 Gittler M, Davis AM. Guidelines for Adult Stroke Rehabilitation and Recovery. JAMA. 2018
504 Feb;319(8):820–1.
- 50523 Xu X, Chan QL, Hilal S, Ikram MK, Venketasubramanian N, Tan BY, et al. The Diagnostic Utility
506 of the NINDS-CSN Neuropsychological Battery in Memory Clinics. Dement and Geriatr
507 Cognitive Disorders Extra. 2016 Jul;6(2):276–82.
- 50824 Wong A, Xiong Y, Wang D, Lin S, Chu WWC, Kwan PWK, et al. The NINDS-Canadian stroke
509 network vascular cognitive impairment neuropsychology protocols in Chinese. J Neurol
510 Neurosurg Psychiatry. 2013 May;84(5):499–504.
- 51125 Chen X, Wong A, Ye R, Xiao L, Wang Z, Lin Y, et al. Validation of NINDS-CSN
512 neuropsychological battery for vascular cognitive impairment in Chinese stroke patients.
513 BMC Neurol. 2015 Mar;15(1):20.

-
- 51426 Sea M-JC, Cermak SA, Henderson A. Performance of normal chinese adults and right CVA
515 patients on the random chinese word cancellation test. Clin Neuropsych. 1993 Jul DOI:
516 10.1080/13854049308401896
- 51727 Shao K, Dong F-M, Guo S-Z, Wang W, Zhao Z-M, Yang Y-M, et al. Clock-drawing test:
518 Normative data of three quantitative scoring methods for Chinese-speaking adults in
519 Shijiazhuang City and clinical utility in patients with acute ischemic stroke. Brain Behav. 2020
520 Nov;10(11):e01806.
- 52128 Atkins L, Francis J, Islam R, O'Connor D, Patey A, Ivers N, et al. A guide to using the
522 Theoretical Domains Framework of behaviour change to investigate implementation
523 problems. Implementation Sci. 2017 Jun;12(1):77.
- 52429 Liu Z, Wang Y, Zhang Y, Chu X, Wang Z, Qian D, et al. Cohort profile: The Rugao Longevity and
525 Ageing Study (RuLAS). Int J Epidemiol. 2015 Jun;dyv101.
- 52630 Cocks K, Torgerson DJ. Sample size calculations for pilot randomized trials: a confidence
527 interval approach. J Clin Epidemiol. 2013 Feb;66(2):197–201.
- 52831 Detry MA, Ma Y. Analyzing Repeated Measurements Using Mixed Models. JAMA. 2016
529 Jan;315(4):407–8.
- 53032 Van Soest AP, Beers S, Van De Rest O, De Groot LC. The Mediterranean-Dietary Approaches
531 to Stop Hypertension Intervention for Neurodegenerative Delay (MIND) Diet for the Aging
532 Brain: A Systematic Review. Adv Nutr. 2024 Mar;15(3):100184.
- 53333 Chen H, Dunk MM, Wang B, Zhao M, Shen J, Zong G, et al. Associations of the
534 Mediterranean-DASH Intervention for Neurodegenerative Delay diet with brain structural
535 markers and their changes. Alzheimers Dement. 2024 Feb;20(2):1190–200.
- 53634 Dhana K, James BD, Agarwal P, Aggarwal NT, Cherian LJ, Leurgans SE, et al. MIND Diet,
537 Common Brain Pathologies, and Cognition in Community-Dwelling Older Adults. J Alzheimers
538 Dis. 2021 Sep;83(2):683–92.
- 53935 Arjmand G, Abbas-Zadeh M, Eftekhari MH. Effect of MIND diet intervention on cognitive
540 performance and brain structure in healthy obese women: a randomized controlled trial. Sci
541 Rep. 2022 Feb;12(1):2871.
- 54236 Wang Z, Zhu W, Xing Y, Jia J, Tang Y. B vitamins and prevention of cognitive decline and
543 incident dementia: a systematic review and meta-analysis. Nutr Rev. 2022;80(4):931–49.
- 54437 Scarmeas N, Anastasiou CA, Yannakoulia M. Nutrition and prevention of cognitive
545 impairment. The Lancet Neurol. 2018 Nov;17(11):1006–15.
- 54638 Cater RJ, Chua GL, Erramilli SK, Keener JE, Choy BC, Tokarz P, et al. Structural basis of omega-
547 3 fatty acid transport across the blood-brain barrier. Nature. 2021 Jul;595(7866):315–9.

-
- 54839 Morris MC, Tangney CC. Dietary fat composition and dementia risk. *Neurobiol Aging*. 2014
549 Sep;35:S59–64.
- 55040 Arnold SE, Arvanitakis Z, Macauley-Rambach SL, Koenig AM, Wang H-Y, Ahima RS, et al. Brain
551 insulin resistance in type 2 diabetes and Alzheimer disease: concepts and conundrums. *Nat*
552 *Rev Neurol*. 2018 Mar;14(3):168–81.
- 55341 Yan D, Yao J, Liu Y, Zhang X, Wang Y, Chen X, et al. Tau hyperphosphorylation and P-CREB
554 reduction are involved in acrylamide-induced spatial memory impairment: Suppression by
555 curcumin. *Brain Behav Immun*. 2018 Jul;71:66–80.
- 55642 Zhang Y, Yang H, Li S, Li W, Wang Y. Consumption of coffee and tea and risk of developing
557 stroke, dementia, and poststroke dementia: A cohort study in the UK Biobank. *PLoS Med*.
558 2021 Nov;18(11):e1003830.
- 55943 Zhang F, Zhu F, Chen B, Su E, Chen Y, Cao F. Composition, bioactive substances, extraction
560 technologies and the influences on characteristics of *Camellia oleifera* oil: A review. *Food Res*
561 *Int*. 2022 Jun;156:111159.
- 56244 Weng M-H, Chen S-Y, Li Z-Y, Yen G-C. Camellia oil alleviates the progression of Alzheimer's
563 disease in aluminum chloride-treated rats. *Free Rad Biol Med*. 2020 May;152:411–21.
- 564

565 Table 1 Inclusion and exclusion criteria of the MINDICOMS trial.

Inclusion Criteria

1. Aged from 35 to 70 years old.
 2. Clinical judgments and DWI confirmed new cerebral infarction, with onset hospitalization time ≤ 14 days.
 3. NHISS score of 0-6, with no difficulty in autonomous eating or aphasia.
 4. Baseline Mini-mental State Examination (MMSE) score 16-25 or Montreal Cognitive Assessment (MoCA) score < 24 , combined with post-stroke subjective cognitive decline.
 5. Baseline MIND dietary pattern screening scale score $\leq 10/15$ points.
 6. Body mass index no less than 18.0 kg/m^2 .
 7. Normal chewing and swallowing functions, able to eat hard foods such as nuts.
 8. Willing to participate and sign an informed consent form.
 9. Agree not to take over-the-counter nutritional supplements during the trial period.
 10. Able to understand research procedures and adhere to them throughout the study.
 11. Other situation deemed to be eligible based on investigators' consideration.
-

Exclusion Criteria

1. Diagnosis of dementia at a county level or above hospital before the stroke or suspected pre-stroke dementia from the informant interview administered by a neurologist.
 2. Allergies to foods involved in the experiment (nuts, berries, olive oil, fish, etc.) or using drugs not compatible with the foods involved.
 3. Medication to treat Alzheimer's or Parkinson's disease.
 4. Diagnosis of cancer, severe liver and kidney disease, or life expectancy less than 3 years.
 5. Diagnosis of depression, bipolar disorder, or other severe mental conditions.
 6. Diagnosis of inflammatory bowel disease or other malabsorption-related gastrointestinal diseases.
 7. History of alcohol or drug abuse.
-

566

Table 2. Intervention targets of the Chinese localized MIND diet and MIND diet scoring rules.

Table 1. Intervention targets of the Chinese localized MIND diet and MIND diet scoring rules.					
Food group	Recommendations		Localized MIND diet score		
	Goal	Portion size*	0	0.5	1
Recommended					
Whole grains	≥2/d	25 g	<2/wk	≥2/wk to <2/d	≥2/d
Dark green-leafy vegetables	≥2/d	100 g	<2/wk	≥2/wk to <2/d	≥2/d
Dark red/yellow vegetables	≥1/d	100 g	<1/wk	≥1/wk to <1/d	≥1/d
Other vegetables	≥1/d	100 g	<1/wk	≥1/wk to <1/d	≥1/d
Berries and citrus	≥5/wk	100 g	<1/wk	≥1/wk to <5/wk	≥5/wk
Poultry (not fried)	≥3/wk	50 g	<1/wk	≥1/wk to <3/wk	≥3/wk
Fish and seafood (not fried)	≥4/wk	75 g	<1/wk	≥1/wk to <4/wk	≥4/wk
Beans and legume	≥4/wk	25 g	<1/wk	≥1/wk to <4/wk	≥4/wk
Nuts	≥1/d	10 g	<1/wk	≥1/wk to <7/wk	≥7/wk
Olive / camellia oil	≥1/d	/	<1/ mo	≥1/mo to <1/wk	≥1/wk
Green tea	≥1/d	3 g (dried tea leaves)	<1/ mo	≥1/mo to <1/d	≥1/d
Restricted					
Red and processed meats	≤4/wk	/	>1/d	>4/wk to ≤7/wk	≤4/wk
Animal fat (including cream/butter)	≤1/wk	/	>3/wk	>1/wk to ≤3/wk	≤1/wk
Fried foods	≤1/wk	/	>6/wk	>1/wk to ≤6/wk	≤1/wk
Sweets and pastries	≤2/wk	/	>7/wk	>1/wk to ≤6/wk	≤2/wk

* Goals and scoring rules are described as frequency per day, per week, or per month. Portion size designed for total energy intake of 1650-1750 kcal/d. Individuals are guided to adjust the portion according to their energy needs recommended by the China Dietary Guidelines (2022).

MIND: Mediterranean-DASH Intervention for Neurodegenerative Delay.

573 Table 3 Measurements Schedule.

Variable	Day 0		Day 1	Hospitalization	Discharge		Week 2		Week 13±1		Week 26±2
	Screening	Enrollment									
DWI	X								X		X
Clinical Assessment	X						X		X		X
NIHSS	X				X		X		X		X
mRS									X		X
IQCODE and AD8	X										
MIND diet adherence screener	X								X		X
Height	X										
Weight	X								X		X
Consent	X										
WeChat Management		X			X	X	X	X	X	X	X
Baseline Questionnaire ^a		X									
FFQ		X									X
ADL, IADL, PSQI		X							X		X
PHQ-9, GAD-7		X							X		X
Collection of fasting Blood ^b , urine, feces			X				X		X		X
Collection of tears, saliva			X						X		X
Cognitive Battery ^c			X						X		X
Food distribution for the MIND diet intervention group			X	X	X		X		X		X
Dietary Intervention			X	X	X	X	X	X	X	X	X
MRI ^d				X					X		X
Food photography and					X	X	X	X	X	X	X

feedback for the intervention group ^e											
MIND diet education for the intervention group ^f			X	X	X	X	X	X	X	X	X
Stroke education			X	X	X	X	X	X	X	X	X

574DWI, Diffusion Weighted Imaging; NIHSS, National Institutes of Health Stroke Scale; mRS,
575modified Rankin Scale; MMSE, Mini-mental State Examination; MoCA, Montreal Cognitive
576Assessment; IQCODE, the Informant Questionnaire on Cognitive Decline in the Elderly; AD8,
577Ascertain Dementia 8; FFQ, Food Frequency Questionnaire; ADL, Activities of Daily Living; IADL,
578Instrumental Activity of Daily Living; PSQI, Pittsburgh Sleep Quality Index; PHQ-9, Patient Health
579Questionnaire-9; GAD-7, Generalized Anxiety Disorder; MRI, Magnetic Resonance Imaging.

580^a Baseline questionnaire collects information on gender, age, race, marriage, residential status,
581education, occupation, medical history, family medical history, smoking, alcohol, frequency of
582physical activity, sedentary time, group activity, physical health indicators (self-reported health,
583self-reported vision, hearing, taste, smell, multiple pain, dizziness, oral hygiene).

584^b Fasting blood collected at baseline and months 3 and 6 since discharge. Measures will include
585glucose, oxidized LDL, total cholesterol, HDL cholesterol, fatty acids, triglycerides, albumin,
586folate, Vitamin A, B1, B2, B9, B12, D, E, K, carotenoids, hsCRP, IL-2, IL-4, IL-6, IL-10, IL-17, TNF- α ,
587IFN- γ .

588^c Cognitive Battery includes Hopkins Verbal Learning Test, Category Fluency, Boston Naming Test-
589Revised, Digit span test, Cancellation test, Trails B, Clock Drawing, Trails A, Rey complex figure,
590Symbol Digit Modalities Test

591^d Brain MRI scans assessed at the baseline and months 3,6 includes: total brain volume (cubic
592centimeters) and hippocampal volume (cubic centimeters) and white/grey matter, segmented
593grey matter regions, white matter lesions, the thickness of segmented cortical regions,
594microbleeds, perivascular spaces, brain atrophy, micro-infarcts, and white matter
595hyperintensities. Functional connectivity change is measured using the fMRI signal correlation
596coefficient between brain regions.

597^e Frequency of taking photos of meals a day; everyday within 2 weeks after discharge; 3 days per
598week during 2-4 weeks after discharge; 3 days per week during 1-6 months after discharge.

599^f Education pictures Sent to patients and family members via WeChat every Saturday and Sunday.
600Stroke education materials were produced by the Chinese Stroke Society. MIND diet education
601materials were made by the research group.

602

603 **Table 4 Neuropsychological Test Battery of the MINDICOMS Trial.**

Cognitive Domain	Cognitive Tests	Scoring
Memory	Hopkins Verbal Learning Test (HVLТ)	Range 0–12
	Learning	
	HVLТ Recall	Range 0–12
	HVLТ Recognition	Number of correct recognitions
	ROCF 3-minute recall	Range 0–36
	ROCF 30-minute recall	Range 0–36
Attention/Executive Function	ROCF Recognition	Number of correct recognitions
	Trail Making Test (TMT)-A	Time to complete in seconds
	Trail Making Test (TMT)-B	Time to complete in seconds
	Digit Span Test (DST) Forward	Range 0–16
	DST Backward	Range 0–16
	Symbol Digit Modalities Test (SDMT)	Number of correct digits
Language	Cancellation test	Accuracy - time to complete ratio
	Verbal Fluency (VF) Animal	Total number of words
	VF Vegetable	Total number of words
	VF Animal-Fruit Alternation	Total number of words
Visuospatial Function	Boston Naming Test (BNT)-Revised	Range 0–15
	Rey–Osterrieth complex figure (ROCF) Copy	Range 0–36
	Clock Drawing Test (CDT)	

604

605Table 5 Baseline characteristics of the included participants in MINDICOMS I and II.

Variable	MINDICOMS I				MINDICOMS II			
	Overall	Control	Intervention	p-value	Overall	Control	Intervention	p-value
n	60	30	30		60	30	30	
Female, n (%)	18 (30.0)	7 (23.3)	11 (36.7)	0.398	17 (28.3)	8 (26.7)	9 (30.0)	>0.999
Age, years, mean (SD)	57.9 (7.6)	56.7 (9.1)	59.2 (5.7)	0.212	60.0 (7.0)	60.1 (7.0)	59.9 (7.1)	0.913
Highest education, n (%)				0.169				0.632
No formal education	0 (0.0)	0 (0.0)	0 (0.0)		1 (1.7)	1 (3.3)	0 (0.0)	
Primary school	21 (35.0)	9 (30.0)	12 (40.0)		19 (31.7)	8 (26.7)	11 (36.7)	
Middle school	23 (38.3)	12 (40.0)	11 (36.7)		26 (43.3)	12 (40.0)	14 (46.7)	
High school	9 (15.0)	3 (10.0)	6 (20.0)		11 (18.3)	7 (23.3)	4 (13.3)	
University or college	7 (11.7)	6 (20.0)	1 (3.3)		1 (1.7)	1 (3.3)	0 (0.0)	
Graduate degree	0 (0.0)	0 (0.0)	0 (0.0)		2 (3.3)	1 (3.3)	1 (3.3)	
Smoking status, n (%)				0.717				0.687
Current	26 (43.3)	14 (46.7)	12 (40.0)		25 (41.7)	14 (46.7)	11 (36.7)	
Former	5 (8.3)	3 (10.0)	2 (6.7)		12 (20.0)	6 (20.0)	6 (20.0)	
Never	29 (48.3)	13 (43.3)	16 (53.3)		23 (38.3)	10 (33.3)	13 (43.3)	
Alcohol drinking status, n (%)				0.824				0.369
Current	19 (31.7)	10 (33.3)	9 (30.0)		19 (31.7)	12 (40.0)	7 (23.3)	
Former	3 (5.0)	1 (3.3)	2 (6.7)		4 (6.7)	2 (6.7)	2 (6.7)	
Never	38 (63.3)	19 (63.3)	19 (63.3)		37 (61.7)	16 (53.3)	21 (70.0)	
Pre-existing conditions								
Dyslipidemia, n (%)	22 (36.7)	15 (50.0)	7 (23.3)	0.061	22 (36.7)	11 (36.7)	11 (36.7)	>0.999

Cardiovascular event, n (%)	9 (15.0)	6 (20.0)	3 (10.0)	0.470	5 (8.3)	4 (13.3)	1 (3.3)	0.350
Hypertension, n (%)	44 (73.3)	20 (66.7)	24 (80.0)	0.381	45 (75.0)	21 (70.0)	24 (80.0)	0.551
Diabetes mellitus, n (%)	22 (36.7)	11 (36.7)	11 (36.7)	>0.999	24 (40.0)	9 (30.0)	15 (50.0)	0.188
TOAST Subtype, n (%)				0.728				0.066
Large artery atherosclerosis	26 (43.3)	13 (43.3)	13 (43.3)		22 (36.7)	7 (23.3)	15 (50.0)	
Cardioembolism	4 (6.7)	1 (3.3)	3 (10.0)		0 (0.0)	0 (0.0)	0 (0.0)	
Small artery occlusion	25 (41.7)	13 (43.3)	12 (40.0)		31 (51.7)	17 (56.7)	14 (46.7)	
Other demonstrated cause	1 (1.7)	1 (3.3)	0 (0.0)		3 (5.0)	3 (10.0)	0 (0.0)	
Undetermined cause	4 (6.7)	2 (6.7)	2 (6.7)		4 (6.7)	3 (10.0)	1 (3.3)	
NIHSS score, mean (SD)	1.6 (1.4)	1.8 (1.4)	1.5 (1.4)	0.520	1.6 (1.5)	1.7 (1.6)	1.5 (1.4)	0.548
MMSE, mean (SD)	24.0 (3.7)	24.1 (4.3)	24.0 (3.0)	0.917	24.9 (3.3)	25.4 (2.8)	24.3 (3.7)	0.173
MoCA, mean (SD)	18.1 (3.6)	18.0 (4.0)	18.1 (3.3)	0.916	19.1 (3.7)	19.6 (3.2)	18.6 (4.1)	0.314
MIND diet score, mean (SD)	7.6 (1.3)	7.6 (1.0)	7.6 (1.6)	0.960	7.6 (1.4)	7.6 (1.2)	7.6 (1.6)	0.890

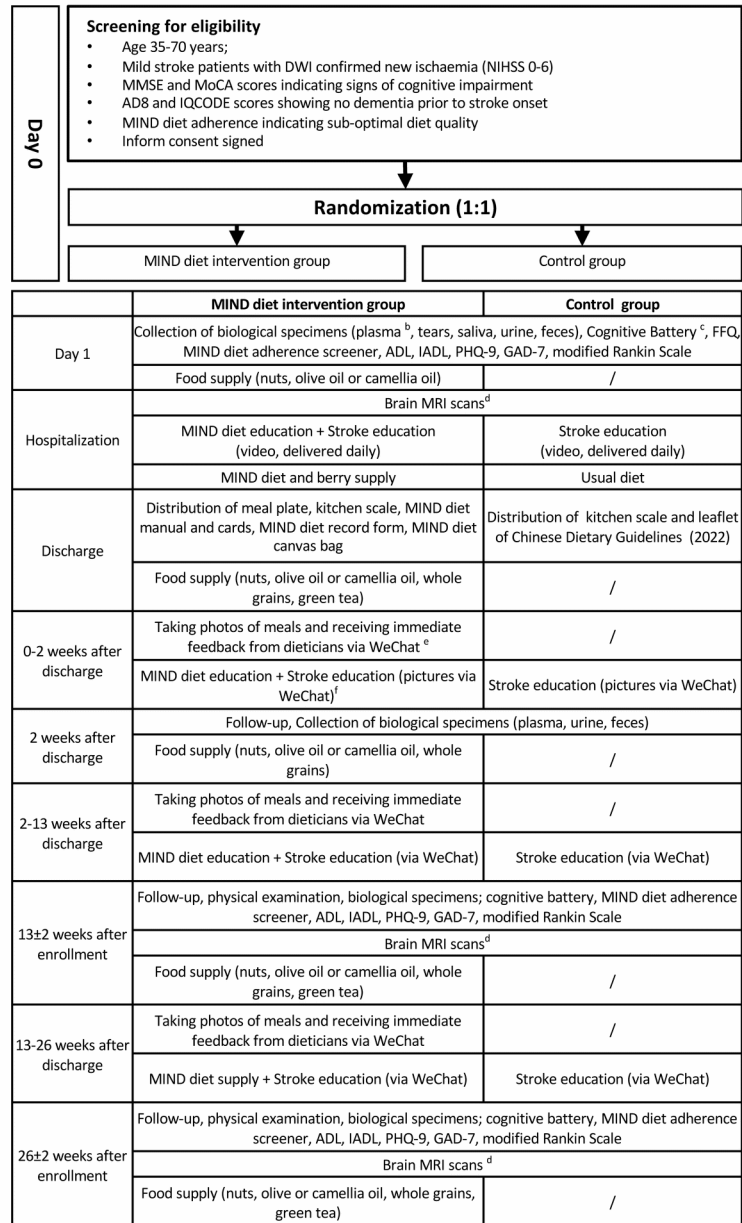
606

607MINDICOMS: MIND Diet to Improve Cognitive Function in Mild Stroke Patients. NIHSS: National Institute of Health stroke scale; TOAST: Trial of Org10172 in Acute
608Stroke Treatment; MMSE: Mini-Mental State Examination; MoCA: Montreal Cognitive Assessment; MIND: Mediterranean-DASH Intervention for
609Neurodegenerative Delay. MIND diet score was calculated from the MIND diet adherence screener.

610

611FIGURE LEGENDS

612Figure: Flow chart of the MINDICOMS trial



613