



# The Effect of Tea (*Camellia Sinensis*) Consumption as a Chinese Cultural Practice on the Cognitive Function: A Quasi-Experimental Study

Kesaktian Manurung<sup>1\*</sup>, Siska Evi Martina<sup>1</sup>, Donal Nababan<sup>1</sup>

<sup>1</sup>Faculty of Pharmacy and Health Sciences, Sari Mutiara Indonesia University, 20123, North Sumatra, Indonesia

\*Email correspondence: [kesaktianmanurung@gmail.com](mailto:kesaktianmanurung@gmail.com)

<p><b>Track Record Article</b></p> <p>Revised: 5 January 2026 Accepted: 28 February 2026 Published: 31 March 2026</p> <p><b>How to cite :</b> Manurung, K., Martina, S. E., &amp; Nababan, D. (2026). The Effect of Tea (<i>Camellia Sinensis</i>) Consumption as a Chinese Cultural Practice on the Cognitive Function: A Quasi-Experimental Study. <i>Contagion : Scientific Periodical of Public Health and Coastal Health</i>, 8(1), 273–282.</p>	<p style="text-align: center;"><b>Abstract</b></p> <p><i>Cognitive decline is an increasing public health concern among older people, particularly those residing in nursing homes where structured preventive interventions are limited. Non-pharmacological approaches such as tea consumption have been associated with cognitive benefits; however, experimental evidence in institutionalized populations remains scarce. This study aims to examine the effect of structured daily tea (<i>Camellia sinensis</i>) consumption on cognitive function among older people in nursing homes in North Sumatra, Indonesia. A quasi-experimental design was conducted involving 60 participants aged 60–80 years, allocated into an intervention group (n = 30) and a control group (n = 30) using purposive sampling. The intervention group received 200 mL of supervised tea (<i>Camellia sinensis</i>) daily for four months, while the control group received a cognitive health information leaflet. Cognitive function was assessed using the Montreal Cognitive Assessment – Indonesian Version (MoCA-INA) at baseline and post-intervention. Data were analyzed using paired and independent t-tests. The intervention group showed a significant improvement in cognitive scores from <math>17.60 \pm 4.32</math> to <math>21.93 \pm 4.03</math> (<math>p &lt; 0.001</math>), with a large within-group effect size (Cohen's <math>d = 1.04</math>). Post-intervention cognitive scores were significantly higher in the intervention group compared to the control group (<math>p &lt; 0.001</math>), indicating a large between-group effect (Cohen's <math>d = 1.20</math>). Structured tea (<i>Camellia sinensis</i>) consumption may represent a culturally relevant, low-cost strategy to support cognitive health among institutionalized older people. Further randomized controlled trials with longer follow-up are warranted.</i></p> <p><b>Keywords:</b> <i>Dementia, Older People, Cognitive Function, Tea Consumption, Nursing Home.</i></p>
---	---

## INTRODUCTION

Aging populations are a major challenge faced by many countries, including Indonesia (Gauthier S, 2021). Cognitive impairment and dementia are increasingly common health problems among aging populations worldwide. Globally, approximately 50 million people currently live with dementia, and this number is projected to triple to 152 million by 2050 as the proportion of older people rises (Alzheimer's Association, 2023). In Indonesia, demographic trends reflect rapid population aging: older adults constituted around 12 % of the population ( $\pm 29$  million) in 2024 and are expected to reach nearly 20 % ( $\pm 50$ – $65$  million people) by 2045 (Alzheimer's Indonesia, 2019). This disease causes a decline in older people's ability to perform daily activities and socialize, which is a major obstacle for older people and requires high care costs (J. Huang et al., 2025). Dementia affects approximately 50 million people and is rapidly increasing. The number of older people with dementia is projected to

reach 152 million by 2050 (Nandi, 2022). Therefore, research development is needed to contribute to cognitive function in older people, especially in non-pharmacological aspects.

One promising non-pharmacological intervention is traditional tea consumption, which has demonstrated positive effects in managing hypertension, obesity, or diabetes (Dong et al., 2021; Gao et al., 2022; Nandi, 2022; Y. Wang et al., 2022). Tea drinking is also a widely accepted cultural practice (Cheng et al., 2025; Gao et al., 2022).

Tea (*Camellia sinensis*) is among the most extensively used beverages globally and has bioactive substances, notably polyphenols, which demonstrate antioxidant, anti-inflammatory, anti-apoptotic, and epigenetic-modulating properties that may retard the aging process (Sirui et al., 2023; Xiang et al., 2018). The content found in tea, namely polyphenols, can provide antioxidant, anti-inflammatory, and apoptosis effects (Yue et al., 2021) and modulate epigenetic changes, thereby delaying the aging process (Alam et al., 2022). Some studies have shown that tea consumption is associated with improved cognitive function, including attention, memory, and processing speed (Sirui et al., 2023; Xiang et al., 2018). Other studies have found that tea consumption is linked to a reduced risk of depression and anxiety, although the evidence is less consistent (Feng et al., 2021; Xiang et al., 2018). Huang et al. (2025) (L. Huang et al., 2024) stated that tea consumption and cognitive function in Chinese older people showed better cognitive performance in this population, particularly in attention and executive function.

Drinking tea may be a simple and inexpensive way to improve healthy cognitive function in older Chinese people (Cheng et al., 2025; Gao et al., 2022; Sirui et al., 2023). Higher tea consumption is significantly associated with better cognitive function. Cognitive impairment is a common health issue in older people, and it is important to identify potential risk factors for prevention and treatment (Chung et al., 2023; Feng et al., 2021). Tea consumption significantly impacts cognitive function, attention, and memory improvement. Additionally, tea consumption positively affects mood, including increased relaxation and reduced stress levels. Institutionalized older people are particularly vulnerable to cognitive decline due to reduced stimulation and limited preventive programs.

In Medan, Bodhi Asri Nursing Home, founded by a Chinese community-based foundation, serves predominantly Chinese older people. This culturally specific setting provides a relevant context for examining culturally grounded interventions such as tea consumption. Although tea consumption has been associated with better cognitive function in previous studies, this evidence is largely observational and not specifically examined in Indonesian institutional settings.

In Bodhi Asri Nursing Home, tea is culturally practiced but not systematically integrated into cognitive health programs. Limited professional staffing further restricts the implementation of structured, culturally aligned dementia prevention strategies. Therefore, this study aims to identify the effect of tea consumption (*Camellia Sinensis*) in Chinese culture on the cognitive function of older people in a Nursing Home.

## METHODS

This study employed a quasi-experimental design with a repeated-measures approach involving two groups (intervention and control). A quasi-experimental design was selected because random allocation was not feasible within the nursing home setting. This design allows comparison of outcomes between groups in naturalistic environments and is appropriate for evaluating non-pharmacological interventions such as tea consumption. The study was conducted from July to October 2025 in two nursing homes in North Sumatra, Indonesia.

Purposive sampling was used to recruit participants who met the inclusion criteria: older people aged 60–80 years, cooperative, not bedbound, and without severe degenerative conditions that could interfere with participation. Participants were excluded if they had severe cognitive impairment (MoCA-INA score indicating severe impairment), diagnosed neurodegenerative disease in advanced stage (e.g., advanced dementia, Parkinson's disease with severe impairment, severe visual, hearing, or speech impairments that could interfere with cognitive testing, known allergy or intolerance to tea or caffeine sensitivity, currently consuming high amounts of tea (>3 cups/day) as part of habitual intake, unstable medical conditions (e.g., acute infection, uncontrolled cardiovascular disease) during the study period.

The sample size was calculated using G\*Power with an effect size of 0.84, an alpha level of 0.05, and a power of 0.95. The minimum required sample was 25 participants per group. To account for potential dropouts, the sample size was increased by 15%, resulting in 30 participants in each group (total N = 60). Bodhi Asri Nursing Home was assigned as the intervention site due to its cultural alignment with structured tea consumption, which facilitated standardized implementation and monitoring. Binjai Nursing Home was designated as the control site to maintain usual care without cross-exposure to the intervention. Allocation was therefore based on feasibility and contamination control rather than expected outcomes. Because randomization was not feasible in the nursing home setting, several strategies were implemented to reduce potential confounding. Strict inclusion and exclusion criteria were applied to enhance group comparability. Baseline demographic characteristics and cognitive scores were analyzed to assess equivalence between groups before intervention. Blinding

procedures were limited due to the nature of the intervention. Participants and research staff administering tea could not be blinded. However, outcome measurement was conducted using a structured and validated instrument (MoCA-INA) to reduce measurement variability.

The intervention involved daily consumption of black tea (*Camellia sinensis*) for four consecutive months. Black tea was chosen due to its high content of theaflavins and thearubigins, bioactive polyphenolic compounds formed during fermentation, which have demonstrated antioxidant and potential neuroprotective properties. The tea was prepared using commercially available black tea bags (2 g per tea bag). Each serving consisted of one tea bag infused in 200 mL of hot water at approximately 90–95°C for 3–5 minutes to optimize polyphenolic extraction. To standardize intake, no sugar, milk, or additional flavorings were.

Participants consumed one serving daily in the morning (08:00–09:00 AM) after breakfast to minimize gastrointestinal discomfort and ensure consistency in timing. Tea consumption was supervised by trained research assistants and nursing home staff, and carried out in a designated communal area to promote adherence and uniform implementation. Each participant was required to finish the full 200 mL serving during the supervised session. The control group received a cognitive impairment prevention leaflet containing information about dementia, symptoms, impacts, and preventive activities, but did not receive structured tea consumption.

Cognitive function was assessed using the Montreal Cognitive Assessment – Indonesian Version (MoCA-INA) (Husein & Herqutanto, 2010). The MoCA-INA evaluates seven cognitive domains: visuospatial ability, naming, attention, language, abstraction, delayed recall, and orientation. Scores range from 0 to 30, with scores  $\geq 26$  considered normal. One additional point was added for participants with less than 12 years of formal education. The MoCA-INA has demonstrated good validity and reliability in the Indonesian population (Husein N, 2010). Baseline cognitive assessment (pre-test) was conducted before the intervention. Following four months of intervention, a post-test cognitive assessment was performed using the same instrument. Data were collected by trained researchers to ensure consistency.

Data were analyzed using IBM SPSS Statistics for Windows, version 29.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics (frequency, percentage, mean, and standard deviation) were used to describe the characteristic information. The normality of continuous variables was assessed using the Shapiro–Wilk test ( $N < 50$ ) and visual inspection of histograms and Q–Q plots. Baseline comparability between the intervention and control groups was examined using independent t-tests for continuous variables.

This analysis was conducted to assess potential group differences before intervention, given the quasi-experimental design. Within-group changes in cognitive function (MoCA-INA scores) were analyzed using paired t-tests. Between-group differences in post-intervention cognitive scores were analyzed using independent t-tests. Effect sizes were calculated using Cohen's d to quantify the magnitude of the intervention effect. For within-group comparisons (pre-post analysis), Cohen's d was computed by dividing the mean difference between pre- and post-intervention scores by the pooled standard deviation of the difference scores. For between-group comparisons, Cohen's d was calculated as the difference between post-intervention group means divided by the pooled standard deviation of both groups. The pooled standard deviation was calculated using the standard formula for independent samples. Interpretation followed Cohen's conventional thresholds: 0.20 (small), 0.50 (medium), and 0.80 (large effect).

This study was approved by the Health Research Ethics Committee of the Faculty of Medicine, University of Muhammadiyah Sumatera Utara, with number 1544/KEPK/FKUMSU/2025. Under the Declaration of Helsinki, informed consent was obtained from all individual respondents. No personal information that could identify a person was collected in this study.

## RESULTS

**Table 1. Characteristic of older people in nursing homes (n=60)**

Characteristics	Intervention (n=30)		Control (n=30)	
	F	%	F	%
<b>Age (Years), Mean ± SD</b>	71.74 ± 8.06		70.35 ± 6.80	
<b>Gender</b>				
Female	23	76.7	19	63.3
Male	7	23.3	11	36.7
<b>Level of education</b>				
Elementary	21	70.0	14	46.7
Junior High School	1	3.3	7	23.3
Senior High School	8	26.7	6	20.0
College	0	0.0	3	10.0
<b>Cognitive Function</b>				
Normal	10	33.3	0	0.0
Mild Cognitive Impairment	15	50.0	15	50.0
Moderate Cognitive Impairment	5	16.7	13	43.3
Sever Cognitive Impairment	0	0.0	2	6.7

A total of 60 participants were recruited for the study. All participants were assessed after the intervention. Participants in the intervention group (Mean= 71.74 years, SD= 8.06 years) and control group (M= 70.35 years, SD = 6.80 years) conditions did not differ in approximate ages. There was a higher proportion of female participants (76.7%) in the intervention and control groups (63.3%). Most participants from the intervention group had an elementary school level of education (70.0 %), whereas in the control group, most respondents were not formally educated (46.7%). Regarding cognitive function, half of the respondents had mild cognitive impairment (50.0%) in the intervention and control groups. However, in the control group, there was a moderate cognitive impairment (43.3%). The details are shown in Table 1.

**Table 2. Within-Group Comparison of Cognitive Function (n = 30)**

Variable	Mean	SD	t	p-Value	Cohen's d
Cognitive Function of Post Older People Pre	21.93 17.60	4.031 4.315	-15.205	<0.000*	1.04

*Paired t-test; MoCA-INA = Montreal Cognitive Assessment – Indonesian Version;  $\alpha = 0.05$*

Table 2 shows the means comparison for paired samples within the intervention group before and after a 4-week intervention on cognitive function with the Paired t-test. The participants in the intervention group had a significantly higher mean of cognitive function ( $p < 0.001$ ) with a large effect size (Cohen's  $d = 1.04$ ), indicating a substantial magnitude of change following four months of black tea consumption.

**Table 3. Between-Group Comparison of Post-Intervention Cognitive Scores (n = 60)**

Variable	Intervention (n=30)		Control (n=30)		t	p-Value	Cohen's d
	Mean	SD	Mean	SD			
Cognitive Function of Older People	21.93	4.315	16.73	4.339	-4.65	< 0.000*	1.20

*Independent t-test; MoCA-INA = Montreal Cognitive Assessment – Indonesian Version;  $\alpha = 0.05$*

The comparison of means of the intervention and control groups after the intervention is shown in Table 3. After the intervention, cognitive function ( $p < 0.001$ ) in participants in the intervention group was significantly higher than that of the control group, which received usual care. The effect sizes were large (Cohen's  $d = 1.20$ ), reflecting a meaningful practical difference between groups.

## DISCUSSION

This study demonstrates that older adults living in nursing homes who consumed 200 mL of black tea (*Camellia Sinensis*) daily for four months exhibited significantly better cognitive function. This improvement was reflected in higher mean MoCA INA scores in the intervention group compared to the control group. The substantial effect sizes suggest that structured tea consumption may serve as an effective, culturally relevant, and low-cost intervention to enhance cognitive health among institutionalized older adults.

The results align with prior research indicating that tea drinking correlates with enhanced cognitive performance, encompassing attention, memory, and executive skills (Feng et al., 2021; Han et al., 2022; J. Huang et al., 2025). Long-term tea use is associated with a reduced rate of cognitive deterioration compared to non-consumers (Fitri et al., 2023; J. Huang et al., 2025). This impact may be due to polyphenols in tea, notably catechins, which are antioxidants, anti-inflammatories, and protectors of neurons that can slow down damage to neurons that happens with age (Feng et al., 2021; Iso-Markku et al., 2022). The Indonesian tea utilized in this work is noted to possess elevated catechin concentrations (X. Wang et al., 2020), potentially elucidating the pronounced effect seen.

A further factor likely enhancing cognitive performance is the cultural alignment of the intervention. Tea consumption is a well-established cultural tradition in China, especially within the Bodhi Asri Nursing Home community. Culturally pertinent interventions may improve acceptability and adherence in older people, hence reinforcing intervention benefits (Martina, 2020). Non-pharmacological approaches incorporating cultural components have been advocated in dementia care frameworks (Farina et al., 2024; Mataqi & Aslanpour, 2020). The control group in our study received a cognitive-impairment prevention leaflet, but did not demonstrate comparable improvements. Future research should explore whether combining tea consumption with structured cognitive or physical activities could produce synergistic effects in enhancing cognitive health. It is crucial to acknowledge that baseline cognitive status varied among the groups. While fifty percent of participants in both groups were classified with mild cognitive impairment, the control group had a significantly greater prevalence of moderate and severe cognitive impairment relative to the intervention group.

This disparity may partially elucidate the elevated post-intervention cognition scores noted in the intervention group. Participants with milder disability at baseline may possess greater cognitive reserve and reactivity to stimulation, leading to more substantial measured enhancements. Conversely, people with more impairment in the control group may have possessed a diminished potential for cognitive recovery. In addition, tea (*Camellia Sinensis*)

contains moderate amounts of caffeine and L-theanine, which may act synergistically to enhance attention and executive function (Gao et al., 2022; Xiang et al., 2024). Caffeine stimulates central nervous system activity, while L-theanine has been associated with improved relaxation without sedation (Sirui et al., 2023). The combination of these compounds may contribute to enhanced alertness, cognitive processing speed, and mental performance among older people.

Several limitations should be acknowledged. First, the quasi-experimental design without random assignment may have introduced differences between groups, particularly in cognitive severity. The control group included more participants with mild to severe cognitive impairment than the intervention group, which may have influenced post-intervention comparisons and potentially overestimated the observed effects. Second, the study duration was limited to four months, preventing assessment of long-term sustainability. Third, the sample was drawn from only two nursing homes, which restricts the generalizability of the findings to other settings. Finally, unmeasured factors such as comorbidities, social engagement, and dietary intake may also have influenced cognitive outcomes. To strengthen causal inference, future research should employ randomized controlled designs with baseline matching or statistical adjustments (e.g., ANCOVA).

## CONCLUSIONS

This study demonstrates that a regimented daily intake of 200 mL of black tea (*Camellia sinensis*) over four months was associated with significant improvements in cognitive function among elderly individuals residing in nursing homes. The intervention group exhibited a significant enhancement in MoCA-INA scores relative to the control group, signifying a substantial practical benefit. The findings indicate that culturally ingrained, economic, non-pharmacological methods, such as tea intake, may enhance cognitive health in institutionalized elderly people.

Due to the quasi-experimental design and baseline differences between groups, the findings should be interpreted cautiously. Future randomized controlled trials with larger and more diverse samples are needed to strengthen causal inference. Longer-term follow-up studies are also recommended to determine the sustainability of the observed cognitive function. In addition, the authors sincerely thank all participants for their valuable contribution to this study. This research was funded by the Directorate General of Higher Education, Research, and Technology of Indonesia. The authors declare no conflicts of interest. The funding body had no

role in the study design, data collection, analysis, interpretation, or manuscript preparation, and the authors are solely responsible for the content of this article.

## REFERENCES

- Alam, M., Ali, S., Ashraf, G. Md., Bilgrami, A. L., Yadav, D. K., & Hassan, Md. I. (2022). Epigallocatechin 3-gallate: From green tea to cancer therapeutics. *Food Chemistry*, 379, 132135. <https://doi.org/10.1016/j.foodchem.2022.132135>
- Alzheimer's Indonesia. (2019, April 22). *Statistik Demensia*. Alzheimer's Indonesia.
- Alzheimer's Association. (2023). 2023 Alzheimer's disease facts and figures. *Alzheimer's & Dementia*, 19(4), 1598–1695. <https://doi.org/10.1002/alz.13016>
- Cheng, S., Qin, J., Hou, C., Wu, Y., Du, X., Liu, H., Lei, S., Li, R., Yue, X., & Guo, Y. (2025). Linking Cognitive Screening Tests in Community-Dwelling Older Adults: Crosswalk between the Montreal Cognitive Assessment-Basic and the Mini-Mental State Examination. *Journal of the American Medical Directors Association*, 26(5), 105550. <https://doi.org/10.1016/j.jamda.2025.105550>
- Chung, Y.-H., Wei, C.-Y., Tzeng, R.-C., & Chiu, P.-Y. (2023). Minimal amount of exercise prevents incident dementia in cognitively normal older adults with osteoarthritis: a retrospective longitudinal follow-up study. *Scientific Reports*, 13(1), 16568. <https://doi.org/10.1038/s41598-023-42737-3>
- Dong, X.-X., Wang, R.-R., Liu, J.-Y., Ma, Q.-H., & Pan, C.-W. (2021). Habitual tea consumption and 5-year incident metabolic syndrome among older adults: a community-based cohort study. *BMC Geriatrics*, 21(1), 728. <https://doi.org/10.1186/s12877-021-02707-8>
- Farina, N., Hassan, E., Theresia, I., Fitri, F. I., Suswanti, I., Sani, T. P., Evans-Lacko, S., Banerjee, S., & Turana, Y. (2024). Awareness, attitudes, and beliefs of dementia in Indonesia. *Alzheimer's & Dementia: Diagnosis, Assessment & Disease Monitoring*, 16(2). <https://doi.org/10.1002/dad2.12570>
- Feng, C., Cao, Y., Su, Y., Cai, H., Shu, X.-O., Zheng, W., Yu, D., & Zong, G. (2021). Association between Tea Consumption and Hypertension Risk among Middle-Aged and Older Chinese Adults. *The Journal of Nutrition*, 151(12), 3773–3780. <https://doi.org/10.1093/jn/nxab293>
- Fitri, F. I., Farina, N., Turana, Y., Theresia, I., Sani, T. P., Suswanti, I., & Banerjee, S. (2023). Modifiable risk factors for dementia in Indonesia: Results from STRiDE project. *Neurology Asia*, 28(4), 1009–1017. <https://doi.org/10.54029/2023nxi>
- Gao, T., Han, S., Mo, G., Sun, Q., Zhang, M., & Liu, H. (2022). Long-term tea consumption reduces the risk of frailty in older Chinese people: Result from a 6-year longitudinal study. *Frontiers in Nutrition*, 9. <https://doi.org/10.3389/fnut.2022.916791>
- Gauthier S, R.-N. P. M. J. W. C. (2021). *World Alzheimer Report 2021: Journey Through the Diagnosis of Dementia*. Available online at: <https://www.alzint.org/u/World-Alzheimer-Report-2021.pdf>.
- Han, F., Luo, C., Lv, D., Tian, L., & Qu, C. (2022). Risk Factors Affecting Cognitive Impairment of the Elderly Aged 65 and Over: A Cross-Sectional Study. *Frontiers in Aging Neuroscience*, 14. <https://doi.org/10.3389/fnagi.2022.903794>
- Huang, J., Xu, J., Gu, Y., Sun, H., Liu, H., He, Y., Li, M., Gao, X., Tang, Z., & Wang, H. (2025). Tea consumption and cognitive health in Chinese older adults: A propensity score matching and weighting analysis. *Archives of Gerontology and Geriatrics*, 131, 105735. <https://doi.org/10.1016/j.archger.2024.105735>

- Huang, L., Chen, H., & Liang, M. (2024). The Association Between Habitual Tea Consumption and Frailty Transition in Community-Dwelling Older Adults: A Prospective Cohort Study. *Journal of the American Medical Directors Association*, 25(2), 259-265.e3. <https://doi.org/10.1016/j.jamda.2023.06.006>
- Husein N, L. S. R. Y. Herqutanto. (2010). Montreal Cognitive Assessment Indonesia Version (MoCA-INA) for cognitive function screening. *Neurona Neuro Sains*, 27(4), 15–22.
- Iso-Markku, P., Kujala, U. M., Knittle, K., Polet, J., Vuoksima, E., & Waller, K. (2022). Physical activity as a protective factor for dementia and Alzheimer's disease: systematic review, meta-analysis and quality assessment of cohort and case-control studies. *British Journal of Sports Medicine*, 56(12), 701–709. <https://doi.org/10.1136/bjsports-2021-104981>
- Mataqi, M., & Aslanpour, Z. (2020). Factors influencing palliative care in advanced dementia: a systematic review. *BMJ Supportive & Palliative Care*, 10(2), 145–156. <https://doi.org/10.1136/bmjspcare-2018-001692>
- Nandi, A. et al. (2022). Global and regional projections of the economic burden of Alzheimer's disease and related dementias from 2019 to 2050: A value of statistical life approach. *EClinicalMedicine*, 51.
- Sirui, Z., Linghui, D., Shi, Q., Yuxiao, L., Xiaochu, W., & Birong, D. (2023). The association between tea consumption and the risk of cognitive impairment: Results from the West China Health and Aging Trend (WeCHAT) study. *Asian Journal of Psychiatry*, 83, 103521. <https://doi.org/10.1016/j.ajp.2023.103521>
- Wang, X., Liu, F., Li, J., Yang, X., Chen, J., Cao, J., Wu, X., Lu, X., Huang, J., Li, Y., Zhao, L., Shen, C., Hu, D., Yu, L., Liu, X., Wu, X., Wu, S., & Gu, D. (2020). Tea consumption and the risk of atherosclerotic cardiovascular disease and all-cause mortality: The China-PAR project. *European Journal of Preventive Cardiology*, 27(18), 1956–1963. <https://doi.org/10.1177/2047487319894685>
- Wang, Y., Zhang, M., Wang, X., Liu, S., & Ding, H. (2022). Correlates of cognitive impairment in the elderly in China: A cross-sectional study. *Frontiers in Public Health*, 10. <https://doi.org/10.3389/fpubh.2022.973661>
- Xiang, Y., Xu, H., Chen, H., Tang, D., Huang, Z., Zhang, Y., Wang, Z., Wang, Z., Yangla, Han, M., Yin, J., Xiao, X., & Zhao, X. (2024). Tea consumption and attenuation of biological aging: a longitudinal analysis from two cohort studies. *The Lancet Regional Health - Western Pacific*, 42, 100955. <https://doi.org/10.1016/j.lanwpc.2023.100955>
- Xiang, Y., Zare, H., Guan, C., & Gaskin, D. (2018). The impact of rural-urban community settings on cognitive decline: Results from a nationally-representative sample of seniors in China. *BMC Geriatrics*, 18(1). <https://doi.org/10.1186/s12877-018-1003-0>
- Yue, Z., Xiang, N., Li, H., & Liu, E. (2021). The evolution trend of availability of China's community-based care services and its impact on the cognitive function of elderly people: 2008-2018. *International Journal for Equity in Health*, 20(1), 203. <https://doi.org/10.1186/s12939-021-01544-w>