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Virtual individual cognitive stimulation therapy in Hong Kong: A mixed methods feasibility study

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ABSTRACT

Objectives: We aimed to translate and culturally adapt Virtual Individual Cognitive Stimulation Therapy (V-iCST) for the Hong Kong (HK) Chinese population, and to evaluate its feasibility and acceptability.

Methods: A mixed methods case series (N=8) was used to assess the feasibility of V-iCST and changes in cognition, quality of life (QoL), mood, and communication pre and post-test. Data were analyzed with the reliable change index. Thematic analysis of post-therapy interviews and content analysis of session rating forms were used to evaluate the acceptability.

Results: V-iCST was feasible with low attrition (0%) and high attendance (100%). Participants had reliable improvements in all outcomes. Six had improved and stable cognition; four had clinically significant changes in depression. There were no reliable changes in QoL. Qualitative analyses indicated V-iCST as acceptable but required assistance.

Conclusions: V-iCST can be adapted for HK Chinese with dementia and potentially improve cognition, QoL, mood, and communication.

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Introduction

People with dementia (PwD) have been disproportionately impacted by COVID-19, and are associated with 31% of all COVID-19 related deaths.¹ While access to treatment is paramount for PwD to maintain functioning, COVID-19 has led to the suspension of community-based dementia services in many regions, including Hong Kong (HK), where evidence-based interventions, such as Cognitive Stimulation Therapy (CST), were delivered.² A recent systematic review suggest that COVID-19 isolation measures damaged the cognitive and mental health of PwD worldwide, and it is urgent to balance infection control measures against guaranteed fair and appropriate care.³ In response, it has become vital to understand whether Individual Cognitive Stimulation Therapy (iCST) is feasible to deliver virtually as technology-based interventions could bridge the treatment gap.

Cognitive Stimulation Therapy, the only manualized non-pharmacological intervention recommended by the UK National Institute for Health and Care Excellence (NICE) for improving cognition and QoL in mild to moderate dementia, is a group-based intervention

delivered in 85% of UK memory services and offered in at least 34 countries.^{4,5} CST has previously been adapted and validated in HK.⁹

Even before COVID-19, some were unsuitable for group and in-person therapies. For example, those with sensory impairments and without transport could find it difficult to participate in groups. iCST was developed to increase accessibility and this was evaluated in a pragmatic randomized controlled trial (RCT).⁶ Unlike the group-based CST, it was offered three times a week by carers for 75 sessions, rather than twice a week by trained facilitators. Only significant improvements in carers' QoL were observed. However, PwD in a more recent version of iCST had cognitive improvements of 5-points on the Alzheimer's Disease Assessment–Cognitive Subscale (ADAS-Cog),⁷ and four-point change have been indicated as clinically significant. This updated version of iCST was more similar to the original group-based CST in terms of dosage and delivery—facilitated by trained professionals.⁸

While RCTs are the gold standard for intervention evaluation, nomothetic approaches have been criticized for focusing on average effects and ignoring individual variation, which may be more informative, especially in the development of interventions.⁹ An idiographic approach, like case series, can shed light on individual responses, which could be particularly helpful for individualized

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interventions. Case series are often the first evidence for innovative treatment and can have a substantial impact on subsequent research.⁹

This study aimed 1) to translate and culturally adapt V-iCST for the HK Chinese PwD; 2) to evaluate the feasibility and acceptability of a virtual and 14-session version of V-iCST program in HK.

The research questions were:

1. Is V-iCST feasible and acceptable for HK Chinese PwD?
2. Does cognition, QoL, mood, and communication improve after V-iCST?

We hypothesized that the intervention would be feasible and acceptable for PwD in Hong Kong, and that there will be cognitive and quality of life (QoL) improvements.

Methods

Development of V-iCST manual in HK

The V-iCST HK manual was guided by an ongoing study—an online adaptation of the 14-session iCST program.⁷ EH, bilingual in English and Chinese, translated the intervention and resources to Chinese. A bilingual independent researcher, LS, checked the translation, and edits were made when necessary.

Some cultural adaptations were made based on the adapted and validated CST-HK program.¹⁰ For example, due to the lower educational level of HK Chinese participants, news videos were provided as alternatives to newspaper articles. More culturally appropriate food, music, and toys were also used.

Adaptations from CST-HK were used as guidance because the individual version of CST allows for more personalization.¹⁰ Some

CST-HK modifications were only appropriate for groups (i.e., team games). While the therapists, EH and two CST facilitators, followed the V-iCST manual, they were encouraged to add the materials they used for tailoring to the manual and resources so that V-iCST was comprehensive and suitable for a range of PwD. GW and LS further reviewed the manual and resources to ensure additional changes were culturally appropriate (Table 1). Alongside this study, the team were simultaneously developing and evaluating V-iCST in the UK (registration identifier: NCT04828434).

Feasibility study

Design

A mixed methods case series was used. A quantitative component was used to test the feasibility of V-iCST, and a qualitative framework was used to understand its acceptability.¹¹

Ethics approval

The study was approved by the Human Research Ethics Committee for Non-Clinical Faculties (EA200282) at The University of Hong Kong.

Procedure

The sample was recruited from the community and residential care homes. We used purposive sampling to identify potential participants, referred by family members or care home staff. The information sheet and consent form were sent to participants and their carers. EH screened potential participants in a 30-min videoconferencing call, where she further explained the study. Participants who were eligible and agreed provided joint consent with their carers on the recorded videoconferencing call.

Table 1
Cultural adaptations for V-iCST.

Session Themes	Cultural adaptation	Reasons for adaptation
Physical Games	Added more Chinese exercise options with videos (e.g., chair exercises with a Chinese physiotherapist, Tai Chi 10 finger exercise)	More familiar to participants
Life History	Used images with Asians for the life game (e.g., images of Chinese children and Chinese sayings); <i>added school-related questions</i> †	More familiar to participants
Sound	Added Chinese singers and instruments to session resources; played indoor and outdoor sounds heard in HK; <i>added American musicians</i> †	More familiar to participants
Childhood	Used a variety of Chinese childhood toys and food; <i>added school-related questions</i> †	Participants came from different regions of China; tailored food and toys sections based on their hometown and era
Food	Included HK Chinese food and childhood snacks based on the origin of the participant; used food adverts in HK and <i>the United States of America (US)</i> ; <i>added food from various regions of China</i> †	Participants came from different parts of China and lived in various countries; tailored food and toys sections based on their hometown, experiences, and era
Faces/scenes	Exchanged Caucasian faces with Asian ones; <i>included scenes from HK, China, and the US</i> †	More familiar to participants
Word association	Added pictures with Chinese idioms, Fill-in-the-blank task with Chinese idioms and units, Chinese proverbs	For participant with lower educational level or illiterate
Being creative	Added arts and craft options related to Chinese holidays (e.g., Chinese New Year, Mid-Autumn Festival); included local and Asian virtual museums	More familiar to participants
Categorizing objects	Used commonly used household and grocery items in HK; added categories related to HK culture (e.g., exchanged picnic with 'yum cha,' a common traditional brunch with tea and dim sum)	More familiar to participants
Orientation	Added maps of HK and scenes of HK and the US†	More familiar to participants; some participants have not traveled out of China, while some lived overseas
Using money	Included HK and <i>foreign currencies</i> †	More familiar to participants; some participants have not traveled out of China, while some lived overseas
Number games	Used Chinese fruits and meals for bargain game	More familiar to participants
Word games	Replaced hangman with charades; exchanged proverbs with Chinese idioms, proverbs, allegorical sayings presented as a fill-in-the-blank or Pictionary game; <i>riddles</i> †	More familiar to participants
Thinking cards	Replaced the lottery with Mark Six in Thinking Cards I; exchanged all pictures in thinking cards to more culturally appropriate ones; changed "part" to "dinner party" or/and "yum cha" in thinking cards version 2	More familiar to participants

Note: HK, Hong Kong. †Modifications made during the intervention are italicized.

Participants were eligible if they:

- (1) Met the Diagnostic and Statistical Manual for Mental Disorder, 4th edition criteria for dementia¹²
- (2) Scored ≥ 2 on Montreal Cognitive Assessment 5 Minute Protocol (MoCA 5 min)¹³
- (3) Age ≥ 18 years
- (4) Communicated in Cantonese
- (5) Provided consent to videoconferencing and videorecording

Eligible participants who agreed to take part provided joint verbal consent with their carers on a recorded videoconferencing call.

At baseline, participants were staged with the Clinical Dementia Rating Scale (CDR) and underwent psychosocial, clinical, and cognitive assessments via videoconferencing with independent researchers.¹⁴ Demographic data was collected. Carers completed proxy-based assessments and demographic information. We adjusted the ADAS-Cog for virtual use, e.g., props were displayed as photos on PowerPoints. All were evaluated with the same set of assessments at 9-week follow-up.¹⁵

Feasibility of recruitment was evaluated by a) successful recruitment of a target sample of eight in two months; b) retention rate of at least 75% at nine-week follow-up.

Acceptability of intervention was assessed by overall attendance of nine or more sessions (60%); any negative adverse events related to V-iCST; and feedback demonstrating acceptability from qualitative interviews.

Outcome measures

- (1) Montreal Cognitive Assessment 5-minute protocol (MoCA 5-min): a brief telephone version of the Montreal Cognitive Assessment—a screening tool for cognitive impairment—more sensitive to mild dementia than the Mini-Mental State Examination (MMSE).^{13,16} Its domains measure attention, verbal memory, executive function, and orientation. Higher scores reflect better cognition.
- (2) ADAS-Cog: a sensitive and standard scale used in dementia trials.^{17,18} It comprises 11 tasks, measuring memory, language, praxis, attention, and other cognitive abilities. Lower scores denote better cognition.
- (3) Quality of Life in Alzheimer's Disease (QoL-AD): a 13-item outcome measure for QoL in dementia with good reliability and validity, recommended by the European consensus on outcome measures for dementia.^{19,20} It includes both self-reported and proxy-rated versions. Higher scores indicate better QoL.
- (4) Geriatric Depression Scale – Short Form (GDS-15): a self-reported dichotomous scale with 15 items and good internal consistency.^{21–23} Total scores range from 0 to 15. Higher scores reflect more depressive symptoms, and the cut-off for depression is 5.
- (5) Holden Communication Scale (HCS): a proxy-based scale with 12 items, assessing social behavior and communication, including conversation, awareness, knowledge, and communication.²⁴ It is sensitive to PwD, and lower scores denote better communication.

Intervention

All participants received 14 sessions of V-iCST, twice a week for seven weeks. Sessions were delivered by EH, a psychologist, and two CST facilitators. All completed the CST training and had experience in working with PwD. Each session consisted of a theme based on the manual, such as life history, in a consistent structure with an orientation-based task at the beginning, and feedback questions at the end (Table 1). Facilitators recorded feedback as explicit statements or ratings on the session rating forms (see Supplementary Fig. 1).

Experience of V-iCST

Session rating forms and semi-structured qualitative interviews explored the carers or/and PwD's experience and whether V-iCST was acceptable. EH developed the interview topic guide (see Supplementary Figure 3), informed by the consolidated framework for implementation science and a previous iCST study.^{25,26} To ensure honest feedback, the therapists did not interview participants they delivered V-iCST to. EH, and clinical psychology trainees, WL and SY, facilitated the interviews.

Analysis

Quantitative

To assess changes in measured constructs over the intervention period, we calculated the Reliable Change Index (RCI) for all outcome measures and reported the respective reliable coefficients.²⁷ Morley and Dowzer's reliable change indicator was used.²⁸ We calculated clinically significant change (CSC) for mood with a cut-off score of five.²² CSC was not applicable for other measures, such as cognition as PwD would not have a non-clinical score.

Qualitative

The first question on the session rating forms indicated session enjoyment in three categories (“a lot”, “a little bit”, and “not at all”), and their corresponding percentages were calculated. Conceptual content analysis was used on questions two and three, and both inductive and deductive methods were used. The deductive categories indicated the barriers and facilitators (“what was enjoyable?”, “what was not enjoyable?”). An inductive approach was more grounded and flexible—allowing domains to be formulated directly from the participant's comments.²⁹

EH developed the codebook with the deductive domains. She then coded all forms inductively and updated the codebook. The frequency of concepts was coded, meaning that each included quote could be in more than one category. VT reviewed the codebook, and WL coded 20% of the forms with the initial categories. Discrepancies were resolved via discussion. Minor amendments were made to the codebook, and EH recoded all forms. Raw data quotes were exported to a spreadsheet. The frequency of each domain was identified.

This study used a “medium-Q thematic analysis approach,” which combined reflexive thematic analysis (TA) (“small-Q:”) with a coding frame (“big-Q”), to analyze the interviews.^{30,31} This was chosen to ensure consensus between coders without compromising the values of reflexive TA.³² We did not assess reliability as it restricts coding flexibility.³³

EH transcribed and translated the interview recordings into English because some of the research team could not understand Cantonese. Transcripts were read and re-read. Line-by-line coding was conducted to generate the initial codebook. To ensure the trustworthiness of the analysis and translation, SY, a certified translator, reviewed 20% of the transcripts with the initial codebook and translation. Differences in coding and translation were discussed and resolved between EH, SY, and VT. Minor changes were made to the codebook and translation. Example quotes with themes were reviewed by VT and discussed with the wider research team.

Fidelity

A fidelity checklist was developed based on the key principles of CST and the core intervention components of the V-iCST sessions. To develop the measure, we referenced the framework for fidelity measures for complex interventions and previous fidelity measures for psychosocial interventions.^{34,35} We selected the 10 key principles

that were applicable to all 14 V-iCST and presented them in a dichotomous scale: “yes” (code = 1), “no” (code=0), “not applicable” (code=98), and missing (code=99). The codes for each response options corresponded to the scores except “missing” and “not applicable” were scored as 0. Facilitators completed a self-reported fidelity checklist straight after each session.

Results

Participant demographics

Six participants were female and two were male. Ages ranged from 69 to 94 years. All were HK Chinese with mild (63%) to moderate (38%) dementia. Table 2 outlines the participant demographics and characteristics.

Feasibility and acceptability

We recruited eight participants who met the inclusion criteria and provided consent in two months. Six were recruited from the local community and were referred by friends or relatives, and two were identified by care home staff. Sixteen participants were screened for eligibility, where seven did not meet the inclusion criteria and one refused to participate (see Supplementary Figure 4 for flow diagram).

All participants completed the 14 V-iCST sessions (100% attendance) and the post-test assessments and interviews (0% attrition). The facilitators completed 93.75% (105/112) of the session rating forms. Overall, the feedback indicated V-iCST as acceptable. Most rated that they enjoyed the session “a lot” (76.2%) or “a little bit” (21.9%). According to the content analysis, the most popular main activities involved food and Chinese idioms (Table 3).

Table 2
Participant demographics and characteristics.

Characteristics	n	(%)
Sex		
Male	2	25%
Female	6	75%
Age		
65 to 75	1	13%
75 to 85	3	38%
85 to 95	4	50%
Ethnicity		
Chinese	8	100%
Highest level of Education		
Primary or below		
No schooling	1	13%
Primary	3	38%
Secondary		
Lower secondary	1	13%
Upper secondary	2	25%
Post-secondary		
Degree	1	13%
Marital Status		
Married	7	88%
Widowed	1	13%
Stage of dementia (CDR)		
Mild	5	63%
Moderate	3	38%
Use of dementia drugs		
Yes	4	50%
No	4	50%

Note: CDR, Clinical Dementia Rating Scale.

Treatment fidelity

Fidelity ratings were collected for all participants. The mean fidelity score was 14.5 out of 15 points (97%, SD=0.21, range=12–15), indicating that the quality of delivery was high.³⁶

Changes to the manual

Minor changes were made to the manual and resources for the program to be flexible and suitable to HK Chinese PwD. For example, Wong et al. removed school-related questions because most participants had only primary school or no formal education.¹⁰ However, our sample and a recent virtual CST study suggest that the educated are more likely to access teletherapies; hence, we re-introduced school-related questions and word games to ensure V-iCST was comprehensive.

Quantitative findings

Table 4. presents the changes in outcomes at baseline and 9-week follow-up. Reliable improvements were observed in cognition, QoL, communication, or/ and mood for most participants. More than half of the participants either maintained or improved on the MoCA 5-min and ADAS-Cog. Four had clinically significant changes in depression. *Cognition*

Six participants maintained or improved their scores on the MoCA 5-min. One had a reliable improvement of 6 points. On the ADAS-Cog, four participants' scores improved, with one reliable increase of 11 points (see Supplementary Figure 2).

Quality of life

There were discrepancies in QoL-AD proxy and self-reported ratings. One and two participants had reliable improvements on the self-report and proxy ratings, respectively. No reliable changes were observed when scores were combined.

Communication

At 9-week follow-up, three participants had improved communication abilities, of whom two were reliable. Five participants reported no reliable change. No post-test data were collected for one participant as the care home staff member had left the organization.

Mood

Three participants were clinically depressed at baseline. After receiving V-iCST, four improved reliably—three were clinically significant.

Qualitative

Eligible participants were interviewed, and six were accompanied by their carers. Seven and 11 subthemes were generated. Each theme is presented below with illustrative quotes from a range of participants and carers. P1 denotes participant 1, C1 means carer for participant 1 (Fig. 1) (see Supplementary Table 1 and 2).

Theme 1: V-iCST made treatment more accessible

The dyads (carers and participants) described how the virtual and home-based aspects of V-iCST made it easier for them to participate.

Convenience

The dyads felt that attending a virtual program at home was convenient. They did not have to travel, which saved time.

Table 3
Frequency of domains in session rating forms question 2 and 3.

Domains	Description	Frequency
1) What was enjoyable and interesting?	Explicit statements on what was enjoyable	
a Current affairs or news articles	Any component of current affairs or news	14
b Listening to music	Activities related to listening to music	13
c Looking at pictures	Activities related to looking at photos or images	3
d Main activity	Explicit statements on the main activity	45
i Art activities	Artwork or other creative activity	5
ii Categorizing objects	Activity related to categorizing objects	4
iii Chair exercises	Chair exercises (session 1)	3
iv Childhood pictures	Looking at childhood pictures (session 2)	2
v Chinese idioms	Chinese idiom and proverbs	6
vi Food activity or discussions	Discussion or activity on food	8
vii Music game	Matching photos of instrument and sound	1
viii My family activity	Family tree activity (session 2)	2
ix Number games	Playing number games (session 12)	2
x Old money	Looking at old money (session 11)	2
xi Orientation	Orientation activity such as maps, location	3
xii Photos of faces and scenes	Looking at faces and scenes	2
xiii Shopping task	Shopping activity (session 5)	5
e Nothing particularly enjoyable (all enjoyable)	No activity was more enjoyable than the rest; all was enjoyable	34
f Reminiscence (main activity or general discussion)	Activities or discussion related to the past	25
g Talking and discussing	Conversing with facilitator	23
2) What was not enjoyable?	Explicit on what was not enjoyable	
a Orientation session	Did not like the orientation activity	1
b Reminiscence	Did not want to talk about the past	1
c No interest in activity	Had no interest in activity	1
d Nothing that participant did not like, or we could've done better	Nothing that he/she did not like	82
e Prefer participating in-person	Preferred to go to places or attend therapy session face-to-face	3
3) Other comments	Domains that did not fall into other categories	
a Appreciates facilitator	Liked that facilitator tailored the session based on interest and ability	7
b Appreciates personalization	Liked that facilitator tailored the session based on interest and ability	2
c Feels stimulated	Participant had to think	9
d More instructions	Participants wanted facilitator to explain more	1
e Prefer gifts	Participants wanted a gift	1
4) Not applicable	Participant could not answer the question	
a Could not understand question	Participant could not understand the feedback question	15

C5: It's also super convenient because it is at home. You can grab a glass of water whenever. Sometimes she would forget to take her medication and she could do so.

Half of the carers were working children of the PwD, and it was difficult to find time to bring the participants to day care centers. Some participants were concerned about inconveniencing their children and chose to remain at home. Others liked to stay at home during and before the pandemic.

C1: ... [day care center] is far, I won't have time to take her...I can take her during my time off, but I can't when I have work.

P5: ... I mean I can see you and talk to you right now. I don't need to go out and travel.

I am old and there is not a lot of places that I can go. People don't need to bring me there. That would be quite troublesome.

Safe and familiar environment

Participants preferred to stay at home as it was a safe and familiar place. Before the pandemic, some did not go out independently due to age and frailty, while others were unaware of their age and found it confusing to be at day care centers.

C1: even if I bring her [to a day care center], she might not go

P1: I cannot get on transportation.

C1: it's not that she can't, she just doesn't want to move or go...

P1: yes, I am old... I rarely go out.

C4: This program really suits him because he doesn't like going to elderly centers. He has never liked going to those places...He believes that he is very young, and he thinks that others are too old. He does not like it.

Theme 2: Benefits of having a facilitator

Carers described the advantages of having someone trained to deliver V-iCST, because the facilitator knew how to adapt the sessions based on the PwD's interests and abilities.

C3: [P3] will show interest in some areas, and [EH] will be able to tell. She would ask [P3] to elaborate in the discussion.

Someone else to talk to

The dyads suggested that having a non-family member facilitator added to conversations because two people have limited topics to discuss; an additional person adds diversity. Some carers thought that participants were more likely to respond to a non-family member.

C3: ...I think it's very good. Stimulates her brain. Especially because there are only two of us in the house. We have limited subjects to talk about.

C4: At home, he does not really like to listen to me. When I ask him a question, he does not have to answer. He thinks that I'm annoying

Table 4

Summary of pre and post-test raw scores, reliable change, and clinically significant change.

Outcome measures		Participant								Mean	SD	Cohen's d
		1	2	3	4	5	6	7	8			
Cognitive Function (MoCA 5-min)												
Score	Pre	10	16	13	9	17	6	14	16	12.63	3.93	0.256
	Post	11	22	13	10	17	8	15	14	13.75	4.40	
Reliable Change Index (RCI: 5.06)		No change	Improve	No change	No change	No change	No change	No change	No change			
Cognitive Function (ADAS-Cog)												
Score	Pre	12	16.67	27	28	20	25.33	15.3	18.66	20.37	5.85	0.210
	Post	15.33	14	25.66	17	20.67	24.66	16.33	20	19.21	4.30	
Reliable Change Index (RCI: 6.02)		No change	No change	No change	Improve	No change	No change	No change	No change			
Quality of Life (QoL-AD – Combined)												
Score	Pre	25.67	28	31	38.33	33.67	35	31.33	39.00	32.75	4.690	0.335
	Post	24	31.67	35	42.67	37	35	29.67	41.67	34.58	6.17	
Reliable Change Index (RCI: 4.27)		No change	No change	No change	No change	No change	No change	No change	No change			
Quality of Life (QoL-AD – Participant)												
Score	Pre	26	27	28	39	33	33	28	41	31.88	5.67	0.430
	Post	26	30	34	43	39	35	26	44	34.63	7.05	
Reliable Change Index (RCI: 5.88)		No change	No change	Improve	No change	No change	No change	No change	No change			
Quality of Life (QoL-AD – Carer)												
Score	Pre	25	30	37	37	35	39	38	35	34.5	4.72	0.012
	Post	20	35	37	42	33	NA	37	37	34.43	6.92	
Reliable Change Index (RCI: 4.81)		No change	Improve	No change	Improve	No change	NA	No change	No change			
Communication (HCS)												
Score	Pre	32	21	17	17	14	4	13	10	17.71	7.20	0.223
	Post	33	16	17	10	16	NA	10	10	16	8.14	
Reliable Change Index (RCI: 4.89)		No change	Improve	No change	Improve	No change	NA	No change	No change			
Depression (GDS-15)												
Score	Pre	4	6	4	2	5	2	7	1	3.88	2.10	0.974
	Post	6	2	1	3	1	2	1	2	2.25	1.80	
Reliable Change Index (2.33)		No change	Improve	Improve	No change	Improve	No change	Improve	No change			
CSC (< 5)		Not met	Met	Met	Not met	Met	Not met	Met	Not met			

Note: ADAS-Cog, Alzheimer's Disease Assessment – Cognitive Subscale; GDS-15, Geriatric Depression Scale – Short Form; HCS, Holden Communication Scale; MoCA 5-min, Montreal Cognitive Assessment 5-minute Protocol; QoL-AD, Quality of Life in Alzheimer's Disease.

and ignores me. For you, someone that he does not know, he must answer. The therapy improved his communication skills.

Theme 3: Prefer one-to-one

The dyads described the benefits of one-to-one interactions. Some felt that the participant would not be able to engage in virtual groups.

SY: the fact that this is virtual, it's probably easier for you to attend? You can still talk.

C1: yes, I agree. There is more time. One-to-one is like having a personal tutor. If it was a center, there might be a few together, she might not be able to engage/ focus.

C4: he likes virtual. He prefers one-to-one. For his personality, he does not like a big group. One-to-one is very good.

Theme 4: I had to think

V-iCST was mentally stimulating as participants engaged and used their minds. Sessions were enjoyable, and they desired to learn. This contrasted with the boredom some experienced at home or in their care homes.

was concentrating and learning

P2: I do concentrate and thank you very much for telling me things. It'll be hard if you don't pay attention, but I do concentrate.

SY: what do you like the most about [the therapy sessions]?

P2: It increases my knowledge and experiences.

"A good way to spend time"

Some participants described retired life as boring because they no longer had a routine and much to do, and this was exacerbated in the pandemic. They felt that V-iCST was stimulating and offered interesting activities to help them pass time.

P2: I am less bored and it's entertaining. The discussion makes me think. I am not just eating and sleeping every day. It sounds awful. A very simple life...it's good that there are some events for me to attend, and to pass time. It's less boring than sleeping after I eat.

Theme 5: Improvements after therapy

Carers commented on the changes they observed in the PWD's social life, communication, and mood post-therapy.

More socially active

Since V-iCST, participants were more proactive in social settings. Some took part in more activities within the community.

WL: do you think he is more active and responsive?

C4: Yes, he has more reactions and is more responsive. He will now get others to talk. Before he would not talk

EH: Did [P5] participate in [the community program] at the same time as V-iCST?

C5: You guys started first. But what they do is just plant flowers.

Better mood

C4: His mood after the therapy. He is more open. He used to look stiff and now smiles more. He is significantly better.

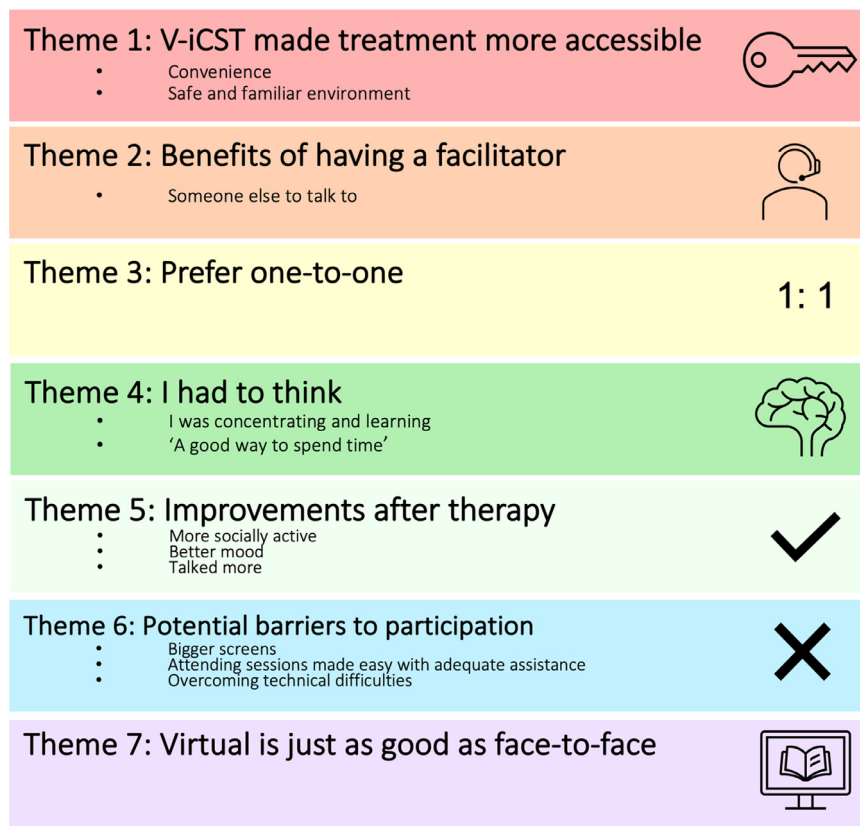


Fig. 1. Summary of themes and subordinate themes.

Talked more

Some participants kept to themselves before the therapy, and V-iCST offered an opportunity for them to converse with others. Some not only actively engaged in conversations but would initiate conversations post-therapy.

C4: First, since he has been through these sessions, he has talked more. In the past, he would not initiate conversations. Now, he will and talks more. Communication is the main improvement. When people come over and eat, he usually just sits and doesn't say anything. Now, he tries to participate in the conversation. . .

C5: There is not a lot of people she talks to. Only one or two relatives who also speak the Teochew dialect. . .It's really good that she gets to regularly talk like this.

Theme 6: Potential barriers to participation

Resources and technical assistance were required to take part.

Bigger screens

All participants used tablets or computers, and they thought mobile phone screens might be too small.

SY: Now we are using a device that's quite big. But what if you were using your mobile phone?

P2: . . .It will be more tiring for my eyes to read something that small. The device I am using currently is this big and it is very clear.

Attending sessions made easy with adequate assistance

Participants were able to join online with ease. However, carers thought assistance, i.e., setting up the call and resolving technical issues, was required. Carers were comfortable in providing the support.

C3: to me, Zoom is very simple. Like Skype. But, for [P3]'s situation it is more difficult. She doesn't know how to turn on the volume. She needs someone else to standby to use it. Maybe for this problem is not just for [P3], but for other people who need therapy.

C5: She also doesn't really know how to use the microphone. Someone really needs to be there to help her at home.

Overcoming technical difficulties

Both carers and participants encountered technical difficulties, but most were resolved immediately, and the software was user-friendly.

SY: [P2] mentioned that you would set up Zoom... How do you feel about providing technical assistance?

C2: At times, I really didn't understand. My daughter would teach me. During COVID-19, the elderly center and church had some online activities. . .My daughter taught me how to use Zoom before.

Theme 7: Virtual is just as good as face-to-face

While some participants may still prefer face-to-face, they did not find a major difference attending online. Talking to and seeing the facilitator clearly was important to them, and they could do so online.

P6: It doesn't matter [that it is online]. I can see very clearly.

EH: does that mean that if the pandemic situation was better, and we can come in person, you will prefer that?

P6: Yes, exactly. It doesn't matter that it is virtual.

P2: when it's in person, you can directly ask if there is something you do not understand. That's more familiar and approachable for me. But now we are using television, it's not face-to-face. But we can still see each other well so you can directly ask if there are things you do not understand. It's about the same as face-to-face. The difference is not big.

Discussion

This mixed methods study indicates that V-iCST is feasible and acceptable for HK Chinese PwD. V-iCST can be integrated into the existing community and residential care services. Positive trends in cognition, QoL, communication, and mood showed the potential effectiveness of V-iCST for mild to moderate dementia.^{4,10,37}

The therapy program, manual and resources were acceptable. No adverse effects were identified. Participants enjoyed the sessions, and the content analysis findings indicated the food activities were the most well-received. This concurred with the CST-HK findings, where Chinese pragmatism—interest in practical issues over abstract theorization—was observed in participants.¹⁰

V-iCST could have a positive effect on cognition because cognitive scores were either maintained or improved. PwD usually drop 3.4 points per annum on the MMSE³⁸. The minimally clinically important difference (MCID) on the MMSE is one to three points. When we converted the scores from MoCA 5-min to MMSE, five participants met the MCID requirement.^{39,40} Four participants also improved on the ADAS-Cog; one with a reliable improvement of 11 points. While it may be inappropriate to compare individual changes with trial results, a four-point increase is considered significant in previous dementia drug trials.^{8,41} The small effect size was like CST trials with significant changes in cognition. Past studies reported Cohen's *d* from 0.233 to 0.86.^{4,10,37}

The qualitative findings supported the quantitative ones on cognition. Participants felt stimulated and enjoyed learning from V-iCST as they were under-stimulated amidst the pandemic. Social distancing measures in HK had been in place for 14 months at the time of this study, and the resulting social isolation hastened cognitive decline.⁴² V-iCST provided stimulation at a critical time, and it is likely to be valuable post-pandemic as PwD tend to self-isolate.⁴²

While no participants had reliable improvements on the QoL-AD (combined), six participants had clinically meaningful improvements on the QoL-AD (participants) and three on the QoL-AD (carers). Changes in three points is clinically important.⁴³ Our results aligned with past studies where proxy ratings were worse than self-reported ones, potentially because of the lack of sense of hope in carers.⁴⁴ The QoL-AD (combined) effect size was comparable to the original CST study where significant improvements were observed.⁴

Relationships with family was strengthened as participation in V-iCST encouraged social interactions. Some talked more while others participated in more activities. As suggested by the biopsychosocial model, social interactions play significant roles in health and could attribute to better QoL.⁴⁵

Changes in communication were comparable to the CST study in terms of effect size.⁴ Only two people improved reliably, but the qualitative findings indicated that it was the main improvement. PwD are often socially isolated due to cognitive inactivity.⁴⁶ Carers reported that participants were more proactive in conversations post-therapy

because V-iCST gave them regular opportunities to socialize and be stimulated.

PwD with pre-existing depressive symptoms may benefit from V-iCST. All who were depressed at baseline, and one was one-point from the clinically cut-off had reliable and clinically significant improvements. One participant's spouse passed away at week 6 hence her depressive symptoms increased. Significant improvements in mood were not observed in past UK CST trials; however, most did not meet caseness for depression, limiting the opportunity for improvement.^{4,7} In the CST-Brazil trial, significant improvements were observed. The participants were notably more depressed at baseline, allowing for more scope for change.⁴⁷ The quantitative changes matched the qualitative findings on the significant improvements in mood.

The one-to-one interactions with a facilitator were vital. Having someone the participant was not already familiar with before therapy encouraged and enriched conversations as topics and perspectives differed from their friends and family. Chinese can be conservative and cautious, which hindered open discussion in CST-HK.¹⁰ Talking to a skilled and non-judgmental facilitator in private allowed for a comfortable sharing space, and some found it easier to engage online on a one-to-one basis.

Strengths and limitations

This study observed individual changes that are often neglected in RCTs. Observing individual changes is critical because there is often variability of responses to treatment within the sample. Individuals do not necessarily experience clinical improvements even with effective treatments, and therefore the ability to explore individual changes is particularly informative in evaluating new interventions.²⁷

The triangulation of the qualitative and quantitative findings provided a comprehensive picture of post-therapy changes. Clinical observations from the interviews and statistical information from the RCI are both paramount. We observed which participants changed reliably, and what they or/and their carer observed. For example, participants who had reliable improvements in cognition also said they felt mentally stretched.

The average fidelity scores suggest that the intervention was delivered as planned. However, all fidelity measures were self-completed. Future trials could consider using independent researchers to evaluate a subset of the recorded therapy sessions and calculate the inter-rater agreement in terms of weighted kappa and percentage agreement like past interventions for PwD to provide a more objective view of delivery.⁴⁸

The quantitative findings were limited by the small sample size, selection bias, lack of control group, and no follow-up data, making it hard to draw conclusions on the impact of V-iCST. RCI were calculated from the standard error of measurement of the small sample, and there was missing data—one care home staff resigned before week 9.

As all participants had tablets/ computers and carers, V-iCST's feasibility and acceptability are limited to those with support, who may be of higher socioeconomic status (SES). It is unclear if V-iCST is feasible and implementable for those living alone or with lower SES.

Implications for practice and research

Our findings suggest V-iCST might be suitable for community and residential care home use in HK. While all participants were HK Chinese, many grew up in different areas of China (i.e., Hakka Han, Taishanese, Kaipingnese, Teochew people, Shanghainese). Most HK Chinese from this cohort moved to HK during World War Two or the Cultural Revolution. This indicates V-iCST offered a flexible template that was adaptable for various backgrounds, interests, and abilities.

V-iCST was one of the first iCST studies in HK. The iCST manual and resources translated for the HK Chinese PwD can potentially be used in clinical settings. However, as this was a feasibility study, it was not our intention to generalize findings to a wider clinical context. Future trials could determine efficacy and consider implementation.

Unlike the original iCST trial, we used trained facilitators, and therefore more research is needed to determine whether professional delivery leads to more positive outcomes.⁷ While the qualitative findings suggest non-family members encourage conversation, family facilitators could make the treatment even more accessible if effective.

Future studies should consider providing technology with assistance for V-iCST to be accessible for all. Like Cheung et al., our study shows technical assistance was required.⁴⁹ Participants' comments indicated that cellphones may be too small; however, this requires further investigation.

The virtual aspect of this 14-session iCST program made it potentially more cost-effective than iCST. Facilitators did not travel, saving time and travel costs. V-iCST could be beneficial for participants who prefer or need iCST post-pandemic (e.g., mobility issues). Several participants preferred staying at home before COVID-19. Much of the dyad feedback relates to convenience. Working carers found it difficult to bring participants to in-person services. While face-to-face interactions were preferred at times, V-iCST was functional and similar.

Some participants preferred a hybrid of on and offline activities. Restrictions began to lift during the intervention period of this study. Two participants joined more activities in their local community centers, indicating that there may still be an interest in V-iCST post-pandemic when participants have access to more services.

Conclusion

Virtual Individual Cognitive Stimulation Therapy in HK can be adapted and delivered to those with mild to moderate dementia. V-iCST was well received by participants and their carers. Improvements were observed in cognition, QoL, mood, and communication. Future trials could explore efficacy and implementation.

Ethics approval statement

This study was conducted according to the guidelines from the Declaration of Helsinki and all procedures involving participants were approved by the Human Research Ethics Committee for Non-Clinical Faculties (EA200282) at The University of Hong Kong. Informed consent was obtained from all participants.

Data availability statement

The study data is available upon request from Esther K. Hui at the Department of Clinical, Educational and Health Psychology, University College London.

Declaration of Competing Interest

The authors declare no conflict of interest.

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Supplementary materials

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