Protocol Title: User-Led Meaningful Activity and Early-Stage Dementia

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The clinical trial phase will be a pilot randomized, controlled trial exploring the design and feasibility of a novel approach to dementia intervention development. The randomized, controlled pilot study compares the efficacy of the co-creation of a tailored activity plan with a wait-list control group. Using a two-group randomized, parallel design, 60 persons with early-stage dementia will be assigned to treatment or wait-list control.

Recruitment: Potential participants will be recruited through 1) the Johns Hopkins University Maximizing Independence (MIND) at Home study, 2) the Johns Hopkins Bayview Medical Center Memory Clinic, 3) community-based social agencies such as the Alzheimer's Association, and 4) independent and semi-independent residences designed for older adults including continuing care retirement communities and assisted living facilities. Recruitment efforts are aimed at persons living with early-stage dementia and their informal/unpaid caregivers using three main forms of messaging: (a) flyers, (b) a description of the study that was prepared originally for clinicaltrials.gov, and (c) in-person recruitment presentations. All recruitment materials describe the general nature and goals of the research and provide information about what participation involves and monetary compensation. The Principal Investigator (PI) is listed as the source for additional information and addressing questions in all materials.

Pre-Screening: Contact with potential participants will primarily be made through the potential participant contacting the study phone number on advertisements or speaking with the PI following recruitment presentations. Interested persons who believe they have early-stage dementia must: 1) be English-speaking, 2) be medically stable and responsive to the environment (e.g., not comatose), and 3) have a designated caregiver or care partner who lives within close proximity or resides with them. If potential participants with dementia are on any of four classes of psychotropic medications (antidepressant, benzodiazepines, antipsychotic, or anti-convulsant) or an anti-dementia medication (memantine or a cholinesterase inhibitor), it is required that he/she be on a stable dose for 60 days prior to enrollment (typical time frame in clinical trials) to minimize possible confounding effects of concomitant medications. Individuals are excluded if: 1) they are bed-bound, defined as confined to bed or chair for at least 22 hours a day for at least four of the previous seven days, 2) are receiving palliative care or are at end-of-life, 3) have schizophrenia or a bipolar disorder, 4) their cognitive decline is secondary to probable head trauma, or 5) they are taking any neuroleptic medications or have any of the following medical diagnosis: (a) restless legs syndrome, (b) delirium, or (c) akathisia, medication-induced, or other movement disorders such as Parkinson's disease or essential tremor. The primary criteria for inclusion in the study is a diagnosis of early-stage dementia, but this is not ascertained during pre-screening as it is contingent on the results of baseline neuropsychological assessment as described below.

Consent: For those identified as potentially eligible at during pre-screening, the PI will obtain informed consent in-person immediately prior to the neuropsychological

assessment. For caregiver and PLWD interviews, the PI introduces herself, explains the study purpose and procedures and reviews the Johns Hopkins University IRB approved informed consent. Informed consent guidelines of the Johns Hopkins University's Review Board will be followed. The informed consent details the study objectives, procedures, steps to maintain confidentiality, and the risks and benefits of this study and will be presented to each participant and their caregiver in their home. The informed consent procedure will emphasize that participation is strictly voluntary and may be withdrawn at any time.

Participant Remuneration: Participants will be compensated for their time based on length of study participation, and all persons who complete the baseline neuropsychological assessment will receive a minimum of $100. The maximum amount of remuneration is $500 at the 12-month, final data collection time point.

Baseline Assessment and Screening Procedures: Following in-person informed consent, all potential participants will undergo in-person neuropsychological testing prior to randomization in order to establish baseline cognitive functioning and verify that they are indeed in the early stages of dementia (i.e., "mild" dementia). This testing will take approximately two hours and will be administered and scored/interpreted by the PI, who previously received extensive training in neuropsychological assessment, interpretation, and feedback. Cognitive domains evaluated will include global cognitive status, learning and memory, attention, processing speed, executive function, visuospatial skills, and language. If test results indicate that a participant has early-stage dementia, he or she will then be randomly assigned to the intervention group or wait-list control. For those individuals who meet criteria, assessments measuring aspects of well-being, sense of self, sense of control, and frequency/severity of neuropsychiatric symptoms will also be administered. Specifically, various subtests from the following protocols will be used: Test of Premorbid Function, Wechsler Memory Scale-III, Wechsler Adult Intelligence Scale-Fourth Edition, Trail-Making Test Parts A and B, Stroop Color-Word Test, Controlled Oral Word Association Test, Boston Naming Test, Rey-Osterrieth Complex Figure Test, and Repeatable Battery for the Assessment of Neuropsychological Status. The purpose of the home clinical assessment is to confirm dementia diagnosis and staging, review medication use, and exclude delirium and other conditions as described above. The Neuropsychiatric Inventory, Geriatric Depression Scale, Geriatric Anxiety Inventory, MIDI Sense of Control Scale, Wallhagen Perceived Control Questionnaire, Identity-Alzheimer Moderate Test, and IMAGE Test will also be administered.

Feedback Session: The potential participant and his/her caregiver will be provided with feedback from the neuropsychological assessment within one week of testing. If the results indicate that the potential participant is cognitively healthy, meets criteria for mild cognitive impairment, or meets criteria for dementia that has advanced beyond the early, or mild, stage, this will be the final session with the potential participant. If the results of the assessment indicate that the potential participant is indeed at a mild stage of dementia, he or she and the PI will work together in a subsequent session to co-design a meaningful activity plan and map out a gradation plan to correspond with

disease progression. The caregiver will be advised on how to modify/grade the activity(ies) as the disease advances.

Randomization and Study Arm Protocol: Persons randomized to the User-Led Meaningful Activity intervention group will begin the treatment protocol (described below) right after randomization. The intervention will consist of 2-3 sessions lasting 60-90 minutes each in which participants identify the basis/topic of the activity plan, receive dementia psychoeducation, and map out an activity gradation plan. There will be a check-in at 8 months. The neuropsychological battery that was administered at baseline will be re-administered 4 months and 12 months after baseline. Persons randomized to the wait-list control group will begin the treatment protocol after four months' time. There will be a check-in at 8 months. The neuropsychological battery that was administered at baseline will be administered 4 months and 12 months after baseline.

Co-Design of Meaningful Activity Plan: The *first co-design session* will involve an assessment of the person living with dementia's (PLWD) interests, values, and cherished "roles" (e.g., position at work, role within the family, hobby) using a range of performance based and self-report elicitation methods. The goal of this session is to identify 1-3 important interests, hobbies, or roles that the person with dementia is concerned about losing or disconnecting from as the disease progresses. While, ideally, the identification of this interest, hobby, or role should come directly from the participant, it is possible that some participants may need prompts or suggestions. If necessary, the Activity Card Sort will be used to facilitate the discussion of participant interests and valued roles, which will also be informed by principles from studies examining the values and preferences of PLWD as they relate to care. Development of the activity plan may take more than one session.

During the *second co-design session*, the completed meaningful activity plan will be reviewed with the PLWD and their caregiver and modified if necessary. The 1-3 meaningful activities identified in the first session will have an associated gradation plan to accommodate disease progression. An example gradation plan, based on the PI's work with participants in the Treatment Routes for Exploring Agitation (TREA; PI: Jiska Cohen-Mansfield) study, is as follows: (1) an individual who is/was a researcher may continue to maintain a job, conduct research, and even publish papers in the early stages of dementia. (2) As the dementia progresses, the nature of the person with dementia's relationship to the research will likely change. He or she may be able to continue to run analyses and read/access literature in his or her field. (3) In the moderate stages of dementia, this participant may read his or her existing publications or go to museums showcasing research of interest. As the disease approaches the severe stage, the participant may read very basic books about his or her former profession. (4) In the severe stages of dementia, this study participant may watch videos related to the former profession, e.g., BBC or National Geographic.

In the *final session* with the PLWD and his or her caregiver, the PI will provide psychoeducation on the stages of dementia. This is designed to help the caregiver recognize signs of progression, and prepare the PLWD for greater involvement of the

caregiver as the dementia progresses. This session will also involve a discussion of how to modify the activity and follow the gradation plan through the stages of dementia. Carer participation is essential for the delivery and sustainability of the intervention, as the PLWD will have increasing difficulty with activity initiation over time.

Study Reminders: The PI and study staff will contact study participants monthly via phone to inquire about how the implementation of the meaningful activity plan is going, answer any questions, and elicit feedback related to intervention feasibility and acceptability. For persons in the wait-list control group, these phone check-ins will also occur each month during the four months prior to co-design and intervention implementation, but the focus will be reminding them of their start-date and that they are still enrolled in the study and study staff are looking forward to working with them.

Follow-Up Data Collection Periods: Treatment group participants will receive the intervention, and will be reassessed at 4 months and 12 months from baseline. There will also be a "check-in" after 8 months' time. Four months after their baseline, wait-list controls will receive the same intervention and will be reassessed, and again at 12 months from baseline. There will be an 8-month visit for wait-list controls. This design allows for estimation of effect sizes using a randomized two-group design at four months, confirmation of treatment gains for wait-listed participants from 4-12 months, and evaluation of intervention acceptability.

Feasibility and Acceptability: Feasibility and acceptability as perceived by the PLWD and the caregiver will be assessed through semi-structured interviews and rating scales. Regarding rating scales, the PLWD and caregiver will separately be asked to rate intervention feasibility and acceptability using the following questions on a three-point Likert scale (1 = not at all, 2 = somewhat, 3 = very): 1) Was the meaningful activity plan useful? 2) How easy was it to incorporate the activities into your routine? 3) How easy was it to follow the instructions for adjusting the activities if needed? 4) Did the meaningful activity plan increase the amount you did enjoyable activities? 5) How satisfied were you with the meaningful activity plan? 6) Was participation in this study burdensome? 7) Do you think you will continue using the activity plan now that you are done with the study?

In addition to these seven questions, the caregiver will be asked to rate the following on the same Likert scale: 1) Did this meaningful activity plan relieve any caregiving-related stress? 2) Were there any insurmountable barriers to incorporating these activities into your care recipient’s routine? 3) Did participation in this study positively impact your relationship with your care recipient?

Feedback from the semi-structured interviews and follow-up questions in response to the rating scale responses will be evaluated and used in concert to capture the multidimensional aspects of feasibility and acceptability.