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Art-based intervention in promoting brain health among the elderly in Okere City, Otuke District, Northern Uganda. A protocol for a Quasi-experimental study

Rodney Erismas Kiggundu
Kiggundu Arts Studio
Elizabeth Ajalo
EDPA International Hospital
Faith Agumya
Kwalmani Community
Destiny Gladys Chaiga
Hatma Creative Initiative
Nancy Loreen Nangobi
Kiggundu Arts Studio
Ojok Okello
Okere City
Linda Mutesi
Future Generations Foundation
Phillip Musoke
Uganda UK Health Alliance
Enock Mukiibi
Ubora Foundation Africa
Annie Pink
Kiggundu Arts Studio
Innocent Ayesiga
ayesiga49@gmail.com

Mbarara University of Science and Technology
Noeline Nakasujja
Makerere University
Charles Windon
University of California, San Francisco

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Abstract

Background

Population ageing is accelerating globally, with a rising burden of neurocognitive disorders such as dementia and Alzheimer's disease, particularly in low- and middle-income countries. In Uganda, the growing elderly population faces increasing risks of cognitive decline, yet contextually relevant, non-pharmacological interventions remain limited. Creative arts have shown promise in improving cognitive function, social engagement, and mental well-being among older adults.

Methods

This quasi-experimental study will be conducted among adults aged ≥60 years or older in Okere City, Otuke District. Participants will undergo a 12-week art-based intervention comprising storytelling/poetry, community mural creation, and dance-based physical activity. Cognitive function will be assessed using the Montreal Cognitive Assessment (MoCA) at baseline (T0), post-intervention (T1), and at 3-month follow-up (T2). A minimum sample size of 63 participants was determined to ensure adequate power while accounting for repeated measures and potential attrition. Data will be analysed using paired t-tests and repeated-measures ANOVA.

Discussion and Conclusion

The intervention is anticipated to improve MoCA scores, enhance social cohesion, and reduce cognitive decline among participants. This study will provide evidence on culturally grounded, scalable strategies to promote brain health among older adults in rural Uganda.

Ethical Consideration

The study has been reviewed and approved by the Mulago Hospital Research and Ethical Committee, with approval number MHREC 3139.

Contributions to the Literature

Art-based interventions are relevant to improving memory and retention.

Creative arts can also delay mental ageing.

With limited evidence, this paper aims to identify the potential of integrating creatives in health structures in low and middle-income countries.

Background

Globally, population ageing is rapidly transforming global health systems. It is estimated that the number of people aged 60 years and above will exceed 1.5 billion by 2050, with the majority in low- and middle-

income countries.[1] Increase in age is associated with multiple age-related neurocognitive disorders, such as dementia, cognitive impairment, and Alzheimer's disease, among others. Globally, it was estimated that over 55 million and over 10 million people are living with dementia and Alzheimer's by 2023, respectively.[2] Further evidence estimates that over 115 million people will be living with dementia worldwide.[3] The occurrence of these conditions is associated with a significant burden both at the individual, familial, and societal levels. Some of this burden includes psychological distress and depression, especially among the caregivers of these individuals.[4, 5]

Uganda's aged population, comprising individuals aged 60 and above, is growing steadily due to improvements in health facilities and an improved socioeconomic status. It was estimated that there are currently over 2.3 million elderly individuals in Uganda, with a projected 5.4 million by 2050.[6, 7] It is estimated that there are approximately 94,950 older persons aged 60 and above in the Lango sub-region. These account for approximately 4.6% of the population aged 60 years and above, with 54.5% of them being female.[8] Most of these elderly people are prone to different mental health illnesses, for example, dementia and Alzheimer's disease. For example, a study done in Lira demonstrated a 23% prevalence of dementia among 434 older persons aged 50 years.[9] Another evaluation conducted at a faith-based geriatric centre in Mukono found a 46.2% prevalence among 267 elderly individuals aged 50 years and above.[10] In other rural parts of South Western Uganda, mental illness, such as Alzheimer's, has also been rampant among the elderly population, and this represents an active health challenge among this population category.[11] Additionally, the occurrence of these illnesses demonstrates the need to have appropriate interventions to ensure healthy brain health among the aged population.

Creative arts can transform the health and well-being of older individuals.[12] Creative arts activities can include storytelling, dance, music, and folklore. These activities remain powerful tools for education and advocacy in Ugandan communities. These cultural expressions have long been used to address social issues, including HIV/AIDS, and have shown significant improvements in health education, awareness, and health outcomes.[13] Evidence shows that the creative arts enhance social cohesion and reduce social disparities among older adults.[12] Additionally, they can promote healthy behaviour, reduce isolation, and help minimise cognitive decline among older adults. While creative interventions that support social engagement and raise awareness about dementia have been successfully implemented in high-income countries like the United States, Australia and across Europe, such strategies remain underutilised in LMICs, even with existing initiatives that have increasingly emphasised the arts for mental health as a component of brain health.[14–16] In 2017, the United Kingdom's all-party Parliament special interest group on Arts developed a comprehensive manual on integrating arts in health.[17] This high-level advocacy demonstrates progress in the use of creative arts as a health promotion modality. Sadly, there is limited information in Uganda on the use of the arts to promote brain health among people aged 60 years and above, and on their integration into relevant health promotion policy. This study shall implement art-based interventions among the elderly in Okere City, Otuke District, Lango sub-region to promote brain health.

The study shall follow the hypotheses below:

Null Hypothesis (Ho)

There is no significant difference in the mean MoCA scores before and after the art-based intervention among elderly study participants in Otuke District.

Alternative Hypothesis (H_a)

There is a significant difference in the mean MoCA scores before and after the art-based intervention among the elderly study participants in Otuke District.

Methods

Study Design

This study shall utilise the quasi-experimental study design and will be conducted in Okere City, Otuke District. Data shall be collected quantitatively using the MoCA score, and the outcome measures will be assessed at baseline (T_0), immediately after the 12-week intervention (T_1), and at the 3-month follow-up (T_2) to assess the sustainability of the effects.

Study site

Okere City is located in Okere Mom Kok village, in the Adwari Sub-county of Otuke District. It is approximately 70–80 km east of Lira City and about 400–420 km from the capital, Kampala. The project covers a 500-acre area within Okere Parish, characterised by savanna grasslands and shea trees, and is near the border of the Acholi sub-region to the south. This village, home to over 3,000 people, is recovering from the aftermath of a rebel insurgency that began in the 1990s. The city of Okere comprises 14 villages, each with approximately 200 residents.[18] The villages are: Acandyang, Akwalakwala, Amoka Adong, Amon Oneno, Amukaluga, Amukogungu, Apaku, Ayiiloi A, Ayiloi B, Okere, Cike, Kamdini, Oketpur, Omukugungu. Okere Community Development Project (Okere City) is an ambitious community-based social enterprise on a journey to transform Okere, a village in Otuke District, Northern Uganda, into a thriving, sustainable city through an integrated rural development model.[19] It is a community-driven development project often referred to as a "rural city" that aims to provide infrastructure such as schools, clinics, and solar power to a previously underserved area.

Study Intervention

This will be an art-based intervention involving 3 major creative art forms. The first form will be a poetry anthology that will involve storytelling, especially about earlier experiences. The next form will be a community mural in which elderly individuals will come together to create art based on their life experiences, guided by a professional artist. The community mural is intended to reflect the local culture, history, and values. It is also intended to foster a strong sense of pride and social cohesion within this

population. The other form will be a dance and physical exercise as demonstrated in Fig. 1. Together, these art forms will be evaluated for their effectiveness using the Montreal Cognitive Assessment (MoCA). The MoCA score has been widely used to evaluate cognitive function in elderly individuals and has strong psychometric properties.[20–22]

Study Population

The study population will consist of elderly persons aged 60 years and above residing in selected parishes in Otuke District. Participants must have lived in the area for at least six months and be able to communicate effectively.

Sample Size Determination

The sample size shall be determined to detect a mean difference in cognitive scores using a two-sided paired t-test.[23] The primary outcome will be the change in MoCA score. This will be based on the assumptions of an expected mean improvement of 2 points, a standard deviation of difference of 4, a power of 80%, and an alpha of 0.05. using the calculation below:

$$n = \left(\frac{\left(Z_{\alpha\,2} + Z_{\beta} \right) .\ \sigma_{\,d}}{\delta} \right)^{2}$$

where: Mean difference (δ) 2 points

Standard deviation of differences (σd) 4

Significance level (α) 0.05

Power (1 − β) 80%

Using the values above:

$$n = \left(\frac{(1.96 + 0.84) .\ 4}{2} \right)^{2}$$

n = 31.36

Considering a 30% drop out rate

$$n_{adjusted} = \frac{n}{1 - non\ response\ rate}$$

$$n_{adjusted} = \frac{31.36}{1 - 0.3}$$

$$n_{adjusted} = 44.8$$

The final sample size is 45 pairs. However, to account for potential loss to follow-up after 3 study visits and variability in intervention effects in a community-based setting, the sample size was conservatively increased to 60 participants to ensure adequate statistical power and robust findings.

Sampling and inclusion criteria

A multistage sampling approach will be used. Selected parishes will be identified in consultation with district authorities. Village elderly registers will serve as sampling frames, and eligible participants will be selected using simple random sampling. Elder persons aged 60 years and above who consent to participate in the study shall be included. Individuals with severe cognitive impairment shall be excluded from the study and referred to the nearest health facility for further management.

Data Collection, management, and analysis

Cognitive function will be assessed using the Montreal Cognitive Assessment (MoCA). Data will be collected electronically using tablets. Data will be captured using REDCap with built-in validation checks. Daily synchronisation and encrypted storage will be ensured. De-identified datasets will be stored in a password-protected Google Drive and accessible only to authorised research team members. Descriptive statistics will summarise participant characteristics and outcome measures. Inferential analysis will use paired t-tests for normally distributed continuous variables and Wilcoxon signed-rank tests for non-normally distributed data. For three time-point measurements, repeated-measures ANOVA or linear mixed-effects models will be used. Effect sizes will be calculated using Cohen's d, and statistical significance will be set at $p < 0.05$.

Ethical Considerations

This proposal has been reviewed and approved by the Mulago National Referral Research and Ethics Committee, receiving approval number MHREC 3139. All study participants will be informed about the study, and written informed consent will be obtained from them before recruitment. Informed consent will be obtained from all participants before research begins. They will receive clear info on the study's purpose, procedures, risks, benefits, duration, and their rights, with time for questions and clarification. Participation will begin only after participants give written informed consent. For those unable to provide written consent, procedures such as witnessed verbal consent will be used in accordance with ethical guidelines.

Participants will also be informed that they can withdraw at any time without penalty or impact on their services. The team will clarify that participation won't affect relationships with healthcare providers, institutions, or access to services. Participants will have time to decide independently and can decline to answer or withdraw at any time without giving a reason. The study will respect their autonomy. The study

will follow the ethical principle of non-maleficence by preventing avoidable harm to participants. Physical, psychological, social, and economic risks have been identified during the design of the proposal, and emphasis has been made to minimise them. Data collection will be respectful, maintaining privacy and sensitivity, especially with personal or sensitive topics. Clinical assessments will be performed by trained personnel in accordance with standard procedures to ensure safety.

Strict measures will be implemented to protect participants' privacy and confidentiality. Personal identifiers will be minimised; unique IDs will be used instead of names or direct identifiers. Data will be securely stored with restricted access: electronic data password-protected and physical documents locked. Study findings will be presented in aggregate, ensuring that no participants can be directly identified in reports or publications. The research team will maintain transparency and integrity by managing conflicts of interest and ensuring that personal or financial interests do not influence recruitment, data collection, analysis, or reporting. The study will be conducted in accordance with internationally recognised ethical principles for human research, including the principles outlined in the Declaration of Helsinki and applicable national research regulations. The data shall be discarded and deleted after 5 years post-project.

Study Status

The study has not yet commenced. Data collection is slated for the end of August, 2026.

Discussion

The proposed quasi-experimental study on art-based interventions for promoting brain health among older adults in Otuke District is both timely and contextually relevant. The integration of community-led art-based creative engagements, such as storytelling and painting, is key to promoting brain health and culturally linked evaluations, especially among the elderly.[24] There is a rapid population ageing transition and an increasing burden of neurocognitive disorders across both high and Low- and middle-income countries (LMICs).[25, 26] It is estimated that approximately 46.8 million elderly people live with dementia, with numbers expected to rise to 74.7 million by 2030.[24] The health systems within some settings, like LMICs, are inadequately prepared to manage the long-term care needs of ageing populations, especially with limited integration of mental health services in primary care. For example, evidence curated from South-East Asia demonstrates the presence of 1 psychiatric nurse, 1 psychiatric social worker, and 1 clinical psychologist in a population of 25,000.[27] Further evidence has demonstrated the absence of mental health care programs in LMICs, yet 8 in 10 elderly individuals are projected to have mental health illnesses by 2050.[28] Also, there are limited policy frameworks for caregiving for the elderly, which hinder the provision of optimal care.[29] Most mental health care for the elderly in LMICs is still provided by families, which may place a heavy emotional and financial burden. In Uganda, higher estimates of dementia among the elderly in Lira and Mukono further highlight the need for multiple, culturally appropriate interventions. [9, 10]

The use of creative arts as a therapeutic and preventive strategy for cognitive decline is increasingly supported by robust evidence. Engagement in artistic and cultural activities has been associated with improved cognitive resilience and delayed onset of dementia. These activities have also been found to engage attention, stimulate memories, and enhance communication.[30] Older adults who regularly engaged in arts activities, such as music and storytelling, had significantly lower rates of cognitive decline and better mental well-being over time.[31] The mechanisms through which creative arts exert their effects are multifaceted. Neuroscientific evidence suggests that activities such as music, dance, and storytelling simultaneously stimulate multiple brain regions, including the frontal cortex, thereby enhancing neuroplasticity and cognitive reserve.[32] This evidence further enhances the relevance of this study. The study's quasi-experimental design, with repeated measures at baseline, post-intervention, and follow-up, is appropriate for assessing both immediate and sustained effects of the intervention. The Montreal Cognitive Assessment (MoCA) is a validated, widely used tool for measuring cognitive outcomes, thereby enhancing the comparability of findings with other studies worldwide.

Dissemination Plans

A report will be generated upon completion of the study. Reporting will follow the JBI checklist for quasi-experimental studies (non-randomised experimental studies).[33] Results from the analysis will be presented to the relevant stakeholders, such as the Uganda Psychiatric Association. A manuscript will be generated for submission to a peer-reviewed journal. International conferences focusing on mental health, Alzheimer's, or dementia will also be targeted to present the study findings.

Potential Limitations

This study employs a quasi-experimental study design, which lacks a control group and may limit causal inference. Additionally, the proposed study design may limit the use of advanced statistical methods, such as mixed-effects models, to mitigate confounding. Contextual factors, such as education level, baseline cognitive status, and social support systems, may moderate the intervention's effectiveness. However, we will ensure consistent implementation of the intervention to minimise variability and enhance reliability.

Conclusion

This study represents an innovative and culturally grounded approach to addressing the growing burden of cognitive decline among older adults in rural Uganda. The study has the potential not only to improve cognitive outcomes but also to enhance social cohesion and overall well-being among the elderly population. If successful, the intervention could serve as a model for scalable, low-cost strategies to promote healthy ageing across similar settings in Sub-Saharan Africa.

Abbreviations

ANOVA	Analysis of Variance

LMICs	Low- and Middle-income countries
MoCA	Montreal Cognitive Assessment

Declarations

Ethics approval and consent to participate

This proposal has been reviewed and approved by the Mulago National Referral Research and Ethics Committee, receiving approval number MHREC 3139.

Consent for publication

No participant information is available in this version of the paper.

Availability of data and materials

No data has been generated yet, since this is a protocol.

Competing interests

Kiggundu Rodney Erismas is the grantee from the Global Brain Health Institute (GBHI). The authors declare no other financial or any other competing interests.

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Authors' contributions

ERK and EA conceptualised the study. FA, DGC, NLN, and OO developed the different manuscript segments and will coordinate the interventions during the implementation. NN, EM, AP, LM and CW reviewed the initial project proposal and suggested corresponding amendments. These will also lead the different segments once the project commences. IA and PM amended the manuscript and provided additional technical input. All authors approved the final manuscript for publication.

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Clinical Trial number

Not applicable

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Figures

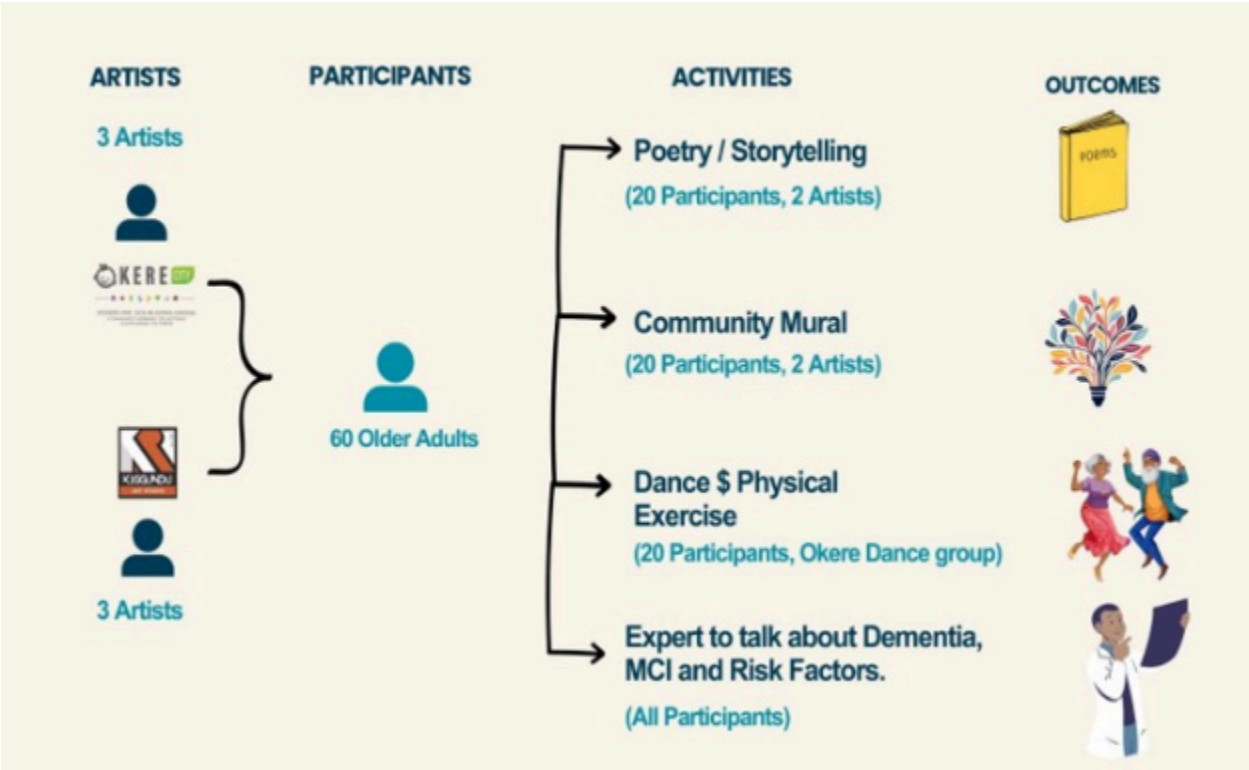


Figure 1

The different interventions proposed for the study.