INTRODUCTION

The global population is rapidly aging, and projections indicate a two-billion increase by 2050. This trend poses a multifaceted challenge with social, economic, and mainly health impacts, straining healthcare, welfare, and social care system. It also has significant implications for sustainable development. A scoping review has addressed efforts targeting older people under SDGs 1, 3, 10, and 11, although limited research is available on SDG-targeted efforts focused on older adults. Despite these challenges, aging presents opportunities, with older adults contributing to communities through works, volunteering, and informal care (Shevelkova, et al, 2023).

World Health Organization promoted the concept of healthy aging in 2015 as a process of developing and maintaining functional ability for well-being in older age, including happiness, satisfaction, and fulfillment, with functional ability encompassing health-related attributes supporting valued activities. WHO stated that ageing is also influenced by external factors like the built environment, societies and communities, policies, services, and systems, rather than biological process only (World Health Organization, 2015).

It is widely known and has become commonplace in society when the elderlies experience cognitive function decline. Dementia, a term for several diseases that affect memory, thinking, and the ability to perform daily tasks, are mainly affects older people but not all people will get it as they age (World Health Organization, 2023). Dementia becomes epidemic as the number of elderly increases (Sindi, et al, 2023).
2015). One of the most common causes of dementia is Alzheimer’s disease (60-70% of total cases). Alzheimer’s Indonesia on its page stated that every 3 seconds, 1 person in the world experiences dementia. Currently, more than 55 million people have dementia worldwide (Alzheimer’s Indonesia, 2023).

In Indonesia, it is estimated that there were around 1.2 million people with dementia in 2016, which will increase to 2 million in 2030 and 4 million people in 2050 (Alzheimer’s Indonesia, 2023). The estimated life expectancy of Indonesians in 2045 will increase to 77.6 years because of the decrease in mortality, and this increases the population of the elderly (Pusat Data dan Informasi Kementerian Kesehatan Republik Indonesia, 2013).

Dementia causes parental dependence and disability, and increases social, economic, and medical burden as its progression in cognitive capacity impairment can interfere with daily functioning or activities. Deterioration in cognitive capacity occurs because of the loss of the relationship between neurons or synapses and the breakdown of neurons themselves due to the formation of intracellular and intracellular neurofibril beta plaque formation (Shevelkova, et al, 2023).

Dementia is diagnosed based on careful medical history, physical examination, laboratory test, and the characteristic changes in thinking, day-to-day function and behaviour associated with each type (Alzheimer’s Association, 2023). Until now, there is no cure for dementia. Some medications only help to manage dementia symptoms (World Health Organization, 2023). Therefore, early intervention and prevention of dementia should be one of the primary focuses in public health, especially in primary health care (Shevelkova, et al, 2023).

Efforts in preventing dementia should also include the development of protective factors, including (1) psychosocial factors (high levels of education and socioeconomic status, social activities, and cognitive stimulation), (2) healthy lifestyle (physical activity), (3) healthy nutrition intake, and (4) the use of medicinal drugs to treat risk factors, because if dementia has occurred, the only thing that can be done is brain reservation and cognitive reservation to prevent the progression of dementia (Shevelkova, et al, 2023). (Pusat Data dan Informasi Kementerian Kesehatan Republik Indonesia, 2013).

CERIA (Cerdas Hindari Dementia), is a community development program that helped the elderly being physically active and taking part in activities and social activities that stimulate the brain and maintain daily function. The interventions are community-based activities which are hoped to maintain their quality of life and promote well-being. Our program aimed to evaluate the effectiveness of CERIA as community-based intervention, increase awareness of dementia and perform some activities involving brain stimulation. The primary focus is to do screening of cognitive function for pre- and post-intervention in the elderly in Kebagusan District, Pasar Minggu, and do early intervention in primary until tertiary preventive measures.

**METHODS**

*Design & Participants*

This is a quasi-experimental study conducted in Kebagusan District, Pasar Minggu, South Jakarta from May - October 2017. We included the reachable population of 32 eldersies aged 50 years old or older who all live in the neighborhood, willing to participate by signing an informed consent form, and are physically active. Exclusion criteria are bedridden elderly and unstable medical conditions. Samples were taken by consecutive method.

We conducted weekly meetings with the participants and gave different interventions each week. Assessment for dementia was done using the same tool at the baseline (on the first week before any intervention was given) and on the last week (after all the interventions had been given). Based on the results of the initial assessment, we excluded those with impaired ADL from having these interventions and referred them to the neurologist to be further examined.

Participants in each weekly session were not steadily maintained; one individual may come in 2 sessions and not in the others, another came in all sessions; it is subject to the participants’ convenience. In the end, there were 33 elderly who were exposed to at least one intervention and did both pre- and post-intervention tests, all of which were included in the analysis.
Tools

We used ABCDE screening tools for dementia to assess the conditions of the subjects pre-and post-intervention. ABCDE stands for A) Activity daily living, measured using Katz Index; B) Balance test, done using Romberg's test; C) Cognitive, done using Mini Mental State Examination (MMSE) questionnaire; D) Disability and Disease, recording of comorbidities occurred in the subject; and E) Emotion, measured using Geriatric Depression Scale (GDS) (Mayza, 2016) (Forbes, et al, 2013). ABCDE method introduced by Ministry of Health is a comprehensive examination including both physical and mental aspects (Sulistyaningsih, et al, 2021).

Activity Daily Living (ADL). The Katz Index for ADL was developed by Katz et al. in the 1960s. It measures six self-care tasks with dichotomous ratings (dependent as 0/independent as 1) as listed: bathing, dressing, toileting, transferring to and from a chair, maintaining continence, and feeding. The measurement result of six points indicates independence while less than two points is considered major functional impairment (Katz, et al, 1970) (Wallace, et al, n.d).

Balance. Romberg’s test was a standardized tool used widely in clinical settings to assess a patient’s ability to maintain body balance. Participants were told to stand erect, and the balance was observed. The participant is then told to close his eyes and be observed for one minute. This test is said to be positive if the subject is not able to maintain balance while observed, as implied by abnormal movements such as swaying or toppling over or even signs that the participant will fall. This tool was chosen for its simplicity to be done in many situations (Katz, et al, 1970) (Wiratman, 2017).

Cognitive. MMSE was also a widely used tool in neurological clinics. It consists of 11 instructions each assessing different cognitive domains such as orientation, registration, attention and calculation, memory recall, or language.9,14

Disability and Disease. Known history of life-long diseases such as diabetes Mellitus, hypertension, and dyslipidemia were recorded as they would impact the well-being as well as become risk factors for dementia (Piolatto, et al, 2022).

Interventions

Memory Training. We did memory recall training as part of our intervention to maintain cognitive function. We did the training by playing a 5 to 10-minute short film and asked participants about some key events, characters, or plots during the film.

Brain Vitalization Gymnastics. This is the gymnastics that stimulate the brain through some physical movements.

Playing angklung. Angklung is a traditional musical instrument originating from the Sundanese tribe of West Java, Indonesia. Angklung is very easy to play and was widely taught all around Indonesia, usually to elementary school students. This instrument was unique as it had to be played in a group, for one instrument being played by one person only represents one melody. Thus, playing angklung improves the cognitive function of the brain, as it demands concentration, trains auditory stimulation, and needs coordination between auditory stimuli and hand movement, while also inducing interpersonal social abilities among its players.

Storytelling to toddlers. The act of storytelling itself has various advantages for the elderly. It restricts cognitive function degradation.

Additional Instruments

In addition to the programs, we created supplementary instruments as a means of sustainability and ease of replicability of our program in the future. Buku Panda (Panduan Pencegahan Demensia) is a book that contains general information about dementia and written information about our program. It is provided as a manual book for the elderly group to run our program independently. All screening assessment tools as well as descriptions and materials for our interventions were given in the book.

Mobile Application. We developed an Android application to be used by healthcare workers to assist them while...
doing this program. The application contains all our screening/assessment tools as well as brief information about dementia and the CERIA intervention. Using this application, all assessment scores are readily stored on our cloud-based server and may be quickly analyzed. We hope this will ease future analysis and replication efforts of this program. This application may be found in the Google Play Store under the name CERIA.

RESULTS AND DISCUSSION

This intervention was conducted on 32 elderly people in Kebagusan District, Pasar Minggu, South Jakarta with a mean age of 61.9 years. The female elderly have greater frequency compared with male, that is women equal to 71.8% and males equal to 28.2%. Preliminary screening is performed before interventions that include daily activities, balance, cognitive function tests, depressive symptoms checkups, and comorbid disease.

Table 1. Baseline characteristics of subjects (n=32).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of subjects based on age</td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>2 (6,25)</td>
</tr>
<tr>
<td>50-59</td>
<td>9 (28,125)</td>
</tr>
<tr>
<td>60-69</td>
<td>16 (50)</td>
</tr>
<tr>
<td>70-79</td>
<td>5 (15,625)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>9 (28,125)</td>
</tr>
<tr>
<td>Women</td>
<td>23 (71,875)</td>
</tr>
<tr>
<td>Comorbid diseases</td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>9 (28,12)</td>
</tr>
<tr>
<td>Diabetes Melitus</td>
<td>6 (18,75)</td>
</tr>
<tr>
<td>Others</td>
<td>4 (12,5)</td>
</tr>
<tr>
<td>No disease</td>
<td>13 (40,62)</td>
</tr>
</tbody>
</table>

As many as 2 people (6.25%) experience impairment of daily activities. Examination of balance by using the Romberg test sharpened showed impairment in 2 elderly people (6.25%). On examination of cognitive function using MMSE, the average pre-intervention score in the elderly was 27.

Table 2. Screening results.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity daily living</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>30 (93,75%)</td>
</tr>
<tr>
<td>Impaired</td>
<td>2 (6,25%)</td>
</tr>
</tbody>
</table>

The examination of depressive symptoms using the Geriatric Depression Scale on pre-intervention showed a mean of 1 that classified into the normal category. A comorbid disease that is most suffered by the elderly is hypertension with an amount of 9 people (28.12%).

The results obtained were augmenting cognitive function improvement from the mean increase of MMSE score from 27 to 29. There were significant differences in MMSE scores before (M = 27 SD = 3.53009) and after intervention (M = 29, SD = 2.94044); p = 0.004, hypothesis test using Student T-test.

Examination of depressive symptoms also decreased from a mean of 1 to 0 after intervention. There were significant differences in the GDS Score before (M = 1, SD = 1.20439) and after intervention (M = 0, SD = 0.84190); p = 0.096, hypothesis test using Student T-test.

Preliminary screening was carried out using ABCDE tools. Almost all subjects who were screened in pre-intervention demonstrated good physical activity scores. The Romberg test was performed on all subjects in the pre-intervention stage as a screening test. Both ADL Katz Index Score and Romberg test were not carried out in the post-intervention since we did not attempt on improving motoric skills and balance of the body in the elderly.

In MMSE screening, there was a mean increase of 2 points. Many factors can contribute to the improvement of MMSE score, such as diet, social interaction, and physical activity. Activities that require cognitive skill and mental stimulation have been shown to protect against the progression of brain aging. Few studies investigated that decreases in mental engagement or cognitive stimulation during life are associated with dementia risk (World Health Organization, 2023). The elderly population in Kebagusan District were...
experiencing retirement, which is a risk factor for dementia. Exercise programs have a significant impact in improving the ability to perform activities daily living and cognition in elderly people. The evidence shows that exercise affects structural and functional changes in neurons. The increase of production of brain-derived synaptic proteins (BDNF) has induced exercise-related neurogenesis and neuron modelling. Meta-analyses written by Kuiper et al. (2016) confirmed that multiple aspects of social relationships are associated with cognitive decline. The modulation function of social circumstances involves the significant influence of social networks, encompassing both direct and indirect interactions among individuals through which information, attitudes, and norms are exchanged (Piolatto, et al, 2022).

From the GDS, the average score decreased from 1 point to 0 point. This shows a positive result as a high GDS indicates the presence of depressive symptoms in the elderly. Higher score on the GDS is mainly obtained in the elderly who were illiterate, who had no children, who were bedridden, who were without visits from relatives, and who had no activities outside (Jung, et al, 2017) (Patra, et al, 2017). Our results are in line with a systematic review by Mammen et al. (2013) which included 30 follow-up studies. They concluded that baseline physical activity is inversely related to depressive symptoms. The relationship between depression and future daily activity dependence is also found; lack of motivation and initiation is mainly found in people with depression, and this leads to restriction of daily physical activity. This explains that depression is strongly linked to lack of social interaction, physical activity, motivation, and initiation. In addition, a robust level of social involvement and expansive social connections have been linked to improved glucose regulation in adults without diabetes, as well as enhanced self-management of diabetes, leading to a decreased risk of dementia. This suggests a potential connection between social relationships and cognitive abilities (Marseglia, et al, 2019).

CONCLUSION

This program has the potential as a preventive measure for dementia that can be implemented in a wider scope. Several long-term efforts have been created, such as the PANDA book as a guideline for dementia prevention in the community and the CERIA application as a comprehensive dementia screening tool. From the results, it can be concluded that interaction with other people in daily life and physical activity on a regular basis play important roles in improving and maintaining cognitive function in the elderly and prevent the development of dementia.

REFERENCES
Jakarta: Neurobehavior division, Department of Neurology Faculty of Medicine Universitas Indonesia-Ciptomangunkusumo National General Hospital; 2016.