Assessing the implementation of a nursing home-based physical and mental training: Utilizing the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework: A qualitative descriptive study

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INTRODUCTION

The prevalence of sedentary behavior among nursing home residents has been high [1], especially during the coronavirus disease 2019 (COVID-19) pandemic [2]. Sedentary behavior is a risk factor for cardiovascular disease [3]. Furthermore, sedentary behavior can cause obesity, type 2 diabetes, muscle and bone problems, mental health issues, certain cancers, weaker bones, poor blood circulation, and trouble thinking. Many older adults do not know about physical exercise programs based on expert recommendations, so they do not achieve the expected results [4]. Some older adults believe physical exercise is
Experts recommend that older adults perform regular physical exercise weekly for 150~300 minutes, done 3~5 times. Exercise includes 150~300 minutes of moderate-intensity aerobic exercise, 75~150 minutes of high-intensity aerobic exercise, or an equivalent combination. Additionally, moderate-intensity muscle strengthening involves the main muscles for 2 or more days a week, a combination of functional balance and strength at moderate or vigorous intensity for a minimum of 3 days a week [7,8].

Many exercise programs have been designed to change sedentary behavior in older adults living in nursing homes; however, changes in behavior do not last long [9]. Physical exercise has several physical, mental, and social benefits. An example of a physical benefit is reducing the risk of cardiovascular disease and falling. Therefore, developing an exercise program suitable for nursing home residents is essential [10]. Various physical activity programs are necessary so that older adults do not get bored easily during exercise; increase motivation and compliance with exercise [11]; improve mood, self-confidence, and happiness; and reduce anxiety and depression to improve their quality of life [12].

Caregiver staff for nursing home residents must also increase motivation and pay attention to older adults’ preferred physical activity desires [8]. In addition to physical activity, mental and spiritual activities must also be included. It aims to improve the quality of life in older adults. Holistic care emphasizes the importance of the dynamic interaction of biological, psychological, social, and spiritual components to obtain optimal results [13].

A new program was designed for older adults who could move independently in nursing homes. This program is called Spirit and refers to enthusiasm. The Spirit program comprises a blend of physical exercises and mindfulness practice, including chair exercises, stationary bike exercises, walking, muscle-strengthening exercises, flexibility exercises, balance training, breathing relaxation, and gratitude practice. It aims to improve physical fitness and reduce anxiety, blood pressure, and the risk of falling, thus improving the quality of life of older nursing home residents. The researchers were interested in creating a new program for nursing home residents by combining safe, easy, and beneficial physical activities, such as aerobic exercises, strength training, flexibility exercises, and balance exercises. The program was complemented by breathing relaxation and gratitude therapy.

The Spirit program was based on recommendations from a review of 29 articles that highlighted the importance of engaging in physical activities that could be performed at home during the COVID-19 pandemic [14]. These activities focused on aerobicics, strength, flexibility, balance exercises, relaxation, and meditation practices, as they can improve both physical and mental health while reducing the risk of falls, especially in older adults. The program consisted of physical exercises that included gymnastics, stationary bicycles, and walking, combined with breathing relaxation and gratitude, performed for 60 minutes three times a week, accompanied by an instructor. Researchers trained caregiver staff at a nursing home to become program instructors and supervisors in three sessions of 2 hours each until caregivers were deemed capable of becoming instructors. The research team member and caregiver taught or instructed the nursing home resident to follow the Spirit program. This program starts according to the abilities of older adults and can be gradually added.

In Indonesia, research on easy, inexpensive, and low-risk physical activities for older individuals is limited. Current research topics in the older adult population mostly focus on non-pharmacological therapies for disease prevention and mild disorders (minor health problems or medical conditions that are not overly severe but still have a slight impact on an individual’s well-being or functioning) [15]. Meta-analysis results have shown that regular physical exercise in older adults is beneficial for reducing depression, improving the quality of life, and enhancing self-esteem [16]. As a non-pharmacological therapy, slow breathing techniques can lower blood pressure in older adults [17]. Therefore, it is expected to provide an easily implementable physical activity program for older adults as a follow-up to these findings.

The Spirit program was conducted in a nursing home. This study aimed to evaluate the pilot implementation of the Spirit program to determine whether it could be applied to a broader population.

**METHODS**

**Ethic statement:** The Faculty of Medicine, Sebelas Maret University’s research ethics committee has examined the protocol and given ethical clearance number: 88/UN27.06.6.1/KEP/EC/2021. The participants had given verbal consent to participate and they could withdraw at any time.
The Spirit program aimed to improve the physical and mental health of older adults residing in nursing homes during the social restrictions of the pandemic. The Spirit program was developed based on a literature review until May 14, 2020, and focused on maintaining physical fitness and mental health during the COVID-19 pandemic. From 29 high-quality publications in reputable databases, such as Embase, PubMed, SCOPUS, SPORTDiscus, and Web of Science, reduced physical activity during the pandemic was found to cause declines in various aspects such as oxygen consumption, cell oxygen uptake, stroke volume, circulation, and muscle metabolism. These conditions lead to physical and mental impairments. Recommendations for older adults include aerobic exercises, strength training, flexibility exercises, meditation, and balance training. Institutions are advised to create home-based physical activity programs, especially during government-imposed restrictions [14]. Sports and psychology experts have reviewed and approved the program.

We formed a team comprising two experts: one specializing in sports and the other in psychology. The sports specialist validates the physical activity movements for older adults that we propose by reviewing video recordings we have created. The sports expert team then meticulously evaluates these movements and provides feedback for improvement. To improve this, we got help from a psychology specialist to suggest mental and spiritual activities to go along with exercises. Afterwards, we concluded that exercises could be combined with relaxation and expressing gratitude. The inquiries we directed to both expert teams were as follows: 1) What do you think about stationary cycling, walking exercises, senior gymnastics, muscle-strengthening exercises, flexibility routines, relaxation, and expressing gratitude for elderly individuals?; 2) How do you perceive the exercise timing (3 times a week, 50~60 minutes)?; 3) According to your perspective, what elements influence the engagement of older adults in this initiative?; and 4) What advice or suggestions would you offer for enhancing this program?

The trial of the Spirit program was conducted on July 2022 for 4 weeks at a nursing home. Data were collected 1 week after the program trial was completed by interviewing seven older adults and two caregivers who had participated in the Spirit program trial. All sources provided informed consent to participate in the study. To participate in the Spirit program, individuals need to meet the following criteria: Being aged ≥ 60 years, possessing good communication skills, being willing to undergo the intervention, having resided in a nursing home in Surakarta for at least 3 months, having a Katz Index of Activities of Daily Living score indicating independence in essential daily activities [18], and obtaining permission from the nursing home management.

The researcher used a structured interview guide within The Reach, Effectiveness, Adoption, Implementation, Maintenance (RE-AIM) framework (Table 1). The RE-AIM was developed by Glasgow in 1999 [19]. This evaluation framework has five dimensions: reach, effectiveness, adoption, implementation, and maintenance. This study assessed the effects of public health interventions [19]. Interviews were conducted by a principal investigator with prior experience. The list of interview questions is presented in Table 1. The interviews were audio recorded and transcribed verbatim. NVivo12 software was used for data processing, coding, and analysis [20]. The research ethics committee examined and approved the study protocol and gave ethical clearance (institutional review board approval No. 88/UN27.06.6.1/KEP/EC/2021). The participants

<table>
<thead>
<tr>
<th>Domain</th>
<th>Definition</th>
<th>Question example</th>
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<tr>
<td>Reach</td>
<td>- How is the participation of older adults in participating in the program and is expected to get.</td>
<td>- How many older adults join the program?</td>
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<tr>
<td>Effectiveness</td>
<td>- The benefits of the program on the activities and quality of life of older adults in nursing homes.</td>
<td>- What is the impact felt by older adults?</td>
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<tr>
<td>Adoption</td>
<td>- Description of how the program is promoted and endeavored to be accepted and followed by all respondents or participants.</td>
<td>- Were there any activities that were easy or difficult to continue?</td>
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<tr>
<td>Implementation</td>
<td>- How do the nursing house staff implement the program?</td>
<td>- What factors influence the participation of older adults in this program?</td>
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<tr>
<td>Maintenance</td>
<td>- Willingness of participants to continue to carry out the program</td>
<td>- Are they willing to continue this program?</td>
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RE-AIM=Reach, Effectiveness, Adoption, Implementation, Maintenance.
provided verbal consent to participate and withdraw from the study at any time. To ensure data credibility, researchers employed triangulation. This was achieved by involving multiple researchers in the analytical process to merge the data's interpretations objectively. Steps were taken, including team collaboration involving multiple researchers, discussions, and comparisons of the results, achieving consensus through in-depth discussions, and additional validation through external parties to objectively merge the interpretation of data [21].

We employed a descriptive qualitative methodology with a deductive approach during our qualitative analysis, integrating the RE-AIM framework. Our research aimed to evaluate the current and future status of the Spirit program, focusing on participant reach, program effectiveness, nursing home adoption, implementation consistency, and program maintenance. We asked the same interview questions to both older adults and caregivers using the RE-AIM framework and sought to understand the perspectives of both groups. Despite the limited participant size, the responses exhibited a common and steady pattern. This indicates that the collected data reached saturation, suggesting that the incorporation of additional participants is improbable to bring forth substantial or pertinent novel insights related to the research topic.

### RESULTS

The older adults living in this nursing home have an average age of 66.0 years. They have been residents there for almost 2 years. Among the seven participants, five of them don’t have any other health conditions. The particulars of these characteristics of older adult participants are indicated in Table 2.

The descriptive qualitative analysis results are presented as findings across various themes, utilizing the RE-AIM framework are presented in Table 3. Reach: Older adults who are in good health and can walk can access the Spirit Program for nursing home residents. Effectiveness: The Spirit program brings older adults happiness, togetherness, entertainment, and good care and improves physical health, especially regarding better sleep quality. Adoption: Nursing home caregivers actively support the program by dedicating time as instructors, providing facilities, and motivating older adults to participate. Implementation: Older adults can actively engage in Spirit programs. It is recommended that balance exercises be simplified for easier participation by all older adults, with strict supervision from the instructor. Maintenance: The Spirit program is intended to be sustained by nursing home residents, with the primary goal of improving the quality of life for older adults. This is achieved through various means, including facility maintenance, communication, and implementation of feedback support programs. Furthermore, multiple benefits in dif-

<table>
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<th>Table 2. Characteristics of Participants</th>
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<tr>
<td>Characteristic</td>
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<tr>
<td>Average age (year)</td>
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<td>Length of stay in nursing home (month)</td>
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<tr>
<td>Sex</td>
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<tr>
<td>Male</td>
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<td>Female</td>
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<td>Educational background</td>
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Values are presented as mean±standard deviation or n (%).
Different directions motivated participants to continue with the Spirit program.

1. Reach

The program’s scope was evaluated to determine how much it could reach a specific population or group. Additionally, reach can be interpreted as how many participants can follow or participate in the program. The scope or reach of the program was revealed by the orphanage staff, namely, the older adults in nursing homes who were still healthy and able to walk. Residents who have to rest completely or just bed rest cannot participate in the program. Participants indicated that the Spirit program was easy to implement for older adults, making it applicable to any nursing home setting and benefiting a larger population of independent nursing home residents.

“For individuals who are still in good health, meaning they can walk and do not require bed rest, they are still able to engage in their daily activities.” (Older Adult 6)

“For the number of participants themselves, from start to finish, 7–8 older adults participate in this program.” (Caregiver 1)

2. Effectiveness

Effectiveness is assessed based on how the program can provide benefits as directly expressed by participants. The older adults revealed that the Spirit program is one of the things they enjoy because after participating, they can feel happiness, togetherness, and entertainment well-cared for. Moreover, after regularly participating in the program, older adults felt physically healthier, especially due to better sleep quality.

“Yes, if I could get an extra hour of sleep, it would benefit me. Second, I feel happy when we are always cared for together. Consequently, I do not feel bored like that. I sincerely thank you for your attention.” (Older Adult 4)

3. Adoption

Adoption describes how the program is promoted, accepted, and followed by all the respondents or participants. In this study, nursing home caregivers actively supported the program by providing time to become instructors, providing facilities, and motivating older adults to participate.

“We always encourage the older adults to join us. We reach out to the caregivers in all departments to include as many grandparents as possible, especially those still capable of participating in the program. However, we should not push too hard. If they decide to come, they can come; if not, they have the choice not to attend.” (Caregiver 1)

The nursing home caretakers also revealed that the Spirit program could become a well-organized program and facilitate the active movement of older adults.

“That is good enough, good enough... The grandmother is also happy. Most of them are still here. No more suggestions are needed; it is already good they have been trained. Um... their joints are active again, just like that.” (Caregiver 2)

4. Implementation

Implementation was assessed based on program implementation, including how the program was implemented, the schedule of activities, participants’ enthusiasm, reasons for participants wanting to join the program, and criticism and suggestions from older adult participants and nursing home staff regarding the sustainability of the Spirit Program.

“Yes, sir, because the instructor has not arrived yet. Some grandparents inquired about the delay and wondered why the sports instructor did not arrive. Their questions indicated their desire to engage in instructor-led activities. They eagerly await the instructor’s arrival as they are strongly inclined to participate in sports activities.” (Caregiver 1)

Seniors can join the movement in the Spirit program.

“For the movement, it is already possible to reach, sir, at least according to his grandmother. It is not too difficult.” (Older Adult 5)

Balance exercises must be simplified in movement to make them easier for all older adults and require close supervision from instructors.
“I am sorry, sir, but I am unable to do it. I cannot walk in a straight line like that if I do not have something to hold onto.” (Older Adult 1)

5. Maintenance

Maintenance refers to how program participants can still use the experiences they found while participating in the Spirit program to continue being carried out by nursing home residents. Participants can utilize their experiences to continue implementing the Spirit program in nursing homes. Various benefits motivated the participants to continue the Spirit program. In ensuring the continuity of this program, maintenance was conducted by involving participants’ experiences, facility maintenance, and ongoing communication. Additionally, suggestions are provided to support the program’s implementation to continue running in nursing homes.

“Later on, we might place this tool in the hall. For instance, there will be a designated area for it in the future.” (Older Adult 5)

“Yes, we will... we will also have regular briefings for the present clients. Afterward, we will guide them to use it. Additionally, on Fridays, we have an exercise session. Later, we will invite the older adults to come to the hall and perform the exercises independently, especially those still capable of walking actively.” (Caregiver 2)

“Whenever I can use the bicycle, I do not need to bring it to the office. It can stay here. If I am at the office, I hesitate to ask someone from the office first (laughs).” (Older Adult 2)

DISCUSSION

The qualitative in-depth interview analysis used the RE-AIM framework to present the findings. The Spirit Program is accessible to healthy older adults living in nursing homes. It brings happiness, togetherness, entertainment, and good care and improves physical health, including sleep quality. Nursing home caretakers actively supported the program by dedicating time as instructors and providing facilities to motivate participation. Under instructor supervision, older adults participated in a program with the recommended simplified balance exercises. The program aimed to sustain and enhance older adults’ quality of life in nursing homes, motivated by multiple benefits.

The Spirit program was conducted in stages according to the abilities of the older adults. Programming considers the results of previous research on activities for older adults [8,14,22]. This study’s results are consistent with those of previous studies that have shown a significant increase in the quality of life of older adults after participating in a program [22,23], especially during the COVID-19 pandemic [24]. The results are also consistent with meta-analysis conclusions regarding the relationship between physical activity and quality of life in older adults [16].

Existing programs must be evaluated periodically. Researchers have used the RE-AIM framework to assess the Spirit program because RE-AIM has been widely used by many researchers in public health and behavior change, especially qualitative research. This design can provide more in-depth information about the benefits obtained from a program and why and how the process occurs, which is difficult to explore using quantitative research [24].

Overall, the older adults performed well in the Spirit program. Indoor static bicycle exercise is the preferred exercise in fitness centers and is beneficial for increasing aerobic capacity and lowering blood pressure, lipid profile, and body composition [25]. The review results showed that regular physical activity positively affects all body systems; reduces stress and anxiety; and increases self-confidence and hormones of happiness, brain performance, and memory [26]. Participants stated that they benefited not only from healthier aspects of physical health, namely, being fitter, more flexible, and having better sleep quality, but also from feeling happy, being together, being entertained, and feeling cared for.

The participants revealed that there were older people with limited movement; therefore, the exercises were adjusted to their abilities, especially during balance exercises. Balance training can be performed using static or dynamic exercises. It can be prescribed based on older adults’ ability to consult a health sports expert [27]. Balance training must still be conducted, considering that the prevalence of injuries related to falls in older adults in Indonesia is 12.8%; therefore, efforts are needed to prevent falls [28]. The meta-analysis showed that balance training, as a single program or combined with other activities, effectively prevented falls in older adults, especially those in nursing homes [29].

Activities should have the ability to make older adults feel comfortable, motivating them to do it regularly and avoiding excessive exercise that risks injury. Physical activity beyond the threshold of the training zone results in a decrease in mito-
chondrial function in cells [30], interferes with insulin metabolism and reduces the immune system [31].

Social support is essential in implementing programs for older adults [32]. The Spirit program received social support from nursing home managers, fellow seniors, and outsiders. The support provided was in the form of information, assistance with facilities and infrastructure, and motivation. This is one of the reasons older adults consistently participate in the Spirit program so that it can be appropriately implemented and is highly effective.

The maintenance and continuation of the Spirit program should be accompanied by various improvements and the availability of facilities for physical activity, motivation, and social support for nursing home residents, as well as scheduling adjusted to the abilities of older adults participating in the program. This maintenance and sustainability are based on a positive increase in the quality of life of older adults toward consistent, productive physical activity, especially when facing various events in their lives [33].

The Spirit program, combined with physical activity, relaxation techniques, gratitude therapy, and blood pressure monitoring, offers a comprehensive approach to address the unique challenges older adults face during this difficult time. By engaging in regular physical exercise, older adults can maintain their physical fitness, improve their mental well-being, and reduce their risk of falls [34]. The inclusion of relaxation techniques and gratitude therapy further contributed to managing stress and promoting a positive mindset. Additionally, the integration of blood pressure monitoring allows for the proactive management of cardiovascular health, which is crucial for older adults. By implementing the Spirit program, nursing home residents and older adult care facilities can provide a holistic and tailored approach to support older adults’ well-being and overall quality of life during a pandemic. Future research should explore the long-term effects and sustainability of the Spirit program in improving the physical and mental health outcomes of older adults in similar settings.

This study has some limitations. Although the RE-AIM provides comprehensive guidelines for evaluating public health interventions, the findings may not directly apply to a broader population. The applicability of the results could be influenced by the specific conditions and characteristics of the evaluation study. Another limitation is the small number of participants in the qualitative research. This choice was because of the study’s focus on a limited population of nursing home residents, which affected the amount of data that could be collected.

**CONCLUSION**

The Spirit program, which consists of gymnastics, stationary bicycles, walking, flexibility exercises, muscle strength, and balance, combined with breathing relaxation, provides the benefits of increasing physical fitness, health, happiness, and social interaction, making it worthy of being considered as a program to improve the quality of life of older adults in nursing homes.

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**Authors’ contribution**

Conceptualization - EBC and AAS; Data curation - EBC; Formal analysis - EBC and S; Funding acquisition - AAS; Investigation - EBC; Methodology - AK and S; Project administration - EBC; Resources - AAS; Supervision - AAS, AK, and S; Validation - AAS, AK, and S; Writing – original draft - EBC; Writing – review & editing - EBC, AAS, AK, and S.

**Conflict of interest**

No existing or potential conflict of interest relevant to this article was reported.

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**Data availability**

Please contact the corresponding author for data availability.

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