

Assessing needs for developing a multisensory room design with Javanese gestures for older adults

Fery Agusman Motuho Mendrofa¹, Umi Hani^{1*}, Rita Hadi Widyastuti², Restu Murniati³, and Wisnu Pratama³

¹Department of Community Health Nursing, Universitas Karya Husada Semarang, Semarang, Indonesia

²Nursing Department, Faculty of Medicine, Universitas Diponegoro, Semarang, Indonesia

³Nursing Study Program, Universitas Karya Husada Semarang, Semarang, Indonesia

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Corresponding author:

Umi Hani

Universitas Karya Husada Semarang, Jl. R. Soekanto 46, 50276, Semarang, Indonesia

Email: umi.hani.ners@gmail.com

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Abstract

Background: Multisensory stimulation in the elderly helps train cognitive function and motor skills by incorporating elements that stimulate their senses. The application of a multisensory room caters to sensory stimulation identified for individuals experiencing cognitive decline from moderate to severe and those with neurodegenerative conditions such as Parkinson's, Dementia, and Alzheimer's.

Objective: This study aimed to assess needs to develop a multisensory room design tailored with a Javanese cultural approach for the older adults.

Methods: A plan for a multisensory room was made involving experts in gerontic nursing, design, and interior space design. Qualitative data collection utilized the Focus Group Discussion (FGD) technique. FGD was employed to comprehend factors associated with the necessity of a therapeutic room for the elderly, especially concerning the functionality of the multisensory space. Additionally, the FGD sought to identify Javanese cultural elements applicable to the room concept. Participants in the FGD included geriatric nurses, representatives from Alzheimer's Indonesia, Javanese cultural experts, architects, and Health Service members. The analysis of FGD results was conducted using the Colaizzi method. This involved creating transcripts from the FGD, multiple readings of the transcripts, extracting significant statements, validation with participants, and formulating meaningful themes, sub-themes, and categories. The themes identified during the data analysis were integrated and presented as research outcomes.

Results: Two themes emerged from the analysis: aspects that need to be considered when creating a multisensory room and the elements in a multisensory room.

Conclusion: By addressing the demand for innovative elderly health services and collaborating with stakeholders in developing spatial models, this study anticipates the creation of applicable and beneficial space designs. This endeavor aims to validate the effectiveness of the applied concepts in line with evolving health needs, particularly concerning the elderly population.

Keywords: elderly; Javanese culture; multisensory room; older adult; Indonesia

Background

The number of elderly populations continues to increase, and it is projected that by 2035, Indonesia

will enter an aging population (Fery Agusman Motuho Mendrofa & Umi Hani, 2020). Indonesia, the fourth most populous country in the world, is relatively young compared to other countries in

Southeast Asia. However, with a relatively low proportion of older people compared to other countries, the number of older people is still ranked eighth in the world (Alzheimer Indonesia, 2019; Arnata et al., 2018; Badan Pusat Statistik, 2019). Likewise, older people in Semarang also continue to experience an increase. In 2020, there were 170 thousand older people (9.29%) spread across 37 sub-districts (Badan Pusat Statistik, 2021).

The ageing population structure indicates the success of achieving human development related to increasing life expectancy. This change in demographic structure is caused by an increase in the elderly population with a decrease in the death rate and a decline in the number of births. This situation is related to improvements in the quality of health and improved community social conditions. However, an increase in life expectancy can also result in an epidemiological transition in the health sector due to increased morbidity due to degenerative diseases, including reduced cognitive function and productivity in the elderly (Maulana & Rizal, 2023).

Ageing is related to the degenerative process of physiological functions, so good physical and mental conditions do not always accompany old age. Impaired cognitive function is usually accompanied by worsening control of emotions, behavior and motivation (Djajasaputra & Halim, 2019). Negative behaviors associated with decreased cognitive function result in decreased health and disability (Fery Agusman Motuho Mendrofa & Aeni, 2020). Decreased cognitive function also impacts decreasing daily social activities in the elderly, which is a problem in public health. It impacts increasing family, community and government funding related to health care needs.

Older people with impaired cognitive function is often neglected when making decisions regarding self-care. Every part of society must play an active role in helping maintain the quality of life of the elderly. Several strategies have been tried to improve subjective well-being (SWB) in the elderly. Negative behavior in the elderly is triggered by environmental conditions related to the senses of smell, touch and sight. Non-pharmacological management approaches should be considered to manage complex symptoms in the elderly (Fery Agusman Motuho Mendrofa & Aeni, 2020). In the

elderly, positive emotions can reduce mortality rates or prolong life (Maulana & Rizal, 2023). In this case, a positive physical and social living environment, giving elderly people the opportunity to carry out essential daily activities independently, significantly influences SWB (Pangestia, 2022). Environmental aspects also significantly impact caregivers who accompany elderly people with dementia. Families and caregivers must be involved in designing comfortable spaces in elderly care (He et al., 2023).

A comfortable environment that supports the elderly's independent participation in self-care provides many benefits (Fery Agusman Motuho Mendrofa & Aeni, 2020). An environment that does not confuse the elderly needs to be designed, among other things, by avoiding shiny floors that can be perceived as water or using contrasting patterns and colors effectively to increase activity independence safely (He et al., 2023). In addition, the environment must minimize stressors for the elderly through physical design, adding physical objects, or modifying gathering spaces (Evans et al., 2019; Figueiro et al., 2019; He et al., 2023). Environmental modifications have been identified as reducing symptoms of impaired cognitive function, especially those related to behavior and psychology.

Several parts of the environment, such as noise reduction, lighting settings, natural light, easy access to gardens, dining environments, and interior settings, affect health more significantly than the environment surrounding the elderly, for example, nursing homes or residential homes (Bourdon et al., 2022). One environmental modification that can be attempted to create a therapeutic environment for the elderly is an environment with multisensory stimuli. Multisensory, as a non-pharmacological therapy through various environmental modifications, provides sensory stimulation, encouraging a person to explore their sensory and emotional experiences. Various countries have considered multisensory environments for older adults with cognitive problems. The UK, Spain, Australia and the United States have begun applying multisensory stimulation in caring for older people with dementia. Because the feelings and behavior of older adults are different in a multisensory stimulation environment, appropriate adjustments must be made to physical and emotional needs so that older adults can experience the multisensory stimulation environment in a comfortable mood

without resistance or increased difficulty (Tsai & Hong, 2019).

Multisensory stimulation can be achieved in the built environment, for example, in rooms equipped with various colors of lighting, visual displays, fiber optic lamps, projectors for beams on walls, tactile objects, bubble tubes, olfactory stimulants, equipment for sound production, as well as various furniture for relaxing, such as floor pillows and water or air beds. These facilities are designed so that caregivers or nurses can come in and share experiences with clients. Multisensory environments have therapeutic value and can be used as recreational activities that provide therapeutic effects (Burns et al., 2020).

A multisensory room as a therapeutic space is a multisensory stimulation method based on the assumption that sensory stimulation can improve the quality of life. However, the level of evidence is still controversial. Multisensory rooms are widely known and used as a therapeutic environment. Snoezelen Multisensory Room (SMR), known to some as a "comfort room," is a sensory, non-verbal, and non-pharmacological treatment (Barbier et al., 2022; Di Taranto et al., 2022). Several studies have identified three aspects in designing a multisensory room: the intrinsic features and functionality of the room, accessibility and availability, and special equipment or desired sensory experiences. Currently, known sensory items in multisensory spaces include light boards, fiber-optic curtains, bubble-light tubes, light projectors, tactile touch walls, sound boards, aromatherapy, armchairs with vibroacoustic attachments, and foam wedges (Duchi et al., 2019). However, in Indonesia, a multisensory room has not been developed for the elderly, so it is necessary to explore the development of a multisensory room for the elderly. This research aimed to assess the needs to explore multisensory room with a cultural approach. In this research, researchers used a Javanese cultural approach in the features designed for the multisensory room.

Methods

Study Design

A descriptive qualitative study approach was adopted to understand the need for creating multisensory room design with Javanese gestures

and to explain multisensory room design with Javanese gestures.

Setting

The research was carried out from August to October 2023 in Semarang. This research is a collaboration between Karya Husada University Semarang and Diponegoro University Semarang.

Participants

The Focus Group Discussion (FGD) involved geriatric nurse, caregiver, architect, health officer and Javanese culturalist. FGD were conducted primarily by authors who had trained and experienced qualitative researches to understand the needs of multisensory room design with Javanese gestures. Before the study began, a working connection was created with each participant, and inquired about their interest in taking part in the study. The nature and goal of the study were communicated to the participants, who also received assurances of complete anonymity.

Data Collection

Face-to-face FGDs were conducted after obtaining the informed written consents and assents of the participants. An FGD guide format was created during the research. Open-ended questions set the stage for the FGDs, which lasted 120 minutes. The majority of the FGD was conducted in Indonesian.

Data Analysis

This data was qualitatively analyzed using thematic analysis (Vaismoradi et al., 2016). Recordings obtained from FGDs was transcribed. After carefully reading and rereading the transcripts to find the themes in the manuscripts, then authors used inductive analysis to arrange and code the topics (Fereday & Muir-Cochrane, 2006). After that, the codes were once again examined in accordance with the categories for the frequency of recurring patterns across all of the manuscripts. The themes and quotes were translated from Indonesian to English. Data analysis was helped by ATLAS.ti software version 23.

Trustworthiness

Data validity testing aims to increase or optimize research rigor. Credibility, reliability, confirmability, and transferability were all aspects of data trustworthiness (Polit & Beck, 2010). Regarding credibility, the researcher returned to the

participants the verbatim results and voice recordings as well as the thematic analysis results to be checked for veracity. Some participants added or subtracted before giving consent. Some additions provided by participants were regarding the security of each feature included in the space. Researchers also apply the principle of transferability by providing the results of theme analysis to experts who are not participants but have the same criteria. Researchers visited architectural experts who concentrated on elderly housing and geriatricians to discuss the themes of the research results. If the theme analysis is following the science, then it can be said that the research results meet the principle of transferability.

Ethical Considerations

Ethics approval was conducted by the Ethics Committee, University of Karya Husada Semarang number 329/KEP/UNKAHA/SLE/VII/2023.

Results

Data analysis was carried out objectively using ATLAS.ti software is presented without providing theoretical interpretation. The information described

will be discussed in more detail in the discussion section to understand better the need to create multisensory room designs with Javanese cultural gestures for older adults from the theories and concepts used in this research.

This study held an expert forum on August 2, 2023. Five experts from academy, health service, geriatric nurse expert, Javanese cultural expert, representative of the elderly health observer association as well as elderly caregiver, and architect. The background information of experts is given in **Table 1**.

Table 1 Background information of experts

Identification codes	Affiliation
Dw	Yayasan Alzheimer's Indonesia chapter Semarang
I	Central General Hospital of Dr. Kariadi Semarang
Ir	Health Department of Semarang City
D	Culturalist
H	Architect Consultant

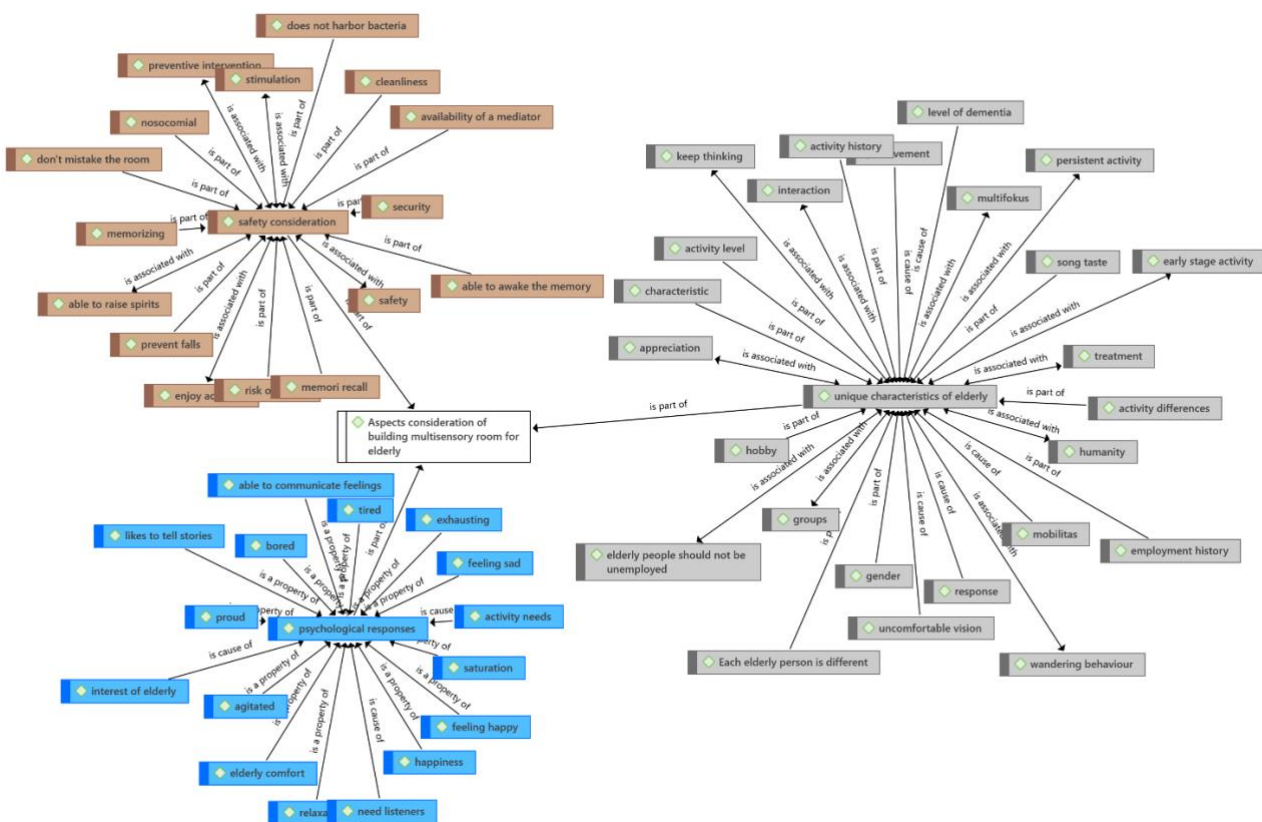


Figure 1 Theme 1: Aspects consideration of building multisensory room

The themes that emerged from the qualitative analysis are presented in the model below (**Figure 1 and 2**). This shows a study of the need for designing multisensory spaces for the elderly by paying attention to various aspects that are directly related to the elderly and their families or caregivers. The aspects consideration of building multisensory room for elderly consist of safety consideration, unique characteristics of elderly, and psychological responses among elderly.

The elements for building a multisensory room for the elderly can be understood from the statements submitted by FGD participants, which include elements for activities stimulation which include gardening, sensory activities, daily living activities, playing activities; elements for sensory stimulation which include sound sensory, vision sensory, olfactory sensory, light stimulation, touch; physical space; and physical objects. Based on the results of the focus group discussion conducted, the following is the coding for the two themes found.

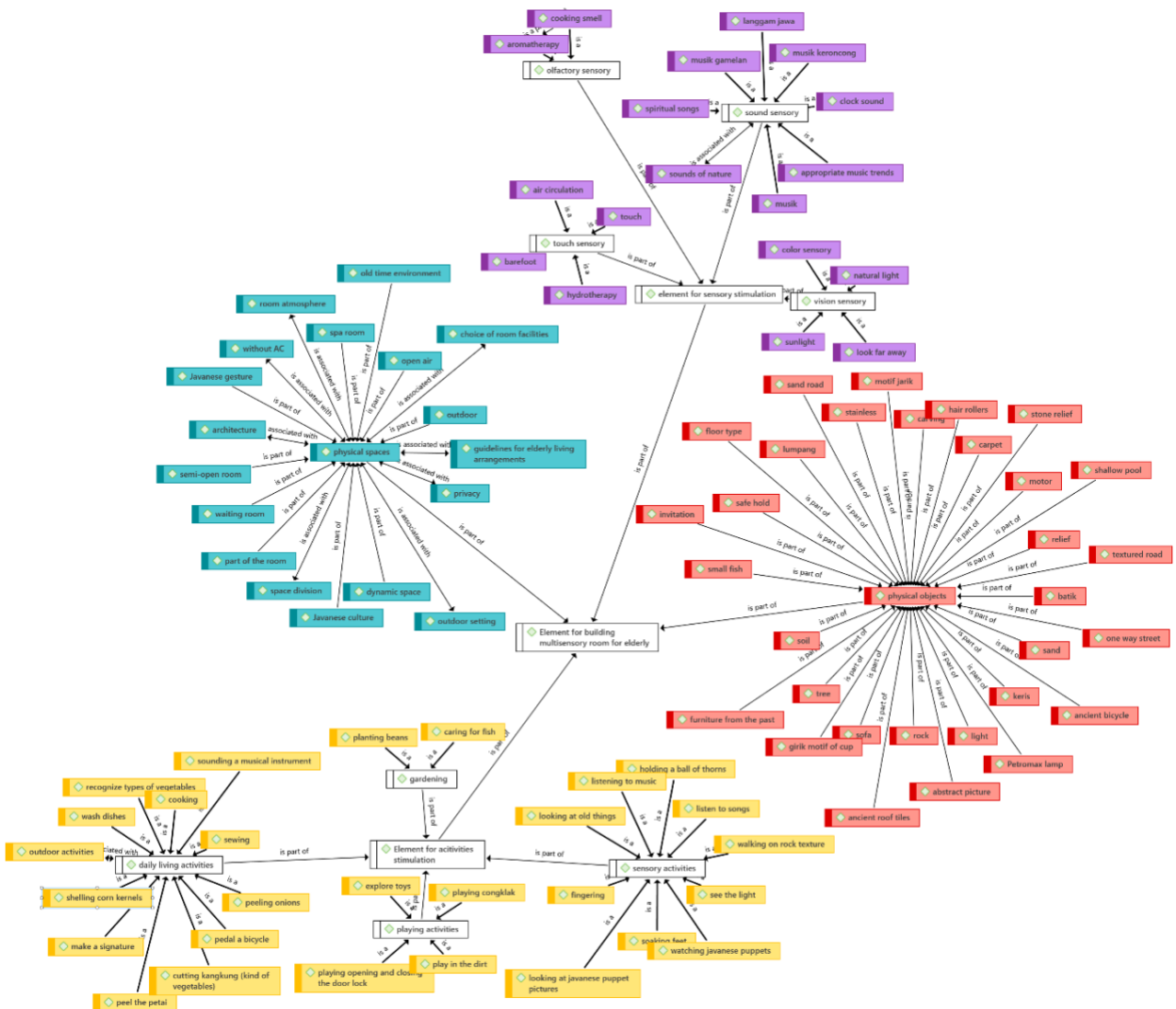


Figure 2 Theme 2: Element for building multisensory room for elderly

Discussion

Aspects consideration of building multisensory room

Multisensory environments (MSEs) and multi sensory stimulation (MSS) are nonpharmacological

interventions used for behavior modification that have gained much popularity in recent years (Helbling et al., 2023). Multisensory helps with cognitive and behavioral improvements. The targets of the multisensory stimulation environment are the intervention of nature, past life experiences, the

memory and beliefs of the culture, and user characteristics (Tsai & Hong, 2019). A previous study has shown that multisensory environment and stimulation therapy are beneficial in cognitive and behavioral disorders. Multisensory environmental stimulation can improve anxiety, depression, cognition, and other behavioral disorders such as agitative behavior (Helbling et al., 2023).

Sensory stimulation using a multisensory room can improve the quality of life. However, the level of evidence is still controversial. Multisensory rooms are widely known and used as a therapeutic environment. Snoezelen Multisensory Room (SMR), known to some as a "comfort room", is a sensory, non-verbal, and non-pharmacological treatment (Barbier et al., 2022; Di Taranto et al., 2022; González-García et al., 2022). Several studies have identified three aspects in designing a multisensory room: the intrinsic features and functionality of the room, accessibility and availability, and special equipment or desired sensory experiences. In this study, the authors used a Javanese cultural approach in the features designed for the Multisensory Room. Experts in another study also point out that sensory stimulation can combine the natural and cultural characteristics of the region, connecting the elderly with their lifestyle and providing the most appropriate healing environment (Tsai & Hong, 2019). Javanese cultural elements can be included through sound, play of light and natural nuances, walls, and aroma therapy.

Various sensory items when applied to therapy rooms for the elderly need to consider various aspects such as safety, health, comfort and cognitive stimulation which need to pay attention to the welfare of the elderly (Arnata et al., 2018; Berg et al., 2021; Krishna et al., 2023; Mishra & Sekher, 2022). As in this study, in the theme aspects consideration of building multisensory room for the elderly, there are three points found in data analysis coding: safety considerations, unique characteristics of the elderly, and physiologic responses of the elderly. The most critical indicators of multisensory environmental characteristics are safety and personality. Safety as a basic concept can be reflected in the planning and design of indoor construction, and it is recommended that the finalization of space be discussed further with relevant experts in the planning process to

understand the needs of older adults and caregivers (Tsai & Hong, 2019).

Apart from that, the characteristics of older people also need to be considered in implementing the multisensory room concept. In terms of individuality, older people must be given autonomy to choose the environmental sensory stimulation they need, taking into account the involvement of caregivers and the developmental background of each older person. Thus, each older person can be given different sensory stimulation, and training is needed for older people to understand the benefits of the stimulation provided. The literature states that a comfortable sensory room can calm cognitive function in the elderly. For the elderly, contact between the sensory environment and past experiences is something that needs attention. Therefore, elderly people have different feelings when using the sensory room. In this case, the multisensory room needs to combine the elderly's past experiences with the physical environment to create a harmonious effect, so that the elderly can truly enjoy the healing process in the form of comfort and peace of mind. However, experts argue that momentary sensory environmental stimulation is not enough to maintain cognitive function, so continuous stimulation intervention must be effective (Tsai & Hong, 2019).

Element for building multisensory room

Multisensory stimulation in older adults is an effective practice that helps train the mind and motor skills through elements that stimulate the human senses. The currently known sensory stimulation room is the "Snoezelen" multisensory room. Initially, this room was mainly intended for children with learning difficulties, namely children who had difficulty exploring their environment. Previous research developed and implemented a Multisensory Black Room for elderly patients with neurodegenerative diseases and cognitive impairment. Different sensory stimuli help the cognitive and functional areas of older people. The implemented room has several elements: a color staircase, star curtain, fiber optic shower, texture track, virtual reality glasses, and sound therapy (Duchi et al., 2019; Helbling et al., 2023). However, the FGDs conducted in this research identified space elements more applicable to the characteristics of older people in Indonesia.

Elements of concern in building a multisensory room for older people include dividing the space according to the intended function and stimulation, physical objects such as puppets, reliefs, stones, and natural light, with the concept of incorporating outdoor concepts into the room, or interior scaping. The concept of interior scaping, namely adding biophilic elements to buildings, is in great demand. Creating a beautiful and tranquil indoor environment requires designing and placing plants, water features, rocks, and other natural components. Incorporating natural elements into interior spaces helps overcome health problems, such as healing gardens, therapy gardens, water channels, and other therapeutic activities. Apart from adding aesthetic value, plants used to decorate rooms can also relieve stress, improve the quality and purify indoor air, reduce indoor air pollutants, increase focus, improve personal performance, encourage recovery and improve mood. Interior styling also has therapeutic properties, an advantage for people living alone at home (Krishna et al., 2023; Tsai & Hong, 2019). Previous studies showed many benefits of healing gardens for patients, staff, and visitors, including reduced stress and feelings of depression, improved cognitive function, increased patient mobility, and greater well-being and satisfaction. Access to an outdoor can improve cognitive function (Berg et al., 2021). Interaction with nature provides many tangible benefits for humans, including improving the quality of life. Plants improve human physical, mental and emotional well-being. Studies show that in old age when the social environment becomes smaller, the nuances of nature become more critical as a means of connecting with other living creatures. Childhood memories about the experience of living in a green natural environment can also grow and help improve cognitive function (Anderson et al., 2020; Berg et al., 2021; Thauvoye et al., 2018).

Multisensory rooms also need to provide sensory stimulation activities, daily activities that can be

Conclusion

Multisensory rooms for older people need to consider the characteristics of older adults and the level of problems faced related to the room's function in providing stimulation. Creating a multisensory room for older people needs to include various aspects, such as the unique characteristics of older adults, physiological responses of older

stimulating, and play activities that can be stimulating. A room that provides an atmosphere of health and relaxation can reduce aggressive patterns and impact functional parts (fine gross motor skills) and the ability to focus scattered attention in patients with neurodegenerative diseases and cognitive disorders in the early and late stages. In addition, patients can improve relationships with their social and personal environment (Duchi et al., 2019). In other studies of multisensory rooms, Namaste and Sonas therapies also used the multisensory stimulation room concept. Namaste uses MSS elements such as aromatherapy, touch, music and color. The intervention includes meaningful activities, ongoing nutrition and hydration, and staff and family involvement. This intervention is intended to provide a sense of well-being and reduce symptoms of agitation, depression and pain in people with cognitive impairment (Helbling et al., 2023; Yous et al., 2023). Meanwhile, the Sonas concept is focused on improving communication and quality of life. It includes MSS (music, pleasant aromas, tasting food, and receiving a massage), reminiscence therapy (looking at personal items or listening to poetry) as well as physical activity in treatment sessions (Helbling et al., 2023).

The parts in the room influence the function of the room. In this case, analysis of the FGD results shows that the multisensory room section requires dividing the room according to the level of function, the outdoor concept applied to the room, privacy, and rooms that provide a relaxing effect. The multisensory room concept recommends the concept of a house with space division according to the function of each room. A previous study identified that stimulation distributed in day services can respond more to the care needs of different aged people than in an independent sensory room (Tsai & Hong, 2019).

adults, and safety considerations. Several elements are needed to support sensory stimulation, including physical objects, physical spaces, elements for sensory stimulation (sound sensory, vision sensory, olfactory sensory, light stimulation, touch), as well as elements for activity stimulation (gardening, sensory activities, daily living activities, playing activities). The availability of studies on the needs of innovative elderly health services, as well as research partners in the development of space models, is expected to

be able to create space designs that are applicable and useful in their use, which prove the effectiveness of the concepts applied according to the needs and developments in the health situation, especially for the elderly.

Declaration Conflicting Interest

The authors have no conflicts of interest to declare.

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Author Contribution

Fery Agusman Motuho Mendrofa was the leader of this study. He led the FGD in collecting data, assisted by Umi Hani as the first member. Umi Hani was also doing the data analysis using ATLAS.ti. software. Rita Hadi Widiastuti, the third member of this study, helped analyze the data from FGD and finished the article. The fourth and fifth author made the transcript data from focus group discussion recording.

Author Biography

Fery Agusman Motuho Mendrofa is a Lecturer at Universitas Karya Husada Semarang, Indonesia.

Umi Hani is a Lecturer at Universitas Karya Husada Semarang, Indonesia.

Rita Hadi Widyastuti is a Lecturer at Universitas Diponegoro Semarang, Indonesia.

Restu Murniati is a Student of Nursing Study Program, Universitas Karya Husada Semarang.

Wisnu Pratama is a Student of Nursing Study Program, Universitas Karya Husada Semarang.

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