

## ENVIRONMENTAL AUDIT: THE ASSESSING TOOLS FOR OUTDOOR ENVIRONMENTS AT RETIREMENT HOMES

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### ABSTRACT

*The Elderly gerontology is an interdisciplinary includes biological, psychological, sociological, economic, and environmental aspects. The primary reason for interpreting the needs for environmental audit of green or outdoor environments at retirement homes is due to the raising rate of the increasement of ageing population. With the rapid world's ageing population rapidly, there is a growing need to investigate a better environment for the residential care. The Seniors' Outdoor Survey (SOS) environmental audit tool is developed by Rodiek, 2014 as a legitimate and accurate method in determining the community's outdoor spaces based on how well they meet the needs and desires of elderly residents. The primary aim of this study is to describe the requirements of environmental audit as a tool for assessing the outdoor environments in retirement homes to support elderly living. The study objectives are (i) to determine the significant criteria in retirement homes and (ii) to analyze the significance of the SOS for outdoor usage by the elderly at retirement homes. The study methods, which included determining the content validity of the main SOS items, were based on relevant literature and preliminary studies conducted in retirement homes. The audit was organized in each domain to attain the excellent design and significance of outdoor environments for the elderly. The importance of environmental audits to the elderly is to improve and preserve environmental protection at retirement homes. The SOS tool fills the gap in the environmental audit tools, giving a reliable way for researchers and designers to compare and build the potential of outdoor environments for the elderly at retirement homes.*

Keywords: Environmental audit, Outdoor environments, Senior outdoor survey, Retirement homes.

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### INTRODUCTION

The world's population is ageing; every nation in the world faces growth in the number and proportion of the elderly. Population ageing is characteristically considered a positive demographic transition usually associated with successful social and economic development (United Nations & Social Affairs, 2015). Nevertheless, this demographic transition was expected to have significant social, economic and health care (Handler, 2014).

The phenomenon of a significant proportion of elderly people in the total population and this trend is expected to increase in Malaysia. In tandem, with the rapidity of an ageing population in Malaysia affecting the elderly mobility and health, the whole social structure development due to societal changes and modernization in mindset and lifestyle. The situation is feasible that the number of elderly livings in retirement homes will continue high or even increase despite the emphasis placed on institutional living.

A lot of negative features characterize institutional living at retirement homes. This illness was created of age segregation, loneliness and isolation to the elderly (Ismail et al., 2019; Sanmargaraja & Wee, 2013). In modern society, it is clear segregation space or environments between the young and the elderly generation. The functionally efficient and sterile environment of institutions can accelerate a decline in the abilities of the elderly. The elderly's higher risks of health problems, social isolation, and increased needs for enjoyment in green space present a challenge to landscape planners as the population ages. It is generally

documented that most outdoor spaces tend to be underused in retirement homes because most of the elderly spend almost all their time in the facility setting. The identified environmental barriers to outdoor use include insufficient shade and seating, unsafe walkways, and self-locking doors (Rodiek et al., 2014, 2016).

Since spending time outdoors is not mandatory, a comprehensive assessment of outdoor access remains a low priority, despite universal recognition as a significant and health-promoting feature in long-term care settings. Therefore, the environmental audit is one of the tools to evaluate a facility's outdoor spaces with proper preferences for the elderly. This application-oriented method can regularly analyse and compare a wide variety of senior facilities and outdoor spaces to facilitate decision-making. A variety of evaluation tools have been created to measure the qualities of the physical condition of long-term care facilities emphasizing solely on the indoor space (Bardenhagen & Rodiek, 2015; Rodiek et al., 2016).

An environmental audit can promote sound management of the elderly environment-environmental audits as seen as essential support tools to the health facilities at retirement homes. Also, improve the existing or new green area with well-designed to the elderly and providing a sense of belonging. As well as encourage the elderly to be more physically active.

### ENVIRONMENTAL AUDIT: SENIOR OUTDOOR SURVEY

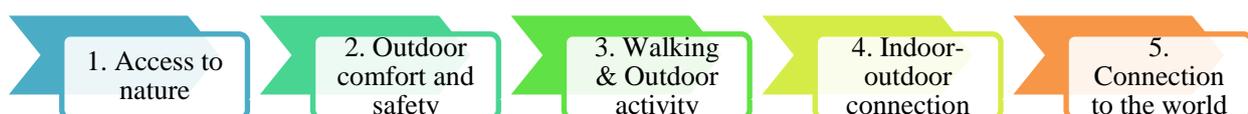
The environmental audit has been developed as a tool to assess an outdoor area for the elderly at retirement or nursing homes. According to (Bardenhagen et al., 2018, 2019; Rodiek, 2018), the significance of environmental audits to the elderly can enhance and conserve environmental green areas also reverence ecological development at retirement homes. The environmental audit can improve the new or existing green area with outdoor layout and amenities with safety for the elderly in planning and design (Rodiek et al., 2014). Also providing a sense of belonging and encourage the elderly to be more physically active at outdoor area.

The effective tools of the environmental audit were known as the Senior Outdoor Survey (SOS), are used to measure the use of the green area or space to improve the elderly environment's quality (*refer figure 1*). The method was created as an accurate and reliable way to ascertain the requirements and desires of aged residents for outdoor spaces (Bardenhagen & Rodiek, 2015; Rodiek, 2018; Rodiek et al., 2014). These tools are critical in demonstrating the real needs of the elderly for green space. It can also impact the elderly's emotions and health as they go about their daily lives.

A preliminary version of the SOS Tool (Seniors' Outdoor Survey) was developed and pilot-tested in nearly 200 outdoor spaces across 68 assisted living facilities in a sizeable multiregional study (Rodiek, 2018). The finalised tool is used to assess 60 different features organised into five categories or "domains." The items in the SOS Tool are intended to address the most critical aspects of residents' outdoor usage and satisfaction (Adnan & Abdul Shukor, 2015; Briefs & Rohde, 2012; Rodiek et al., 2014).

The SOS tool has been thoroughly tested and is free to download. This application-oriented tool can be used to consistently assess and compare a wide range of senior facilities and outdoor spaces to aid decision-making (Scopelliti & Giuliani, 2008; C. Y. E. and S. F. A. Shukor, 2016). Decision-makers can weigh the costs and benefits of various improvement proposals using the SOS Tool's ability to more easily communicate the successes and shortfalls of outdoor spaces in seniors housing. The use of this tool is expected to improve outdoor access for older adults significantly.

**Figure 1: The five (5) domains of Senior Outdoor Survey (Source: Rodiek, 2014)**



### DESIGN AND METHOD

This study employed a qualitative research design through observation to explore the needs of the assessing tools for outdoor environments at retirement homes and an essential green garden for the elderly. According to Patton (1990), qualitative data brings results to life through in-depth case elaboration. Qualitative research designs are used most in the field of ageing and the green outdoor environment. These designs reflect an effort to extend information on the green outdoor environment and ageing by adding physical attachment aspects that are not readily covered by conventional laboratory testing designs (Boyes, 2009; Doyle et al., 2009; van Dijk-Heinen et al., 2014).

### CASE STUDY: RSK SERI ISKANDAR, PERAK

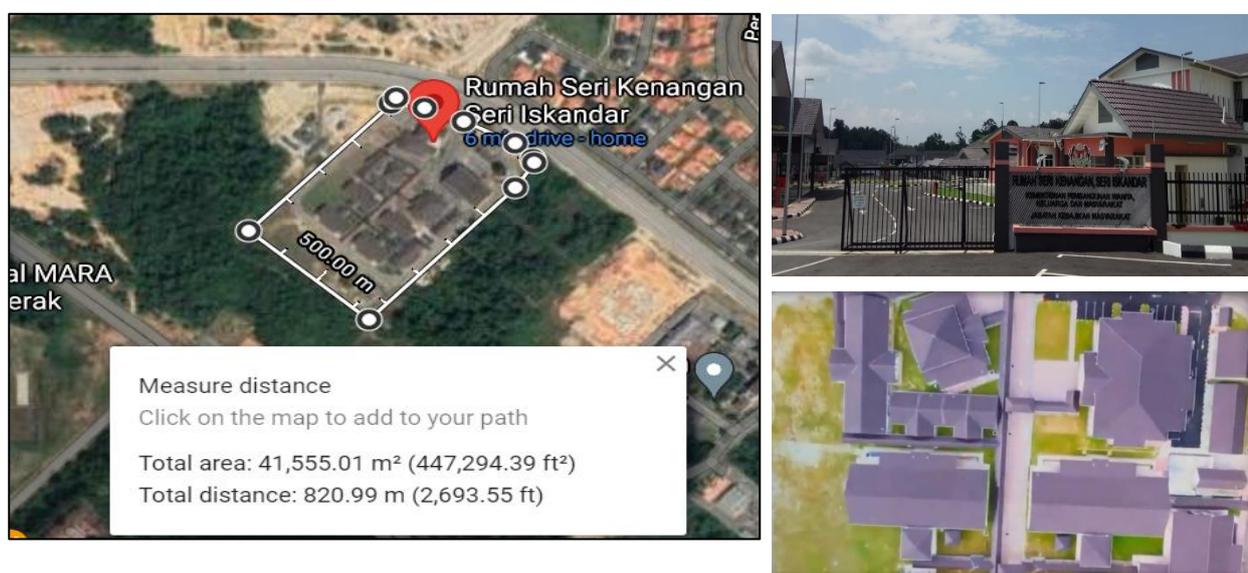
The retirement home is a comprehensive nursing home with appropriate facilities. It is the location of choice for the elderly in living their old life. In Malaysia, the retirement home established by the Government was known as Rumah Seri Kenangan (RSK) registered under the Department of Social Welfare Malaysia (JKKM). The case study for environmental audit tools of Senior Outdoor Survey (SOS) was tested at Rumah Seri Kenangan (RSK) Seri Iskandar, Perak. RSK Seri Iskandar is located at Perak Tengah district with 41,555. 01 meter/square total of area. The RSK Seri Iskandar concept was "Home Retreat" with 103 people of the elderly living there (*refer figure 2*).

The methods of assessing tools for SOS at RSK Seri Iskandar were conducted by qualitative approach through direct observation system. The observation method is a promising way to objectively measure physical activity and environmental data at a sufficiently detailed level (Maller et al., 2009). A direct observation method is a promising means of accurately assessing physical activity and environmental data at a comprehensive level (Lim Pei Li & Hayat Khan, 2012; Zainab et al., 2012). The research phase focused on observing the green space at RSK Seri Iskandar by using each domain from the SOS.

The observation was concentrated on observable physical features and environments. Therefore, the observations in RSK involved only three out of the five (5) domains: access to nature, outdoor comfort, and safety, and walking and outdoor activities. The three (3) domains assessment is comprehensive and emphasizes specific observations. The Senior Outdoor Survey (SOS) tool instruction sets into two (2) steps:

- i. the boundaries of green space or environment at RSK Seri Iskandar was observe and selected.
- ii. the researcher takes a walk, sits in several zones, observes the green space, and examines the furniture based on the SOS checklist or audit's three (3) domains.
- iii. the researcher evaluates and tick each domain at each zone in RSK Seri Iskandar.
- iv. the researcher calculates the subtotal number in each domain for zones 1, 2 and 3 at RSK Seri Iskandar.

**Figure 2: The location and views of Rumah Seri Kenangan (RSK) Seri Iskandar, Perak**



The RSK Seri Iskandar zone of boundaries for green space or environment was divided into three-zone, which are: (i) Zone 1- walkway area, (ii) Zone 2- *Surau* area and (iii) Zone 3- resting area. The zone was selected based on the daily activities of the elderly at RSK Seri Iskandar. Each zone has a different scale and landscape elements (*refer figure 3*).

Figure 3: The zoning of green space or environment at RSK Seri Iskandar



The first domain is access to nature or green space with the nine (9) items. Access to nature or green space leads to value; green space should have various species and connections between all the abiotic (non-living) and biotic (living) elements, such as flora, fauna, and water elements. The second domain is outdoor comfort and safety with nine (9) items. It is related to the elderly outdoor facilities available for relaxation, especially the seating area's needs. Furthermore, this domain also includes climate control and comfort issues. The third domain was walking and outdoor activities in the green space environment with thirteen (13) items (refer table 1). This instrument helps researchers “evaluate and compare the supportive potential of outdoor spaces” (Bardenhagen et al., 2018; Rodiek et al., 2014, 2016).

Table 1: The Senior Outdoor Survey (SOS) Domain and Item

Domains	Items
Access To Nature	Abundance of greenery
	Diverse mix of plants and trees
	Easily reachable or raised plants
	Hard boundaries screened by plants
	Seating has pleasant views
	Water features available
	Outdoor fairly quiet
	Privacy from resident rooms
	Private place to sit
Outdoor Comfort and Safety	Plenty of seating available
	Choice of different seating types
	Some seating easily moveable
	Seats available in sun or shade
	Seats comfortably shaped
	Tables for coffee, food, etc.
	Microclimate control
	Smoking areas well separated

	Outdoor area well maintained
<b>Walking and Outdoor Activities</b>	Abundant walkways of different lengths
	Roundtrip walkways available
	Paving level, easy for wheelchairs
	Paving non-skid and non-glare
	Handrails along some walkways
	Walkways partly shaded
	Interesting views from walkways
	Frequent seating along walkways
	Some walkway seating in shade
	Destinations to walk toward
	Places for social activities
	Places for recreation and exercise
	Place for gardening, horticultural therapy

**FINDINGS: CONTENT VALIDATION OF ITEMS AND DOMAIN**

In this study, the findings based on a direct observation system –Senior Outdoor Survey (SOS). The environmental audit at RSK Seri Iskandar has carried out an environmental assessment for each zone. The overall findings for each domain at RSK Seri Iskandar were summarizing in *table 2*. Based on the preliminary study at RSK Seri Iskandar, the content of item and domain of Senior Outdoor Survey (SOS) revealed that physical environment emerging as the importance of criteria in sound design for the elderly in the green or outdoor area.

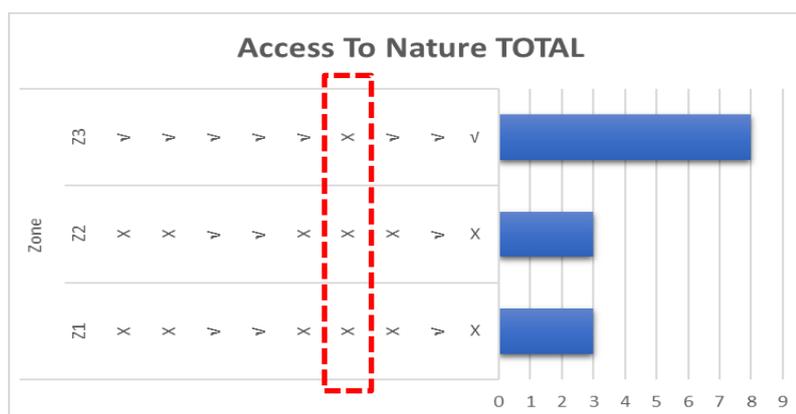
**Table 2: Data of each domain in environmental audit at RSK Seri Iskandar**

Domains	Items	Zone		
		Z1	Z2	Z3
<b>Access To Nature</b>	Abundance of greenery	X	X	√
	Diverse mix of plants and trees	X	X	√
	Easily reachable or raised plants	√	√	√
	Hard boundaries screened by plants	√	√	√
	Seating has pleasant views	X	X	√
	Water features available	X	X	X
	Outdoor quiet	X	X	√
	Privacy from resident rooms	√	√	√
	Private place to sit	X	X	√
	<b>TOTAL</b>	3/9	3/9	8/9
<b>Outdoor Comfort and Safety</b>	Plenty of seating available	X	X	√
	Choice of different seating types	X	X	X
	Some seating easily moveable	X	X	X
	Seats available in sun or shade	X	X	√
	Seats comfortably shaped	X	X	√
	Tables for coffee, food, etc.	X	X	X
	Microclimate control	X	√	√
	Smoking areas well separated	√	√	√
	Outdoor area well maintained	√	√	√
	<b>TOTAL</b>	2/9	3/9	6/9
<b>Walking and Outdoor Activities</b>	Abundant walkways of different lengths	√	√	√
	Roundtrip walkways available	√	√	√

	Paving level, easy for wheelchairs	√	X	√
	Paving non-skid and non-glare	√	√	√
	Handrails along some walkways	X	X	X
	Walkways partly shaded	X	√	√
	Interesting views from walkways	√	√	√
	Frequent seating along walkways	X	X	X
	Some walkway seating in shade	X	X	√
	Destinations to walk toward	√	√	√
	Places for social activities	√	√	√
	Places for recreation and exercise	X	X	√
	Place for gardening, horticultural therapy	√	√	√
	<b>TOTAL</b>	8/13	8/13	11/13

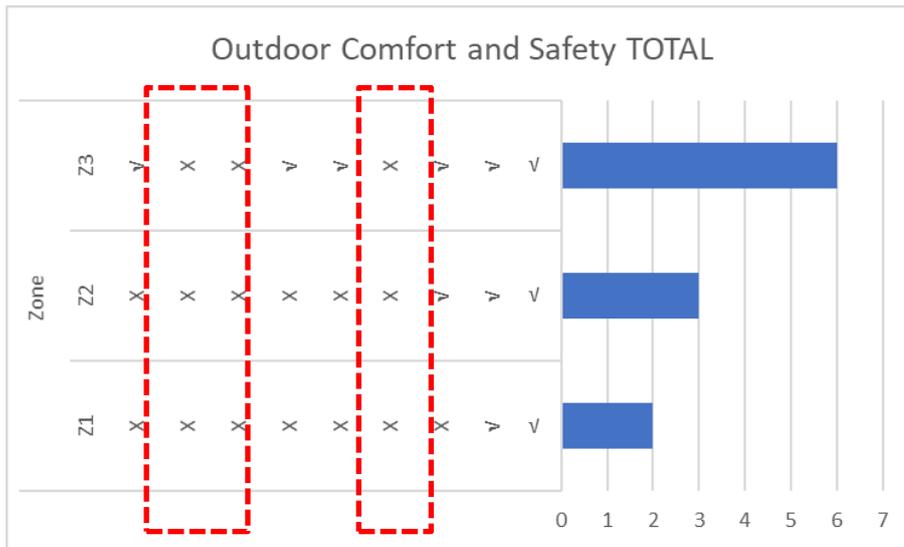
*Domain 1:* An observation study showed access to nature is one of the major patterns of outdoor usage in retirement homes. Access to nature is an essential part of the quality of later life by decreasing boredom, isolation, and loneliness and boosting one's sense of purpose and accomplishment. Blue space such as water features and any water elements provide opportunities for non-weight bearing physical activity and physiotherapy. Unfortunately, documented domain 1 (access to nature) with 48.1% was lacking the elements of softscape. Zone 1, 2 and 3 at RSK Seri Iskandar was low in the abundance of greenery and not much in a diverse mix of plant and tree. Besides, the water element or blue space is not provided in all three zones (*refer graph 1*). Many research revealed that access to nature might provide valuable health benefits for the elderly, particularly in retirement homes, where residents seldom leave. Spending time outside with greenery and plants can theoretically boost morale, sleep habits, and vitamin D absorption, preventing spills that fractures (Detweiler et al., 2012; Pasca, 2014).

**Graph 1: Domain 1 (Access to nature) for Zone 1,2 & 3 at RSK Seri Iskandar**



*Domain 2:* The outdoor comfort and safety was related to the elderly outdoor facilities available for relaxation. However, the senior Outdoor Survey (SOS) checklist revealed only 40.7 % was fulfilled of outdoor comfort and safety at zone 1, 2 and 3. The hardscape elements of seating (moveable seating, range seating and tables) not supplied at zone 1 and 2 in RSK Seri Iskandar (*refer graph 2*). The facilities of the gazebo are only provided at zone 3 (resting area). According to (Adnan & Abdul Shukor, 2015; C. Y. E. and S. F. A. Shukor, 2016; S. F. A. Shukor, 2012), the seating facilities should provide and have an arm back and having an overhead structure for shelter in the outdoor green space. It may improve the quality of safe, tranquil, and comfortable outdoor space.

Graph 2: Domain 2 (Outdoor comfort and safety) for Zone 1,2 & 3 at RSK Seri Iskandar

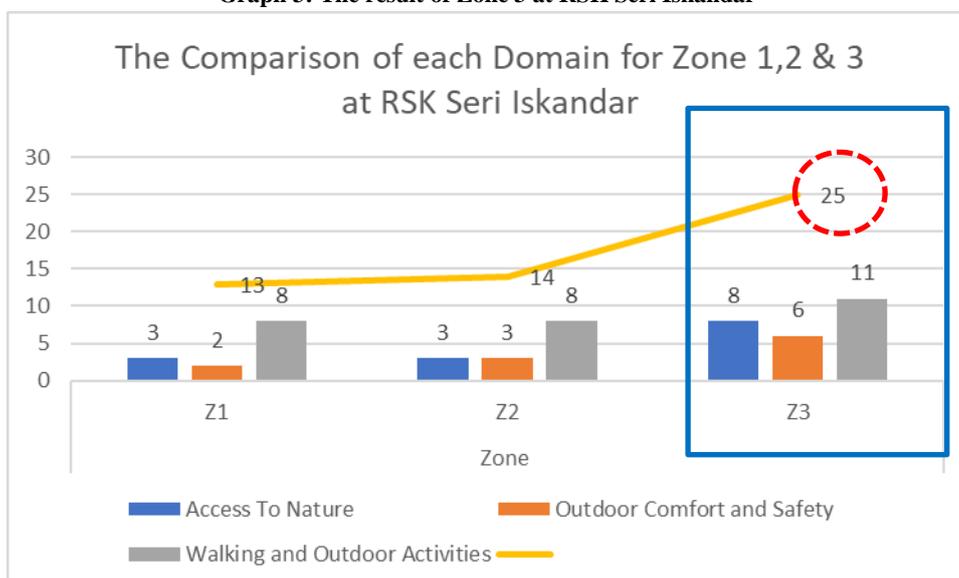


Nevertheless, the smoking area is well separated from the green places and maintenance of the outdoor space at RSK Seri Iskandar is in reasonable consideration. The planning and design of the separated smoking areas are very effective for the healthy development of the elderly in retirement homes. The good air quality also can improve the better living of the elderly well-being. Lastly, for *Domain 3*: walkways are also a vital part of the elderly outdoor activities. Walking has multiple physical and psychological benefits for them. Walkability was related to the themes of safety, comfort or convenience, and aesthetics (Rodiek & Lee, 2009; Wen et al., 2018).

In RSK Seri Iskandar, the walkway or pathway area facilities provide fantastic walkways with different lengths. The access was friendly for the elderly and achieved to 69.2% for overall of items. However, some walkways levels need to improve significantly for the elderly who use support equipment such as wheelchairs, crutches, and more for their ease of movement when having social activities. For the materials, the walkways provided with paving non-skid and non-glare. It is essential for the elderly safety and ease of movement from the slippery. The destinations to walk toward are also clearly designed for the elderly and other users at RSK Seri Iskandar. All the benefits will encourage social activities among the elderly in the green or outdoor area.

Overall, the findings of study are identifying the main components of environmental audit and restoration of environmental qualities towards establishing the relationship of the elderly with the greenest environments. As a result, zone 3 (resting area-refer graph 3) was accomplished 80.6% for all the needs in the environmental audit for each domain. The space provided good facilities in the gazebo, half-shaded area, and suitable places for the elderly at RSK Seri Iskandar to rest and do any exercises or activities. The space can improve by adding more variety of plant species and water elements to evoke better environmental comfort.

Graph 3: The result of Zone 3 at RSK Seri Iskandar



## CONCLUSION & RECOMMENDATIONS

The study revealed that the environmental audit is crucial for the outdoor or green space design at retirement homes. The ecological features according to each domain and item have a great influence on the outdoor usage and satisfaction among the elderly (Bradshaw et al., 2012; Gibler et al., 2009; Jiang, 2014). Consequently, this study suggested that green space at retirement homes facilities provides *access to nature* with several features, such as scented plants, abundant greenery with suitable species for the elderly, and interesting views. Also, all the plants are non-hazardous, varying in plant size and recognizable for the elderly environments. This study has shown that nature elements were essential to the elderly. The nature elements for the elderly to manipulate as a positive sensory stimulation would increase outdoor usage (Bardenhagen et al., 2018, 2019; Fumagalli et al., 2017).

Other, outdoor comfort and safety are among the most important environmental features that affect the elderly. This study suggested that outdoor comfort and safety should include several design features for retirement homes facilities. It contains a comfortable and configured sitting area for the elderly, providing shade, stable tables, good air quality, good maintenances, and suitable seating with u-shaped and right-angled. Additionally, comfortable seats with arms, backs, and cushions could be welcomed by elderly people. (Rodiek et al., 2014, 2016).

The facilities of the walkway area are essential for the elderly exercise and to support long term restoration benefits among them. The many design elements needed at retirement homes include safe paving, a comfortable walkway, correct design details, and frequency of walkway seating.

Overall, these findings illustrate the framework of indicating the methodological process, which is helpful for future environmental audit assessment in retirement homes in Malaysia. It also leads to possible benefits for elderly well-being (mental) and health-promoting environmental characteristics among facilities. Moreover, it is hoped that this study could act as an eye-opener to the government of non-government organizations of providing adequate and good quality of green spaces when designing retirement homes.

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