



A STUDY ON WHETHER ASSISTIVE DEVICES ARE NEEDED FOR DEMENTIA ELDERLY IN DEMENTIA DAY CARE CENTRE

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ABSTRACT

The aim of this paper is to seek whether there is a current or future need for the devices to be used in dementia day care centre based on the Malaysian context. This is due to the community has not yet familiarize with such devices for cognitive use as there is limitation in terms of reaching the product itself in the local market. Moreover, there are few research studies linking the needs of dementia, people and their acknowledgement of utilizing the gadgets. Dementia is a mental illness that demonstrates a decrease in cognitive capacity and memory, which generally affects the seniors. Studies show that the number of elderly affected with dementia keep rising and this phenomenon has grabbed a lot of people's attention. Due to this matter, there are a lot of experimental and exploration researches being conducted that are correlated with assistive devices for this cohort. For this research, observations, checklist and interview session were used as instruments for data collection. Two of the dementia day care centers were selected as the case studies. Assistive device is a tool designed to facilitate and enhance human capabilities for everyday use basis. Its existence is proven to bring tremendous help for people with disability to help them to be independent and carry on with their daily routine, analyze the collected data of the study regarding whether there are needs for the devices to be included in the dementia day care center program. Suggestions and recommendations for future research were given in the end based on the conclusions achieved.

Keywords: Elderly, Universal design, Assistive devices, Dementia, Day care center, Care center.

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Contribution/ Originality

The paper's primary contribution is finding information on suitable types of assistive devices to be used in the dementia day care center in Malaysia. These facilities are important to assist the dementia and in most cases they are also disabled persons, to help them to be independent and carry on with their daily routine.

1. INTRODUCTION

In many countries today, the number of elderly beginning to increase which has resulted in changes in the demographic population. Malaysia is also experiencing the same situation, due to the baby boom phenomena after the Independence Day in 1957. According to the Department of Statistic Malaysia, the population growth rate for the country for the period 2000-2010 is about 2.0 per cent, which is lower compared to 10 years before. The population was 28.3 million of which 91.8 per cent were Malaysian citizens and 8.2 per cent were non-citizens. The proportion of male was reported outnumbered by female. The proportion of the Malaysia aged 65 years and above was increased to 5.1 per cent as compared with 3.9 per cent in 2000, and it is projected to increase more than three folds of the 2010 population by 2040. The details are shown in Figure 1.

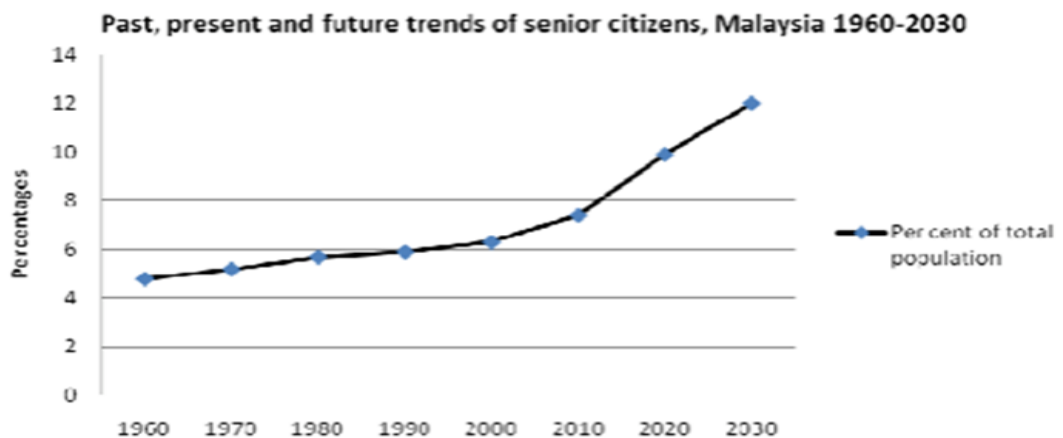


Figure-1. The percentage of past, present and future trends of senior citizens in Malaysia 1960-2030.
Source: Department of Statistics Malaysia.

Due to the demographic changes in the population nowadays, elderly is often associated with all sorts of impairments and to a significant extent, the estimation of number of elderly with dementia will expected to increase [1].

World Health Organization has expressed it in 2012 that just about 35.6 million individuals live with dementia. The sum is accepted to be double in 20 years and influencing all countries. In Alzheimer's disease International report, dementia case in Malaysia in 2005 was at 0.063% and the yearly event rate was 0.020%. This measurement was foreseen to grow in 30 years' time [2]. Subsequently it has become necessary for the designers and architects to have high understanding and be more compassion while giving the constructed environment to them [1].

2. AIMS

The aim of this paper is to seek whether there is a current or future need for the devices to be used in dementia day care centre based on the Malaysian context. This is due to the community has not yet familiarize with such devices for cognitive use as there is limitation in terms of reaching the product itself in the local market. Moreover, there are few research studies linking the needs of dementia, people and their acknowledgement of utilizing the gadgets. Physical built environment of the selected current day care centers were also being examined in order to root out how the assistive devices and built environment can help improving the quality of life of dementia elderly.

3. BACKGROUND STUDY

Dementia is a mental sickness where the brain can no longer work properly because of the decrease of mental activity which affecting the process of understanding through thought, experience, conduct and sensation. As it developing, individual with dementia won't have the capacity to do ordinary routine in their day-to-day life because of the functional inability and over the long run will end with death [3]. As reported by World Health association, Alzheimer's disease is the most well-known kind of dementia within the community.

It has been accounted for as an episode illness that has quietly spreading without a lot of knowledge, however its impact is truly immense and influencing the patient as well as the community. Apart of experiencing difficulty with their memory, the erratic behavior is an alternate issue confronted by this individual [4].

Research demonstrates the level of individual's mindfulness towards dementia is still at a low level. It was a heartbreak situation when dementia was seen as a typical affairs and being seen as a part of aging, when the fact that it is actually a disease that highly required for counteractive action [4]. Moreover, dementia symptom is frequently being ignored resulting an obscure number of individuals with dementia risen in all around the globe [5]. Therefore, in order to prevent the spreading of ignorance towards this irremediable malady, it is crucial for people in general to be educated through education learning, be it from the kindergarten level or in any working institutions. By executing this approach, it would have the capacity to avoid stigma issues upon dementia in the community as a whole [6].

As the number of the elderly is swiftly growing, the result can be felt tremendously in terms of health care provisions due to the inadequacy of the expertise in this division and also young generations in the present community [7]. It also consider as lethal and should never be taken lightly as it has a significant impact on healthcare system, social and economic growth of the country [8]. The vital aspect while taking care of the dementia people is a communication. A good relationship between the caretaker and the dementia patients can always rely on the good communication between them. The positive relation between dementia patients and the caretaker is the most crucial point in enhancing the quality care of the person with dementia. It also involves lots of decision-making and consideration in terms of when it comes to the needs of individual who are involved [8].

4. DESIGNING FOR THE DEMENTIA – THE IMPLEMENTATION OF UNIVERSAL DESIGN

Due to the above problem, the built environment for dementia people should comply with the criteria of universal design. The implementation of universal design is diverse in concept and does not only meant for those with disabilities only, rather it should be able to serve all people ranging from toddler to the older adult, despite their differences in physical and mental ability [9]. The principle of universal design was developed in 1997 by a working group of architects, product designers, engineers and environmental design researchers, led by the late Ronald L. Mace. There are seven principles of universal design which are 1) Equitable use 2) Flexibility in use 3) Simple and intuitive use 4) Perceptible information 5) Tolerance for error 6) Low physical effort 7) Size and space for approach and use.

The implementation of universal design in Malaysia has not started until the late 1980s that was after about 20 years from Malaysia regained its independency (Abdul Rahim 2013). The concentration of developing the country were given prioritize to education, agriculture, economy, infrastructure and basic facilities. It was until late of 1980s of which Malaysia Standards was endorsed and code of practices was introduced, the awareness towards the universal design has started to bloom [9].

Study demonstrates that great living milieu has been demonstrated to have an impact on individual's feeling [5]. It can possibly minimize instability and nervousness, improve the capacity of individual's spatial explaining furthermore have the capacity to impact individual's connection and correspondence with other individuals. Meanwhile, poor design surrounding would prompt abnormal state of disarray, despondency, changes in conduct, and may likewise cause harm to the dementia individuals [10]. In this manner, it is vital for the architects and designers and different experts in the building industries to comprehend the impacts of built environment on an individual with dementia before beginning the planning process. The built environment has an indispensable effect to an individual with dementia, which is a great deal more prevailing contrasted with those without cognitive disabilities [11].

As a solution to cater the rising number of the elders pertaining to the residential home, many suggested that although various accessible housing with many amenities are provided within the community, some facilities are seen not suitable with the cognitive impairment. This is due to the unstable emotion and action of dementia people, which could lead to wander off behavior and also because of high level of sensitivity towards surrounding [11]. Therefore this issue should be considered whether it is in health, medical sector or built environment for dementia, people and the elderly are also a part of the society.

However, there are few contradict opinions regarding the use of universal design for elderly with dementia. Despite that the design concept of universal design was claimed to be suitable for all people, in another view, the universal design is said not conclusive for those with dementia problem. Universal design is not necessarily for the dementia since the new design often portrays 'simple and intuitive use' image as accordance to one of the principles of universal design. Even with the accessible buildings was built to facilitate people with dementia problem, there is still a

gap that needs to be filled, since everything that is in the dementia people's surrounding is subject to a strange thing. They have trouble to comprehend new things apart of what they have been used throughout their lifetime [1]. Apart of implementing the universal design and design for dementia from the early stage of designing, other efforts that can be used to make the environment suitable for the dementia people is through home modification [11]. Based on this statement, the challenge will be greatly imposed to the designers who are to design physical built environment and required assistive devices for this cohort.

5. ASSISTIVE DEVICES

Massive change in demographic has also opened up ways for designers and inventors to invent devices with the intention to help the elderly and those with different disabilities that are known as an assistive device or assistive technology. It has been defined in many studies as tools that are fabricated to help people with disabilities with their daily routine especially activities that in need of assistance, as well as promoting safety and independent lifestyle [12].

The usage of this device is usually utilized to balance out the effect of aging on the body and other associated ailments. With the rising number of mentally impaired people in this world and easy access to the technology nowadays, more studies and researches were pursuing to fabricate tools and gadgets to help this cohort of people [3].

The evolution of modern gadgets has a high possibility in delivering a great help to people. This would help the user of the devices to be more independent and also can remain in their existing accommodation.

The usage of assistive devices also depends on individual needs. Hence, it is important for the product designers to know all the possible needs of any user before creating such devices. The main idea while designing a new device for the mentally impaired people is to make sure that the end user can use the device with fewer attempts in using their brain [3].

Some of the assistive devices that were used by ordinary elderly without cognitive impairment can also be used by those who suffered from dementia sickness, for instance, basic grab rail in staircases, bathroom, along the corridor can help them independently stay up on their feet. However, there are also few assistive devices that could not be used by them due to the lack of understanding on how to operate the devices [13].

Since that is the case, any modern devices should be designed to have more old-fashioned features [11]. The acceptability of assistive gadget is relied on the relation between the sense of necessity for help and the understanding towards the devices itself. The sense of need also leans on the individual character and preference, building category and style, and the overall interaction between what have been mentioned [13].

6. METHODOLOGY

This study is a descriptive study by using case studies, which introduce a preliminary study on how current Malaysian context influence the needs of the assistive devices for the dementia elderly in dementia day care centre, and whether it will be a later use of this devices for future

needs. For this research, qualitative and quantitative method was implemented as data collection, which embodies questionnaire, observation, checklist and interview session with the targeted respondent. This study has tendency to focus on the evaluation of physical built environment of the current day care centre as well as related assistive devices.

7. CASE STUDIES

Two-dementia day care centre in Malaysia, which caters elderly with mild to moderate Alzheimer's disease were selected as case studies for this purpose of research. This two case study was operated under the private sector. Case study 1 situated in Perak whereas case study 2 situated in Petaling Jaya. Case study 1 have maximum number of 15 elderly at one time with six staffs, and case study 2 have maximum number of 23 elderly at one time with six staffs.

8. DATA COLLECTION

The first set of data collection is the literature study, which includes books, peer-reviewed articles and conference proceedings. The search covered the subject of architecture, architectural modifications, modern technologies, assistive technologies, universal design, design for dementia, behavioral of dementia and environmental design planning.

The sources of the literature are taken from varied field, and due to this reason, there is a possibility of significant difference in terms of the way the issues being elaborated by the authors, which depends on authors perceptions pertaining to the matter.

As for the tools used to collect data, which is the questionnaire, observational work, checklist and also interview session, the basic contents for those mentioned tools were extracted from the literature review and good practice. Several sections were divided for questionnaire and insertion of pictures for the assistive devices were included to make data collection more organized and easy to understand.

The observational work was done to further understand the behavior of dementia elderly and the overall scenario in the dementia daycare centre. Checklist was used to identify the physical built environment of the existing daycare centre for the purpose of suggestion for improvement. Lastly, interview session was held to obtain the respondent's opinions regarding the use of assistive devices in the built environment.

9. ANALYSIS

The analysis of this study will start with the discussion on the findings of built environments of both case studies.

9.1. Case Study 1

Based on the data gathered for case study 1 (Table 1), day care centre is operated in rented one story landed bungalow. Due to this case, modification was done to modify the spaces to suit the needs of the occupants.

Since the day care centre is situated in neighborhood area, the environmental surrounding offers quiet and calm environment for the elderly. Moreover, in case of emergency, help can also be obtain from the community living in the neighborhood.

In terms of facilities inside the day care centre, this day care centre contains combined living and dining area, kitchen, toilet, office gym room, resting room, reminiscence room, storage room and garden. The office and storage room are the only rooms that are not accessible by the elders. Living and dining room was used for the purpose of eating breakfast and lunch and also table games. All of the physical exercise activities were carried out in the garden during morning session and at the gym. This day care centre has spacious garden with garden tables and water fountain and offers therapeutic senses.

Layout plan of the day care centre is easy to understand which has adhered to the basic principle design for dementia that had been laid out by many previous researchers. The interior of the day



Figure-2. Physical exercise activities were conducted in the gym room in case study 1, Perak day care centre

Care centre also portrayed domestic interior and does not have complex design on wall and flooring, but instead, there are hanging photographs of the elders. This care centre also provides accessible toilet for the elderly, allowing the wheelchair user to enter and it is near to the gym, living and dining area. There is also a short corridor along the gym room with handrail provided on both sides of the wall. The application of basic universal design for building such as ramp, handrails and grab bars in this day care centre makes it suitable for the elderly to live. This is to ensure that the elders can keep standing on their feet and to avoid them from falling.

Every room in the day care centre is painted with different color with the intention to differentiate from one another. For safety purposes, the day care centre has electronic main gate to avoid the elders from wander off outside the day care centre perimeter. The doors and windows are keep shut when they are inside just so that it is easy to monitor them. There is only one signage, which is the accessible toilet, mainly is because; there is always someone monitoring

these elderly. In case one of them gets up from the seat, the caretaker or assistant will approach them and ask if there is anything that they can assist.

Table-1. Built environment features for case study 1 and case study 2

Built environment features	Case study 1 (Perak)	Case study 2 (Petaling Jaya)
Building typology	- Detached house type - One story rented bungalow - Small scale	- Two story bungalow - Small scale
Location of day care	- Neighborhood area	- Neighborhood area
Facilities provided	- Combined living and dining area - Kitchen - Toilet - Office - Gym room - Resting room - Reminiscence room - Storage room - Garden	- Living and guest area - Common room for activities and dining area - Kitchen - Toilet - Office - Exercise area - Female resting area - Male resting area - Small garden with gazebo - Nurse room - Meeting room
Layout plan	Easy to understand	Easy to understand
Domestic interior	Yes - some displayed old items in the day care centre	Yes – have old set of rattan sofa, lazy chair, displayed old items
Complexity of interior design	Some part of the wall is decorated with hanging photograph	Wall decorated with hanging photograph and elderly's art work
Accessible toilet	Yes	Yes
Toilet location	It is near to the gym, living and Dining area and resting room.	Near to the living room and dining area
Corridor/ walkway	Short corridor along to the gym And resting room	No corridor
Safety features	Grilled windows and doors Electronic main gate Fire extinguisher provided	Griller windows and doors Electronic main gate Fire extinguisher provided
Application of universal design	Ramp, handrail, grab rail, walking stick, crutches slopes and steps clearly marked and lit	Handrail, grab rail was provided in the toilet, entrance
Assistive product/ devices	Only two elderly wear wander alert Devices as bracelet and pendant (funded by own family)	None
Color contrast	Different color for wall for each room	Plain white color for wall, and flooring tile
Signage	Signage only applicable to the toilet Eye level Used universal pictogram for toilet Exit sign on top of every door	Signage inside the toilet and on top of every room Used simple step by step pictures
Assistive Device	No high tech assistive device found Common devices used in physiotherapy	No high tech assistive device found Common devices used in physiotherapy
Garden	Spacious garden with garden seating Water features	Small garden for walking around

9.2. Case Study 2

As for case study 2, the day care centre is run in two stories landed bungalow in the residential housing area. This day care centre has some major modification done for the bathroom where it has been design purposely for disabled people. The application of the grab bar and handrail were widely used inside and at the entrance of the building. Since the nature of the day care centre is situated in the residential area, it offers the calm and quiet environment for the elderly. Emergency help can also be reaching out easily.

The day care centre has been zoned into two categories, which are private areas and public areas. The private zone is situated on the first floor, which consists of resting area for staffs, meeting room and offices. The public zone opened for dementia elderly and visitors. It consists of living room and guest area, reception area, toilet, kitchen, common area, separate female and male resting area, nurse room, exercise area and also small garden. Most of the activities were carried out in the common room, which include singing, dancing, dining, watching television and resting. Physical exercise will take place every morning in the exercise area and a little bit of singing in the garden at the gazebo.

Layout plan of this day care centre is very straightforward and easy to understand and it applies open concept for living and common area. However, the exercise area, accessible toilet and female resting area were not visible from the common area. The accessible toilet was located inside the male and female resting area, which is just next to the common area.

Design interior portrays the homelike environment in almost every part of the day care centre except the nurse room and the common area. Since common area is a multipurpose area, which is used for dining and activities, the table setting inside this area, has make the environment feels a little less homey. Though with the present of elderly's artwork and their pictures on the wall has somehow blends the environment to look less like in the institution.



Figure-3. Physical exercise activities were conducted in the exercise room in case study 2, Petaling Jaya day care centre.

Design interior portrays the homelike environment in almost every part of the day care centre except the nurse room and the common area. Since common area is a multipurpose area,

which is used for dining and activities, the table setting inside this area, has make the environment feels a little less homey. Though with the present of elderly's artwork and their pictures on the wall has somehow blends the environment to look less like in the institution.

One of the specialties of the accessible toilet in this day care centre is that it is fully purposely built for the disabled people. There is a slight degree of ramp on the entrance of the toilet with benches around sink and shower area to ease them washing up and refreshing themselves. Grab bars and handrails are also available next to the water closet (WC). There is enough turning space for the wheelchair user as well as double swing door for the entrance.

In terms of the internal finishes, the wall was painted in white paint with tiles for the flooring for easy cleaning. As for signage, most of the room that frequently visited by dementia elderly was provided with a signage on top of the door. There is step-by-step picture guideline of how to unclothed and get dressed in the toilet.



Figure-4. Some of the equipment used for activities and physical exercise activities in case study 2, Petaling Jaya day care centre



Figure-5. Accessible toilet that is purposefully built to meet the needs of the disabled people in case study 2, Petaling Jaya daycare centre

9.3. Assistive Devices

Table-2. Assistive devices in case study 1 and case study 2.

	Case study 1 (Perak)	Case study 2 (Petaling Jaya)
Assistive devices used for Built environment and as product devices	Ramp Handrail Grab rail Wheelchair Walking stick Wander alert devices (Personal funded) Physiotherapy equipment for exercise Flash card	Handrail Grab rail Wheelchair Physiotherapy equipment for exercise Flash card/ game card Bingo

Based on data collected, the use of the devices in day care centre is according to the needs and local context of Malaysian elderly. Referring to the Table 2 of case study 1, the implementation of ramp, handrail and grab rail are compliance with basic design facilities for disabled people, thus makes the environment suitable for the elderly. Other available devices in the day care centre are wheelchair, walking stick, physiotherapy equipment for exercise purposes and flash card for memory game. Through observation, the elderly seems to be responded well with the available devices and showed good progress with the program offered.

In terms of highly advance devices, out of all the residents in the day care centre, only two of the elderly has the wander alert system attached to them. This device was wear as pendant and bracelet and is fully owned and sponsored by the family. Since the device was designed to look like a jewelry, these two elderly thought that they are actually wearing them and unnoticed of its existence.

Based on the interview with the general manager of this dementia day care centre on the devices used to help the dementia elderly, she mentioned that even though they did not use the high technology devices, the dementia elderly living here does shown good progress with the program activities offered. The program offered such as exercise, memory card game, singing, video watching which involves two-way communication between the elderly and the assistant. Their progress is updated to their loved ones one how they are progressing in terms of their responding and behaving compared to the first time they joined the team.

The manager gives out opinion that based on her working experience in the industry of nursing dementia elderly in Malaysia, she noticed that the most important element in taking care of this cohort is the communication. If the dementia people are left alone, their health may deteriorate faster compared to those who communicate. That is why currently they do not need such advanced equipment at the moment, since there are still family members and the caretaker that are well enough to take care of them.

She agreed that devices invented targeted on this group of people does bring tremendous help and very useful to them especially those who are living on their own.

In case study 2, the facilities provided for disabled only comprises of handrail and grab rail in the toilet and wheelchair. The ramp was provided at the entrance and inside the toilet. As for

equipment, they have physiotherapy equipment for exercise, flash card or game card and bingo for memory game.

None of advanced piece of equipment for the dementia elderly found in this care centre. As stated by most of the caretaker, there is no need for the advanced equipment in the day care centre yet, since based on their experience the elderly will respond better if there is good communication between the caretaker and the dementia people. These devices are seen as supportive element in reaching towards the aims of day care centre establishment.

According to the Nurse Executive in this day care centre, all of the equipment they have in here are enough to support dementia elderly and currently, there is no need for advanced piece of equipment to be used. Every of the program offered here such as the brain gym and other simple activities carried out has its purpose or target. Moreover she continues, even though assistive devices has the potential in helping these types of people however for dementia day care centre she would prefer the dementia people to be attended with caretaker as it is more convenient and safer. Plus, their state of health will be much better if they received continuous conversation in order to help the brain cell continues to work.

10. CONCLUSION

In conclusions, in terms of physical built environment, there is no harm to modify any type of housing to suit the needs of dementia people. Though, it is highly recommended that the house to be modify so that it is user friendly for disabled people. The application of handrail, ramp and grab bar is the basic elements that need to be installed. Out of these two case studies, case studies 1 have the highest percentage of universal design compliances through home modifications. The layout plan for any day care centre for dementia elderly should be easy to understand and have accessible toilet at reachable length especially from living and dining room. Interior design of the day care centre should offer homelike environment and minimize complex design on wall and floor. Non-slippery material should be incorporated in the design for safety issues purposes. Signage for accessible toilet is appropriate for easy recognition.

In terms of assistive devices, the acceptability of the devices is depended on the need of the devices at the first place. In this study, the assistive devices used in the case studies depended on its necessity in local context and social relation between the elderly and the caretakers. In this matter, the basic devices for the disabled people is highly needed as it very useful for the elderly, on the contrary, the usage of highly advance devices currently are seen not quite relevant for a day care centre in Malaysia. Most of the devices invented are suitable for those who live alone and in the care centre to help them to be more independent. However, assistive devices can be adopted and modified to suit the need. Perhaps in the future, more research needs to be done in designing device for the dementia people that can be well blend into the community's need and necessity, which based on Malaysia context.

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