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Occupational Therapists' Experience of Using Home Adaptation and Assistive Products as Interventions for Older Individuals and Persons with Disabilities in Thailand

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Abstract

As Thailand becomes an aged society it is important to promote advancements in geriatric medicine to provide the best care for older individuals. The right assistive facilities and household mobility equipment are essential for everyday activities. The use of home adaptations and assistive products can maximize the quality of life for older individuals and make life more convenient for those with disabilities. This study aimed to investigate the experience of occupational therapists, using home adaptations and assistive products. An individual interview was conducted with eight occupational therapists who worked at regional hospitals and centers of excellence throughout Thailand using a qualitative study. The results were interpreted through thematic analysis. Five main themes emerged: (1) empowering independent living at home, (2) accident prevention and safety, (3) family financial constraints and barriers, (4) availability and accessibility of products, and (5) matching products with clients' capabilities and needs. Based on an occupational therapy approach, this study examines Thailand's needs for home adaptations and assistive products, as well as barriers to accessing those products and services. Through a contribution to knowledge and information based on occupational therapists' experience, the laws and regulations regarding home adaptations and assistive products for people with disabilities can be improved. Additionally, the interdisciplinary team and authorities involved in this issue should also collaborate to formulate guidelines for home adaptations and assistive products for older individuals and persons with disabilities in the future.

Keywords

disabilities, older individuals, home adaptation, assistive products, occupational therapist, qualitative research

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As Thailand becomes an aged society it is important to promote advancements in geriatric medicine to provide the best care for older individuals. The right assistive facilities and household mobility equipment are essential for everyday activities. The use of home adaptations and assistive products can maximize the quality of life for older individuals and make life more convenient for those with disabilities. This study aimed to investigate the experience of occupational therapists, using home adaptations and assistive products. An individual interview was conducted with eight occupational therapists who worked at regional hospitals and centers of excellence throughout Thailand using a qualitative study. The results were interpreted through thematic analysis. Five main themes emerged: (1) empowering independent living at home, (2) accident prevention and safety, (3) family financial constraints and barriers, (4) availability and accessibility of products, and (5) matching products with clients' capabilities and needs. Based on an occupational therapy approach, this study examines Thailand's needs for home adaptations and assistive products, as well as barriers to accessing those products and services. Through a contribution to knowledge and information based on occupational therapists' experience, the laws and regulations regarding home adaptations and assistive products for people with disabilities can be improved. Additionally, the interdisciplinary team and authorities involved in this issue should also collaborate to formulate guidelines for home adaptations and assistive products for older individuals and persons with disabilities in the future.

Keywords: disabilities, older individuals, home adaptation, assistive products, occupational therapist, qualitative research

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The United Nations' 2030 Agenda for Sustainable Development focuses on three areas: economic, social, and environmental development (Nilsson et al., 2016). The 17 Sustainable Development Goals (SDGs) push global action and address the critical gaps in ensuring "no one will be left behind" (UN General Assembly, 2015). Older individuals and persons with disabilities (PWDs) are among the groups who are most likely to be left behind. The two groups account for most individuals who need home adaptations (HA) and assistive products (AP). Without HA & AP, older individuals often become excluded and trapped in poverty and isolation, thereby increasing the impact of impairment, disease, and disability on themselves, their families and society (Tebbutt et al., 2016).

In 2020, there were 1.4 billion individuals over the age of 60 worldwide (World Health Organization, 2021a). Currently, older individuals live longer and have several opportunities to contribute to their families and society. However, this ability to contribute is heavily reliant on good health. Many older individuals currently spend their retirement years living with disability because of chronic disease (World Health Organization, 2015). The number of PWDs worldwide is over 1 billion, with 80% of them living in low-and middle-income countries, and half of them lacking access to healthcare (World Health Organization, 2021b). Moreover, PWDs have poorer health outcomes, lower educational successes, less economic participation, and job opportunities, and encounter greater inequity than other groups (World Health Organization, 2011).

The Thailand 4.0 agenda is a policy aimed at boosting national development at a multidimensional scale, including economic conditions and quality of life (The Office of the Prime Minister, 2016). In conjunction with the Thailand 4.0 national policy, the government launched the 20-year national strategic plan (2017-2036) as a reform to shape the education and health systems (Ministry of Public Health, 2018). Nevertheless, Thailand, similar to other countries, is an ageing society, particularly since 2021, and the percentage of older individuals is expected to reach 28% in 2031, thus ushering Thailand into a super-aged society (Prasartkul, 2016). In addition, the number of PWDs was approximately two million in 2018, which corresponds to three percent of the Thai population (Department of Empowerment of Persons with Disabilities, 2018).

The number of older individuals is increasing globally, particularly in developing countries. As older individuals, they are more likely to have non-communicable chronic conditions, and as life expectancy increases. Non-communicable diseases are quickly becoming the main causes of death and disability, and in the next few decades, those responsible for making decisions regarding health and social issues will have to deal with the significant challenges presented by the rapidly changing prevalence of chronic illnesses in older age (Yadav et al., 2021).

Many older Thais contribute significantly to their own families and communities. They play an essential role in religious practice and traditional activities, including passing on the culture to family members and future generations (Department of Empowerment of Persons with Disabilities, 2018). Moreover, the direction and strategy of the Empowerment of Person with Disabilities Act and the National Development Plan for Empowerment of Person with Disabilities (fifth edition) promoted "the real right for persons with disabilities towards independent living in a sustainable inclusive society" (National Committee for Promotion and for Empowerment of Person with Disabilities, 2019; UN General Assembly, 2015). Furthermore, community-based development is supported by local government, community members, and organizations, including universities, to achieve inclusive development within communities. It is critical to use home adaptations and assistive products to raise awareness and improve the quality of life for older people and PWDs.

Home adaptations are alterations that aim to make buildings more suitable for older individuals and PWDs (Heywood, 2004). They were identified as one of the most promising

interventions for clients (Allen & Glasby, 2013). Home adaptation can reduce the need for people to be cared for in their own homes, especially the older individuals and those with disabilities (Clemson et al., 2019). The home environment can help family manage care levels in ageing societies, and these modifications and design play a significant role in reducing care needs in community settings (Carnemolla & Bridge, 2019). In the process of adapting a home for PWDs or older residents, assistive products, ramps, and pathways may be required (Fielo & Warren, 2001).

With assistive products, older individuals and PWDs can reduce their inequalities, be more productive, participate in all aspects of everyday life, and engage in activities (Tebbutt et al., 2016). According to the definition of the World Health Organization, an assistive product is "any product, instrument, equipment or technology adapted or specially designed for improving the functioning of a disabled person" (World Health Organization, 2001). Therefore, assistive technology (AT) can lead to healthy, productive, independent, and dignified lives that enable individuals to participate in educational, employment, and civic opportunities.

Occupational therapists are among the health professionals who provide and oversee home adaptation and assistive products. They can assist older individuals and PWDs with mobility and cognitive challenges to adapt to their home environments. There are a variety of home adaptations that occupational therapists can help older individuals and PWDs with, using assistive products and services to engage in everyday activity (Finlayson et al., 2001). The Bureau of Sanatorium and Art of Healing reports that, currently, there are 1571 occupational therapists serving the 70 million-population of Thailand (The Occupational Therapists Association of Thailand, 2022). There are three occupational therapy schools in Thailand: Chiang Mai University in Chiang Mai (Department of Occupational Therapy, 2022), Mahidol University in Bangkok (Faculty of Physical Therapy, 2022), and Srinakharinwirot University in collaboration with the Department of Medical Services, Ministry of Public Health in the central region (Division of Occupational Therapy, 2022).

As SDGs, the Act on the Elderly, and the Empowerment of Persons with Disabilities Act in Thailand, occupational therapists can apply for funds from local municipalities and agencies to support older people and PWDs. Thus, a team of architects and occupational therapists designs home adaptations and assistive products based on the specific needs of individuals to engage in purposeful and meaningful activities.

The home adaptation approach is consistent with theoretical models and frameworks supporting an ecological approach (e.g., focusing on the dynamic relationship between individuals and their environments) (Lawton & Nahemow, 1973). A previous study demonstrated that home adaptations significantly improved accessibility and usability (Fänge & Iwarsson, 2005). In a study conducted in Sweden, participants reported experiencing less difficulty in everyday life and increased feelings of safety two months (Petersson et al., 2008) and six months (Petersson et al., 2009) after home adaptations were installed. A systematic review also found that focusing on patients' living environments was effective in reducing falls (Clemson et al., 2019). However, a subsequent study demonstrated that this may only be true for high-risk patients (Pighills et al., 2016). The use of a client-centered home adaptation program improved the daily activity performance of older individuals, which was sustained for approximately two years post- modification (Stark et al., 2009). In South Korea, Jo and Kim studied the effects of the model of human occupation-based home modifications on PWDs. They found that the interaction between humans and the environment could increase occupational participation and competence to perform occupation by enhancing time use (Jo & Kim, 2022).

In Taiwan, a research team found that the number of assistive devices used by participants with physical, visual, and multiple disabilities was significantly higher than those with intellectual disabilities (Yeung et al., 2016). In Spain, assistive products were used to

assist 193 community-dwelling older individuals with disabilities in performing their daily activities. The study showed that assistive products positively impacted participants' ability to perform transfer skills (OR=2.59, 95% CI=1.48-4.53; p=0.01). Furthermore, implementing a bathroom adaptation had a significant effect on social functioning and decreased social risk among participants (OR = 0.76, 95%CI =0.63–0.93; p = 0.006) (De-Rosende-Celeiro et al., 2019).

In the US, home adaptations for dementia patients include grab bars, door alarms, and the provision of safe storage for potentially hazardous items such as cleaning supplies (Unwin et al., 2009). In Italy, an analysis of the person-environment relationships and the proposed adaptations for improving the independence, well-being, and quality of life of individuals with severe disabilities, showed the need for a reliable and multidimensional evaluation of the effects of home adaptations, and a sociologically informed approach to habitation (Costa et al., 2021).

In Thailand, Sukkay (2016) studied the criteria for home adaptations and found that PWDs' primary concerns were long-term care, body function identification, and cost-effective adaptations. This study highlighted that, in houses of individuals with mobility disabilities, the two places where adaptation was required first were the toilet and the bedroom. Moreover, Tongsiri et al. (2017) studied home adaptation for PWDs. They found that home modifications led to improved mobility and quality of life for 43 recruited participants, except for those with severe difficulties, such as those who could not walk and get up on their own. Another study showed that home adaptations can help families manage care levels in ageing societies and that these modifications and designs play a key role in reducing care needs in community settings (Carnemolla & Bridge, 2019).

In addition to functional improvements, client-centered intervention strategies are key to engaging in occupation and activities at home and surrounding area (Kielhofner, 2008). It is common for occupational therapists to modify the environment-related occupational performance by using the Model of Human Occupation (MOHO) (Haglund et al., 2000; Wikeby et al., 2006). Based on this model, human interactions with their environment are explained through the interaction between volition, habituation, and performance capacity (Kielhofner, 2008). In accordance with this model, practitioners can modify a client's home from their perspective, their occupation, and their environment, allowing the client to actively participate in all areas of their home (Chase et al., 2012). By improving client's physical environment, clients can achieve a subtle balance between the person, the environment, and the occupation, which reduces the difficulty and burden of a client participating in diverse occupations (Melody, 2017).

However, few studies on Thai OTs' use of home adaptations and assistive products have been conducted. They play a crucial role in ensuring that older individuals and persons with disabilities maintain control and autonomy by modifying their homes based on their health, limitations, and cultural environment. To understand the role of OTs in home adaptation and assistive product approach, it needs to be studied. Therefore, this study aimed to investigate OTs' experience in implementing home adaptations and assistive products for older individuals and PWDs.

As part of this research, we explore: 1) the challenges associated with providing home adaptation and assistive products to older individuals and PWDs and 2) the needs of older individuals and PWDs as related to home adaptation and assistive products.

All the researchers involved in this study have experience working with older people, adults, or children with disabilities. Our experiences as occupational therapists and educators led us to learn firsthand how difficult it can be when interacting with older individuals and people with disabilities. During the past decade, Thailand has seen an increase in the number of older individuals and PWDs. The result is that Thailand becomes an aged society. There

were a lot of policies and regulations regarding the welfare of older individuals and PWDs, including home adaptations and assistive products.

Nevertheless, poverty and limited product accessibility can also inhibit older individuals and PWDs from engaging in their daily activities and occupations at home and in their surroundings. Based on our clinical experience, we understood that we lacked knowledge and research on home adaptations and assistive products for older individuals and PWDs. Therefore, we conducted a study on this topic. Most Thai research team members are occupational therapists, educators, and researchers at various occupational therapy, medical, health and education departments at (i) Mahidol University, Thailand, (ii) Navamindradhiraj University, Thailand, (iii) Srinakharinwirot University, Thailand, (iv) Tokyo Metropolitan University, Japan, and (v) Chiang Mai University, Thailand. As we learn more about this underserved population, we hope to establish a more appropriate home adaptation and assistive products in the support system for older individuals and PWDs through education, community, and government resources.

Methods

A descriptive qualitative study was conducted to inquire about occupational therapists' experiences in the use of home adaptation and assistive products for older individuals and PWDs. In the Merriam & Grenier (2019, p. 7) definition of descriptive qualitative approach, it aims to "seek to discover and understand a phenomenon, a process, the perspectives, and worldviews of the people involved or combination of these." Research design, methodology and methods alignment, rigor strategies, and analytical lens were all considered in this study (Caelli et al., 2003). This study obtained ethical approval from the Mahidol University Central Institutional Review Board [COE No. MUCIRB 2021/026.1401].

Participants

Participants were Thai occupational therapists and recruited based on the following criteria: (a) possessed an occupational therapy national license, (b) had more than 5 years' experience of home adaptation and assistive products for older individuals and PWDs, (c) working with regional hospitals that represented each region in Thailand, and (d) willingness to share individual experience through an interview. Advertisements were disseminated to five regional hospitals in each region of Thailand and three excellent centers in the central region over a period of two months. After being contacted by the research team, participants were chosen based on the inclusion criteria.

Interview Procedure

The interview questions are designed from the literature review and are based on the aim of this study. The interview guideline was developed using iterative processes. Pilot interviews were conducted prior to implementation. The researcher validated the pilot questions by ensuring the study's setting, participant selection, and interview method aligned with the goals. Pilot participants were chosen via an interview process, and the mock interview guidelines were designed to reflect the study's content and concepts. Prompts were added to each question to encourage further discussion when needed. Feedback from participants and the pilot study proved useful in refining and revising the semi-structured interview. One of the research assistants was trained to conduct the interview by receiving instruction on interview techniques. The training consisted of a 45-to-60-minute mock interview in an isolated room. In addition to serving as an evaluation of the interviewer's skills, the mock interview allowed

the research assistant to practice and receive feedback. A single interview with participants was conducted in the field. Semi-structured interviews were comprised of the following questions in Table 1.

Table 1
Example interview questions

Questions
• What is the home adaptation and assistive products that you perceived, felt for clients (older individuals and PWDs), and value for their living and useful things? Could you state why it is helpful? • Did you feel that the home adaptation and assistive products made your client safe, or prevented them from an accident at home?
• What are the main factors of your clients when they consult you before deciding to make their home adaptation and assistive products? Do they have any support and complaints? • In your experience, did your client find assistive products or devices easily or not? Tell me about how your clients access the service about assistive products or devices?
• As therapists, do think that assistive products in the market or Thai commerce fit with your clients?

Data Collection

Semi-structured interviews were conducted for data collection between April and June of 2021. The researcher reached out to occupational therapists who met the inclusion criteria to schedule individual interviews at their convenience. Telephone interviews were scheduled at a mutually convenient date and time. Before the interview, each participant gave their consent electronically by emailing a signed consent form. Semi-structured interviews were conducted with each participant, which were recorded by voice and lasted between 45 to 60 minutes.

Data Analysis

The qualitative data were analyzed using Braun and Clarke's six-step approach for thematic analysis (Braun & Clarke, 2006). The first step was to conduct an overview of the data to gain a general understanding of occupational therapists' experiences. This involved transcribing audio onto paper and then typing it into Microsoft Word, and thoroughly reviewing the text multiple times while taking notes to become familiar with the data. The second step generated initial codes for the data by highlighting text segments in the form of phrases or sentences to describe their content. These codes offered an overview of the main points and grouped common meanings about therapists' experiences in home adaptation and assistive products approach to older individuals and PWDs that ran throughout the data. The third step identified patterns among the codes from each participant and categorizing them by looking for similarities in codes across the various interviews into potential themes. The fourth step

reviewed the themes to ensure their accuracy and usefulness as representations of the data. The fifth step defined and named the themes to formulate the results. The sixth and final step involved the creation of a report that addressed the research inquiries and included relevant literature to fulfill the study's aim.

Rigor and Trustworthiness

The assessment of credibility, transferability, dependability, and confirmability was performed using the strategy of Hanson et al. (2011). Triangulation was accomplished through the interviews of eight participants, providing a diverse range of experiences and ensuring that credibility was upheld. The interviews were conducted by research assistants following a set of guidelines. Transferability was ensured by offering a comprehensive description of the sample, setting, interview questions, and results. Further details were made available upon request to future researchers by contacting the research team. Dependability was established through multiple researchers conducting the data analysis and through peer debriefing, where the first author discussed emerging insights with the interviewing author during the data collection process. Member checking was also performed, where the researcher revisited participants after the identification of themes to confirm that the themes aligned with their experiences and captured their intended message. All participants confirmed the accuracy of the identified challenges and needs themes.

Confirmability was achieved through recording and transcribing all interviews, recording the meetings between researchers to discuss coding and themes, and through a final decision-making meeting among all researchers. This allowed external researchers to follow the logic and reasoning behind the findings. Additionally, a thorough translation contributed to the study's trustworthiness by providing more accurate data, promoting inclusiveness, consistency, and transparency in the analytical process (Braun & Clarke, 2006).

This study examined potential translation-related problems which might interfere with trustworthiness. During the data translation and analysis process, the researcher considered the challenges of translation and aimed to maintain semantic equivalence with both realistic and textual meanings. Word-for-word transcripts were analyzed in the participants' native language (Thai) and later translated into English (Twinn, 1997) and verified by two experts fluent in both Thai and English. The linguistic differences between the two languages were considered, as expressions in one language may not be present in the other (Patton, 2014). A trustworthiness audit trail was established by the research team to support interpretations and analyses (Nowell et al., 2017).

Results

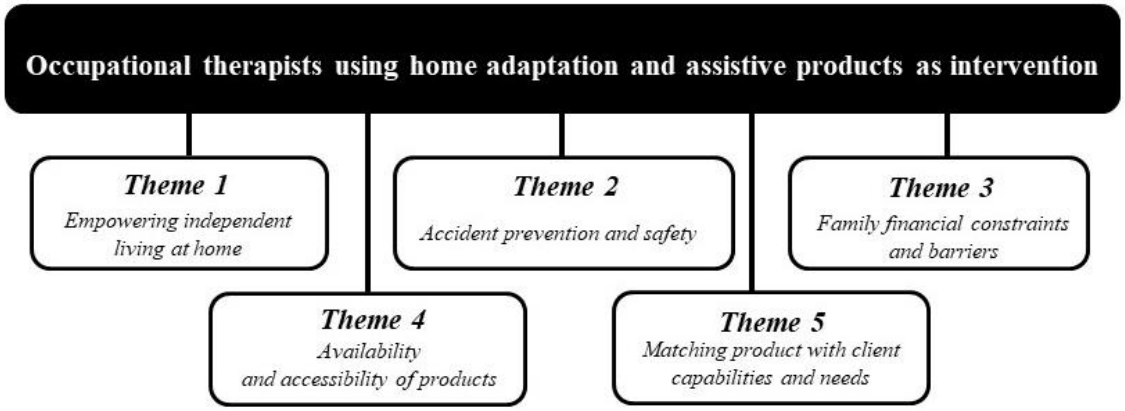
Eight occupational therapists agreed to participate (three males, five females); all signed consent forms before participating in the study. They had between seven and 22 years of experience, working with home adaptation and assistive products for older individuals and PWDs. Five participants were from each region (North, Northeast, East, South, and West), and three were from the central region of Thailand including Bangkok, the capital city of Thailand. We used pseudonyms to protect the participants' identities. Participants' characteristics are reflected in Table 2.

Table 2
Demographic characteristics of participants

Participant	Gender	Region	Years of Experience
OT1	Men	Central	17
OT2	Women	South	9
OT3	Men	Northeast	7
OT4	Women	Central	22
OT5	Women	East	11
OT6	Women	North	8
OT7	Women	West	20
OT8	Women	Central	22

Data analysis resulted in the emergence of five themes related to OTs' use of home adaptation and assistive products as part of interventions (Figure 1). Each of the five themes are presented and illustrated with example quotes from the interviews.

Figure 1
Summary of themes



Theme 1: Empowering Independent Living at Home

Participants believed that the aim of providing home adaptation and assistive products was to enable clients to live independently, which reflects that empowering people to live independently at home is the main purpose of OT services. The account below notes that home adaptation and assistive products can increase clients' ability to live independently and enable them to engage in various activities because they are familiar with their atmosphere and surroundings. OT4 stated:

> In many cases, if my clients cannot improve their skills to do what they want to do, we use assistive products to improve and adjust their environment. It helps them to live independently and pave their way. They engage in more activities and decrease the burden of care on their families (OT4).

In OT2's interview, independent living meant providing home adaptation and assistive products to allow clients to perform activities and occupations at home. He stated:

> OTs have to get clients or people who live with disabilities to return to being able to perform their activities of daily living independently. I think that home adaption and assistive products are a good solution to help my clients perform their relevant activities at home, such as getting up from bed, bathing, going to the toilet, and eating (OT2).

Similarly, OT5's perspective showed that the use of home adaptation and assistive products is a factor that increases the clients' abilities and is provided at the same time as rehabilitation services. Her statement reflects an understanding that home adaption and assistive products not only increase her clients' abilities and skills but also promote clients' confidence in safely engaging in their ADL without taking risks:

> I adapted my clients' homes and environments with their families. We consulted with the architect to plan and design home adaptations and devices. Teamwork helps clients and their families be positive about the modification of their environment and makes sure that clients will be able to do their activities of daily living at home independently and confidently (OT5).

A portion of OT8's account was similar regarding positive experiences from her clients. She and her team installed rounded handrails in toilets to assist clients with personal care and in corridors to assist with walking. Her experiences are as follows:

> My team and I installed assistive products, handrails in the toilet and corridor. Our clients can help themselves to stand after going to the toilet, including helping them walk independently back to their bedroom. It is a good opportunity when our clients and their families are willing to allow us to adapt their home and environment (OT8).

As demonstrated in the above quotes, participants assisted their clients in home and environmental adaptation to provide comfort and confidence in performing everyday activities. Relevant home adaptation and assistive products are important tools that encourage their clients to help themselves and reflect on the meaning and value of independent living.

Theme 2: Accident Prevention and Safety

Home adaptation and assistive products are key facilitators in increasing safety and preventing complications or accidents. Participants reported that this approach assisted their clients in protecting against risk-taking and injury. OT6 described how home adaption can reduce barriers and prevent falling among older people:

> I think that home adaptations can reduce barriers and limitations in walking. My clients, particularly older individuals, can walk easily and live a safe life by

> themselves. We installed a handrail in slippery areas and renovated corridor junctions to remove steps. We also installed lights along the hallway and increased brightness in stairways, including areas where there is a risk of falling (OT6).

Similarly, OT5 recounted how her clients were older individuals and had an increased risk of falling in their home and the surrounding area. Home adaptation and assistive products are part of her recommendations and suggestions for clients and their families to prevent accidents at home:

> In normal older people, I have to consider the risk of falling. Mostly, I will give them advice about using the handrail and anti-slap mats in both the toilet and bathroom, as well as the hallway. If they agree, I and my team will suggest assistive products and where they can buy them from, including the price and for a plan for how to modify their environment (OT5).

In OT7's experience, safety is key to preventing accidents at home and in the surrounding area. She adapted and modified clients' houses who lived with disabilities to facilitate their movement and increase their safety skills related to performing everyday activities. She stated:

> It is very important when preparing my clients to go home. Safety at home always comes first and we need to talk with a client and their family about home and environment safety before they go home. If we plan together and decide to adapt and modify clients' homes, we will also focus on safety and skill improvement related to their functional abilities after rehabilitation (OT7).

As illustrated in the above section, home adaptation and assistive products are one of the ways of helping PWDs and older individuals. The participants described how they provided these approaches using relevant adaptions and modifications. Furthermore, they reflected on how they facilitated accident prevention and increased safety at home and in the surrounding area. This enables clients to be confident in doing their everyday activities independently which can improve their self-esteem, rather than creating a burden for their families.

Theme 3: Family Financial Constraints and Barriers

The participants reported that financial support was an important factor in providing home adaptation and assistive products for older individuals and PWDs. In Thailand, government agencies provide financial support for investments aimed at increasing movement skills and eliminating mobility barriers. Interviews revealed high levels of expenditure on purchasing equipment, materials, and construction. However, despite this available support, as OT1's account showed, financial constraints were a main problem for his clients and their families:

> My clients' families complained about their financial problems, even though they were subsidized by the government agencies. But the budget was not enough to modify and adapt the home and surrounding environment because equipment, materials, and construction are expensive. And if they are required to pay more, then they will withdraw (OT1).

A part of OT5's account describes that her clients were children with disabilities and required adaptive devices to perform ADL. Some rich families, whose children had a good education, could afford assistive products to facilitate improvements in their children's skills and abilities. However, most clients' families have low education and poor income, which are important factors affecting their children's conditions. OT5 stated: "My clients are children with disabilities. If some of them come from well-educated and rich families, they can easily afford and access ways to solve the problem. But most come from poor families, and they cannot afford these products."

OT2 described how he mainly provided services to older individuals living in extended family households. When implementing home adaptation and assistive products for older individuals, he encountered some barriers related to family member disagreements. This created misunderstandings among family members that impacted subsidized money and financial constraints.

> In many cases with older people, if some family members disagree about modifying the home and installing products, it is very hard to adapt the home and surrounding environment due to the different opinions and family members who are unwilling to pay money and provide support. This situation is likely to happen in an extended family when members need to spend money on other things (OT2).

As revealed in the above quotes, financial constraints are a major problem in the use of home adaptation and assistive products to maintain the functional abilities and improve the life skills of older individuals and PWDs

Theme 4: Availability and Accessibility of Products

The accessibility and availability of home adaptation and assistive products are significant factors related to the market and service delivery. Most participants described that the number of assistive products being sold is insufficient to reach economies of scale, particularly special wheelchairs, prosthetics, and orthotics required by many PWDs. OT1 described that his clients who lived with disabilities and their families could not access the assistive product market, because there was generally very little choice of providers.

> Actually, I think that our country is weak in terms of the availability and affordability of assistive products. Most companies import these devices from abroad and sell them at high prices. They cannot make these products available in markets or shopping malls (OT1).

OT3 reported that most assistive products available in the commercial market did not include proper operation instructions, which created confusion about how to operate these products and resulted in potential problems.

> My clients cannot operate specific assistive products for themselves due to the fact that these products in the commercial market have unclear indications; how to use them or who needs to use them. Sellers cannot give correct and accurate details of the products and services they offer (OT3).

OT8 described how financial support was not a problem for some of her clients who had children with disabilities; these families could afford assistive products to improve their

children's functional skills. However, some of these products needed to be imported from the US or Europe and required prior approval from Thai Food and Drug Administration (Thai FDA).

> My clients were disabled children who wanted to move comfortably and perform activities by themselves. Some families can afford to pay money for special tools for their kids. The big problem is not the high price to import from abroad, but that the mechanism of Thai FDA approval may create a big gap to accessibility (OT8).

OT7 noted that she advised one of her disabled clients to obtain a special wheelchair suitable for the terrain in the area in which the client lived. However, wheelchair training could not be practiced in the target area.

> It was hard to get a specific product such as a terrain wheelchair. Even if we can deal with the assistive product agency for disabled people, we cannot access space to train clients in the rural area about how to work with their environment (OT7).

Similarly, OT6 recounted how some of her clients were amputees living in a hill tribe in high and difficult-to-access land. They struggled to take transport from the mountain community to the hospital in the city centre, and the process of obtaining prosthetics involved a long waiting period.

> My clients told me that it was hard to get a car from the mountain to the city. They always came to see a doctor with an appointment at the hospital to prepare artificial limbs. It is difficult to access the hospital within one day because the process of obtaining an artificial limb takes a long time. They have had to go in and out of the hospital several times within a few months (OT6).

These participants' accounts reflected issues with the unavailability of assistive products and equipment for PWDs, including at health facilities.

Theme 5: Matching Products with Clients' Capabilities and Needs

It was reported that every client's requirement differed according to their physical conditions, pathology, age, and gender. All these factors affected the current abilities of clients, particularly older individuals and PWDs. These unique requirements create a huge gap between what is needed from businesses and available on the market. Companies and agencies cannot locally produce new and bespoke products at reasonable prices. OT4 described the need for manufacturers and the commercial market to change strategies and find effective solutions that match the capability of the client with the design of the home and assistive products. She stated:

> I think that home and assistive products for clients need to change direction both in terms of production and their launch in the market. Producers must find relevant products for disabled and older people. The mass-produced assistive products in the market do not work; they need to provide different sizes and real applications to meet the needs of clients and their skills at home (OT4).

Similarly, OT3 described how there was a variety of equipment available for home adaptation and assistive products in the commercial market, which differed in terms of price, type, size, and quality. However, they were not designed to match their clients' specific requirements and abilities. He described that the equipment for home adaptation and assistive products was often unsuitable and not applicable in the real context of the client's home. He stated:

> My clients not only complain about the size, materials, and design of assistive products, but they also complain about how applicable they are to their specific condition. Most are willing to pay if a product is suitable and can be applied at home (OT3).

OT2's account described how each of his clients had different conditions in terms of disabilities, abnormal body structure and function, and physical limitations. He reflected that the form and design of home adaptation and assistive products should relate to the specific functions required, which should be established at the outset. He stated:

> In my experience, [current production of home adaptation and assistive products] is not appropriate because disabled people are not the same and they have different problems such as upper or lower limb loss that depend on their individual condition. I think that assistive products should be designed to fit with the individual by starting with the function and form. This design should be concerned about the real situation and whether it can be applied at clients' homes and in their environment (OT2).

OT7's account described how the use and application of assistive products at clients' homes should be designed and planned to suit a particular client based on their conditions, limitations, and opportunities. She recounted:

> I think that it depends on the client's disability and characteristics. Some impairments do not continue in the long term, such as those seen in the first stage of a stroke; if that function is restored correctly, some assistive products may not be required. This means that if our clients can restore their functions and perform their activities, these products are not necessary. But some clients have already lost a particular function and to recover their skills the assistive products must be utilized (OT7).

As illustrated in the above section, the capacities and needs of clients should be an integral part of the design of home adaptation and assistive products. Furthermore, the experiences of OTs can provide useful insights on the appropriate design and use of home adaptation and assistive products.

Discussion

In this study, most participants advised their clients about home adaptation and assistive products to make their lives easier and more independent. Their experiences confirm a positive view of home adaptation and assistive products. According to Crews and Zavotka (2006), living spaces should be created in 'under-designed' environments employing a universal design which can improve feelings of well-being and safety for older individuals and others. Good home design and environments can enhance living conditions for older individuals and their families, and reduce costs associated with disabilities, impairment, and healthcare. Moreover,

assistive products, independent living aids, and supportive technology at home enable older individuals to continue living at home and prevent the need for long-term care (Lansley et al., 2004). AT can also enable older individuals and PWDs to improve quality of lives. AT device is hard technology, while activities about systematic application (set-up, customizing, trail, and clinical advice, training and follow up) are soft technology (Cook & Hussey, 2002). This soft technology is related to the role of occupational therapists to use AT intervention for their clients (Waldron & Layton, 2008).

In the present study, most participants reported that home adaptation and assistive products can reduce the risk of falls and assist both PWDs and older individuals to improve their function and safety when performing activities. Following Clemson et al. (2019), home and environmental modification are effective long-term intervention approaches to improve independence, fulfilment, and safety for older individuals in the community. These assistive products, such as personal mobility aids, bodywear aids, communication aids, and sensory self-help tools, were found to reduce the risk of falls. Serious potential consequences of falls and fractures leave a deep impact on older individuals, including physical injury, pain, increased risk of death, functional impairment, and self-imposed restrictions on activities (Soliman et al., 2016).

Regarding risk-taking and accident causation, our study found that assistive products were often installed in toilets and slippery areas to prevent falls and accidents by older individuals and PWDs. This is consistent with Ferretti et al (2013), who found that the bathroom (24.94%), and kitchen (18.25%) were the locations in the home that presented the highest risk of falls. In Thailand, Sophonratanapokin et al. (2012) studied the effect of living environments on falls among the Thai elderly. They found that slippery areas on the first floor, bathroom, or toilets located inside or outside the home were related to a chance of falls. Moreover, older individuals who lived with their spouses showed a lower risk of falls than those who lived alone. In recent years, an increasing number of technology-based applications were developed to support effective and efficient fall prevention measures (Sophonratanapokin et al., 2012).

Our study reported that low incomes and a lack of financial support are major reasons why individuals do not possess the tools they need. Although the Thai government subsidized home modifications, this support was not covered in constructing and implementing agents due to the increasing of the labor cost and raw materials for construction. Consistent with Roy et al (2008) found that eleven parents of children with motor disabilities were interviewed about using home adaptations for their children. The finding showed that financial and organizational constraints is a major cause in the use of home adaption. In Thailand, the government enforced the PWDs Empowerment Act in 2007, which follows the United Nations Convention on the Rights of People with Disabilities. This act ensures that registered PWDs are permitted to access home environment adaptations' benefits up to a maximum of 670 US dollars; however, the act's enforcement is still weak in Thailand (Tongsiri et al., 2017). Thailand has since passed the Disabled Persons Empowerment Act (No. 2) in 2013, which grants entitled people to home environment adaptation benefits up to a maximum of 1,200 US dollars (Royal Thai Government Gazette, 2013). However, participants in this study reported that low incomes and a lack of financial support are major reasons why individuals do not possess the tools they need. Although the Thai government subsidized home modifications, this support did not cover constructing and implementing agents due to the increasing of the labor cost and raw materials for construction.

Addressing the unmet needs for assistance is crucial to achieve universal healthcare coverage that were established by the United Nations Convention on the Rights of People with Disabilities (Lang et al., 2011) and implemented in Thailand. In 2018, the Thai government subsidized the disability pension for the PWDs to improve their quality of lives through the

Life Promotion and Development for the Disabled Act and the National Plan of Life Development for PWDs (Department of Elderly Affairs, 2021). In our study, most participants reported that the availability and accessibility of home adaptation and assistive products for PWDs need to be assured by encouraging companies to produce and sell high- quality products that are specific to the needs of clients. According to Cheausuwantavee and Keeratiphanthawong (2021), only 8% of PWDs were employed and most of these worked in the unskilled labor market. Many PWDs needed home adaptation, assistive products, transportation, and essential support that accommodated them to perform everyday activities and get from their homes to their workplaces. Therefore, it is recommended that employers invest in making the working space and environment accessible, including support for PWDs.

The Thai government and agencies should address the need to help older individuals and PWDs with assistive products and home adaptation designed to protect them from accidents and deterioration. Our study found that some clients and families needed assistive products that were unavailable or inaccessible in Thailand, and relevant agencies were unable to help them import it from other countries. This finding resonates with those of other studies related to low- and middle- income countries. Eide and Øderud (2009) found that assistive products in low-income countries had limited access and led to stagnation of the rehabilitation. Moreover, Copley and Ziviani (2004) studied the use of assistive technology for children with multiple disabilities. The provision of assistive technology and devices faced major barriers related to imported products, complicated practice, limited time, shortage of professionals for training, and inaccessible academic settings. Hence, it is widely recognized that in low- and middle-income countries, there is a great and growing need for home adaptation and assistive products, but the lack of research in these countries means that insufficient evidence exists.

Our study revealed that assistive products should be tailored to a client's condition. Cavalcanti et al. (2020) found that adaptive eating devices assisted people with Parkinson's disease who has difficulties with standard cutlery. This device significantly increased functional performance and satisfied the requirement for participating in meal activities. AT and devices play an important role in promoting functional independence in the bathroom and dining room. The assistive devices can facilitate functional independence and rehabilitation programs for individuals with neuromuscular disease, but most of these studies do not consider the role and importance of home adaptation and assistive personal support from caregivers to increase user independence (Pousada García et al., 2019). In this study, our participants, as practitioners, described how home adaptation and assistive products are not only the search, design, and size, but also the change of products on the creation of different devices designed for the specific needs of older individuals and PWDs as great solutions for daily life with minimal investment.

In terms of Thai culture and context, the empowerment for independent living at home and financial support reflected that older individuals and PWDs could help themselves about their basic activities of daily living, safe care, and health at their familiar social and cultural environments. With the Foundation of Thai Gerontology Research and Development Institute, this suggested policies to advance active aging in (1) the living environment, (2) living with dignity, and (3) health (Prasartkul et al., 2017), aligning with the concept of the WHO for active aging. According to Lorthanavanich (2021) the government and relevant parties should support the modification of older individuals' living arrangements to allow for independent living and completing daily tasks. Transport and public spaces should be adapted to be age-friendly, and outdoor activities for older people should be encouraged. National and local governments should ensure regular health check-ups, access to nearby exercise spaces, social interaction venues, safe food, and assistance with daily life for older individuals.

Furthermore, home modifications for persons with physical disabilities in Thailand are essential. A national policy supporting such modifications requires both local funding and

effective implementation to improve their quality of life. The home modification program should be broadened beyond its current scope and receive increased government subsidies for varying modification types. Local governments, communities, and provincial staff must also contribute additional financial and technical resources and receive technical guidelines and training. A collaborative and multi-disciplinary approach throughout the entire process is crucial for success (Tongsiri et al., 2017). Therefore, if implemented, this policy would not only benefit older individuals, but also PWDs and others in Thai society.

In Thailand, Putthinoi et al. (2017) found that features for home living and assistive technology can allow elderly individuals who are confined to their homes to live independently within their communities. The study emphasized the importance of including elements of Thai culture, such as recreation, sports, and spiritual practices, in the environment. Additionally, the environmental factors of the International Classification of Functioning, Disability, and Health (ICF) categories can serve to assess and evaluate assistive technology facilities. Thus, healthcare providers can use shared tools and techniques based on the ICF framework to support the home-bound elderly in leading healthier lives and overcoming environmental and physical challenges.

The research team envisions future funding for continued research on home adaptation and assistive products, using a larger survey and intervention sample size that includes not only occupational therapists but also older individuals, PWDs, and their family members. The research will also consider gathering perspectives from older individuals, PWDs, and their family members on home adaptation and assistive products that better align with their activities and cultural context through interviews.

We recommend establishing a nationwide policy with concrete regulations in Thailand to support home adaptations and assistive products. The policy should have local funding and implementation capabilities to improve the quality of life for older individuals and PWDs. The home modification program should be expanded beyond its current locations, with increased government subsidies for various modifications. Local governments and communities should also provide additional financial and technical resources, as well as technical guidelines and training. Collaboration and a multi-disciplinary team approach are crucial for the policy's success, from beginning to end.

In summary, it is important to comprehensively understand the experiences of occupational therapists who provided home adaptation and assistive products for older individuals and PWDS; the use of these tools must relate to the abilities and possibilities of their clients. This study’s findings represent a real situation in the Thai context and echo the need for client involvement in such services. This represents the process of empowering clients in terms of selecting products, being concerned about their own safety, financial support, and matching product usage with clients’ functional capacity. Furthermore, the need for home adaptation and assistive products to be applied in context is related to social and cultural dimensions.

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