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A Closure System on Adaptive Clothing for People with Dementia (PwD) in The Moderate Stage

Perancangan Sistem Closure pada Adaptive Clothing untuk Orang dengan Demensia pada Tahap Moderat

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ABSTRACT

Adaptive clothing is one of the media to optimize the living conditions of people with dementia (PwD), which can solve the problem of undressing in social situations, is friendly for caregivers, and is suitable for the physical and psychological conditions of PwD. The method used is qualitative with a comparative approach by researching closure systems for adaptive clothing in the online market. This research produces design recommendations based on the type, development, and comparison of closure systems on adaptive clothing on the market. Adaptive clothing products are expected to stimulate or train memory, reduce anxiety, improve quality of life, and facilitate caregivers in caregiving.

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Kata kunci:

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ABSTRAK

Salah satu media untuk mengoptimalkan kondisi hidup orang dengan demensia (ODD) adalah adaptive clothing yang mampu memecahkan permasalahan membuka pakaian dalam situasi sosial secara tiba-tiba (undressing), mempermudah caregivers dalam perawatan, serta disesuaikan dengan kondisi fisik dan psikologis ODD. Metode yang digunakan adalah kualitatif dengan pendekatan komparatif. Penelitian ini menghasilkan rekomendasi desain berdasarkan jenis, pengembangan, dan perbandingan sistem closure pada pakaian adaptif yang ada di pasaran. Produk pakaian adaptif diharapkan dapat menstimulasi atau melatih daya ingat, mengurangi kecemasan, meningkatkan kualitas hidup, dan memudahkan caregiver dalam perawatan.

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Introduction

The Ministry of Health data for 2019 shows that Indonesia is currently in the midst of an aging population, which shows an increase in life expectancy followed by an increase in the number of elderly people. Indonesia experienced an increase in the number of elderly people from 18 million people (7.56%) in 2010 to 25.9 million people (9.7%) in 2019, and it is expected to continue to increase, reaching 48.2 million people (15.77%) in 2035. More specifically, based on statistics from Alzheimer's Disease International in 2016, the number of people with dementia in Indonesia is 1.2 million, which is predicted to increase in 2030 to 1.9 million and in 2050 to 4 million. Responding to this data, the Secretary General of the Ministry of Health, Primadi (2019), urges everyone to start paying attention to the needs of the elderly so that they can remain healthy, independent, and active.

According to Alzheimer's Indonesia (2019), dementia is a general term that covers a spectrum of symptoms arising from various brain diseases, such as Alzheimer's, vascular dementia, and others. Any impairment in brain function will have a significant impact on a person's life. The Center for Health Determinants Analysis (2018) states that there is still no cure for dementia. Therefore, according to Strom (2016), the current treatment and care methods focus on optimizing living conditions for people with dementia (PwD) that promote a sense of well-being. One of the mediums is adaptive clothing. According to Giordi and Hugh (2016), in dementia patients, the physical symptoms that come with the progression of the disease, the combination of cognitive decline, deteriorating judgment, and personality changes may contribute to changes in attitude and behavior, so the design of adaptive clothing needs to adapt to the stage of dementia progression. In this context, it is not only concerning the patient but also the clothing that facilitates the caregiver's ability to take care of the patient.

According to Iltanen (2012), undressing in social situations has become a serious problem in care institutions as it may be considered inappropriate. Johnson et al. (2006) explained that actions such as undressing in public or touching the genitals can be misinterpreted as sexual activity when, in fact, they can result from pain, discomfort, hyperthermia, or an attempt to be released from a perceived controlled environment. These behaviors can cause anxiety, distress, and embarrassment and lead to confinement in a home or institution.

One of the responses to this challenge is to design clothing with special closure systems that make it difficult for PwD to undress themselves, such as all-in-one style clothing or jumpsuits with back closures. However, according to Iltanen's (2012) study, PwD and caregivers perceived such clothing as childish and stigmatizing. In fact, the interviews highlighted the importance of clothing for individual expression and enhancing mood and self-confidence. In addition, based on interviews from Salsabila's study (2021), caregivers stated that this type of clothing can prevent caregivers from interpreting the way PwD communicates. The caregiver tends to understand what the patient wants by looking at his or her behavior, such as the patient trying to open his pants or lifting her skirt, indicating that he or she does need to go to the toilet.

Adaptive clothing that is currently on the market does not understand the needs of people with dementia (PwD) and caregivers based on their perspectives, so it does not maximally facilitate the ease and independence of people with dementia (PwD). This research produces design recommendations based on the analysis of the closure system on adaptive clothing on the market.

Method

This research used qualitative research methods. The primary data was collected directly by researching closure systems for adaptive clothing in online markets to find out the types, developments, and comparisons. Objects that have been found were then analyzed to determine suitability as well as their advantages and disadvantages. The results of the analysis produced an adaptive clothing design that is able to facilitate the needs of PwD in encouraging independence and caregivers in caregiving.

The secondary data in the research was collected through literature studies, which are related to the title, such as collecting information or data related to the development of previous research, definitions, functions, types, and other information needed during the process of design. The data was collected in written and pictorial form in books and online journals.




Results and Discussion

In contradiction to the use of Velcro in most adaptive clothing, an interview in Chan et al.’s (2018) study found that Velcro, which has been considered an effective fastener, can sometimes harm the skin, draw the attention of other people, and feel uncomfortable. The use of Velcro to overcome these issues can be solved by considering its size, position, and manipulation to be visually inconspicuous. As an alternative to Velcro, Binkley (in Rutledge, 2017) states that a very common adaptive mechanism used in formal shirts is the MagnaReady closure system. Maura Horton created the MagnaReady shirt line with a magnetic closure system hidden on the inside of the fabric along the edge of the closure. These shirts are detailed with decorative buttons on the outside to give them the appearance of a regular shirt.

In 2013, Li, Wang, Wu, and Zhao (in Rutledge, 2017) designed a special clothing pattern where the crotch of the pants could be detached from the pant legs. This special garment offers convenience when changing clothes. Li, Wang, Wu, and Zhao also used special seams and flaps at the elbows of the circular jacket to provide comfort and support in friction-prone areas for wheelchair users. The jacket also has zippers around the sleeves that allow the jacket sleeves to be removed.

There is still limited previous research that discusses closure systems specifically; hence, a comparison of similar objects was conducted with three brands that provide adaptive clothing for dementia patients.


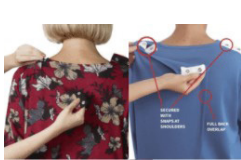

Table I Comparisons among Three Objects of Women’s Dresses Categorized as Self-dressing

Factor	Buck & Buck	Silvers	The Able Label
Object			
Closure system	Front opening	Over-the-head style	Front opening
Closure position and size	Front, chest to the hips	Upper, wider neck opening	Front, full (top to bottom)
Type of closure/materials	Zipper	-	Velcro
Appearance	Hidden	Normal	Hidden with decorative buttons
Thickness	Thin	-	Moderate
Special feature/functions	-	-	Easy fasten
Accessibility (PwD)	Easy to reach, less intuitive	Easy to reach, intuitive	Easy to reach, less intuitive

(Source: Salsabila, 2022)

Buck & Buck dresses allow for a full opening, making it easier for caregivers to provide care. Silvert’s dress features a wider neck opening, allowing for the ease of dressing in an over-the-head style (traditional), which looks like a regular outfit. However, this system may be difficult for caregivers when PwD refuse to change their clothes. Meanwhile, The Able Label dress features a front opening with Velcro to facilitate users with decreased hand dexterity. Each dress has a different closure system and type but can be easily reached by PwD. Based on Salsabila’s interview (2021), women with moderate-to-severe stages of dementia are more familiar with the over-the-head style opening system, as some people with dementia may like to play with buttons or zippers until they are broken. Therefore, it is important to know the behavior of people with dementia to determine the purpose of adaptive clothing. For the category of self-dressing in increasing independence, it is necessary to know the type of closure that is familiar to PwD since it is difficult for people with dementia at this stage to find out the function, so it is only based on memory or habit.




Table II Comparisons among Three Objects of Women’s Dresses Categorized as Assisted Dressing

Factor	Buck & Buck	Silverts	The Able Label
Object			
Closure system	Back opening	Back opening, shoulder snap, overlap	Back opening, overlap
Closure position and size	Back, full (top to bottom)	Shoulder, full (top to bottom)	Back, lower back to bottom
Type of closure/materials	Snap	Snap	-
Appearance	Hidden	Hidden	Hidden
Thickness	Moderate	Moderate	Moderate
Special feature/functions	-	No pressure points	For incontinence users
Accessibility (PwD)	Not easily reachable, not intuitive	Not easily reachable, not intuitive	Easy to reach, intuitive

(Source: Salsabila, 2022)

All brands use garments in this category with a back opening to make it easier for caregivers to change the patient’s clothes. Dressing also makes toileting activities easier for patients. Dresses from the TAL brand cannot be opened completely. The B&B and Silverts can be fully opened, which makes it easier for people with disabilities who have difficulty raising their hands. The back opening with a narrow neck hole also avoids the tendency of PwD to undress in public situations. The snap closure on the B&B brand may take longer to fasten, but it allows caregivers to undress only certain parts of the garment. The position of the closure on Silverts’ garments serves to avoid pressure points that might otherwise be imprinted on PwD’s skin.



Table III Comparisons among Objects (Men's Tops) Categorized as Self-dressing

Factor	Buck & Buck	Silverts	The Able Label
Object			
Closure system	Front opening	Front opening	Front opening
Closure position and size	Front, full (top to bottom)	Front, full (top to bottom)	Front, full (top to bottom)
Type of closure/materials	Velcro	Magnetic	Velcro
Appearance	Hidden with decorative buttons	Hidden with decorative buttons	Hidden with decorative buttons
Thickness	Moderate	Moderate	Moderate
Special feature/functions	-	-	-
Accessibility (PwD)	Easy to reach, less intuitive	Easy to reach, intuitive	Easy to reach, less intuitive

(Source: Salsabila, 2022)

For people with dementia, who are still independent but have decreased hand dexterity, the three types of closures, especially magnetic, are made to be easily used without a lot of effort. In the category of self-dressing to increase independence, it is necessary to know the type of closure that is familiar to the person with dementia because, at this stage, it is difficult for the PwD to find out the function, so they are only relying on memory or habit. However, magnetic closures may be more efficient because if the two sides are near each other, they can be attached by themselves.




Table IV Comparisons among Objects (Men's Tops) Categorized as Assisted Dressing

Factor	Buck & Buck	Silverts	The Able Label
Object			Not available
Closure system	Front opening	Front & back opening	-
Closure position and size	Back, full (top to bottom)	Shoulder, full (top to bottom). Front, chest	-
Type of closure/materials	Snap	Snap & zipper	-
Appearance	Hidden	Hidden backside	-
Thickness	Moderate	Thin	-
Special feature/functions	-	-	-
Accessibility (PwD)	Not easily reachable, not intuitive	Easy to reach, intuitive	-

(Source: Salsabila, 2022)

Both clothes are designed with a back opening to make it easier for caregivers to change clothes. The back opening with a narrow neck hole also avoids the tendency of PwD to undress in public situations. However, the Silverton brand has a zipper, which may also encourage independence.



Table V Comparisons among Objects (Men’s Bottoms) Categorized as Self-dressing

Factor	Buck & Buck	Silverts	The Able Label
Object			
Closure system	Front opening	Side opening	Front opening
Closure position and size	Front, waist to hips	Side, waist to hips	Front, waist to hips
Type of closure/materials	Velcro	Velcro	Velcro
Appearance	Normal	Hidden	Normal
Thickness	Moderate	Moderate	Moderate
Special feature/functions	Lowered Hand Dexterity	Lowered Hand Dexterity	Lowered Hand Dexterity
Accessibility (PwD)	Easy to reach, intuitive	Easy to reach, not intuitive	Easy to reach, intuitive

(Source: Salsabila, 2022)

For those who are still independent but have decreased hand dexterity, the Vecro-type closure is made to be easily used without much effort. The side opening on the Silverton’s bottom is designed to facilitate wheelchair users.

Table VI Comparisons among Objects (Men’s Jumpsuit) Categorized as Preventing Users from Undressing

Factor	Buck & Buck	Silverts	The Able Label
Object			Not available
Closure system	Back opening	Back opening	-
Closure position and size	Back, top to waist	Back, top to waist	-
Type of closure/materials	Zipper	Zipper, dome closures	-
Appearance	Hidden	Hidden	-
Thickness	Moderate	Moderate	-
Special feature/functions	To prevent undressing	To prevent undressing	-
Accessibility (PwD)	Not easily reachable, not intuitive	Not easily reachable, not intuitive	-

(Source: Salsabila, 2022)

This type of clothing helps prevent the unwanted behaviors of PwD. Jumpsuits with back openings that only reach the waist can be difficult to take care of for PwD with incontinence. Based on Salsabila's (2021) interview, caregivers think that this cloth can hinder the communication of PwD to go to the toilet and may cause tantrums, especially for PwD who refuse to use diapers. They have communication difficulties, so the caregivers tend to understand their needs by looking at their behavior, such as when they try to open their pants or lift their skirt, which indicates that they want to go to the toilet. Therefore, it is necessary to design adaptive clothing that is able to understand the needs of PwD and caregivers from both perspectives. The Silverton brand also has a dome to strengthen closure. Based on Ilanen's (2012) interview, this style of adaptive clothing can stigmatize PwD because it looks childish. In fact, the interview showed the importance of self-expression through clothing in improving mood and self-confidence.

Adaptive Clothing Design

The adaptive clothing is designed in two modes, which are self-dressing and assisted dressing. The self-dressing mode is intended to make it easier for PwD to dress independently. Meanwhile, the assisted-dressing mode is intended to overcome the difficulties that people with dementia and their caregivers experience in dressing, such as refusing to change their clothes and sometimes undressing in social situations. Adaptive clothing is also made without pockets to prevent PwD from collecting or hiding objects.



(Source: Salsabila, 2022)

Based on interviews, women with dementia are more familiar with over-head-style openings. For both PwD and their caregivers, dresses or skirts make it easier to do toilet activities. Therefore, adaptive clothing for women is designed as a dress or blouse and skirt set. The opening system of women's adaptive clothing in self-dressing mode is focused on opening by lifting (over-head style). Meanwhile, in the assisted-dressing mode, there are restraining buttons hidden on the top, which can prevent PwD from fully undressing in social situations. This mode also features a hidden zipper to make it easier for caregivers to change PwD's clothes.

Unlike women, men with dementia are more familiar with buttons and zippers. In addition, men's jumpsuit-style clothing sets on the market are considered childish and may restrain the independence of PwD. Moreover, sometimes the attempts of PwD to open their pants are perceived by caregivers as a form of communication in understanding PwD's needs. Therefore, adaptive clothing for men is made with a 2-piece model (top and pants). The closure system of men's adaptive clothing tops in self-dressing mode is made with visible buttons. When the PwD is under supervision or in a social situation, the top can be changed to assisted-dressing mode by closing or hiding the buttons. Meanwhile, the closure system of men's adaptive clothing bottoms in self-dressing mode is made with a button and zipper closure system, as in general. The assisted-dressing mode on the bottom with a side zipper supports caregivers in changing clothes.

Conclusion

The closure system of tops and bottoms for women is not significantly different from men's, but most women's clothing is in the style of a dress or skirt to facilitate toileting activities. According to Iltanen's (2012) study, "undressing" is considered a serious problem in care institutions, in line with Salsabila's (2021) interviews and caregivers' complaints on dementia community forums. It is important to identify the behavior of PwD to determine the purpose of adaptive clothing.

Some people with dementia may like to play with buttons or zippers until they are broken. In the category of self-dressing to increase independence, it is important to know the type of closure that is intuitive to the person with dementia, as moderate-to-severe people with dementia find it difficult to figure out the function, so they are relying on memory or habit. At this stage, most of them may still be able to dress independently, although they may need help or guidance from their caregivers.

Choosing the material, system, and position of the closure also needs to be considered due to the sensitive skin and motor skills decline. Knowing the needs from both perspectives is very important. However, the current design does not seem to take PwD's perspective into account in the first place. Anthropological approaches can be used to understand the physical, psychological, social behavior, and communication of PwD for in-depth understanding, while participatory design is used to understand PwD from the first perspective in an effort to promote independence. A new innovation such as an "all-in-one" closure type with two switchable modes (assisted or self-dressing) that can prevent unwanted behaviors of PwD at any particular time may be very efficient, considering that the selling and production price for personalized adaptive clothing for PwD is still very expensive.

Overall, there is a wide variety of closure systems and types on the market, and each has its own purpose, function, advantages, and disadvantages. Future research may be able to address these limitations. A classification of closure systems and types to prevent certain behaviors may also be beneficial.

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