



## Functional Design Methods for Elderly Clothes

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### Abstract

The text discusses the aging population and its impact on public health policy and economies. It highlights physiological changes associated with aging, such as muscle loss and decreased mobility, as well as psychological and sensory deficits. The text also explores the need for functional clothing for the elderly and the challenges in the market, including unsatisfactory growth and a lack of suitable options. It mentions the importance of customized and made-to-measure apparel, as well as the difficulty for consumers, merchants, and manufacturers in meeting the clothing needs of the elderly. The text concludes with a discussion of functional clothing design methods, including fabric and color selection considerations.

**Keywords:** Elderly, Functional clothes and Design

### Introduction

In many civilizations, the aging population is a developing reality that is causing substantial changes in public health policy and bolstering the economies of these nations. That truth was initially evident in affluent countries, but some developing nations have started to show signs of aging in recent years.

In contrast to the custom of identifying older individuals over 65 as elderly in other countries, our definition of elderly individuals is those who are 60 years of age or older. Longevity is unquestionably one of the greatest achievements of the twenty-first century.

The world's population expects to live longer due to statistics, which means that as people get older, they will need more and more clothing fitting. Elderly folks are entitled to the same selection of products as younger people since they have the same desire to feel and look beautiful. [1-11]

Globally, the percentage of the elderly who are 60 years of age or older is rising quickly. By 2030, according to the Organization for Economic Cooperation and Development, one in three persons would consider "aging". [12]

### About Aging

Significant changes in an individual's physiology, psychology, and social interactions are hallmarks of the natural aging process. From a physiological perspective, aging is defined as a system's decreasing capacity to maintain equilibrium, which has an immediate impact on how well people execute their daily tasks. Moreover, elements including a rise in body fat, insufficient skeletal muscle, and a decrease in strength and power all contribute to the deterioration of physiological processes. [13] Physical restrictions caused by the loss of muscular strength are becoming worse by the inactivity of the body distinctive in these people. [14, 15] Ballak et al. point out that the cumulative loss of muscle mass and function is thought to have a major role in the rise in fall rates, the shift to a dependent lifestyle, and the reduction in quality of life as people age. [1, 8, 16-24]

Sarcopenia is the term for this natural process when it occurs. Doherty states that the decrease of skeletal muscle mass and strength brought on by biological aging is usually referred to as Sarcopenia. [25] The author also highlights the fact that, for both genders, maximal voluntary

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contractile strength decreases by an average of 20-40% between the seventh and eighth decade of life and in the distal and proximal muscles of women. From an alternative viewpoint, Malafarina et al. assert that the gradual reduction in muscle mass starts at around the age of 40. [26]

A decline in muscle mass correlated with a rise in adipose tissue, which starts to replace the lost muscle and causes estimates of disability and death. [27] Muscle fat infiltration has been identified by Visser et al as a potential risk factor for functional deterioration. [28] The illness, known as Sarcopenic Obesity, is characterized by more prominent symptoms such as muscular exhaustion, fragility, and physical handicap when combined with extremely high rates of adipose tissue. [27]

Parallel to the syndrome, cognitive and sensory-motor deficits start to occur, which further adds to the elderly's declining degree of autonomy. There is also a perception of a decreased thermoregulation. This loss lessens the skin's ability to retain or lose heat and is linked to a decline in the person's vasomotor responses. [9] As a result, the negative effects of heat or cold are more likely to affect the elderly. [29]

Homeier<sup>[10]</sup> asserts that joint tissue and function are impacted by aging. The author emphasizes how tendons and ligaments grow more rigid and cartilage in the joints becomes more fragile. Finally, add that the joints could get less pliable, stiffer, and more prone to injury. [30] As can be observed, these conditions severely impair the mobility of the elderly and suggest biomechanical restrictions that need to be well thought out and assessed, particularly in the context of product design.

When it comes to biomechanics, there are two ways to approach a movement: measuring a specific action and describing and observing it. Science offers vital and significant information for comprehending the body and particular bodily regions. This knowledge includes the sizes and reach of specific body parts as well as movement limitations, particularly those resulting from age-related and physical limitations. Regarding Schultz, [31, 32] Determining the key components of mobility limitation is one of the most significant aims of biomechanics research in this area. When combined with additional expertise, like as anthropometry and ergonomics, these insights and data help determine how aggressive the product is meant to be for these particular consumers.

In terms of ergonomics, the science supports the examination of distinct user profiles and how they interact with a certain activity, product, or setting. Based on the body, ergonomics examines a range of factors that are likely to be assessed to pinpoint the particulars of how old people function in their day-to-day activities and duties, hence highlighting their physical limits. This knowledge is crucial because

biomechanics and ergonomics, particularly in the context of fashion design, can support professional guidance regarding the suitability of products for the physical attributes and functional requirements of the user when wearing a particular article of clothing. Given the ongoing interaction between clothing and wearer, these data offer particular insights on how to build suitable models for senior demands, hence improving the comfort and well-being of senior users. [29, 31]

### **Physiological and psychological needs of the elderly clothing**

As they approach middle age, their skin tone, somatotype, and other characteristics will unavoidably alter. Convex and prolapsed, broad but flat back, long arms, small legs, and a host of other traits make up its characteristics as Functional restrictions "mobility and general dexterity". For instance, scoliosis, a disorder that causes the spine to curve and is frequently linked to osteoporosis, results in slanted shoulders and waistlines, which in turn generate slanted clothing hemlines. The uneven waistline causes the fabric to gather on one side of the body. Deformity frequently results in a slumped back, necessitating the usage of extra cloth to cover the ugliness and modifying the fabric properties of outdated apparel. Their thick necks have fat folds running horizontally in their somatotypes. Physiologically, wrinkles are visible in older people because their skin sags and prolapses owing to a decline in body fat based on their bodily type. [33-36]

Their necks skating backward, their backs bowed, their chests flat, and their waists patterned to accommodate these criteria will result in clothing that is both comfortable and serves as a disguise for their atypical body form. When physical dexterity is restricted, little adjustments to stylistic features like bigger buttons or Velcro fastenings might help in dressing and undressing. [32]

Each function in the elderly detects a more severe deterioration, which is mostly found in the five bell-shaped deteriorated sensory functions as a drop in brain activity, including a reduction in memory, a displacement of memory, and slow-responding thought patterns. Organ function decline: As people age, their bodies ability to perform internal processes and repairs starts to degrade. [32] There are two types of women in terms of stature the first is overweight while the other is larger and exhibits various degrees of the humpback phenomenon, including wrinkles, white hair, and an overall aging look, which is defined by the upper body's physique, the waist, the belly fat, and more, the coarse is comparatively arm-lengthier than the fine, and the other is extremely thin, with brutal relaxation visible on the skin. Men are

primarily thin, in addition to the custom of emphasizing those who are physically fit and of a certain stature. General clothing and a greater proportion of black men, blue, and other dark grey-based clothing. Women's jacket with a little floral design in primarily grey, with some pure color and some dark, dark purple, and yellowish-brown hues. Dark grey pants with a partial transfer most elderly women wear clothing that is a bit thicker than that of younger people. Many of them must return a dorsal bag, which is made of a fabric that protects the environment; many of them wear sneakers or other shoes that are soft and comfy.

The general psychological traits of the aged include psychological dependency, psychological reliance, desire for respect, rejuvenation, nostalgia, loneliness, anxiety, and obstinate conservatism. A fit and comfortable physique is what the elderly psychologically need to wear. When it comes to clothing, the majority of elderly people are more concerned with their quality of life than with fashion. As a result, rather than wearing gaudy outfits, they choose comfortable, body-fitting clothing whose practicality may make daily living easier. Generous: Older people tend to dress in a mature, sophisticated way that befits their training and temperament.

Elderly individuals choose clothing that suits their character and temperament rather than just following trends. This makes them appear more self-assured and well-dressed. Before others, there is conservation. Subdued color: - Older people typically choose grey dresses because they are less flamboyant, have more traditional ideologies, and dislike being in the spotlight. Notably "younger": they strongly favor his youthful attire and are less inclined to age internally, similar to a major reddish complexion and dress younger than their true age. Important spiritual vitality: They want to give others a sense of full energy and vibrancy, so they will choose clothing that seems dynamic and full of energy. However, due to their deteriorating physical fitness and lack of exercise, they appear to lack spirit and vitality. Adapt to different occasions: Seniors who have retired from the workforce devote all of their energy to maximizing their quality of life. As such, they dress differently for different occasions. For example, at home, they should wear comfortable, clean clothes; at the park, they should wear elegant, vibrant clothes; and when they go out with friends, they should dress nicely and tastefully. [37]

### **Market analysis**

#### **The market status of functional clothing for the elderly**

Despite the enormous number of senior people around the globe, the geriatric apparel sector is

experiencing unsatisfactory growth and a severe supply and demand mismatch. Furthermore, older items on the market today, such as certain haberdashery, rarely reflect the actual needs of the elderly while designing apparel while keeping functionality in mind. Even after decades of evolution, the requirements for vintage clothes remain the same. Nonetheless, this market's development is not passive; rather, it is stuck in an unpleasant situation. [38]

#### **Clothing purchase – the choices**

When it comes to buying clothes, seniors now have three main options: customized apparel from specialty suppliers, made-to-measure apparel, and ready-to-wear items from the high street. These might not, however, offer a fix for the issue. Ready-to-wear clothing adaptation calls for a certain level of garment-making expertise, and the outcomes are frequently not up to par. Because made-to-measure apparel is pricey, an older person with a limited budget might not be able to afford it. Specialty apparel vendors might be pricey, have a small selection of items, and aren't always trendy. Elderly folks may also believe that wearing "special" attire carries a shame. [5, 17, 21, 34, 36, 37, 39-41]

#### **The analysis of the actual market situation**

##### ➤ Consumers: difficult to buy clothing

Elderly folks walk down the street in the hopes of finding new clothing that fit them. However, they constantly come back empty-handed because it is hard to locate suitable clothing in a large retailer. Not only are they too obese to fit into the garments, but they are also afraid to return because of the gaudy, trendy attire. Apart from the fact that most older people believe that young people go to malls to buy new clothes, they frequently locate a familiar tailor to help them select made-to-measure items.

##### ➤ Merchants: difficult to sell clothing

Dilute the idea of senior clothing in shopping centers. Because there are always plenty of justifications for them, rarely any emotional ones.

##### ➤ Manufacturers: difficult to do the production

The elderly are a unique social consumption group who are typically older than 50 and do not fall into the broader clothes consumption demographic. Businesses find it challenging to understand the clothes production of the elderly. First of all, elderly people's consuming ideas are outdated as they don't research clothing and have poor fashion sense. They prioritize their need for economical items over brand, fashion, style, and

pattern; Second, older consumers are not part of the mainstream customer base and frequently have unique somatotypes; nonetheless, the number of items with a restricted article number of demand, which are expensive to produce in large quantities and are not suitable for mass production, making them unappealing to clothing manufacturers. Nevertheless, under pressure from the market, businesses that had previously focused primarily on producing outdated clothing have frequently shifted to producing a wide range of clothing for young people. The only clothes available for the elderly are frequently bulky, poorly branded items of lower quality. [38]

#### ➤ Elderly functional clothing design methods

According to the features of the elderly, the author presented the approach of preliminary design based on surveys and the physical state of the elderly, which demands a functional examination of the clothing findings. [37]

### The design and analysis capabilities

Numerous components of living in the first functional features of the design include clothes intended for the elderly that are useful, but it also focuses on other elements that must be present to accomplish the goal of cooperation and function. An additional feature of the particular display is the functionality needed by the aging population. The elderly can be broken down into three tiers for specialized examination in terms of its functional design. [42-44]

1. The elderly can be cared for via daily living: The old can also be taken care of in two situations: one in which they are in generally good physical condition with an uncommon issue, and the other in which they have some issues but they do not interfere with their ability to take care of themselves. Old people are in generally excellent physical condition, with a focus only on health care duties and additional support as needed. We also take into account the requirement for care and protective features clothes for sporadic physical conditions that do not interfere with regular living for the elderly.
2. The proper day-to-day activities of the elderly who require assistance: While there are situations, when clothing design may play the role of adjuvant therapy, health care is still a necessity for the function. In the regular course of an aged person in need of assistance, there is some inconvenience on their body.
3. Daily life does not take care of the elderly: Made to make it easier for those who wish to

wear for the elderly. To help the elderly regain their health, functional design should be used. Naturally, no matter what the circumstances, each person's scenario is unique, and as a result, each person's wants are distinct. As a result, we must carefully build its functionality based on the circumstances.

### Fabric selection and adoption

When choosing a fabric, one should first determine whether the clothing's intended use is feasible and beneficial to the play's plot. They should also make sure that fabrics and fashion trends complement one another. Based on these considerations, they should choose a fabric that is appropriate for the physiological changes that occur in the elderly. Winter clothing for the elderly should be more protective because as body functions decline, blood circulation and metabolism slow down, and regular exercise reduces heat generation, making the elderly relatively cold. Therefore, warm winter clothing for the elderly needs to be good and free of constraints and pressure, and has no effect on senior people's hand, foot, or blood circulation activities. Summertime attire should be airy, airy, soft, comfortable, breathable, moisture absorbing, and free of stimulation, all while taking care of the textiles. In recent years, the fabric has become increasingly popular, especially because of its health-related uses. Higher substance content in healthcare fabric has a medicinal impact. [15, 17] When wearing it in a medical setting, the wearer can gradually release drugs and diseases; It can perform a certain impact role. Nowadays, many people choose hemp textiles in the summertime since they are made of more natural plant fibers, absorb moisture well, heat up rapidly, stay cool, and have antibacterial properties. The majority of senior people, particularly those who are older and less likely to wear bra underwear, typically pick summer coats with vests because they come into direct touch with their skin. The fabric selection is robust in terms of permeability and pleasant on the skin, making it appropriate for cotton clothes. Regardless of the season, clothing materials should support the fulfillment of a purpose with the appropriate balance of style, complement an aged person's temperament, and accommodate their demands and way of life. [16]

### Colour selection and analysis

The previous goods' color contrast should not be very striking. Because of their advanced age and gentle disposition, the majority of old people tend to be soft, have low lightness, and have poor purity of clothing color. Older individuals have a tendency toward warm tones in tone, especially in women.

This is related to the psychological suggestion of color to generate, as warm colors evoke feelings of warmth and pleasure in an individual. Those are consistent with the psychological trait of older persons being terrified of loneliness. However, many of the outdated ideas about fashion are changing these days due to the influence of friends and kids, and he or she may now embrace personal expression.

From a psychological perspective, bright colors tend to uplift people and give them a joyful vibe, which is excellent for senior citizens' health as well as for fostering positive moods. As a result, with the right collocation, old people may exhibit their attractive side in clothing color while also seeming youthful and energetic due to their advanced age, which is consistent with the psychological traits of their "younger" years. [44]

### **Conclusion**

This research is about designing clothes that suit the daily needs of the elderly by analyzing the market to help them buy the most suitable clothes and improve their awareness of how to choose suitable clothes. As populations around the world age, designers must consider designing and manufacturing more functional and fashionable clothing. It is necessary to propose some principles for designing functional clothing for the elderly.

In this article, attention was paid to the easiest material for the elderly, taking into account simple colors for easy design trends that are easy to use with clothes. With market analysis to know fashion trends to use this in designing clothes for the elderly

### **Conflict of Interest**

The authors declared no competing interests in the publication of this article

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<sup>2</sup> المركز القومي للبحوث (Scopus 60014618)، معهد بحوث وتكنولوجيا النسيج، قسم التحضيرات والتجهيزات للألياف السليلوزية، 33 شارع البحوث (شارع التحرير سابقا)، الدقي، ص.ب. 12622، الجيزة، مصر

### المستخلص:

يناقش النص شيخوخة السكان وتأثيرها على سياسة الصحة العامة والاقتصادات. يسلط الضوء على التغيرات الفسيولوجية المرتبطة بالشيخوخة، مثل فقدان العضلات وانخفاض الحركة، فضلا عن العجز النفسي والحسي. يستكشف النص أيضا الحاجة إلى ملابس وظيفية للمسنين والتحديات في السوق، بما في ذلك النمو غير المرضي ونقص الخيارات المناسبة. ويذكر أهمية الملابس المخصصة والمصممة حسب المقاس، فضلا عن الصعوبة التي يواجهها المستهلكون والتجار والمصنعون في تلبية احتياجات الملابس لكبار السن. يختتم النص بمناقشة طرق تصميم الملابس الوظيفية، بما في ذلك اعتبارات اختيار النسيج واللون.

**الكلمات المفتاحية:** كبار السن والملابس الوظيفية والتصميم.