

# Considerations on the advances in studies on clothing products development for older adults with Parkinson's disease

## Abstract

Human ageing is characterized - among other factors - by limitations in Activities of Daily Life (ADLs), especially because of the impaired motor and biomechanical functioning. Due to this scenario, the manipulation of some artifacts, such as garments and their fastenings (buttons, zippers), can increase the level of difficulties to perform dressing and undressing activities. In the case of individuals with Parkinson's disease (PD), the current models of clothing and fastenings may lead to dissatisfaction, embarrassment or even full inability to use and complete dressing and undressing activities, compromising independence. Clothing are extensions of the body, when these are associated with physical, mental and social human's well-being. Its morphological and functional aspects - including the application of fastenings - can lead to the promotion of physical and mental health, when developed from ergonomic and usability points of view. Thus, the objective of this mini-review was to investigate the demands on the dressing and undressing activities performed by older adults with PD; and to understand how this subject is addressed in health and design studies. It was identified that the problem is a reality and that understanding the limitations found in literature can be an exceptional alternative to clothing design for a highest level of usability for users. Thus, new research approaches are proposed, especially those of exploratory and applied character, that investigate the clothing usability by older adults and, consequently, the independence promotion of people with PD in their ADLs.

**Keywords:** aging, motor disabilities, ADLs, clothing, ergonomic design

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## Introduction

Over the last decades the increase in life expectancy resulted in the growth of the world population of individuals over 65 years old, which was shown to be a constant in many countries. This increase led to the growth of the incidence of chronic degenerative diseases that cause functional disability in physical mobility. Among the diseases whose the symptoms affect the body's motricity in relation to the functional ability to decide and act independently, Parkinson's disease (PD) stands out due to its prevalence, affecting approximately 200 thousand Brazilians<sup>1</sup> and about 1% of the world's population over 65 years.<sup>2</sup>

Symptoms of this condition include disorders in body movements (involuntary tremor, rigidity, and abnormal slowness) that impair fine manual dexterity and involuntary tremor making repetitive, simultaneous and sequential movements more difficult to be performed; such as those performed in Activities of Daily Living (ADLs) and during interaction with products.<sup>2,3</sup>

The ADLs are essential for maintaining human well-being and are intended to meet basic physiological needs such as hygiene, food and safety. To perform these activities, physical, sensory, psychological, educational and other factors are involved in a good performance and completeness.<sup>4</sup> With the degeneration caused by PD, there is a compromise in motor control skills (coordination and strength) and in the precise movements for manipulating objects (reaching, grasping, holding) used in ADLs.<sup>5</sup> The reduction in the performance in such activities affect its completeness and may cause the dependence on other people.

Dressing and undressing are activities that require the handling of clothes and sometimes fastening (buttons, zippers), which may be considered difficult and eventually impossible to perform when fine handling skills are lost. The impossibility of completing a daily routine task negatively influences the perception of independence and autonomy of this individual, which can lead to negative feelings and conflict.<sup>6</sup>

This reality, among other factors, has triggered the search for products and services (contained in technological artifacts) that promote higher quality of life and functional independence.<sup>7</sup> Thus, the objective of this mini-review was to investigate the demands on clothing products during the dressing and undressing activities performed by older adults with Parkinson's disease, as well as to understand how this topic is addressed in health and design studies. To this end, a narrative overview of the literature previously available was made, in order to synthesize the findings already published.

## Dressing-related problems faced by people with pd: considerations for the improvement of clothes' design

There are numerous researches that involve the analysis of the movements during ADLs activities, especially regarding biomechanical and kinematics perspective.<sup>8-11</sup> It is known that individuals with the PD have functional losses that negatively affect the performance of the different daily activities, mainly when this individual is older and already suffers from losses inherent to the ageing process.

However, in the case of dressing and undressing activities, it is observed that there is a lack of researches about the theme. This reality is even more serious when considering the analysis of the activities performed by older individuals.

One of the few studies published revealed that the activity of "dressing a coat" is more difficult to individuals with PD.<sup>12</sup> This showed that there was no improvement in post-workout performance and that there was a higher degree of difficulty when compared to other activities such as combing the hair, answering the phone and taking the glass to mouth. Due to the fact that the dressing activity required postural stability, serial skills and fine manipulation.

Another study<sup>13</sup>, comparing people with PD and healthy individuals in dressing a social shirt and buttoning seven buttons as quickly as possible in conjunction with a cognitive double task. It showed precision deficits of movements between groups - with the muscle stiffness, the PD group took longer time to complete the activity and it was noted that when the intensity of the tremor was higher, the performance was worse. Other evaluations<sup>14,15</sup> reported that most of participants with idiopathic PD had difficulty in manipulating buttons.

It is understood that these few studies observed so far do not standardize the instruments and steps of the dressing and undressing activities, nor do they analyzed the interaction of the human hand in contact with clothing and, in particular, in contact with fastenings involved in closing and opening parts of clothes.<sup>16,17</sup> Thus, it is still not known which variables (size, thickness, shape, texture and others aspects) intensify the difficulty of handling, and the correlations between the variables involved in the manipulation process and the usability in the activity of dressing and undressing by people with PD need to be clarified. The knowledge about these aspects are essential for the product development as it is possible to identify and interpret mechanisms and guidelines that may guarantee independence, comfort, safety, accessibility and, consequently, satisfactory levels of quality of life.

The optimization of activities that require a higher degree of performance can be achieved through the artifact adaptations, capable of promoting greater independence and inclusion.<sup>18</sup> This happens through technologies that provide independence in dressing and undressing,<sup>19</sup> studies on the new profile of the older adults and their relationship with clothing products<sup>20,21</sup> and the investigation on rehabilitation processes and practices that target the factors that lead to the non-completion of an action or the poor performance in activities.<sup>22,23</sup> These factors can foster the development of more inclusive and accessible designs that promote autonomy and meet the particular user needs.<sup>6,23</sup>

## Conclusion

The impact of clothing products on people's life, especially older users with motor dysfunction such as PD, gives the fashion designer the challenge of rethinking the features of use in such artifacts. This reality involves the understanding of both emotional and physical needs, which can be identified and analyzed through researches that reveals such characteristics, and data that, afterwards, might be interpreted and translated in structural ergonomics aspects that are essential for the assertiveness of clothing products destined to these individuals. However, as noted in this study, the lack of researches involving such issues are a reality that make even more difficult to offer products with qualities that can make the life of older individuals

with PD more accessible, comfortable and independent. Soon, more studies will be needed:

- i. Facilitating and hindering aspects, related to the clothing products usability' and the dressing and undressing activities, with the perception of health professionals (nurses, occupational therapists);
- ii. Types of garments that includes fasteners, textiles, shapes and others - analyzing the functional performance regarding the act of dressing and undressing by people with motor dysfunctions and specifically with PD;
- iii. Coherent guidelines for the development of clothing products for people with PD, based on Ergonomic and Inclusive Design parameters.

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## Conflicts of interests

The authors of this manuscript have no competing interests.

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