**Designing a Lumbar Corset for the Elderly Based on Body Shape Characteristics: A Gender Comparison**

Jooyeon, Lee 1, Yunja, Nam 1,2, Jinhee, Park 3 and Juyeon, Park 1,2

1 Dept. of Textiles, Merchandising and Fashion Design, Seoul National University, Korea / 2 Research Institute of Human Ecology, Seoul National University, Korea / 3 Dept. of Fashion Industry, Inchon National University, Korea

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**Introduction**

Due to their age-related bodily changes, elderly people tend to experience discomfort when wearing products designed for mass consumers (Lee, 2003), often imposing physical complications in them. Specifically, for gender, chronic back pain is more frequently found in elderly females than elderly males due to their weakened bone strength as observed in the higher prevalence of osteoporosis (Bressler et al., 1999; Edmond & Felson, 2003). Given so, Bok & Ahn (2014) suggested that, in order to provide effective back support to elderly females, a lumbar corset should be correctly aligned with the body parts and should give compression at the appropriate areas. The present study was conducted to identify the gender factors applicable to the design of a lumbar corset for the elderly reflecting their different body sizes and shapes.

**Objective**

To the authors’ best knowledge, there is, to date, no research to understand gender-specific needs for the lumbar corset design. Therefore, we aimed to propose a lumbar corset design reflecting the differences in body size, shape, and preference for each gender.

**Methods**

The body sizes relevant to wearing a lumbar corset were analyzed based on 437 3D body models (221 males and 216 females) aged 70-85, which data were retrieved from the 6th Size Korea (KATS, 2014)(Figure 1). Additionally, in-depth interviews were conducted with 11 people (5 males and 6 females) at the age of 65 years or higher to analyze the user experiences of wearing lumbar corset products available in the current market.

**Results**

Table 1 shows the gender differences of the elderly male and female in the size and preference of the lumbar corset. Based on the results, we developed patterns for a lumbar corset specific for each gender. The lumbar corset for elderly females was adjusted to the height of the front fastener and the position of the support, resulting in a U-shaped corset, while that for elderly males looked almost horizontal (or slightly H-shaped)(Figure 1, 2).

<table>
<thead>
<tr>
<th>Table 1. The gender differences of elderly male and female in the size and preference of the lumbar corset</th>
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<tr>
<td><strong>Size</strong></td>
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<td>• the circumference measurement items did not differ between elderly males and females (p &gt;.05)</td>
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<td>• the height measurement items showed significant differences between the gender groups (p &lt;.01 ~ .001)</td>
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<td>• In elderly female, center front height is smaller than that of elderly male due to breast ptosis (p &lt;.001)</td>
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<td><strong>Preference</strong></td>
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<td>• Elderly females felt higher discomfort with the size of the current lumbar corsets, especially due to pricking under the breasts and anterior pelvic area.</td>
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**Discussions**

This study identified gender-specific considerations for the design of the lumbar corset and developed lumbar corset patterns for the elderly, suitable for each gender.

- The findings of this study set a foundational ground for the development of the manufacturing process and size system for the lumbar corset that could be used by elderly people as an effective wearable means for back support.
- Goal 3 of the SDGs aims to ensure health and promote well-being for people of all ages.
- Elderly people tend to be often ignored by product designer despite being easily exposed to chronic diseases compared to younger people. As a result, elderly people are excluded from mass production and are not provided with adequate means to maintain health.
- This study argues that the design of assistive devices requires special consideration of the gender, especially female. Recognizing the exclusion of elderly female in product design and trying to include them, we can contribute to ensuring the health of people of all age.

**References**


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