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The Suitability of Helen Joseph Armstrong's Raglan Sleeve Pattern for Idealized Body Types of Indonesian Women

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ABSTRACT
The Helen Joseph Armstrong raglan sleeve pattern is widely used in garment making, but it is not yet fully suitable for the body proportions of ideal adult Indonesian women. This misfit can result in discomfort and aesthetic issues in clothing, which necessitates research to analyze the weaknesses and make pattern adjustments. This study aims to identify weaknesses, make improvements, and evaluate the fit of the raglan sleeve pattern for women with a height of 165 cm and weight of 53 kg, in accordance with the Body Mass Index (BMI) classification for adult Asians. The research method uses an applied approach, with a Likert scale-based assessment format and descriptive statistical analysis. The evaluation focuses on indicators such as sleeve length, peak arm height, midline of the arm, shoulder slope, raglan line, bicep, elbow line, and sleeve cuff circumference by four panelists. The results show that in the first fitting, the average pattern fit was only 63%, categorized as fairly suitable. Several weaknesses were identified, such as a backward shoulder line, raised raglan line, and overly large biceps. Adjustments were made by modifying the shoulder line, lowering the raglan line, reducing bicep size, and adjusting the sleeve cuff circumference. In the second fitting, the pattern fit increased to 86%, categorized as very high. These results indicate that pattern adjustments are essential to achieving optimal fit for ideal adult Indonesian women, thereby improving both comfort and aesthetic appearance in clothing.

KEYWORDS

Raglan, Sleeve, Pattern, Helen Joseph Amstrong, Ideal Body

INTRODUCTION

Fashion, derived from the Sanskrit word "bhusana," refers to clothing that not only provides comfort but also showcases beauty (Ernawati & Nelmira, 2008; Yuliarma, 2016). In a narrower sense, fashion can be defined as textile or other materials sewn or unsewn to cover the body (Riyanto & Zulbahri, 2009). Fashion plays an important role in life, both as a basic necessity and as a medium of expression that blends creativity, aesthetics, and comfort. In garment making, pattern systems are crucial as they influence the final result of the clothing (Agusti, Zahri & Nelmira, 2010).

One important aspect of garment design is the sleeve design, determined by various elements such as the armhole position, underarm stitching, and the shape of the sleeve line (Marwiyah, 2010). The raglan sleeve has become a popular design due to its seamless shoulder line and flexibility in garment design (Muliawan, 2011). Raglan sleeves provide comfort and

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freedom of movement, making them an ideal choice in garment design (Dillon, 1992). Poespo (2000) explains that the raglan sleeve has a line from the neck to the wrist, offering greater freedom of movement and ease in the arm and body of the wearer.

The raglan sleeve pattern can be made using various systems, one of which is the Helen Joseph Armstrong system, widely used in garment making. However, this system is more suitable for women with larger body proportions, such as American women, and is often not appropriate when applied directly to Indonesian women without adjustments (Zulekha, 2016). Adult Indonesian women with an ideal body type, 165 cm tall and weighing 53 kg, have smaller body proportions compared to American women. Therefore, pattern adjustments are essential to ensure the clothing fits Indonesian women (Listiani & Wulandari, 2022).

Ratri (2018), also emphasizes the importance of accurate measurements, ensuring the body is in a standing position to achieve accurate results. Sari & Yusmerita (2023) state that in pattern making, various types of patterns, such as construction patterns and standard patterns, need to be adjusted to create garments that fit the wearer's body shape. Apristianda & Kharnolis (2023) explain that the raglan sleeve pattern has unique characteristics with a diagonal line from the neck to the armpit, which creates the impression of the shoulder merging with the sleeve.

Figure 1. Results of Pre-Experiment on the Helen Joseph Armstrong Raglan Sleeve System

In the pre-experiment phase, several weaknesses were found in the Helen Joseph Armstrong raglan sleeve pattern, such as a backward shoulder line, raised raglan line, oversized biceps, and an excessively large wrist circumference. However, this pattern also has advantages, such as a loose armhole that provides more comfort for the wearer. Therefore, this study aims to describe the weaknesses of the Helen Joseph Armstrong raglan sleeve pattern, how to correct them, and the pattern's level of fit after improvements through fitting. This research is expected to contribute to the development of more suitable and functional garment patterns for Indonesian women.

METHOD

This study uses an applied research approach to test and improve the Helen Joseph Armstrong raglan sleeve pattern to fit the body proportions of Indonesian adult women with an ideal body shape. The research object is the Helen Joseph Armstrong raglan sleeve pattern applied to women with a height of 165 cm and a weight of 53 kg, adjusted according to the body mass index (BMI) classification table for Asian adults (Hanifah & Ernawati, 2019). The experimental unit in this study is the raglan sleeve pattern, tested through several experimental steps, including preparation, implementation, and evaluation (Setyaningsih, 2010). The preparation phase includes gathering the necessary tools and materials for creating the pattern, such as pattern paper, calico fabric, and sewing tools. In the implementation phase, the basic and Helen Joseph Armstrong raglan sleeve patterns are made, tested through fitting on the model, and adjusted based on the identified weaknesses. The evaluation is conducted by four fashion design lecturers. The data collection instrument is an assessment format (questionnaire) using a Likert scale (Sugiyono, 2013). The data analysis technique used is descriptive statistics.

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RESULT AND DISCUSSION

1. Weaknesses of the Helen Joseph Armstrong Raglan Sleeve Pattern

This study evaluated the Helen Joseph Armstrong raglan sleeve pattern adjusted for ideal-bodied adult Indonesian women. The evaluation was carried out through two fitting stages to identify pattern weaknesses before corrections were made:

***Fitting* I**

Table 1. Statistical Data Processing Results for Fitting I

No	Aspect	P1	P2	P3	P4	Score	Modus	Median	%
1	Sleeve length	4	2	2	2	10	2	2	63%
2	Sleeve peak height	3	3	3	2	11	3	3	69%
3	Sleeve center line	4	3	3	3	13	3	3	81%
4	Shoulder line position	4	2	2	2	10	2	2	63%
5	Raglan line	4	2	2	2	10	2	2	63%
6	Biceps	3	2	2	2	9	2	2	56%
7	Elbow line	2	2	2	2	8	2	2	50%
8	Cuff circumference	3	2	2	2	9	2	2	56%
Total						80	18	18	500%
Average rating						10	2.25	2.25	63%

The statistical data processing results for Fitting I showed the pattern's alignment with eight evaluated aspects by four panelists (P1, P2, P3, P4). Overall, the total score for the eight aspects was 80, with an average score of 10 and an average fit percentage of 63%. Based on the analysis, the sleeve center line had the highest fit percentage at 81%, while the elbow line had the lowest fit percentage at 50%. This indicates that the Helen Joseph Armstrong raglan sleeve pattern requires improvements in areas with low fit percentages, specifically the elbow line, biceps, and cuff circumference.

***Fitting* II**

The second fitting was conducted from October 17–24, 2024. Data from this fitting showed significant progress after pattern modifications, but some aspects still required evaluation to improve the pattern's alignment with the proportions of adult Indonesian women, as follows:

Table2. Statistical Data Processing Results for Fitting II

No	Aspect	P1	P2	P3	P4	Score	Modus	Median	%
1	Sleeve length	4	4	3	3	14	4	3.5	88%
2	Sleeve peak height	4	3	3	3	13	3	3	81%
3	Sleeve center line	4	4	3	3	14	4	3.5	88%
4	Shoulder line position	4	3	3	3	13	3	3	81%
5	Raglan line	4	2	3	3	12	3	3	75%
6	Biceps	4	4	4	4	16	4	4	100%
7	Elbow line	4	4	3	3	14	4	3.5	88%
8	Cuff circumference	4	4	3	3	14	4	3.5	88%
Total						110	29	27	688%
Average rating						13.75	3.625	3.375	86%

The statistical data processing results for Fitting II showed significant improvement in the fit of the Helen Joseph Armstrong raglan sleeve pattern after corrections were made. Overall, the total score was 110, with an average score of 13.75 and an average fit percentage of 86%. Based on the analysis, the biceps (arm width) had the highest fit percentage at 100%, indicating significant improvement. The raglan line had the lowest fit percentage at 75%, but it still showed notable improvement compared to Fitting I. Compared to Fitting I, the average fit percentage increased

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from 63% to 86%, indicating that the pattern modifications successfully improved the fit of the Helen Joseph Armstrong raglan sleeve pattern for ideal-bodied adult Indonesian women.

2. Improvement of the Weaknesses in the Raglan Sleeve Pattern

The corrections to the raglan sleeve pattern in this study were made based on the weaknesses identified during the fitting process, using the pattern adjustment method according to Ernawati & Nelmira (2008).

Sleeve Length

From the assessment, one panelist rated the length as very appropriate, while three panelists rated it as less appropriate due to the sleeve length exceeding the actual size. The correction was made by reducing the sleeve length to match the correct measurement.

Shoulder Line Position

One panelist rated the shoulder line as very appropriate, and three panelists rated it as less appropriate due to the shoulder line shifting 1.2 cm backward. The solution was to lower the shoulder line on the front body pattern and raise it on the back body pattern to restore the correct position.

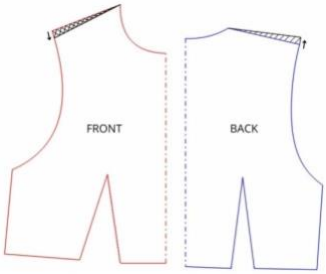

Figure 2. Shoulder Line Correction

Raglan Line

The assessment of the raglan line showed that one panelist rated it as appropriate, while three panelists rated it as less appropriate due to the raglan line being too high. The correction was made by lowering the raglan line by 0.5 cm.

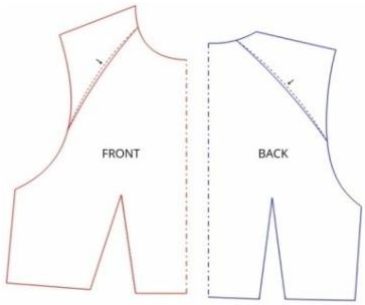

Figure 3. Raglan Line Correction

Biceps

One panelist rated the biceps size as appropriate, while three panelists rated it as less appropriate due to the bicep circumference being too large. The correction was made by reducing the bicep circumference by 1.7 cm on both the front and back patterns.

Cuff Circumference

The assessment showed that one panelist rated the cuff circumference as appropriate, while three panelists rated it as less appropriate due to the cuff circumference exceeding the expected measurement. The correction was made by reducing the cuff circumference to make it more proportional.

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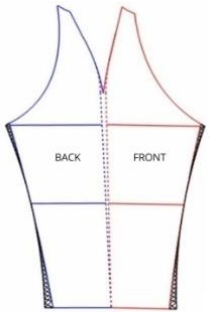

Figure 4. Biceps and Cuff Circumference Correction

Elbow Line

All panelists rated the elbow line as less appropriate because the line was 1 cm lower than the correct size. To address this, the elbow line was raised by 1 cm according to the pattern-making formula for sleeves.

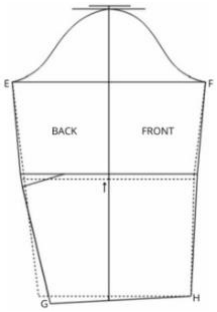

Figure 5. Elbow Line Correction

3. Suitability of the Pattern After Improvement

The suitability of the Helen Joseph Armstrong raglan sleeve pattern for Indonesian adult women with ideal body shapes was evident in the results of Fitting II, where all aspects were deemed appropriate by panelists based on mode, median, and percentage analysis. Below are the steps for creating a raglan sleeve pattern based on Helen Joseph Armstrong's system, customized for this demographic:

Breaking Down the Body Pattern

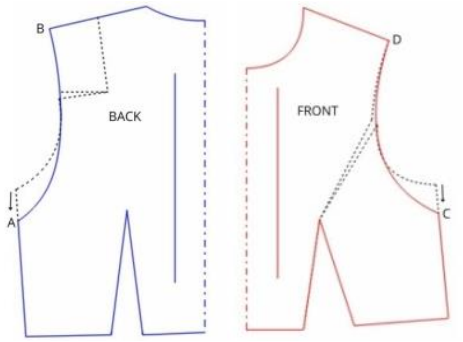

Figure 6. Breaking Down the Helen Joseph Armstrong Raglan Sleeve Pattern – Body Pattern Section

Preparation of Basic Body Pattern

- Transfer the back shoulder dart and 1.2 cm of the front dart to the armhole center.
- Lower the armhole on the front and back body patterns by 3 cm.
- Use a French curve ruler to draw smooth armhole curves to merge with the markers.

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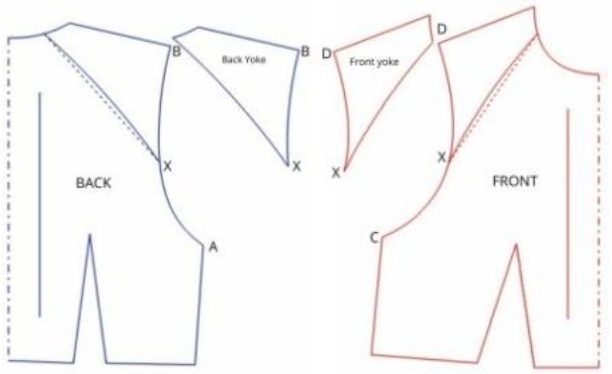

Figure 7. Finalization of Breaking Down Helen Joseph Armstrong's Raglan Sleeve Pattern – Body Pattern Section

Pattern Division Instructions
- A-X = Half of A-B minus 1.2 cm. Mark the point.
- Draw a straight line from the neckline point (3.2 cm from the highest shoulder point) to point X.
- Draw a curve rising 0.5 cm from point X.
- C-X = A-X. Mark the point and replicate the steps.
- Cut the raglan yoke from the body pattern and set it aside.

Breaking Down the Sleeve Pattern

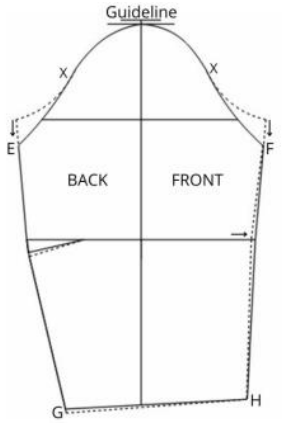

Figure 8. Transforming the Basic Sleeve Pattern into a Raglan Sleeve – Helen Joseph Armstrong System

Basic Sleeve to Raglan Sleeve Division
- Check the basic sleeve pattern and extend the grainline by 0.6 cm, marking guiding lines. Mark points G and H on this line.
- Mark the elbow line 0.6 cm outward on the front sleeve and draw a line to the bottom.
- Mark 3 cm below the biceps line and label the points E and F.
- Use a French curve ruler to draw a curved line from point E to point F, connecting this line to the back and front notches on the sleeve pattern.
- Mark point X: E-X = A-X (back armhole curve), and F-X = C-X (front armhole curve).
- Reduce the dart area (bulge in the lower sleeve) by 0.6 cm with dashed lines.
- Mark point G: Create a line 0.6 cm upward from G and connect it to zero at the front wrist point H. This line will be cut later.

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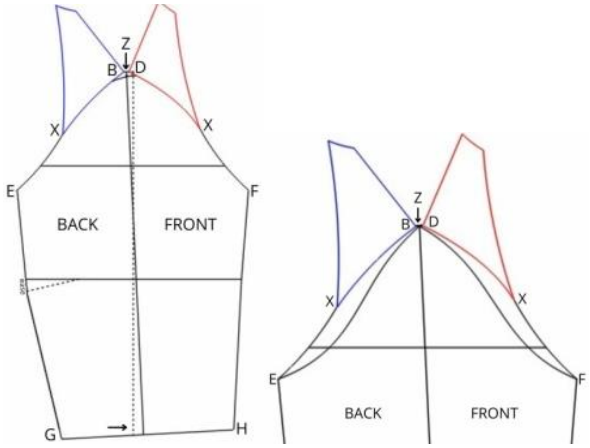

Figure 9. Breaking Down the Raglan Sleeve Pattern at the Sleeve Peak – Helen Joseph Armstrong System

Raglan Sleeve Breakdown at the Sleeve Peak

- Place the raglan yoke at the sleeve peak, ensuring both front and back sections align with the grainline and specific points.
- Mark point Z on the guideline in the center between shoulder ends.
- Mark point Y 1.6 cm from the grainline midpoint at the wrist and draw a line from Y to Z.
- Draw diagonal lines from E and F to Z, but ensure these lines do not cross certain areas.
- Separate the sleeve parts at line Y-Z, then make diagonal lines from E and F to Z.
- Lay the pattern on paper and spread it by 5 cm to allow room for further adjustments or movement. Review and retrace the front and back sleeve patterns.

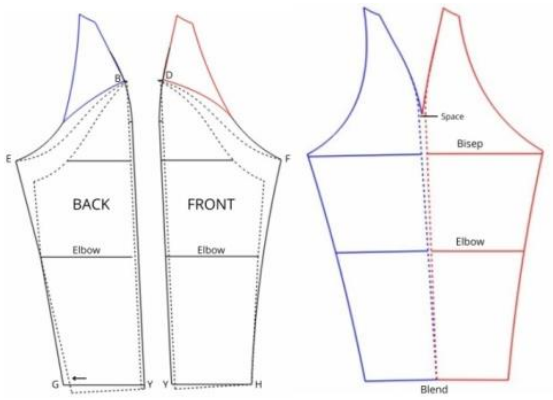

Figure 10. Refinement and Completion of the Raglan Sleeve Pattern Breakdown – Helen Joseph Armstrong System

Finalizing the Sleeve Pattern

- Draw curved lines from points E and F to the elbow, ensuring the front and back sleeve parts connect smoothly.
- Add parallel lines 0.6 cm apart to the sleeve seam, extending to the shoulder end.
- Mark upward from point G, ensuring the distance matches the elbow-to-H distance, then extend 1.2 cm outward.

Adjustments and Smoothing

- Draw lines parallel to the elbow and wrist to allow for 1.2 cm bicep expansion on the front and back sleeves.
- At the center, mark a point 7.6 cm below the shoulder end and draw a curved line toward the shoulder end. Blend the edges for a smoother finish.

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4. Weaknesses of the Helen Joseph Armstrong Raglan Sleeve Pattern

The results of the first fitting revealed several weaknesses in Helen Joseph Armstrong's raglan sleeve pattern, particularly in the elbow line, bicep circumference, and sleeve end circumference, with an overall suitability percentage of only 63% and the lowest suitability observed in the elbow line (50%). These weaknesses stem from differences in the body size standards used in Helen Joseph Armstrong's system, which is more suitable for Western body proportions. This misalignment affects both the comfort and functionality of the garment, such as limited range of motion due to the poorly aligned elbow line, and aesthetic issues from the disproportionate bicep and sleeve end circumferences. Therefore, pattern adjustments are necessary to improve suitability for the body proportions of Indonesian adult women. This aligns with the theory that garment patterns should be designed to provide maximum freedom of movement and comfort for the wearer (Marwiyah, 2010). These findings emphasize the importance of adapting sleeve patterns based on local body proportions, as Pratiwi (2001) mentioned that every pattern should reflect the anatomical characteristics of the wearer.

5. Improvement of the Weaknesses in the Raglan Sleeve Pattern

The pattern improvements were carried out systematically based on the results from the first fitting. The steps included adjusting the sleeve length, shoulder line, raglan line, bicep circumference, elbow line, and sleeve end circumference to achieve better proportions. For example, the sleeve length was reduced, the shoulder line was adjusted by raising or lowering its position, and the bicep circumference was reduced by 1.7 cm to better fit the body size. The improvement method involved using pattern markings such as diagonal lines and crosses to identify areas that needed to be enlarged or reduced. These adjustments highlight the importance of technical pattern details in achieving optimal fit (Pratiwi, 2001; Armstrong, 2010).

6. Suitability of the Pattern After Improvement

The second fitting showed a significant improvement in the pattern's suitability, increasing from 63% in the first fitting to 86%. The bicep circumference achieved 100% suitability, while the raglan line, although still showing the lowest percentage (75%), also showed improvement. Previous studies also support the importance of pattern adjustments in improving fit, such as those by Hidayah & Yasnidawati (2019), on patterns for plus-size women and Cahyani & Adriani (2021), on Armstrong's pant pattern system. The results of this study indicate that with proper modification, Helen Joseph Armstrong's raglan sleeve pattern can be adapted to the body proportions of Indonesian adult women with ideal body shapes, thereby improving both comfort and the overall aesthetics of the garment

CONCLUSION

This study found that Helen Joseph Armstrong's raglan sleeve pattern is not fully suitable for the body proportions of Indonesian adult women with ideal body shapes. The first fitting showed a suitability rate of 63%, with the main issues identified in the elbow line, bicep circumference, and sleeve end circumference. Improvements were made by adjusting the shoulder line, raglan line, and sleeve size. After the improvements, the second fitting increased the pattern's suitability to 86%, with the bicep circumference achieving 100% suitability. These results reaffirm the importance of adjusting standard patterns to local body proportions to enhance both comfort and aesthetics. This study contributes to the development of more inclusive and body-appropriate garment patterns.

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