

The Impact of Fabric Types on the Size M Lantern Sleeves Test Result

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How to cite: Berlianda, S. & Ernawati, E. (2025). The Impact of Fabric Types on the Size M Lantern Sleeves Test Result. *Gorga : Jurnal Seni Rupa*, 14 (1), 295-301. <https://dx.doi.org/10.24114/gr.v14i1.65512>

Article History : Received: May 5, 2025. Revised: June 2, 2025. Accepted: June 30, 2025

ABSTRACT

The lantern sleeve is a variation of sleeve design characterized by its puffed appearance, similar to puff sleeves. The main difference lies in the construction; while puff sleeves are gathered, lantern sleeves are not. Lantern sleeves are composed of two separate pattern pieces upper and lower parts—that together create a distinctive volume. This study aims to analyze the effect of different fabric types on the outcome of lantern sleeves on a size M dummy. The fabrics used in this study include mikado, victori, and toyobo. A quantitative method was employed using a Likert scale questionnaire (1–4). Respondents consisted of two expert panelists and 15 trained panelists. The evaluation focused on three visual aspects: smoothness, shape stability, and volume of the sleeve. Data were analyzed descriptively and through the Friedman K-related samples test. The results showed that mikado fabric produced the best outcomes in all aspects: highly smooth (89.22%), highly stable (92.16%), and highly voluminous (95.59%). Statistical tests indicated a significant difference among fabric types ($p < 0.05$). Therefore, fabric selection significantly influences the final result of the lantern sleeve. Mikado fabric is recommended for optimal sleeve outcomes.

KEYWORDS

Lantern, Sleeves, Fabric Types, Volume, Stability

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INTRODUCTION

Sleeves are an essential part of garment design, serving not only as protection for the arms but also as an aesthetic element that enhances the overall appearance of the wearer. According to Putri & Ernawati (2022) sleeves are components of clothing that cover the arms either partially or entirely while providing protection from weather, dirt, dust, and insects. The shape and appearance of sleeves are influenced by the position of the armhole, the chosen sleeve model, and the finishing techniques, such as hemming, machine stitching, or the use of cuffs.

Based on their model and construction, sleeves are generally categorized into two types: set-in sleeves, which are attached to the armhole with various design variations, and kimono sleeves, in which the sleeve is partially or entirely integrated into the garment's bodice. These classifications are explained in detail by Ekandari (2017). Meanwhile, Ernawati (2008), outlines three basic sleeve types: (1) sleeves sewn into the armhole, (2) raglan sleeves sewn from the neckline to the underarm, and (3) kimono sleeves that are continuous with the bodice.

One type of sleeve known for its unique characteristics is the lantern sleeve. This sleeve is designed to puff outward, resembling a lantern, widening from the shoulder down to the cuff (Shalihah, 2023). Structurally, the lantern sleeve consists of two separate pattern pieces an upper and a lower part that form its characteristic volume. This differentiates it from the puff sleeve,

which also has a voluminous shape but is gathered, while the lantern sleeve is not (Armstrong, 2010). Fabric selection plays a crucial role in achieving the desired appearance of lantern sleeves.

Each fabric type has distinct physical properties, such as stiffness, thickness, drape, and flexibility. These characteristics influence the final construction of the sleeve, particularly in terms of seam smoothness, shape stability, and volume. For example, stiffer fabrics tend to create more structured and voluminous silhouettes, while softer or more drapery fabrics result in looser forms. Therefore, this study focuses on three fabrics with differing characteristics: mikado (thick and stiff), victori (moderate), and toyobo (lighter and more flexible), to analyze their impact on the final result of lantern sleeves.



Figure 1. Lantern Sleeve
Source: The Shapes of Fabric (2022)

As shown in Figure 1, the lantern sleeve has a shape similar to the puff sleeve but differs in that it does not feature gathers. Additionally, it consists of two pattern pieces: an upper and a lower sleeve section.

Textile materials vary in their properties, such as satin, silk, and cotton, each with unique characteristics shine, softness, and stiffness that produce different draping effects (Sari & Yusmerita, 2023). Fabric selection must align with the garment's design to ensure the final outcome meets expectations. Fashion design refers to the sketch or plan of a clothing item (Yusmerita, 2007). According to Werdini & Puspaneli (2023) fashion design involves creating garments worn from head to toe, composed of various design elements arranged according to design principles to produce clothing that is beautiful, functional, comfortable, and accessible.

In the fashion world, using fabric incompatible with the design can result in unsatisfactory garment outcomes (Ernawati, 2008). One critical design element is fabric drape, which affects the overall visual result. Kustanti (2021) categorizes fabric drape into several types, ranging from stiff, heavy and structured, soft, moderately draped, to light and floating. Therefore, design analysis is essential before fabric selection to ensure that the garment's shape and silhouette meet design goals. Patternmaking is also crucial in garment construction. Ernawati (2021) defines garment patterns as body-shaped templates typically made from paper and used as cutting guides for fabric. Various systems exist for drafting women's basic patterns, including the Helen Joseph Armstrong system, developed in Los Angeles (Agustazani & Ernawati, 2024).

Research by Valentina & Karyaningrum (2016) demonstrated that interfacing type significantly influences the final quality of starfruit-style sleeves made from taffeta, particularly in terms of volume, shape, and smoothness. The woven interfacing type 3068M provided the best shape stability and volume. Similarly, Aziz & Karyaningrum (2019) found that taffeta fabric thickness and woven fusible interfacing affect the quality of spiral sleeve designs, including sleeve length and proportion. Novryani & Suci (2024) also highlighted the importance of selecting materials that suit user needs and fabric characteristics, especially in volume-based fashion design.

Based on the background above, this study aims to examine the effect of different fabric types on the outcome of lantern sleeves. Three fabric types mikado, victori, and toyobo each with unique characteristics in terms of fiber, fiber direction, and thickness, are analyzed. The purpose of this research is to investigate how differences in fabric type affect the final appearance of lantern sleeves on a size M dummy, with attention to smoothness, shape stability, and volume. The findings of this study are expected to contribute empirical knowledge on the visual and structural characteristics of various fabrics used in lantern sleeve construction. It also aims to serve as a reference for fashion designers in selecting suitable materials to achieve optimal lantern sleeve results, and to enrich scientific literature in the field of garment construction regarding material influence on structured sleeve design.

METHOD

This study employed a quantitative approach using both descriptive and comparative methods. The research object was the construction result of lantern sleeves on a size M dress form using three different fabric types: mikado, victori, and toyobo. The observed variables focused on three key visual aspects: sleeve smoothness, shape stability, and volume. Data were collected through a four-point Likert scale questionnaire distributed to expert panelists and trained panelists. The expert panel consisted of two lecturers from the Fashion Design Study Program at Universitas Negeri Padang, while the trained panel consisted of 15 students from the same program, class of 2021, who had completed all practical courses. Data were analyzed descriptively to explore the general perceptions of panelists toward each fabric type, and inferentially using the Friedman K-related samples test to determine whether significant differences existed between the fabric types (Pereira, Afonso & Medeiros, 2015).

The research was conducted through several main stages. First, the evaluation instrument was designed, focusing on the aspects of sleeve smoothness, shape stability, and volume. Subsequently, lantern sleeve patterns were constructed using the three different fabric types mikado, victori, and toyobo on a size M dress form. The evaluation process was carried out by two expert panelists and 15 trained panelists, who assessed the results using a four-point Likert scale questionnaire. The evaluation data were then systematically compiled and tabulated. Finally, data analysis was conducted using descriptive statistics to identify panelist perception trends and the Friedman K-related samples test to evaluate significant differences among the sleeve outcomes made from each fabric type.

RESULT AND DISCUSSION

1. Lantern Sleeve Results Based on Smoothness Aspect

This section presents the evaluation results of the first aspect, namely sleeve smoothness, which indicates how even the surface of the lantern sleeve is when constructed using each type of fabric. The descriptive statistical results are presented in Table 1:

Table 1. Descriptive Statistics of Lantern Sleeve Results Using Mikado, Victori, and Toyobo Fabrics Based on Sleeve Smoothness

X	Variable	n	Total Score	Mean	%	Criteria
X1	Mikado Fabric	17	61	3.57	89.22	Very Smooth
X2	Victori Fabric	17	51	3.02	75.49	Smooth
X3	Toyobo Fabric	17	51	3.02	75.49	Smooth

The descriptive statistical analysis in this study utilized the Total Respondent Achievement (TRA), which represents the percentage of the score obtained from the maximum possible score that could be given by all panelists. The TRA score is used to categorize the assessment results into levels of very good, good, fair, or poor, depending on the predetermined score range. Based on the results in Table 1, the lantern sleeve made of Mikado fabric achieved the highest total score of 61, with an average score of 3.57 and a TRA of 89.22%, which falls into the very smooth category. Meanwhile, both Victori and Toyobo fabrics obtained a total score of 51, an average score of 3.02, and a TRA of

75.49%, categorized as smooth. These findings indicate that Mikado fabric produces the best smoothness result in constructing a lantern sleeve, whereas Victori and Toyobo fabrics show similar but lower levels of smoothness compared to Mikado.

2. Lantern Sleeve Results Based on Shape Stability Aspect

This study presents descriptive statistical data to illustrate the differences in the level of shape stability of lantern sleeves constructed using Mikado, Victori, and Toyobo fabrics. The complete assessment results are presented in Table 2:

Table 2. Descriptive Statistics of Lantern Sleeve Results Using Mikado, Victori, and Toyobo Fabrics Based on Shape Stability

X	Variable	n	Total Score	Mean	%	Criteria
X1	Mikado Fabric	17	63	3.69	92.16	Very Stable
X2	Victori Fabric	17	53	3.12	77.94	Very Stable
X3	Toyobo Fabric	17	39	2.31	57.84	Stable

Based on the assessment results of the lantern sleeve stability aspect, it is known that the mikado fabric obtained a total score of 63 with an average value of 3.69 and a TCR percentage of 92.16%, thus falling into the category of “Very Stable.” This indicates that mikado fabric can maintain the shape of the lantern sleeve very well, even when subjected to use or movement. Meanwhile, the victori fabric scored a total of 53, with an average of 3.12 and a TCR of 77.94%, also categorized as “Very Stable,” although its value is lower compared to mikado. In contrast, the toyobo fabric only obtained a total score of 39 with an average of 2.31 and a TCR of 57.84%, which falls into the “Stable” category. This result indicates that toyobo fabric has relatively lower shape stability, possibly due to its lighter and more flexible nature compared to the other two fabrics. Therefore, mikado is the superior fabric in maintaining the shape stability of the lantern sleeve on an M-sized dummy.

3. Lantern Sleeve Results Using Mikado Fabric Viewed from the Volume Aspect

The volume of the sleeve is one of the important aspects in the successful creation of the lantern sleeve because it influences the visual appearance and dramatic impression of the garment. The following presents the descriptive statistical results of sleeve volume assessment based on each type of fabric used:

Table 3. Descriptive Statistics of the Assessment Results of Lantern Sleeve Using Mikado, Victori, and Toyobo Fabrics Viewed from the Sleeve Volume Aspect

X	Variable	n	Total Score	Mean	%	Criteria
X1	Mikado Fabric	17	65	3.82	95.59	Very Voluminous
X2	Victori Fabric	17	58	3.38	84.56	Very Voluminous
X3	Toyobo Fabric	17	31	1.82	45.59	Not Voluminous

Based on the assessment results in the sleeve volume aspect, it is known that the mikado fabric obtained a total score of 65 with an average of 3.82 and a TCR percentage of 95.59%, which falls into the category of very voluminous. This indicates that mikado fabric is highly capable of optimally forming the volume of the lantern sleeve according to the design characteristics. Next, the victori fabric obtained a total score of 58 with an average of 3.38 and a TCR of 84.56%, which is also categorized as very voluminous, although slightly lower compared to mikado. Conversely, the toyobo fabric only obtained a total score of 31 with an average of 1.82 and a TCR of 45.59%, which is classified as not voluminous. This shows that toyobo fabric is less capable of forming the desired sleeve volume, possibly due to its lighter and less stiff nature compared to the other two fabrics.

4. Hypothesis Testing

The test was conducted using the Friedman K-related samples test, a non-parametric test used to compare more than two related treatments or groups. This test was chosen because the data came from the same panelists' assessments of three different treatments, thus allowing the identification of differences in rankings among the three types of fabric used.

Table 4. Friedman K-Related Test Results for Lantern Sleeve Made with Mikado Fabric

Test Statistics ^a	
N	17
Chi-Square	28.667
df	2
Asymp. Sig.	.000
a. Friedman Test	

The Friedman test results for the assessment of lantern sleeves made from mikado fabric show a Chi-Square value of 28.667 with degrees of freedom (df) of 2 and an Asymp. Sig. (significance) of 0.000. The significance value being less than 0.05 indicates that there is a significant difference between the assessments of the lantern sleeve results using mikado fabric across the tested aspects (evenness, stability, and volume). Thus, the alternative hypothesis stating that there are significant differences among the three assessed aspects is accepted, indicating that mikado fabric influences the resulting lantern sleeve.

Table 5. Friedman K-Related Test Results for Lantern Sleeve Made with Victori Fabric

Test Statistics ^a	
N	17
Chi-Square	25.290
df	2
Asymp. Sig.	.000
a. Friedman Test	

The Friedman test results for the assessment of lantern sleeves made from Victori fabric show a Chi-Square value of 25.290 with degrees of freedom (df) of 2 and an Asymp. Sig. (significance) of 0.000. The significance value being less than 0.05 indicates that there is a significant difference between the assessments of the lantern sleeve results using Victori fabric across the tested aspects (evenness, stability, and volume). Therefore, the alternative hypothesis stating that there are significant differences among the three assessed aspects is accepted, indicating that Victori fabric influences the resulting lantern sleeve.

Table 6. Friedman K-Related Test Results for Lantern Sleeve Made with Toyobo Fabric

Test Statistics ^a	
N	17
Chi-Square	31.731
df	2
Asymp. Sig.	.000
a. Friedman Test	

The Friedman test results for the evaluation of lantern sleeves made from Toyobo fabric showed a Chi-Square value of 31.731 with degrees of freedom (df) of 2 and an Asymp. Sig. (significance) of 0.000. The significance value being less than 0.05 indicates that there is a significant difference in the evaluations of the lantern sleeve results made from Toyobo fabric across the tested aspects (evenness, stability, and volume). Therefore, the alternative hypothesis stating that there is a significant difference

among the three assessment aspects can be accepted, which shows that Toyobo fabric also affects the resulting lantern sleeves.

The study results show that using Mikado fabric for making lantern sleeves produces very good outcomes in the aspects of evenness, stability, and volume. For evenness, Mikado fabric achieved the highest score with a percentage of 89.22%, categorized as “Very Even,” indicating that this fabric can produce lantern sleeves that are more even compared to other materials. In terms of stability, Mikado also obtained the best result with a percentage of 92.16%, showing that lantern sleeves made from Mikado fabric have very good durability and firmness, resisting shape changes. Regarding volume, Mikado scored 95.59%, indicating that the resulting lantern sleeves have optimal and fuller volume compared to other fabrics.

The use of Victori fabric in making lantern sleeves shows good results, although slightly lower compared to Mikado fabric. For evenness, Victori scored 75.49%, categorized as “Even.” This result indicates that lantern sleeves made from Victori fabric have fairly good evenness, but there are still some slight imperfections compared to Mikado fabric. For stability, Victori also showed adequate results with a percentage of 77.94% and categorized as “Very Stable,” although not as high as Mikado fabric. Regarding volume, Victori scored 84.56%, indicating that the lantern sleeves produced have sufficient volume but are not as optimal as those made from Mikado fabric.

The research results show that the use of Toyobo fabric in making lantern sleeves produces a quality that is less optimal compared to Mikado and Victori fabrics. For evenness, Toyobo scored 75.49%, similar to Victori, but there are still imperfections in forming the lantern sleeves. For stability, Toyobo scored 57.84%, indicating that lantern sleeves made from this fabric are less stable and tend to easily change shape. For volume, Toyobo obtained the lowest score of 45.59%, categorized as “Not Voluminous.” This shows that Toyobo fabric is less capable of producing optimal volume in the lantern sleeves, which can affect the overall appearance. Although Toyobo fabric has some drawbacks, its results still provide a useful comparison among the three types of fabrics.

There are significant differences in the lantern sleeve results made from Mikado, Victori, and Toyobo fabrics. Based on statistical test results, these differences indicate that Mikado fabric produces the most superior results in all evaluated aspects, namely evenness, stability, and volume. Mikado fabric scored the highest in every aspect, demonstrating the best quality in making lantern sleeves. Meanwhile, Victori and Toyobo fabrics gave lower results, with Victori in the middle and Toyobo showing the lowest results, especially in stability and volume. The statistical tests show that these differences are highly significant, with probability values less than 0.05, indicating that the type of fabric used has a different impact on the quality of the lantern sleeves. These results affirm that fabric selection greatly affects the final outcome of lantern sleeve production, and Mikado fabric is proven to be the best choice for producing lantern sleeves that are even, stable, and voluminous.

The findings are supported by the research of Valentina & Karyaningrum (2016) who found that the type of interfacing significantly affects the final results of bell-shaped sleeves made from taffeta, especially in terms of shape, volume, and evenness. Additionally, the research of Aziz & Karyaningrum (2019) confirmed that the thickness of woven fusible interfacing affects the quality of spiral sleeves, including sleeve length related to proportion and shape. The relevance of these findings is further supported by Novryani & Suci (2024) who emphasized the importance of choosing the appropriate fabric according to user needs, as well as by Ananda & Nelmira (2024) who showed that variations in the number of embroidery threads affect the quality of embroidery results in terms of density, neatness, and balance.

These results are consistent with Valentina & Karyaningrum (2016), findings, which showed that interfacing fabric type influences the stability and volume of bell sleeves. In that study, woven interfacing type 3068M produced the best results for volume and stability. This finding is also in line with Aziz & Karyaningrum (2019) who identified that interfacing thickness and type affect sleeve quality, especially in stability and evenness. Thus, although Toyobo fabric shows slightly lower quality compared to Mikado, the results are still quite good and indicate a significant influence of fabric type on the final product quality.

CONCLUSION

Based on the results of the research and data analysis, several conclusions were drawn as follows: (1) The type of fabric has a significant effect on the quality of lantern sleeves, in terms of evenness, shape stability, and volume, as evidenced by the Friedman test showing a significance value of 0.000 (< 0.05)., (2) Mikado fabric produces the best results among the three tested fabrics. For the aspects: Evenness, Mikado fabric achieved a TCR (Total Correct Response) of 89.22% (categorized as Very Even). For Shape Stability, it obtained a TCR of 92.16% (categorized as Very Stable). For Volume, it scored a TCR of 95.59% (categorized as Very Voluminous), (3) Victori fabric shows fairly good results, especially in volume (84.56%) and stability (77.94%), but still below Mikado fabric, and (4) Toyobo fabric produces the lowest results, particularly in volume (45.59%), categorized as Not Voluminous, and therefore is less recommended for producing optimal lantern sleeves.

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