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Evaluating Comfort Performance in Plus-Size Caesarean Undergarment Design

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Abstract
A framework-based testing approach was employed to evaluate the comfort performance of a plus-size caesarean undergarment design for plus-size caesarean patients in Malaysia, with the goal of validating the framework through successful testing. A paired sample t-test assessed comfort performance across three indicators: clothing, physical, and psychological comfort, at two-time points, evaluating comfort improvements over time. Results showed a mean comfort score of 4.48 in the first hour and 4.61 in the fourth hour, indicating significant improvement in comfort. The statistical analysis revealed a p-value of 0.000 (Sig. 2-tailed), suggesting a highly significant result at the 0.001 level.

Keywords: Plus-size; Caesarean; Comfort; Undergarment design

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1.0 Introduction

Malaysia has the highest obesity rate in Asia, with a prevalence of 54.4% (Phelps et al., 2024; Fact Sheet National Health and Morbidity Survey, 2023), and this rate is exceptionally high among adult females of reproductive age (Nurul Farehah Shahrir et al., 2021; Chong et al., 2023). Maternal obesity, especially among plus-size women, increases the risk of health complications before, during, and after pregnancy, often leading to a caesarean section (Aedla et al., 2024). Caesarean section is a surgical procedure involving an incision in the abdominal area during childbirth to prevent maternal and neonatal mortality; however, as an invasive surgery, it carries risks of morbidity and mortality for both the mother and baby (Richards & Black, 2024; Shamala Devi Karalasingam et al., 2020). Malaysian plus-size caesarean patients commonly face challenges related to discomfort and pain management, which are exacerbated by factors such as an apron belly, dampness around the incision, and mobility issues (Juliana Osman et al., 2022). During recovery, these patients prioritize tending to the incision and ensuring comfort (Mdoe et al., 2024). Concerning that, to improve comfort during recovery, a theoretical framework for designing a plus-size caesarean undergarment was developed based on the preferences of Malaysian plus-size patients (Juliana Osman et al., 2022). Grounded in a theoretical framework that addresses the unique recovery challenges of plus-size cesarean patients during the confinement period (Juliana Osman et al., 2022), this study aims to evaluate plus-size cesarean undergarment prototypes designed according to the framework by assessing three comfort indicators: clothing comfort, physical comfort,

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and psychological comfort through wear-and-test sessions. Comfort improvements were measured over time, specifically between the first and fourth hours of wear. The successful outcomes of these tests validate the framework's effectiveness, supporting its application in future design improvements for plus-size cesarean patients.

2.0 Literature Review

2.1 Comfort

Comfort is subjective and varies from person to person, influenced by factors such as the environment, sensory inputs, and activities (Mansfield et al., 2020; Abdelaliem & Boswihi, 2024). Beyond physical sensation, it also encompasses psychological states, physiological well-being, and environmental harmony (Mansfield et al., 2020). Four clothing comfort considerations are sensorial comfort, body movement comfort, thermo-physiological comfort and psychological comfort (Di Domenico et al., 2022). Sensorial comfort is the body's responses to external stimuli such as pain, pressure and moisture (Abdelaliem & Boswihi, 2024). Body movement comfort is based on the clothing fit and freedom of movement (D'Arcy et al., 2024). Thermo-physiological comfort is influenced by air permeability and moisture management (Di Domenico et al., 2022). Finally, psychological comfort is the feeling of contentment influenced by clothing performances, physical sensations, emotional processes, environment, aesthetics and social factors (Suganya et al., 2024). Evaluating comfort and discomfort perceptions is complex and subjective, as discomfort detection highly depends on self-reported experiences (Mansfield et al., 2020). As individuals prioritize comfort and support during physical recovery, the demand for garments designed with comfort performance to fulfil their comfort needs continues to rise, highlighting the strong link between clothing and overall well-being (Pawsey et al., 2023).

2.2 Undergarments for plus-size caesarean patients

Caesarean-centric undergarment design offers a unique solution to address the challenges faced by caesarean patients during recovery (Hassan, 2021). While compression garments and body wrappings are commonly associated with postpartum recovery, caesarean patients prioritize convenience and overall comfort when selecting undergarments, mainly when dealing with physical pain, swelling, tension, and discharge (D'Arcy et al., 2024). Although studies have shown positive outcomes in mobility following caesarean surgery using abdominal binders (Karaca et al., 2019), a survey of Malaysian plus-size caesarean patients reveals a clear preference against restrictive body binders. Instead, their preference lies in undergarments that offer comfort and convenience, helping to avoid the pain associated with compression garments and post-caesarean complications (Juliana Osman et al., 2022). Oversized panties are the most popular choice among this group despite their minimal compression strength. Their popularity is attributed to their availability in larger sizes, better fit, affordability, and comfortable materials (Juliana Osman et al., 2022). The popularity of oversized panties may also stem from the limited availability of undergarment options in plus-size sizing (Juliana Osman et al., 2022), highlighting the need for further design exploration to serve this target group better.

2.3 Theoretical framework for plus-size caesarean undergarment design.

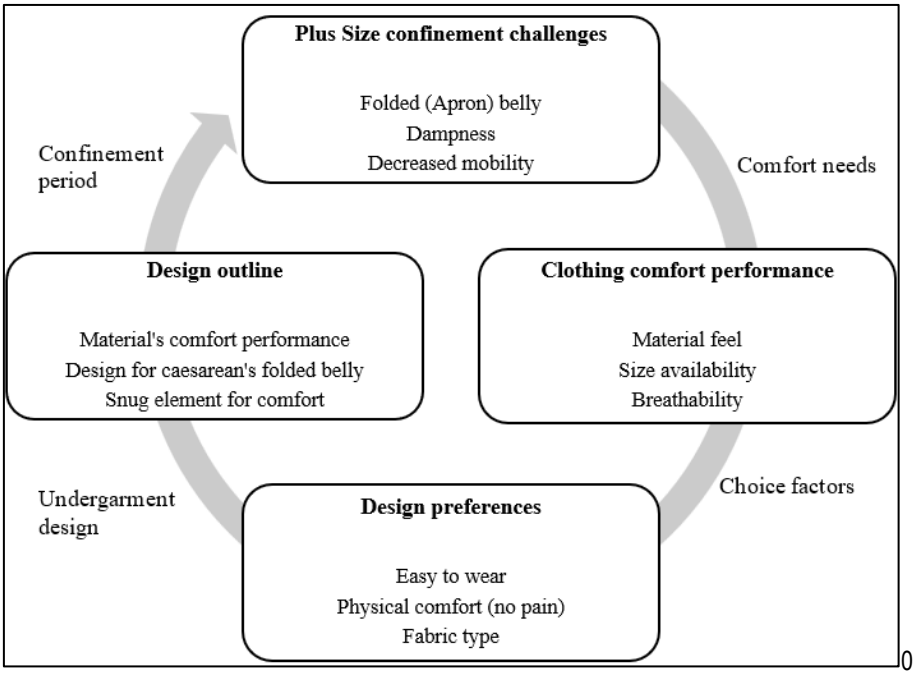

Fig. 1: The theoretical framework for plus-size caesarean undergarment design.
(Source:) Juliana Osman et al. (2022)

A theoretical framework for plus-size caesarean undergarment design outlined the caesarean recovery challenges of plus-size patients, clothing comfort performance, undergarment design preferences, and an overall design outline (Juliana Osman et al., 2022). This theory originates from identifying Malaysian plus-size caesarean patients' post-caesarean challenges, particularly their undergarment preferences during recovery (Juliana Osman et al., 2022). Compression garments, such as the traditional *bengkung* and modern body binders, were expected to be the undergarments of choice. However, the lack of comfortable materials, an appropriate size range, and breathable designs and fabrics failed to meet the comfort needs of plus-size patients—especially when addressing issues like folded bellies, dampness, and mobility challenges (Juliana Osman et al., 2022). Theoretically, if undergarments were designed using comfortable materials, explicitly tailored for folded bellies, and provided mild compression for a snug fit while maintaining simplicity, they would be ideal for plus-size caesarean patients during confinement. The theoretical framework can be referred to in Fig. 1. below.

3.0 Methodology

This study used a mixed-mode method, which requires several important elements of prototype-making and wear and test sessions. An undergarment design was developed based on the design framework outlined by Juliana Osman et al. (2022), focusing on material comfort performance, the undergarment design to accommodate the folded belly, and a snug element for enhanced comfort.

The prototype's materials—cotton spandex, cotton bamboo, and bamboo spandex—were chosen for their proven comfort performance, including breathability, air permeability, moisture management, and thermal comfort (Juliana Osman et al., 2023). A caesarean-centric undergarment design was also designed and produced. In order to accommodate plus-size body shapes, the prototypes were produced in sizes 2XL, 3XL, 4XL, 5XL, and 6XL, following the ASTM D6960/D6960M standard sizing for plus-size women (American Society for Testing and Materials, 2023). The prototypes were pre-washed and individually packed in plastic bags for hygiene purposes.

Data were collected using a purposive sampling method (Amelia et al., 2024) on ten (n=10) (Santi & Sukarni, 2023) Malaysian plus-size caesarean patients with a body mass index (BMI) of 25 and above (World Health Organization, 2024), within the reproductive age range of 20 to 49 years (Nurul Farehah Shahrir et al., 2021), were recruited for wear-and-test sessions and observations. A small-scale sample size was applied because plus-size caesarean patients fall into a high-risk group, and unnecessary contact with this target group is not advisable. Therefore, ten (n=10) respondents were deemed sufficient to validate the experiment's findings. Consent was obtained from each respondent before the experiment. The experiment was conducted at least 24 hours post-caesarean in Hospital Al-Sultan Abdullah, UiTM Puncak Alam, Malaysia, with the support of obstetrics and gynaecology (O&G) specialists. Given that the target respondents belong to a high-risk group, the hospital established a strict protocol, and test sessions were limited to a four (n=4)-hour duration to ensure the safety and comfort of the patients. Four hours are deemed sufficient for the test period based on Charisma et al. (2024) positive results of changing sanitary pads every four hours for genital hygiene practice. This duration allows the undergarment to be removed, and the comfort difference between wearing and removing the undergarment can be felt. Each participant was given one (n=1) new pair of undergarments to try on and was allowed to change size if the initial pair was deemed unsuitable. Subsequent participants did not reuse the undergarments used to maintain the sample's integrity and prevent alteration from its original condition.

During the wear-and-test session, a Likert scale (Robinson, 2024) was used to assess the undergarment's comfort performance during the first and fourth hours of the test period. The scale included ratings ranging from (1) Very Poor, (2) Poor, (3) Neutral, (4) Good, to (5) Very Good, focusing on clothing comfort, physical comfort, and psychological comfort. The ratings assessed breathability, material feel, pressure and support, sweat absorbency, and size suitability for clothing comfort. Regarding physical comfort, the ratings evaluated the comfort experienced while standing, sitting, lying down, walking, and with pressure on the skin. For psychological comfort, the ratings focused on the wearer's perception of ease of putting on and taking off the undergarment, feelings of safety while wearing the undergarment, and its suitability for daily use.

3.1 Limitations of study

This study employs a framework-based testing approach. Therefore, the design and testing are guided by a specific theoretical framework without incorporating elements or frameworks from other studies. The data were collected specifically to assess the undergarment's comfort performance rather than its impact on caesarean recovery or other medical outcomes. Due to the unavailability of standard sizing for Malaysian plus-size clothing, the ASTM D6960/D6960M standard sizing was used for the prototype's application. Following ethical guidelines, the test was conducted exclusively at Hospital Al-Sultan Abdullah, UiTM Puncak Alam, Malaysia, with an obstetrics and gynaecology (O&G) specialist as the appointed medical advisor throughout the test period. Due to the restricted test location and the limited availability of potential participants, respondents were selected based on Malaysian nationality and a BMI of 25 and above without consideration of factors such as race, residency, or economic background.

4.0 Findings

4.1 Respondent's parameters

A total of ten participants (n=10) with a BMI of 25 or higher were selected for the study. Among them, one participant (n=1) was categorized as overweight, three participants (n=3) fell into the Obese Class I category, with BMIs of 30 and above, three participants (n=3) were classified under Obese Class II, with BMIs of 35 and above, and the remaining three participants (n=3) belonged to Obese Class III, with BMIs of 40 and above. While the number of participants is consistent across the Obese Class I, II, and III categories, the

differences in clothing size for each Obese category highlight the unique challenges faced by plus-size individuals. These challenges include issues related to body shape and the physical condition of the body, particularly involving an apron belly following a caesarean. As shown in Table 1 below, the sizes of the undergarments increased in line with the respondents' BMI. However, an interesting variation was observed when a respondent with a BMI of 44.0 selected a size 6XL, larger than the size 5XL chosen by a respondent with a BMI of 48.0. The data suggests that factors such as individual body type, post-caesarean body condition, and personal comfort preferences may have influenced the choice of undergarment size.

Table 1. Respondent's BMI and undergarment size

Respondent	BMI	Size
R1	29.2	2XL
R2	31.0	2XL
R3	32.0	2XL
R4	34.0	3XL
R5	35.0	3XL
R6	36.0	3XL
R7	37.0	3XL
R8	43.3	4XL
R9	44.0	6XL
R10	48.0	5XL

(Source:) Personal collection

4.2 Prototype

An undergarment design was developed based on the outline stated in the theoretical framework. Oversized panties are preferable due to their simplicity and comfort (Juliana Osman et al.,2022). Therefore, the prototype was designed based on the shape of oversized panties, featuring adjustable mild compression panels at the abdominal area to support the apron belly. The cotton spandex, bamboo spandex, and cotton bamboo fabrics (Juliana Osman et al., 2023) have proven suitable for applying the undergarment prototype due to their soft material feel and breathability.

4.3 Clothing comfort

By using the Likert scale of (1) Very Poor, (2) Poor, (3) Neutral, (4) Good to (5) Very Good, five clothing comfort factors were evaluated: breathability, material feel, pressure and support, sweat absorbency, and size suitability. The results showed improvements in all areas. Breathability increased from 4.4 to 4.7, indicating that the material was breathable, and the oversized design did not cause overheating or sweating. The material feel also improved, rising from 4.5 to 4.7, suggesting that the fabric was comfortable and preferred by wearers. Pressure and support increased slightly from 4.4 to 4.5, indicating that the light compression provided adequate support for the apron belly without being overly tight. However, the relatively lower rating suggests that the compression may not have been firm enough throughout the testing period. Sweat absorbency improved from 4.4 to 4.6, showing the material's effective moisture absorption. Size suitability increased from 4.3 to 4.4, with the initial lower rating reflecting that the fit of the oversized undergarment met expectations.

4.4 Physical comfort

Physical comfort was rated using the Likert scale of (1) Very Poor, (2) Poor, (3) Neutral, (4) Good, and (5) Very Good. No specific physical tests were conducted during this experiment, as respondents were allowed to resume their daily activities, with their physical movements observed throughout the test period. Observations showed positive results across all movements. Standing increased the rating from 4.5 to 4.6, indicating no obstruction or material movement. Sitting also rose from 4.4 to 4.6, showing no discomfort from material rolling or irritation. Lying down saw a similar increase from 4.4 to 4.6, confirming no physical discomfort. Walking increased from 4.5 to 4.6, indicating comfort during daily activities. The final test on the pressure felt on the skin showed a slight increase from 4.4 to 4.5, suggesting mild compression but not firm enough to cause lasting discomfort, as reflected in earlier comfort ratings.

4.5 Psychological comfort

Psychological comfort plays a crucial role in determining the wearer's perceptions of the overall design and wearability of the undergarment for plus-size caesarean patients. The Likert scale of (1) Very Poor, (2) Poor, (3) Neutral, (4) Good, and (5) Very Good was applied for the survey with final positive results. The ease of putting on and removing the garment increased from 4.6 to 4.7, indicating high wearability. The perception of safety remained consistent at 4.7 throughout the test, showing no pain or discomfort. The garment's suitability for daily use was rated 4.8 at both the start and end of the test, suggesting it is highly functional and suitable for everyday wear. The simple design and cesarean-specific features make the undergarment convenient, comfortable, and safe for daily use.

4.5 Wear-and-test result

Based on the results, all comfort performance ratings increased from the first hour to the fourth hour of data collection, with the lowest rating being Neutral (3) and the highest rating being Very Good (5). Half of the respondents reported no change in their perceptions of comfort throughout the test period, while four (n=4) respondents experienced improved comfort after the fourth hour. One (n=1) respondent's perception of comfort decreased, particularly during standing, walking, and pressure on the skin. The complete data collected from the respondents can be referenced in Fig. 2.

Pilot Test Data : Comfort Performance Plus-size Caesarean Undergarment Design
Likert Scale Rating Score 1 Very poor 2 Poor 3 Neutral 4 Good 5 Very good

Comfort categories	Comfort descriptions	PT 1 BMI 44 6 XL		PT 2 BMI 32 2 XL		PT 3 BMI 36 3 XL		PT 4 BMI 48 5 XL		PT 5 BMI 43.3 4 XL		PT 6 BMI 31 2 XL		PT 7 BMI 35 3 XL		PT 8 BMI 29.2 2 XL		PT 9 BMI 37 3 XL		PT 10 BMI 34 3 XL		1st hour	4th hour
		1st hour	4th hour	1st hour	4th hour	1st hour	4th hour	1st hour	4th hour	1st hour	4th hour	1st hour	4th hour	1st hour	4th hour	1st hour	4th hour	1st hour	4th hour	1st hour	4th hour		
Clothing comfort	Breathability	4	4	4	5	5	4	5	5	5	5	4	5	3	5	5	5	4	4	5	5	4.4	4.7
	Material feels	4	4	4	5	4	4	5	5	5	5	5	5	4	5	5	5	4	4	5	5	4.5	4.7
	Pressure and support	3	3	5	5	4	4	5	5	5	5	5	5	4	5	5	5	4	4	4	4	4.4	4.5
	Sweat absorbency	4	4	4	5	4	4	5	5	5	5	5	5	4	5	5	5	4	4	4	4	4.4	4.6
	Size suitability	3	3	5	5	4	4	5	5	5	5	5	5	4	5	5	5	4	4	3	3	4.3	4.4
Physical comfort	Standing up	3	4	5	5	5	4	5	5	5	5	5	5	4	5	5	5	4	4	4	4	4.5	4.6
	Sitting down	3	4	5	5	4	4	5	5	5	5	5	5	4	5	5	5	4	4	4	4	4.4	4.6
	Lying down	3	4	5	5	4	4	5	5	5	5	5	5	4	5	5	5	4	4	4	4	4.4	4.6
	Walking	3	4	5	5	5	4	5	5	5	5	5	5	4	5	5	5	4	4	4	4	4.5	4.6
	Pressure on skin	3	3	5	5	5	4	5	5	5	5	4	5	4	5	5	5	4	4	4	4	4.4	4.5
Psychological comfort	Easy to put on and off	3	4	5	5	5	4	5	5	5	5	5	5	4	5	5	5	5	5	4	4	4.6	4.7
	Feeling safe to wear	4	4	5	5	5	4	5	5	5	5	5	5	4	5	5	5	5	5	4	4	4.7	4.7
	Suitable for daily usage	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4.8	4.8
Comfort score		3.38	3.77	4.77	5	4.54	4.08	5	5	5	5	4.85	5	4	5	5	5	4.23	4.23	4.08	4.08	4.48	4.62
Comfort progress 1st - 4th hour		Increase		Increase		Decrease		No changes		No changes		Increase		Increase		No changes		No changes		No changes		Increase	
Comfort performance		Neutral		Very good		Good		Very good		Very good		Very good		Very good		Very good		Good		Good		**Good**	

Fig. 2: Wear-and-test result: Comfort performance for plus-size caesarean undergarment design
(Source:) Personal collection

The mean comparison of comfort performance between the first and fourth hours of testing is shown in Fig. 3. The analysis reveals distinct differences in comfort levels related to various aspects. For clothing comfort, significant variations were observed in breathability and sweat absorbency, indicating the material's effectiveness in maintaining comfort over time. Regarding physical comfort, the undergarment performed best in sitting and lying positions, highlighting its adaptability to these postures. While there was an overall improvement in comfort across all categories, size suitability received the lowest rating, suggesting it may be an area for potential enhancement. On the other hand, design suitability for daily usage was rated the highest, emphasizing that the product's design is well-suited for everyday wear.

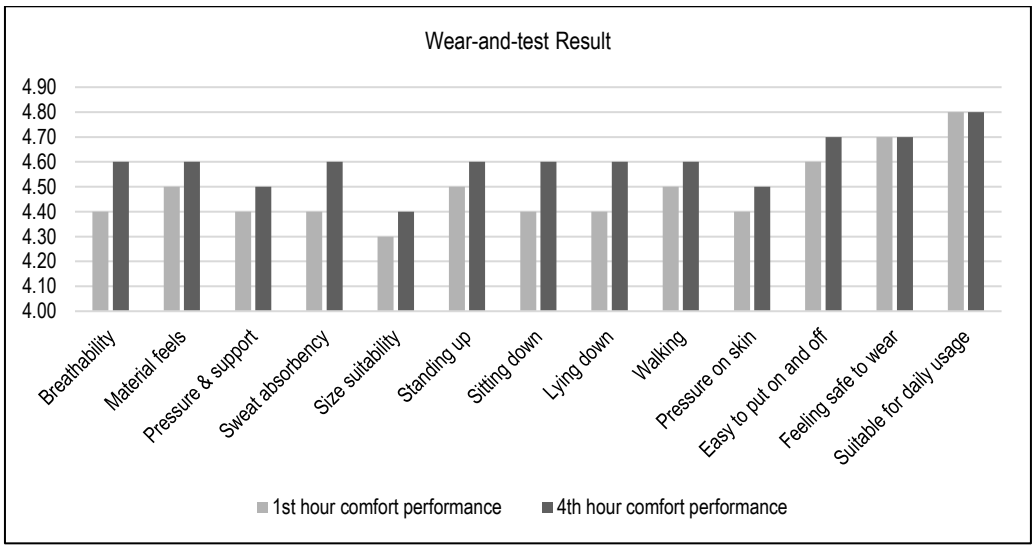

Fig. 3: Wear-and-test results for the first-hour and fourth-hour comfort performances.
(Source:) Personal collection

A paired sample t-test was conducted to analyze the comfort performance of the plus-size caesarean undergarment design between the first and fourth hours. The results indicate statistically significant differences in comfort performance, with a p-value of 0.000 (Sig. 2-tailed), well below the commonly accepted threshold of 0.05. The result suggests a meaningful improvement in comfort performance during the testing period. The mean difference between the first and fourth hours was -0.13077, with a 95% confidence interval ranging from -0.18243 to -0.07911, supporting the conclusion that the undergarment's comfort performance improved

significantly. These findings reinforce the validity and reliability of the observed outcomes, as summarized in Table 2.

Table 2. Paired Differences

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	1st hour mean - 4th hour mean	-.13077	.08549	.02371	-.18243	-.07911	-5.516	12	.000

(Source:) Personal collection

5.0 Discussion

Comfort needs for plus-size undergarment design

The collective data showed that the high wearability rating throughout the test period indicates a strong preference for a simple, oversized panty design. The undergarment did not cause discomfort for the patients, as it lacked firm compression, tight-fitting elements, or any additional hardware that could cause pain. The comfort and peace of mind provided by the prototype's design positively influenced the outcome ratings for the other comfort performance factors tested. A relaxed, functional design can significantly enhance overall comfort during recovery. Given that compression garments have not significantly addressed recovery challenges during confinement (Juliana Osman et al., 2022), the theoretical framework-led prototype effectively fulfils the comfort needs of plus-size caesarean patients during recovery. Beyond the immediate findings on comfort and recovery, the simplicity and cost-effectiveness of the prototype carry significant implications for broader applications, particularly in low-resource settings. The cost-effective and accessible design of the undergarment enhances inclusivity for plus-size patients and supports a healthier, more positive, and comfortable recovery experience. The results from the study indicate that sizing and fit are complex issues, particularly for plus-size women in Malaysia. Since Malaysian women do not have standardized sizing, the prototype was developed based on ASTM D6960/D6960M, an American plus-size standard (American Society for Testing and Materials, 2023). However, this may not be suitable for the tested respondents, as Asian body types are generally smaller than Caucasian women (Hamid et al., 2024). This sizing mismatch could affect the garment's fit and comfort for Malaysian women, highlighting the need for adjustments to align with local body proportions.

6.0 Conclusion and Recommendations

Several preliminary steps were undertaken before testing the theory through the wear-and-test session by analyzing the theoretical framework of plus-size undergarment design (Juliana Osman et al., 2022). The preliminary steps included fabric selection (Juliana Osman et al., 2023), undergarment type choice, size determination, and prototype production. The success of the experiments confirms that the framework is practical and can be applied to future plus-size caesarean undergarment designs or caesarean-centric clothing. Since the results indicate that the prototypes are safe to wear, it is recommended that similar tests be conducted independently at home over a more extended period during the post-caesarean confinement period to evaluate the comfort performance of the prototypes for daily use. Additionally, more plus-size undergarment designs should be developed based on the framework and tested on a larger sample size to ensure their effectiveness for mass consumer markets. The wear-and-test results also highlighted a limitation in plus-size sizing, indicating the need for further investigation into body shapes, types, and proportions through body measurement studies specifically focused on the Malaysian demographic. Exploring 3D scanning technology for collecting body measurement data is recommended, as it may offer greater accuracy in capturing body types and measurements across all sizes. Following the increase in caesarean cases each year (Nurul Farehah Shahrir et al., 2021) and the shift in confinement practice trends today (Juliana Osman et al., 2022), more easy-to-wear but functional designs should be further explored to accommodate the caesarean patient's lifestyle.

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The UiTM Research Ethics Committee approved the study under reference number REC/12/2021 (MR/972).

Paper Contribution to Related Field of Study

This paper makes a meaningful contribution to clothing design and women's health, particularly in post-operative care for plus-size caesarean patients. The findings validate the critical need for specialized clothing designs that address the unique challenges women face during their recovery after a caesarean procedure.

References

Abdelaliem, S. M. F., & Boswihi, H. S. S. (2024). Nurses' comfort and well-being: A descriptive study to find out the relationship between nurses' awareness of self-comfort and well-being at long-term care settings in the state of Kuwait. Medicine, 103(12), e37479. https://doi.org/10.1097/md.0000000000037479

Aedla, N. R., Mahmood, T., Ahmed, B., & Konje, J. C. (2024). Challenges in timing and mode of delivery in morbidly obese women. Baillière's Best Practice & Research. Clinical Obstetrics & Gynaecology/Baillière's Best Practice and Research in Clinical Obstetrics and Gynaecology, 92, 102425. https://doi.org/10.1016/j.bpobgyn.2023.102425

American Society for Testing and Materials. (2023). ASTM D6960/D6960M – 16: Standard Tables for Body Measurements for Plus Women's Figure Type, Size Range 14W – 40W.

Anti Amelia, Y., Yanti, L., Yudhoyono, D. T., & Firdaus, E. (2024). Experience of patients with sectio caesarean in controlling post-operative nausea and vomiting (PONV). Development Nursing Research, 1(1), 17–25. Retrieved from https://eism.web.id/index.php/DNR/article/view/14

Chong, C. T., Lai, W. K., Mohd Sallehuddin, S., & Ganapathy, S. S. (2023). Prevalence of overweight and its associated factors among Malaysian adults: Findings from a nationally representative survey. PloS One, 18(8), e0283270. https://doi.org/10.1371/journal.pone.0283270

D'Arcy, L., Fray, M., Barnes, J., & Watkins, S. M. (2024). Exploring women's perception of high metabolic clothing. Clothing and Textiles Research Journal. https://doi.org/10.1177/0887302x231225471

Di Domenico, I., Hoffmann, S. M., & Collins, P. K. (2022). The role of sports clothing in thermoregulation, comfort, and performance during exercise in the heat: A narrative review. Sports Medicine - Open, 8(1). https://doi.org/10.1186/s40798-022-00449-4

Hassan, S. I., El-Feshawy, N. E., & Ahmed, A. H. (2021). Effect of Elastic Abdominal Binder on Post Cesarean Pain, Distress, Mobilization and Women's Satisfaction. Egyptian Journal of Health Care, 12(1), 364-382.

Juliana Osman, Rosita Mohd Tajuddin, Noorkardiffa Syawalina Omar, & Shaliza Mohd Shariff (2022). Examining Undergarment Preferences During Confinement Period towards Designing Caesarean Undergarment Design for Plus-Size Patients. Environment-Behaviour Proceedings Journal, 8(SI16), 121–128. https://doi.org/10.21834/e-bpj.v8isi16.5234

Juliana Osman, Rosita Mohd Tajuddin, Noorkardiffa Syawalina Omar, & Shaliza Mohd Shariff (2022). The theoretical framework for Plus Size caesarean undergarment design [Image]. Environment-Behaviour Proceedings Journal, 8(SI16), pp. 126. https://doi.org/10.21834/e-bpj.v8isi16.5234

Juliana Osman, Shaliza Mohd Shariff, Rosita Mohd Tajuddin, Mohd Rozi Ahmad, NurÁin Yusoff, & Siti Hana Nasir (2023). The Clothing Comfort Performances' Evaluation on Different Single Jersey Fabrics for Female Undergarment Design. In Proceedings of Seminar Antarabangsa PascaSiswazah Sains Sosial dan Kemanusiaan 2023 (pp. 518-538). Fakulti Sains Sosial & Kemanusiaan, Universiti Malaysia Sabah.

Karaca, I., Ozturk, M., Alay, I., Ince, O., Karaca, S. Y., Erdogan, V. S., & Ekin, M. (2019). Influence of abdominal binder usage after cesarean delivery on postoperative mobilization, pain, and distress: A randomized controlled trial. The Eurasian Journal of Medicine, 51(3), 214-218.

Mansfield, N., Naddeo, A., Frohriep, S., & Vink, P. (2020). Integrating and applying models of comfort. Applied Ergonomics/Applied Ergonomics, 82, 102917. https://doi.org/10.1016/j.apergo.2019.102917

Mdoe, M. B., Mselle, L. T., & Kibusi, S. M. (2024). An integrative review of home care recommendations for women after caesarean section. Nursing Open, 11(3). https://doi.org/10.1002/nop2.2145

Fact Sheet National Health and Morbidity Survey ((2023). Ministry of Health Malaysia. Retrieved from https://iku.moh.gov.my/images/nhms2023/fact-sheet-nhms-2023.pdf

Nurul Farehah Shahrir, Rohana Abdul Jalil, J. Ravichandran R. Jeganathan, Shamala Devi Karalasingam, Noraihan Mohd Nordin, Mohamad Farouk Abdullah, & Nadiah Sa'at. (2021). Maternal obesity and its associated factors and outcomes in Klang Valley, Malaysia: Findings from National Obstetric Registry. Malaysian Family Physician: The Official Journal of the Academy of Family Physicians of Malaysia, 16(3), 56–67. https://doi.org/10.51866/oa1138

Pawsey, H., Cramer, K. M., & DeBlock, D. (2023). Life satisfaction and Maslow's hierarchy of needs: An international analysis of the World Values Survey. International Journal of Happiness and Development, 8(1), 66–79. https://doi.org/10.1504/ijhd.2023.131530

Phelps, N. H., Singleton, R. K., Zhou, B., Heap, R. A., Mishra, A., Bennett, J. E., Paciorek, C. J., Victor PF Lhoste, Carrillo-Larco, R. M., Stevens, G. A., Rodriguez-Martinez, A., Bixby, H., Bentham, J., Mariachiara Di Cesare, Goodarz Danaei, Rayner, A. W., Barradas-Pires, A., Cowan, M. J., Savin, S., & Riley, L. M. (2024). Worldwide trends in underweight and obesity from 1990 to 2022: a pooled analysis of 3663 population-representative studies with 222 million children, adolescents, and adults. The Lancet, 403(10431). https://doi.org/10.1016/s0140-6736(23)02750-2

Richards, C., & Black, M. (2024). Short- and long-term maternal and neonatal outcomes of caesarean section. In C. Bo (Ed.), Pelvic floor, perineal, and anal sphincter trauma during childbirth: Diagnosis, management and prevention (pp. 89-104). Springer International Publishing.

Robinson, J. (2024). Likert scale. In Encyclopedia of quality of life and well-being research (pp. 3917-3918). Cham: Springer International Publishing.
Santi, A. A., & Sukarni, S. (2023). The effectiveness of using corsets on reducing pain scale in post-SC patients at Eka Hospital, South Tangerang in 2022. International Journal of Health and Pharmaceutical (IJHP), 3(4), 677-682.

Shamala Devi Karalasingam, Ravichandran Jeganathan, Ravindran Jegasothy & Daniel D. Reidpath (2020). Caesarean section rates from Malaysian tertiary hospitals using Robson's 10-group classification. BMC Pregnancy and Childbirth, 20(1). https://doi.org/10.1186/s12884-020-2760-2

Suganya, S., Rajamani, K., & Lakshmi Buvanesweri, S. (2024). Examining the influence of fashion on psychological well-being: Investigating the correlation between apparel selections, self-confidence, and mental health. IJRAR, 11(1).

World Health Organization (WHO). (2024). Body mass index (BMI). Retrieved from https://www.who.int/data/gho/data/themes/topics/topic-details/GHO/body-mass-index