

Development of Circumcision Sarong Pants for Circumcision Patient Comfort

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ABSTRACT

Background: Circumcision is a medical procedure that cuts off part of the foreskin from the penis. During the circumcision procedure, the lower body is exposed, causing discomfort during the circumcision process. The purpose of the study was to develop circumcision sarong pants that can provide comfort to circumcision patients.

Methods: This research method is Research and Development (R&D) to test the feasibility of circumcision sarong pants using five steps, namely (I) data collection, data taken through field observations and interviews, (II) product design, (III) design validation, using two surgical nursing expert validators, two circumcision practitioner expert validators, and two fashion expert validators, (IV) design revision, (V) trial, conducted on 6 circumcision patients of As-Salaam Pratama clinic.

Results: The result of this study is the feasibility of developing circumcision sarong pants that provide comfort to circumcision patients during circumcision procedures. Data were collected and then made a design that was assessed directly by the validators with an observation sheet containing four aspects of comfort, namely physical comfort, psychospiritual comfort, sociocultural comfort, and environmental comfort. The results of the assessment scores from two medical-surgical nursing expert validators 87% and 93%, two circumcision practitioner expert validators 90% and 97.5%, and two fashion expert validators 100% and 100%. The assessment from the validators received suggestions and made improvements and was tested on 6 circumcision patients with a percentage score of the results of the circumcision sarong pants trial, namely 96.67%, 98.3%, 98.3%, 96.67%, 95%, and 98.3% which means very good or feasible.

Conclusion: The conclusion of this research is the development of circumcision sarong pants that are considered very feasible to use to provide comfort for circumcision patients during the procedure.

Keywords: Circumcision Sarong Pants, Comfort, Circumcision

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Article History:

Submitted: 7 January 2025
Revised: 30 May 2025
Accepted: 4 June 2025
Published: 31 July 2025

DOI: 10.31436/ijcs.v8i2.423
ISSN: 2600-898X

INTRODUCTION

Circumcision is taken from the Latin *circumcidere*, circum means *circumference* and *caedere* means cutting, so circumcision is the act of cutting the foreskin which results in the release of the glans from the skin hood (1). Khitan in Arabic khatana which means cutting, al-khitanu means cutting the foreskin (skin) covering the tip of the penis. Khitan according to syar'iyah terms means cutting, removing the foreskin of a boy's penis so that all the pubic head is exposed (2). The foreskin is the skin that covers the head of the penis and looks like a pile of layers of skin. The pile of layers of skin usually becomes a gathering place for dirt so that it can cause unpleasant odors and even infections (3).

Circumcision has several benefits, namely it can prevent the risk of infectious diseases such as human papilloma virus (HPV), herpes genitalis, syphilis, diseases of the penile gland or prepuce such as lichen sclerosus. Circumcision can be considered quite effective in reducing the incidence of recurrent genital herpes and can prevent recurrence with the results of the NNT value of 2.7 (4). Research conducted by Selomo (2022) shows that circumcision can reduce the risk of human immunodeficiency virus (HIV) by about 60% and reduce the risk of syphilis infection in men (5).

In Indonesia, circumcision is performed by the total male population with a prevalence of 92.5% (6). In the Pratama As-Salaam clinic, 2222 boys were circumcised during 2022. Patients who will undergo circumcision experience signs and symptoms of discomfort. Disorders of comfort are feelings of lack of comfort, relief, and perfection in the physical, psychospiritual, environmental, and social dimensions (7).

Comfort theory was put forward by previous study in which this theory explains the condition of comfort has positive characteristics and is obtained from the help of nurses in some cases, so that it is an indicator of a change in the status of improving the patient's condition from the previous condition (8). Comfort is a holistic experience that includes physical, psychospiritual, environmental, and sociocultural comfort (9).

Comfort in product innovation relates to how the products can provide comfort to its users.

The comfort level is measured in four aspects, namely physical comfort, psychospiritual comfort, environmental comfort, and sociocultural comfort. Physical comfort relates to the comfort felt physically by users in using product innovation. Psychospiritual comfort relates to the comfort felt psychologically and spiritually in using product innovation. Environmental comfort relates to the impact of product innovation on the environment. Sociocultural comfort relates to the impact of the product on society. By paying attention to these four aspects of comfort, product innovation can be better designed so that it can provide positive experiences for users that are more enjoyable and satisfying.

Based on a preliminary study conducted by researchers for 3 months at the Pratama As-Salaam clinic, Banyumas, Central Java, Indonesia, it was found that patients did not receive facilities that covered their lower body during the circumcision procedure. Not covering the lower body of circumcision patients causes comfort problems.

The nurse in performing circumcision with delegated authority, means accepting the delegation of action along with the responsibility. Nurses will realize and be ready to take responsibility for the circumcision actions performed that lie entirely with themselves (10). This explains that the importance of SOPs in medical actions implicitly includes the need for adequate facilities to provide patient comfort.

This study assumed that one of the main factors of discomfort for circumcision patients is the opening of the lower body area during the procedure. Providing care by enhancing patient comfort will build trust between the patient and the healthcare professional¹¹. This assumption is important as psychological discomfort due to inconvenience can affect the overall patient experience. Therefore, product innovation in the form of circumcision sarong pants can be developed to address this issue and provide better comfort to circumcision patients. This study aims to design and develop product innovation in the form of circumcision pants sarong to provide optimal comfort by covering the lower body for patients during the procedure.

METHODS

Study Design

This study used a Research and Development (R&D) approach based on the main assumption that the discomfort of circumcision patients is not only caused by the pain of the procedure, but also by the opening of the lower body area which can be psychologically uncomfortable. This assumption was derived from initial observations as well as input from health practitioners.

The validity of this assumption is recognized to have limitations as it has not been quantitatively tested in a wider population, but it is considered to be strong enough as a basis for innovative product development. By explicitly conveying these assumptions, the research is expected to have greater transparency and be able to clarify the basis for the choice of methods and the expectations of the results achieved.

The Research and Development (R&D) method is based in the waterfall theory, which later modified by Sugiyono (2019) (12) into ten steps, namely (I) potential and problems, (II) data collection, (III) product design, (IV) design validation, (V) design revision, (VI) product trial, (VII) product revision, (VIII) usage trial, (IX) product revision, (X) mass product manufacturing (1). Researchers modified the 10 steps into 6 steps, steps (I) data collection, (II) product design, (III) design validation, (IV) design revision, (V) product trials, this was done to see whether or not the product developed was in accordance with the research objectives.

Step I

Researchers conducted data collection to find potential and problems that became material for product planning. Data collection techniques were carried out by field studies at the Pratamas As-Salaam Clinic, Banyumas, Central Java, Indonesia and literature studies related to the development of circumcision sarong pants. Searching for data in the field by conducting direct observations, interviews, and from articles or journals related to the design and materials used in the manufacture of circumcision sarong pants to achieve the comfort of circumcision patients. Direct observation was carried out for 3 months and interviews were conducted with 3 circumcision patients, circumcision practitioners, and 2

assistant circumcision practitioners of As-Salaam first clinic.

Step II

In step II, researchers designed the product to be developed. The data obtained in step I research was used to design and develop circumcision sarong pants that function to provide comfort to circumcision patients. The prototype design was made using the Paint application. The Paint application helps beginners or fashion designers in designing more detailed clothing, organizing patterns and drawing creative ideas according to imagination. The circumcision sarong pants were designed with one size.

Step III

Step III researchers validate the product design to assess and determine the advantages and disadvantages of the product developed using an observation sheet. The observation sheet covers four aspects of comfort, namely physical comfort, sociocultural comfort, psychospiritual comfort, and environmental comfort. Validation was carried out by two medical-surgical nursing expert validators, two circumcision practitioner expert validators, and two dressmaking expert validators. The data collected used qualitative data and quantitative data. Qualitative data is in the form of criticism and suggestions submitted to improve the product that has been made. Quantitative data was obtained from the results of the observation sheet using a Likert scale which has 5 alternative answers. The results of the observation sheet were analyzed using the Sudijono formula (2012)(13).

Step IV

Step IV researchers revise the design by improving the product that has received input by the validator so as to make the product better.

Step V

Step V conducts a trial of the product development of circumcision sarong pants. The research method uses a descriptive method to find out the description of the product that suits the needs. The research was conducted at As-Salaam Primary Clinic, Banyumas, Central Java, Indonesia. The subjects of this study were circumcision patients of As-Salaam Primary Clinic. The trial was conducted on 6 circumcision patients to see the feasibility of the circumcision sarong pants when used during

the circumcision procedure. The observation sheet used for experts is a different observation sheet according to the expertise of the experts. It was assessed using an observation sheet with a Likert scale that has 5 alternative answers. The results of the observation sheet were analyzed using the Sudijono formula (2012)(2).

ETHICAL CONSIDERATIONS

Ethical approval for this study was obtained from the Health Research Ethics Committee of Muhammadiyah Purwokerto University (KEPK-UMP), to uphold ethical standards, informed consent was obtained from all participants prior to their involvement, participants were given full knowledge of the purpose, procedures, and the right to withdraw without any repercussions. Confidentiality was maintained throughout the research process and safeguarded their personal information. These measures ensure adherence to ethical guidelines and strengthen the integrity of the study.

RESULTS

This study aims to develop circumcision sarong pants that provide comfort to circumcision patients during circumcision procedures.

Data Collection

Researchers collected data and found literature that made the creation of men's sarong pants from linen and cotton with three models that have different sling models in each model (3). The researcher modified the research by utilizing the potential of sarongs into circumcision sarong pants that function to provide comfort for circumcision patients.

Data collection to find existing problems by making direct observations with the results of the absence of facilities that provide comfort to the lower body of circumcision patients during circumcision procedures. In addition to direct observation, researchers conducted interviews with 3 circumcision patients, circumcision practitioners, and circumcision practitioner assistants.

"I felt uncomfortable because I had to open my pants during the procedure."

(P1)

"Apart from feeling scared, I also felt uncomfortable during the circumcision procedure, because my body parts were not covered with anything."

(P2)

"I felt cold during the circumcision procedure because my lower body was exposed, which made me uncomfortable."

(P3)

"During the circumcision procedure, circumcision patients are required to remove their lower garments to facilitate the procedure. In addition, during my time as a circumcision practitioner, there has been no facility that can cover the lower body without interfering with the procedure."

(Circumcision Practitioner)

"Every time I prepare circumcision patients for circumcision procedures, circumcision patients always complain of discomfort when asked to remove their lower garments. In the circumcision procedure, there is no product that can facilitate the discomfort of the opening of the circumcision patient's body parts. They often refuse to remove their lower garments, say they are uncomfortable, and say they are cold."

(Circumcision Assistant)

Product Development

The design of circumcision sarong pants is designed like a sarong, realized by using toyobo fabric. Circumcision sarong pants are designed with one size that can be used in various ages of children. When the circumcision sarong pants are used, the user will appear to be wearing a sarong when the sarong or cover cloth is glued on. The sarong or cover cloth can be opened or closed as needed. The sarong or adhesive is removed during the circumcision procedure. There is a hole in the genital area to facilitate the circumcision procedure, so the patient does not need to remove the sarong pants. The waist part has a rubber that can be adjusted to the size of the user's waist. Before being realized, the circumcision sarong pants were designed through the Paint application to produce a prototype. The prototype is used to help design the product to be developed with the initial design. The following picture of the prototype design of the circumcision sarong pants can be seen in **Figure 1**.

Design Validity

Design validity was conducted through aspects of physiological comfort, psychospiritual comfort, environmental comfort, and sociocultural comfort. The four aspects were validated directly by six validators consisting of two medical-surgical nursing expert validators, two circumcision practitioner expert validators, and two fashion expert validators who have experience in assessing product development. Surgical medical nursing experts are two lecturers of Surgical Medical Nursing Faculty of

Health Sciences, Universitas Muhammadiyah Purwokerto. Circumcision practitioner experts are two circumcision practitioners who have independent clinics with circumcision services. Fashion experts are two people who open independent sewing services. The assessment was carried out using an observation sheet with a Likert scale and a column for input or suggestions. The results of the experts' assessment can be seen in **Table 1**.

Figure 1: Design of Circumcision Sarong Pants

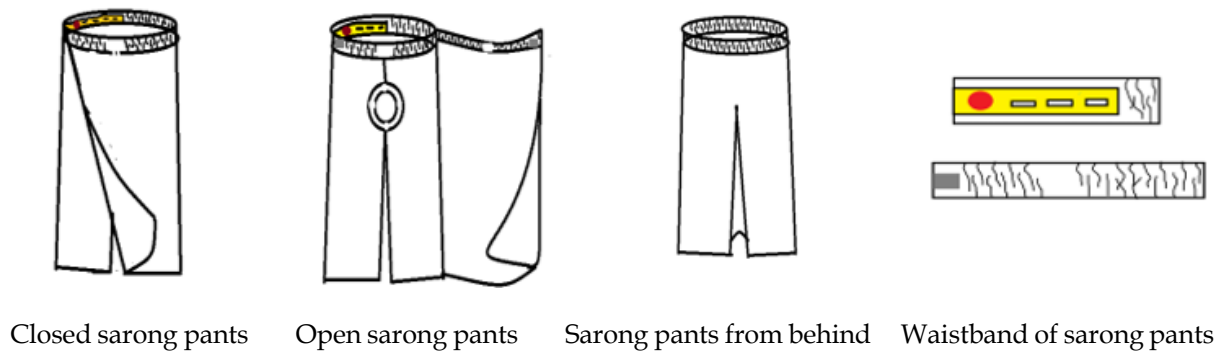


Table 1: Results of Expert Assessment

Expert Category	%	Interpretation
Medical Surgical Nursing 1	87	Very good
Medical Surgical Nursing 2	93	Very good
Circumcision Practitioner 1	90	Very good
Circumcision Practitioner 2	97.5	Very good
Dressmaking 1	100	Very good
Dressmaking 2	100	Very good

The Medical-Surgical Nursing Expert suggested using patterned fabric so that children are happy to use it and adjusting the design to the function of circumcision sarong pants, which is to provide comfort by maintaining the privacy of circumcision patients. The circumcision practitioner expert suggested that the bottom of the pants should be loosened and the motif should be adjusted to the target, which is children. The fashion expert gave advice by providing a strap on the fabric cover or sarong.

Product Revision

The design in accordance with the suggestions and input from experts is carried out so that the design becomes good and feasible to use. The final product of circumcision sarong pants can be seen in **Figure 2**.

The front view circumcision sarong pants with closed sarong is designed with a strap on the sling or sarong to adjust the waist of the pants. It has a motif that is suitable and preferred by boys. When the sarong or sash is opened, there is adhesive on the sash or sarong so that it can be opened and closed as needed. There is adhesive on the side of the genital opening which is used to glue the shell. On the batok there is adhesive that serves to glue the batok to the pants. The batok can be removed during the circumcision procedure and installed after the circumcision procedure is complete, so that circumcision patients do not need to remove their lower clothes during the circumcision procedure. On the waistband, the rubber can be adjusted to the user's waist.

Product Trial

The pilot test was conducted involving 6 circumcision patients of As-Salaam Primary Clinic, Banyumas, Central Java, Indonesia. The trial was conducted on male circumcision patients aged 7-13 years. The assessment was

conducted using an observation sheet that covers physiological comfort, sociocultural comfort, psychospiritual comfort, and environmental comfort. It has a maximum score of 60 with a 5 Likert scale assessment. The results of the trial assessment can be seen in **Table 2**.

Figure 2: Product Revision



Table 2: Product Trial

Participant	Age	Gender	Score result	Maximum Score	%
A1	11	Male	58	60	96.67
A2	10	Male	59	60	98.30
A3	8	Male	59	60	98.30
A4	8	Male	58	60	96.67
A5	9	Male	57	60	95.00
A6	11	Male	59	60	98.30

There were statements from 6 respondents, circumcision patients, circumcision practitioners, and circumcision practitioner assistants.

"I don't need to take off my pants during the circumcision procedure and only stick the shell after the circumcision procedure, this is very effective and comfortable."

(A6)

"Circumcision sarong pants, cool model and comfortable to use."

(A1)

"During my circumcision procedures, the circumcision sheath pants did not interfere with the circumcision procedure. The circumcision patient also feels more comfortable because there is no need to remove his lower garments."

(Circumcision Practitioner)

"Circumcision sheath pants provide comfort so there is no need to remove the lower garment during the circumcision procedure."

(A2)

"The model is nice and comfortable. I wasn't cold during the procedure."

(A3)

"As long as I prepare circumcision patients who have worn circumcision sarong pants, circumcision patients feel more comfortable and there are no complaints of cold or discomfort anymore."

(Circumcision Assistant)

"It is very comfortable to use, especially if you can use it after circumcision because there is already a shell."

(A4)

The results of the trial percentage stated that the scores of 6 respondents, namely 96.67%, 98.3%, 98.3%, 96.67%, 95%, and 98.3% were at 80% < A ≤ 100% which means very feasible. There were no suggestions from circumcision patients or their families. Direct statements submitted by circumcision patients stated that the circumcision sarong pants were very feasible to

"I will continue to wear this until the circumcision wound is dry, because it is comfortable to use."

(A5)

use and provided a sense of comfort to circumcision patients when undergoing circumcision procedures.

Based on the results of Visual Analog Scale (VAS) measurements on six respondents, the average comfort score was 8.63 with a standard

deviation of 0.38 (Table 3). This average value indicates that in general patients feel very comfortable during the procedure. Meanwhile, the relatively small standard deviation value indicates that the variability between respondents is low, meaning that the perception of comfort between patients is quite uniform.

Table 3: Comfort Score by Using VAS Score After Using the Product

Participant	VAS Score	Mean	SD
		8.63	0.38
A1	8.5		
A2	9.0		
A3	8.8		
A4	9.0		
A5	8.5		
A6	8.0		

DISCUSSION

Data Collection

The product development produced by researchers is circumcision sarong pants. The development of circumcision sarong pants was obtained from data collection with field studies to find potential and problems. Field studies were obtained from direct observation and interviews.

Interviews were conducted to find potentials and problems. From the results of interviews conducted on three circumcision patients, expert circumcision practitioners and assistants of circumcision practitioners showed that circumcision patients felt uncomfortable during the circumcision procedure because the lower part of the patient's body was exposed. Research conducted by previous study (15) shows that animated distraction can help focus the patient's attention on pleasant visual and sound stimuli so as to reduce the focus on pain or discomfort felt during medical procedures (4). the study implicitly explains that when children are distracted, they not only forget about physical pain, but also forget about the discomfort of having their bodies exposed in front of others.

In addition, circumcision practitioners and assistants often hear complaints from circumcision patients before the circumcision procedure is performed. In direct observation conducted in the field by researchers, it was found that there were no facilities that provided comfort to circumcision patients to overcome the problem of the discomfort of circumcision patients in the absence of underwear during the

circumcision procedure. Circumcision is a surgical procedure performed to remove all or part of the foreskin of the penis to keep the genital area clean and free from infection (5). Circumcision is a minor surgical procedure that uses infiltration anesthesia or local anesthesia (6). A minor surgical procedure, the application of a drape is a crucial part of aseptic technique to ensure the success and safety of the surgical procedure. The drape plays an important role in keeping the surgical area sterile by covering the entire surface around the surgical wound, thus preventing cross-contamination and reducing the risk of infection during the surgical process (7).

From these problems, the researcher found the potential that can be developed to overcome these problems. Observations of circumcision patients who come to the clinic wearing long pants and sarongs. This is corroborated by interviews conducted with circumcision patients that when going to perform circumcision, they will wear nice and neat clothes such as using a sturdy shirt and sarong or a set of sturdy clothes with long pants. In the interview, the circumcision practitioner mentioned that circumcision patients who come to the clinic wear sarongs and long pants. He believes that there is a need to develop products that can be worn by circumcision patients during circumcision procedures so that circumcision patients feel comfortable. In line with the opinion of previous study (19) that sarong is an Indonesian cultural fashion used to cover the lower body used in daily activities or at important events (8).

A researcher modified sarong pants with a variety of sling or sarong models using toyobo cotton fabric that is comfortable to use and does not cause irritation to the skin. The researcher modified the sarong pants into comfortable circumcision sarong pants used by circumcision patients that function to maintain the privacy of circumcision patients during circumcision procedures and help in accelerating the drying of circumcision wounds. In addition to maintaining the patient's privacy, the sarong pants functioned as a perlak so that the fabric used must have fast absorption. The circumcision sarong pants use toyobo cotton fabric. Cotton fabric has the ability to absorb faster (9).

Design

The design of the circumcision sarong pants is a pants that has a special hole in the genital area and there is a cover designed to look like a sarong. The hole in the genital area serves to facilitate the circumcision procedure. The size of the genital hole is 10 cm in diameter so that it does not interfere with the circumcision procedure. The cover or sarong can be closed and opened as needed by gluing the ends and center of the waist band. The waist band can be adjusted to the wearer's waist by pulling the band and locking it. When the circumcision procedure begins, the cover cloth or sarong can be opened and moved to the back and then glued to the ends so that it does not interfere with the circumcision procedure so that the circumcision patient does not need to remove his lower clothes and still feels comfortable during the circumcision procedure.

Design Validation

The validity test was conducted to assess the validity of a product. The assessment covers four aspects, namely physiological comfort, psychospiritual comfort, sociocultural comfort, and environmental comfort. Validation was carried out by validators from two medical-surgical nursing expert validators, two circumcision practitioner expert validators, and two fashion expert validators.

The percentage result from the surgical medical nursing expert validator 1 was 87%, with the suggestion that the circumcision sarong pants must be adjusted to its main function. Surgical

nursing expert validator 2 rated the circumcision sarong pants with a percentage of 93%, suggesting that the sarong pants should have a motif that suits the interests of boys. Circumcision practitioner expert validator 1 rated the circumcision sarong pants with a percentage of 90%, suggesting that the motif and color of the circumcision sarong pants could be more tailored for boys. Circumcision practitioner expert validator 2 rated the circumcision sarong pants with a percentage of 97.5%. By providing input that the pants are more loosened to make it easier for circumcision patients to use. Fashion expert validator 1 rated the circumcision sarong pants with a percentage of 100%, suggesting that a strap be added to the sarong cover so that the sarong can be adjusted to the user's waist. Fashion expert validator 2 rated the circumcision sarong pants with a percentage of 100% without providing input and suggestions. The design validation that has been carried out by the six validators is included in the very feasible criteria. This is evidenced by the validator's assessment in the category $80\% < A \leq 100\%$ which means very comfortable.

Product design involves various elements such as shape, color, material, ergonomics, and the technology used, all of which aim to create an attractive and functional product. In addition, product design focuses not only on the aesthetic aspect but also on the function and user comfort of the product by the consumer (10).

Product Revision

Input and suggestions by experts were used by researchers to make the circumcision sarong pants better and more comfortable to use by circumcision patients. The improvement of the circumcision sarong pants is the addition of a shell that can be glued and removed. Circumcision sarong pants are worn by circumcision patients before the circumcision procedure. After the circumcision procedure is completed, to overcome the removal of pants and input from surgical nursing experts regarding the function of circumcision sarong pants, a shell that can be glued to the genital opening is added to protect the circumcision wound from friction. There is adhesive on the shell and the genital opening area so that the shell can be removed and installed as needed. The attachment of the batok makes it easier for

the circumcision patient not to take off the pants again so that the patient still feels comfortable.

The choice of fabric in the development of circumcision sarong pants is tailored to the interests of users, namely boys. Researchers chose fabrics with puppet motifs or other images in dark colors. This is supported by the fact that the look and feel of clothing is often the target of unattractive comments. Product design not only affects consumer comfort but is related to the creation of visual appeal that affects preference for a product (11). Good product design not only pays attention to aesthetic aspects, but also user comfort.

Improvement of the size of the circumcision sarong pants is adjusted to the function and comfort of the circumcision patient. The bottom of the pants is widened by 2 cm. Improvements were made to the sarong or cover cloth in the form of providing a retractable strap that adjusts the user's waist. The cover cloth or sarong is glued back from the front to cover the shell so that the circumcision patient appears to be wearing a sarong which is actually pants.

Product Trial

The last stage of this research was the pilot test of the development of circumcision sarong pants. The trial was conducted at As-Salaam Primary Clinic, Banyumas, Central Java, Indonesia. Circumcision sarong pants were tested on 6 circumcision patients with different ages. The percentage results of the trial were 96.67%, 98.3%, 98.3%, 96.67%, 95%, and 98.3% which means it is very feasible to use. The percentage falls into the category of $80% < A \leq 100%$ which means very comfortable. Circumcision patients feel comfortable during the circumcision procedure. The attractive and culturally appropriate design attracts circumcision patients to use circumcision sarong pants. In line with research conducted by previous study (23), there are 4 main characteristics of clothing standards expected by patients, namely: i) ease of use to secure, ii) privacy preservation, iii) accessibility of health care providers for physical examinations and health care interventions, iv) ease of wearing clothes, v) ease of wearing clothes, and vi) ease of wearing clothes (12).

Nurses emphasized the importance of distraction techniques, empathetic presence, family involvement, and spiritual support in alleviating patient discomfort and improving overall comfort during painful procedures (13). Cultural background and personal values shape comfort preferences. Medical staff should respect cultural differences and provide personalized care to enhance patient comfort (14).

CONCLUSION

This development research produced circumcision sarong pants that can be used by circumcision patients when undergoing circumcision procedures. Based on the results of the assessment from experts, the development of circumcision sarong pants is included in the very good category for use in circumcision patients during circumcision procedures and after circumcision. This design has gone through the stages of identifying user needs, prototyping, expert validation, design revision, and field trials, all of which showed positive results and high levels of satisfaction from users and practitioners. However, to ensure the effectiveness and feasibility of the product more generally, further testing is needed involving a larger, more diverse sample, and in various locations. This is important so that the research results can be generalized and widely applied in various health services.

Implications for Healthcare Professionals

For circumcision practitioners and circumcision practitioner assistants, this study is useful in the form of providing post-circumcision comfort and protection. For circumcision practitioners, the recommendation of circumcision sarong pants has several important implications in terms of medical, patient comfort, and business aspects.

The medical implication of the circumcision glove pants is that the circumcision glove pants have a loose space on the front in the form of a shell that can reduce friction or direct pressure on the wound and accelerate healing. Circumcision gown pants can lower the risk of infection as they have a design that allows for better air circulation and minimizes contact with rough fabrics, thus reducing moisture and irritation. Circumcision glove pants help the

patient's mobility because of the loose design and the presence of the shell, the child is more free to move without fear of being exposed to the wound, reducing post-circumcision trauma.

The implication for patient comfort is to increase patient and parent satisfaction by providing circumcision sarong pants as part of the service or facility package. Circumcision sarong pants reduce post-circumcision complications due to friction or infection.

The business implications of circumcision sarong pants can add additional business opportunities by making circumcision packages plus circumcision patient comfort equipment during the circumcision procedure until post-circumcision. It can improve the professional image by educating patients and parents about the importance of providing comfort to circumcision patients.

Benefits for Circumcision Patient

For circumcision patients, this study provides comfort to circumcision patients during the circumcision procedure. The circumcision sarong pants are loosely designed and made using toyobo cotton fabric which is soft, comfortable, and not hot. The loose design makes it easier for the circumcision patient to mobilize so that the circumcision patient can move freely. The loose genital opening and the presence of a shell that can be glued and removed as needed. The shell is removed during the circumcision sarong pants procedure, so that the circumcision patient does not need to remove his/her lower garments. Once the circumcision procedure is complete, the shell only needs to be glued and covered with a cover cloth or sarong. From the preparation to the completion of the circumcision procedure, the circumcision patient does not need to remove his/her lower garments and remains comfortable during the circumcision procedure. In addition, circumcision sarong pants can be used after the circumcision procedure because they are practical and can speed up the healing process because there is no direct friction from clothing and there is good air circulation.

Future Directions

Future research should focus more on improving the quality and quantity of publications in the development of circumcision sarong pants for the comfort of circumcision patients. Researchers can improve the quality of various motifs of circumcision sarong pants to attract male circumcision patients who are interested in using them. In addition, the increase in publications can be done to promote circumcision sarong pants products that are useful for circumcision patients, in the promotion can cooperate with health care facilities that have circumcision services. The greater the use of circumcision sarong pants, the greater the benefits provided by circumcision sarong pants for circumcision patients in providing comfort during circumcision procedures.

LIMITATIONS

This study has some limitations that should be acknowledged.

1. **Small Sample Size:** This research was only tested on 6 respondents who focused on aspects of comfort and practical functions so that the evaluation results could not be generalized to a wider population.
2. **Design:** the printing on circumcision sarong pants should be tailored to boys' interests. The limited choice of printing does not represent the broader visual preferences of children. The printing has not been fully adapted to the age characteristics of children.
3. **Sizing:** the study used only one size. The limitations of inappropriate sizing can affect the comfort and effectiveness of the circumcision sarong pants.

CONFLICT OF INTEREST

The authors acknowledge that publishing this paper has no conflict of interest.

FUNDINGS

The research received no funding.

ACKNOWLEDGEMENTS

Thank you to all the experts who generously shared their experiences and insights. Thank you to all participants who have generously taken the time to contribute to this study.

AUTHOR CONTRIBUTIONS

NRW: Responsible for research design, data collection, statistical analysis, and writing research reports. Students also prepare presentations of research results and play an active role in research discussions.

HDA: Guidance in designing research methodology, selecting topics, and providing academic direction throughout the research process. The supervisor also plays a role in writing the report and final revisions, as well as providing important input in the interpretation of research results.

JS: Evaluating the quality of research, providing constructive criticism, and taking part in oral exams to test students' understanding of the research that has been conducted.

MHPA: Provide input regarding methodological strength and quality of data analysis, as well as assess overall research results. The examining lecturer also plays a role in providing the final assessment of this research.

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