

## Developing Menstrual Pain Relief Underwear (CEDARRIS) for the Comfort of Menstruating Women

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### ARTICLE INFO

#### Article history:

DOI:

[10.30595/pshms.v5i.988](https://doi.org/10.30595/pshms.v5i.988)

Submitted:

Oct 13, 2023

Accepted:

Feb 25, 2024

Published:

Mar 20, 2024

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#### Keywords:

Underwear, Dysmenorrhea, Comfort

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### ABSTRACT

*Background: Menstrual pain or dysmenorrhea often disrupts women's physical comfort. Interventions are needed to alleviate dysmenorrhea by designing special underwear for menstrual pain relief, aiming to reduce menstrual pain and enhance the comfort of menstruating women. Method: This research employed the Research and Development (RD) methodology, comprising ten stages: Stage I (problem potential), Stage II (data collection), Stage III (product design), Stage IV (design validation), Stage V (product revision), Stage VI (product trial), Stage VII (product revision), Stage VIII (wearability trial), Stage IX (product revision), and Stage X (mass production). Due to time constraints, the researcher has condensed the stages into 6 steps. Respective experts conducted product trials. Wearability trials involved sixth-semester nursing students at the Faculty of Health Sciences, Universitas Muhammadiyah Purwokerto. Results: : The clothing expert scored 47 and 46 in the expert development test, signifying "very feasible." The maternal health expert scored 43, indicating "very feasible," and the medical physicist expert scored 45, indicating "very feasible." Conclusion: CEDARRIS is suitable for the comfort of menstruating women.*

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### 1. INTRODUCTION

Menstruation is bleeding that occurs periodically from the uterus which occurs every month and throughout a woman's active reproductive life [1]. One of the health problems that can occur in adolescent reproduction during menstruation is dysmenorrhea or menstrual pain [2]. Dysmenorrhea is lower abdominal pain that occurs before menstruation, usually lasting 2 to 3 days from the day before menstruation [3]. Dysmenorrhea is divided into two types, namely primary dysmenorrhea and secondary dysmenorrhea. Dysmenorrhea is common in women aged around 20 to 25 years, and occurs in up to 91% of women who are single[4].

According to the World Health Organization (WHO) in 2020, as many as 1,769,425 (90%) women experienced dysmenorrhoea and 10-16% experienced severe dysmenorrhoea. The incidence of dysmenorrhea in the world is very high. On average, more than 50% of women experience dysmenorrhea [5]. Menstrual pain is caused by irregular uterine or uterine contractions, abnormal uterine function, resulting in ischemia which is also caused by lower abdominal pain, resulting in increased prostaglandin production in the endometrium [6].

Menstrual pain can interfere with the comfort of daily physical activity. Comfort interventions based on the implementation of the Kolcaba comfort model have proven to be effective in providing comfort to patients. Based on Kolcaba's taxonomy of comfort, pain in women with dysmenorrhea is included in physical comfort disorders. Physical discomfort due to dysmenorrhea can be treated in pharmacological and non-pharmacological ways [7]. Non-pharmacological techniques include administering analgesic drugs such as Ibuprofen, Mefenamic Acid, Aspirin and administering Nonsteroidal Anti-Inflammatory drugs (NSAIDs) [8].

One of the non-pharmacological techniques that can relieve pain is warm compresses. This research is in line with research by Handayani et al (2022) regarding the effect of giving Warm Water Zak (WWZ) warm compress therapy on reducing menstrual pain, the results showed that warm compresses can reduce pain [9], as well as research by Shifa et al (2021) on the effect of warm compresses on reducing the intensity of dysmenorrhoea in young women at Madrasah Aliyah DDI Mangkoso, Barru Regency and the results were effective in reducing pain [10].

According to other research, namely that conducted by Liau et al (2012) regarding non-pharmacological techniques to reduce pain, namely about Electric Warm Corsets for Menstrual Pain Sufferers and the results can reduce pain, but in this study it did not examine whether Electric Warm Corsets are comfortable and safe when used by women with dysmenorrhea. This study aims to develop and test dysmenorrhoea pain relief underwear for the comfort of menstruating women as an intervention to reduce dysmenorrhoea pain in women [11].

## 2. RESEARCH METHOD

This development research method is the R&D (research and development) method using 10 stages developed by Borg and Gall, but because of limited time and funds, this research is modified into 6 stages. The six stages used are I (Potential Problems), Phase II (Data Collection), Phase III (Product Design), Phase IV (Design Validation), Phase V (Product Revision), Phase VI (Product Test). This research was conducted at the University of Muhammadiyah Purwokerto in October - July. Data collection was carried out in March - June. The respondents used for trials were 6 nursing students who experienced dysmenorrhoea pain. Ethics Research Code in this study is KEPK/UMP/34/II/2023.

## 3. RESULT AND DISCUSSIONS

### 3.1. Potential Problems

The first stage in this development research is the potential and problem stage by observing. The problem found in this stage is how menstrual women who experience dysmenorrhea deal with menstrual pain using a warm compress technique using a jar. Based on the results of observations, the potential in this study is the development of dysmenorrhoea pain relief panties with warm compresses using warm jars

### 3.2. Data Collection

Literature studies were obtained from several development journals, namely research by Yuliana and Aprilina (2022) on CENAME (Menstrual Pants) [12], Mei and Aryani (2022) on Electric Warm Corsets for Menstrual Pain Sufferers [13], and Setianingsih et al (2020) on Underwear Innovations for Sufferers Hemorrhoid [14].

### 3.3. Product Design

The materials needed in the development of dysmenorrhoea pain relief panties are lycra and warm bladder. Lycra material is light elastic, comfortable and has pores so it is cool when used, follows the curves of the wearer's body so it is often used for women's clothing [15]. Warm bladder as a pain reliever for dysmenorrhea is made from sodium acetate dissolved in a solution which crystallizes to release energy in the form of heat. These bulbs are often used for hand warmers because they release heat when they crystallize [16].

### 3.4. Design Validation

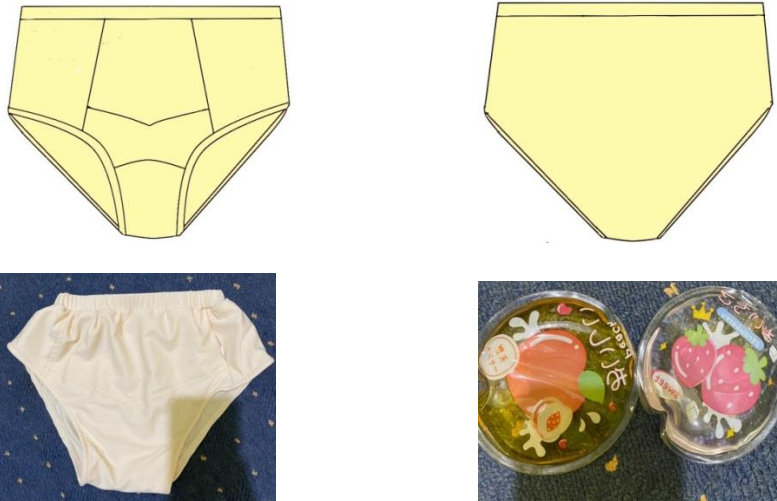
The design of dysmenorrhoea relief underwear was assessed by fashion experts, maternity health experts and medical physicists. The fashion expert is one of the Fashion Design Teachers at SMK 3 Purwokerto and the owner of underwear production in Purwokerto. Maternity health expert is one of the Maternity Nursing Lecturers at the Faculty of Health Sciences, Muhammadiyah University, Purwokerto. A medical physicist is one of the Radiology Nurses at the Banyumas Regional General Hospital. The results of the experts' assessments can be seen in.

Table 1. Results of Expert Assessments

Expert	Total Score	Category
Fashion Expert	47	Very Feasible
Owner Underwear	46	Very Feasible
Maternity Health Expert	43	Very Feasible

### 3.5. Product Revision

The design draft was revised according to suggestions from experts. The fashion designer gave advice, namely changing the underwear material which originally used cotton combed 32 to lycra material and the size of the underwear that needed to be adjusted. Apart from that, the maternity health expert also gave advice, namely that the front pocket is adjusted to the size of the jar so that it does not shift when used.



### 3.6. Product Trial

The trial was carried out by 7th semester nursing students who experienced menstrual pain. The trial was carried out at the Purwokerto Muhammadiyah Faculty of Health Sciences. The results of the trial assessment can be seen in the following table:

Table 2. Product Trial

Respondents	Total Score	Category
1	44	Comfortable
2	43	Comfortable
3	46	Comfortable
4	44	Comfortable
5	44	Comfortable
6	42	Comfortable

The result of testing the comfort level of dysmenorrhea pain relief underwear products. The assessment showed that 6 respondents answered that they were comfortable wearing dysmenorrhea pain relief underwear for menstruating women.

Dysmenorrhea pain is pain that is felt during the menstrual cycle in the lower abdomen [17]. Dysmenorrhea pain is divided into two, namely primary and secondary dysmenorrhea. Primary dysmenorrhea is menstrual pain that is commonly felt by women when experiencing menstruation without any abnormalities in the reproductive organs. Secondary dysmenorrhea is menstrual pain that occurs due to gynecological disorders, for example endometriosis, fibroids, adenomyosis [18].

There are two ways to treat dysmenorrhea, namely pharmacological and non-pharmacological. Pharmacological therapy can be done by consuming non-steroidal anti-inflammatory drugs (NSAIDs), while non-pharmacological therapy can be done by consuming honey, acupressure, warm compresses [19].

A warm compress is an intervention that can be given to women who experience menstrual pain by using a tool that creates warmth in the parts of the body that need it. The principle of a warm compress is the transfer of heat by conduction, by placing a hot bottle covered with cloth over the symphysis it can increase blood circulation and reduce muscle tension so that dysmenorrhoea pain is reduced [20].

This research is strengthened by research by Siregar et al (2021) which states that warm compresses using a bladder are effective in reducing dysmenorrhoea pain in menstruating women. The bladder commonly used to relieve dysmenorrhoea pain is a hot water bag made of rubber which can deliver heat [21].

In this research, the bladder used to relieve dysmenorrhoea pain uses a material made from sodium acetate dissolved in a solution that crystallizes and releases energy in the form of heat. In line with research by Zheng (2019), when sodium acetate solution is below the melting point and is hit by a solid object, it will crystallize and release heat, which is called an esothermic process, so sodium acetate is often used for hand warmers because it releases heat by crystallizing [16].

The jar that will be used to relieve pain is put into the pocket of the dysmenorrhea pain relief underwear. These dysmenorrhea pain relief panties are specifically designed to store the bladder so that the bladder can conduct heat optimally so as to reduce dysmenorrhea pain.

The selection of the type of material used to make dysmenorrhea pain relief underwear is based on women's functionality so that it can make users more comfortable when using dysmenorrheal pain relief underwear. Dysmenorrhea relief panties are made of lycra or spandex which are comfortable to use as underpants. In line with research by Setyawan et al (2021), lycra material is light, comfortable and has pores so it is cool when used, follows the curves of the wearer's body so it is often used for women's clothing [15]. The use of lycra or spandex material in dysmenorrhoea pain relief underwear products, apart from elastic material, is also to overcome genetic health problems such as irritation problems because they are resistant to alkaline acid or sweat. The size of dysmenorrhea pain relief underwear is made according to women's needs [12].

#### 4. CONCLUSION AND RECOMMENDATION

This development research produces dysmenorrhea pain relief underwear to relieve pain in women who are experiencing dysmenorrhea. Based on the results of expert assessments, the development of dysmenorrhoea pain relief underwear is suitable for use for women who experience dysmenorrhoea pain. Suggestions for future researchers are to determine the type of bladder to relieve dysmenorrhea pain with a temperature that remains stable so that it can continue to be used.

#### Acknowledgements

The researcher would like to thank the Faculty of Health Sciences, Muhammadiyah University, Purwokerto, which has given me the opportunity to conduct research and to the respondents who have taken the time to take part in my research.

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