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The Effectiveness Of TENS (Transcutaneous Electrical Nerve Stimulation) With Semi-Fowler's And Sims Position Against Dysmenorrhea In Adolescents

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Abstract

Background: Based on the East Java Province Survei Kesehatan Reproduksi Remaja (SKRR) (SKRR) data in 2021 the incidence of primary dysmenorrhea was 90.25% and secondary dysmenorrhea as much as 9.75%. Various attempts have been made to reduce dysmenorrhea such as acupressure, breathing relaxation techniques and using warm compresses. This still cannot reduce dysmenorrhea to the fullest. **Aim:** to determine the effectiveness of TENS with semi-Fowler's position and Sims' position to reduce menstrual pain in adolescents. **Method:** using a quasi-experimental with a comparative study type of research, namely comparing the level of menstrual pain in adolescents who are given TENS with the semi-Fowler's position and the Sims position. The population is 85 adolescents who experience dysmenorrhea, using simple random sampling so that a sample of 80 people is obtained. The research instrument used TENS with 4 electrodes as a tool to reduce menstrual pain and the NRS questionnaire to determine the level of menstrual pain. **Result:** In the Sims position, none of the respondents felt no pain at all, but in the semi-Fowler's position 5% of respondents said they did not experience pain. Statistical results with the Mann Whitney test also showed that there was a difference in the decrease in menstrual pain in respondents who were given TENS therapy in Sims position and semi-Fowler's position with $p = 0.045$ ($p < 0.05$). **Conclusion:** The use of TENS can be recommended to reduce primary dysmenorrhea. TENS therapy in the semi-Fowler's position is more recommended than the Sims position because the respondent can freely take deep breaths and is more optimal in reducing dysmenorrhea.

Keywords: TENS, Dysmenorrhea, Sims position, semi fowler position

1. Introduction

Dysmenorrhea is abdominal pain that comes from uterine cramps that occur during menstruation. The pain occurs with the onset of menstruation and lasts several hours to several days until it reaches the peak of the pain. Dysmenorrhea is divided into primary and secondary dysmenorrhea. Primary dysmenorrhea is menstrual pain that is not based on a pathological condition, while secondary dysmenorrhea is menstrual pain that is based on a pathological condition such as the discovery of endometriosis or ovarian cysts. The initial onset of primary dysmenorrhea usually occurs within 6 to 12 months after menarche with a duration of pain generally 8 to 72 hours. Primary dysmenorrhea is related to uterine muscle contractions (myometrium) and prostaglandin secretion, while secondary dysmenorrhea is caused by pathological problems in the pelvic cavity (Larasati, T. A. & Alatas, 2016)

Based on the World Health Organization (WHO) the number of dysmenorrhea in the world is very large, on average more than 50% of women in every country experience dysmenorrhea. In Sweden about 72%. In the United States it is estimated that nearly 90% of women experience dysmenorrhea, and 10-15% of them experience severe dysmenorrhea, which causes them to be unable to carry out any activities (Lail, 2019). Whereas in Indonesia the incidence of dysmenorrhea is 64.25% consisting of 54.89% primary dysmenorrhea and 9.36% secondary dysmenorrhea (Tsamara et al., 2020). Based on the East Java Province Survei Kesehatan Reproduksi Remaja (SKRR) data in 2021, around 4,653 adolescents were found to have dysmenorrhea. The incidence of primary dysmenorrhea was 4,297 (90.25%) and 365 people (9.75%) experienced secondary dysmenorrhea (Meinawati & Malatuzzulfa2, 2021)

Many factors cause a teenager to experience dysmenorrhea. Based on a study conducted on 374 female students, there was a significant relationship between sleep quality, exposure to cigarette smoke, fast food consumption, and family history with the incidence of primary dysmenorrhea in female students (Yang et al., 2021). Doing sports is also a factor in the occurrence of dysmenorrhea in adolescents, while the duration of menstruation is not a factor in the occurrence of primary dysmenorrhea (Ade, 2019).

Dysmenorrhea has a negative impact on adolescents, especially adolescents who are still active in the learning process. The optimal learning process is influenced by physical health. Students who experience primary dysmenorrhea feel pain as an unpleasant feeling that allows the disruption of learning activities (Putra et al., 2020). The state of menstruation affects the Hb level of a student as well as the motivation to study. If the student has a low Hb level, she will be weak, tired and often sleepy and she will even lose her enthusiasm for learning. Disrupted learning activities will affect learning achievement (Rahayu, 2017).

Various attempts have been made to reduce dysmenorrhea experienced by adolescents. Some things that can be done are stomach massage with essential oils, warm compresses, consuming turmeric, exercising, drinking lots of water (Adiyatma, 2023). Other research states that pain can be overcome by massage on acupuncture points. Menstrual pain (dysmenorrhea) after massage at the Guanyuan (RN 4) and Qihai (RN6) acupuncture points, more than half (71%) of respondents experienced mild menstrual pain (dysmenorrhea). Massage can make the body relax and can divert the respondent's mind from the pain that is felt (Afiyah & Umamah, 2019).

Other efforts using more sophisticated tools can also be used to reduce menstrual pain (dysmenorrhea), one of which is using TENS (Transcutaneous Electrical Nerve Stimulation). Transcutaneous electrical nerve stimulation (TENS) is a non-pharmacological intervention that activates complex neural networks to reduce pain by activating the descending inhibitory system in the central nervous system to reduce hyperalgesia (Vance et al., 2014). This tool works by stimulating type α β nerve fibers which can reduce pain. The mechanism of action is thought to be through 'closing the gate' of pain transmission from the small nerve fibers by stimulating the large nerve fibers, then the large nerve fibers will close the pain message pathways to the brain and increase blood flow to the painful area and TENS also stimulates the body's natural anti-pain production, namely endorphins (Nuach, Widyawati, & Hidayati, 2014).

The stimulus process through the skin supports working to reduce pain by closing the pain transmission gate. It is hoped that with TENS the results of more effective pain management will be obtained in adolescents with dysmenorrhoea at the Tahfidzul Qur'an Islamic Boarding School Shohihuddin Sidosermo Wonocolo Surabaya.

2. Materials and methods

2.1 Materials

The design of this study used a quasi-experimental with a comparative study type of research, namely comparing the level of menstrual pain in adolescents who were given TENS with the semi-Fowler's position and the sims position. The independent variable of TENS therapy was in semi-Fowler's and sims positions, while the dependent variable was dysmenorrhoea pain in adolescents who were given TENS. The research instrument used TENS with 4 pads as a tool to reduce menstrual pain and a questionnaire to determine the level of menstrual pain. The inclusion criteria were adolescents who experienced primary dysmenorrhea and menstruation on the first to second day. While the exclusion criteria included adolescents who were sick and took analgesic when they had dysmenorrhea

2.2 Data collection procedures

The research was conducted at the Tahfidzul Qur'an Islamic Boarding School, Shohihuddin Sidosermo Wonocolo, Surabaya at Mei until Juli 2023. The population is 85 adolescents who experience dysmenorrhea, using simple random sampling so that a sample of 80 people is obtained.

The research procedure begins with submitting an application for a research permit to the Nahdlatul Ulama University Surabaya LPPM to address Tahfidzul Qur'an Shohihuddin Sidosermo Wonocolo Surabaya. After obtaining permission, the researcher immediately coordinated and approached the board of the Islamic Boarding School. During the implementation of the research, the researcher gave informed consent regarding the willingness of the respondents as research objects. The researcher gave the NRS questionnaire before being treated with TENS. Researchers gave TENS therapy to respondents who experienced dysmenorrhea with 2 groups, namely the TENS group in sims position and the TENS group in semi-Fowler's position. Then the researchers gave the NRS (Numeral Rating Scale) questionnaire to the respondents after being treated with TENS

TENS therapy procedures:

- a. Apply gel to the electrode pad.
- b. Put the electrode pad on the supra pubis.
- c. Set the frequency with a frequency of 80 - 100 Hz.
- d. Give TENS therapy for 30 minutes.
- e. Ask if therapy is comfortable or painful.
- f. After 30 minutes, remove the electrode pads from the patient.
- g. Clean the gel on the skin with a tissue.

h. Tidy up the tools that have been used

2.3 Data analysis

Data obtained directly/primary data, data collection is done by filling in the observation sheet and recapitulating it. The data that has been collected was analyzed to find out the difference between the TENS therapy variables with sims position and semi-Fowler's position with the dysmenorrhea pain level variable. The data were processed, the first by using the Wilcoxon test to identify the effectiveness of TENS in sims and semi-Fowler's positions on reducing dysmenorrhea pain levels, and the second by using the Man Whitney test (to determine differences in the effectiveness of TENS therapy in sims and semi-Fowler's positions on reducing dysmenorrheal pain.

3. Results and discussion

3.1 Description of Respondent Characteristics

In this study, respondents were included in the age range of teenagers. Early adolescence 11-13 years, middle adolescence 14-16 years, late adolescence 17-20 years.

Table 1. Frequency Distribution by Age at Tahfidzul Qur'an Islamic Boarding School Shohihuddin Sidosermo Wonocolo

No	Age	Frequency	Percentage (%)
1.	Early adolescence (11-13 years old)	0	-
2.	middle adolescence (14-16 years old)	24	30
3.	late adolescence (17-20 years old)	56	70
Total		80	100,0

Based on the table it can be seen that the majority (70%) are in the late adolescent stage. In terms of thinking skills, late-stage adolescents have been able to view problems comprehensively with an intellectual identity already formed. Meanwhile, the relationship with their peer group began to decrease in terms of interests in the form of individual friendships. They began to test the relationship between a man and a woman for the possibility of a permanent relationship. In the late adolescent stage (17-20 years) reproductive structure and growth are almost complete and adolescents are physically mature. Adolescents at this stage are already experiencing menstruation regularly, while adolescents in the early stages usually experience menarche.

Menarche is the first menstruation in a woman. This is an important milestone that marks the beginning of a woman's fertile period. Characteristics based on the age of first menstruation or menarche according to Marmi (Marmi, 2013) are early menarche (<11 years), normal menarche (11-13 years), late menarche (> 13 years).

Table 2. Frequency Distribution Based on Menarche Age at Tahfidzul Qur'an Islamic Boarding School Shohihuddin Sidosermo Wonocolo

No	Age of menarche	Frequency	Percentage (%)
1.	Early Menarche (<11 years old)	0	0
2.	Normal Menarche (11-13 years old)	80	100
3.	Late Menarche (> 13 years old)	0	0
Total		80	100,0

Based on the data above, all respondents (100%) experienced normal menarche, namely menarche in the age range of 11-13 years old. The incidence of menarche is influenced by factors which include nutritional status, genetics, food consumption, socio-economic, exposure to adult mass media (pornography), and lifestyle. The cause of early menstruation is caused by audiovisual stimulation, both from conversations and viewing from films or the internet labeled as adult, vulgar, or indulgence in sensuality. Stimulation from the ears and eyes then stimulates the reproductive system and genitalia to mature more quickly. Even this audiovisual

stimulation is a major factor causing early menstruation. All respondents are female students who are in Islamic boarding schools with strict supervision, so that no female students experience early menarche.

According to Aprilia (2021) the age of menarche is a cause of dysmenorrhea, the results of his research show that there is a relationship between the age of menarche and the incidence of dysmenorrhea in young women with $p=0.003$. The age at which girls start menstruating varies greatly. The current trend is for children to have their first menstruation at a young age. When they were 12 years old, they had their first menstruation, but there were also those who were 8 years old and had their first menstruation. The age to reach the menarche phase is influenced by many factors, including: nutrition, social, economic, and so on (Aprilla et al., 2021)

According to Sarwono (2011) menstruation is said to be normal if you get normal menstrual duration if it lasts 3-7 days. The following is a distribution table for the frequency of menstrual periods.

Table 3. Frequency Distribution Based on Menstrual Period at Tahfidzul Qur'an Islamic Boarding School Shohihuddin Sidosermo Wonocolo

No	Duration of Menstruation	Frequency	Percentage (%)
1.	Normal	30	37,5
2.	Abnormal	50	62,5
Total		80	100

Based on the table above, most of the respondents (62.5%) experienced menstrual abnormalities, namely the duration of menstruation exceeding 7 days. This happens because many factors affect the duration of menstruation, which can originate from the uterus in the form of uterine myomas, benign tumors of the uterine muscle, infection of the uterus or endometrial hyperplasia (thickening of the lining of the uterus) and can also be caused by abnormalities outside the uterus such as blood disorders such as anemia, blood clotting disorders, and can also be caused by hormonal disorders or endocrine disorders.

Women with longer menstrual periods can increase the incidence of primary dysmenorrhea. Women with long menstrual periods, large amounts of bleeding and irregular menstrual cycles are at risk for dysmenorrhea. The longer the menstrual period, the longer the uterus contracts so that more prostaglandins are produced which can eventually cause pain and continuous uterine contractions can cause uterine blood supply to stop or decrease resulting in dysmenorrhea (Kusniyanto & Suiyarti, 2019)

Dysmenorrhea is classified into two types, namely primary dysmenorrhea and secondary dysmenorrhea (Aprilla et al., 2021). Menstrual pain (dysmenorrhoea) is classified into 4 categories: no pain, mild pain, moderate pain and severe pain. The following is a table of the frequency distribution of dysmenorrhoea in adolescent

Table 4. Frequency Distribution Based on Disminorea at Tahfidzul Qur'an Islamic Boarding School Shohihuddin Sidosermo Wonocolo

No	Pain scale	Frequency	Percentage (%)
1.	No pain	0	0
2.	Mild pain	10	12,5
3.	Moderate pain	50	62,5
4.	Severe pain	20	25
Total		80	100

Based on the table, it can be seen that the majority (62.5%) of adolescents experience dysmenorrhea with a moderate level of pain. Dysmenorrhoea with a moderate level of pain does not need special treatment or doctor's action. To reduce pain, non-pharmacological therapy can be used. Dysmenorrhea is one of the most common complaints in young women who come to health services or to midwives. The average woman experiences discomfort

during menstruation, such as cramps and usually also with nausea and dizziness, sometimes fainting (Aprilla et al., 2021).

The pathogenesis of dysmenorrhea is due to the increased secretion of prostaglandin F2 α (PGF2 α) and prostaglandin E2 (PGE2) in the uterus during endometrial sloughing. These prostaglandins are involved in increasing myometrial contractions and vasoconstriction, leading to uterine ischemia and production of anaerobic metabolites. This results in the hypersensitization of pain fibers, and ultimately pelvic pain. Prostaglandins are synthesized through the arachidonic acid cascade, mediated by the cyclooxygenase (COX) pathway. Arachidonic acid synthesis is regulated by the level of progesterone, through the activity of the lysosomal enzyme phospholipase A2. The progesterone level peaks during the middle of the luteal phase—the latter phase of the menstrual cycle—that occurs after ovulation. If conception does not occur, this results in degeneration of the corpus luteum and a decline in the circulating progesterone level. This rapid decline in the progesterone level is associated with endometrial sloughing, menstrual bleeding, and the release of lysosomal enzymes, leading to the generation of arachidonic acid, and therefore, the production of prostaglandins (Itani et al., 2022).

3.2 The effect of TENS on menstrual pain (primary dysmenorrhoea)

Transcutaneous Electrical Nerve Stimulation (TENS) is a low-frequency transcutaneous electrical nerve stimulation that can stimulate the body to produce endorphins, which will cause increased relaxation and decreased pain. In addition, intense somatic input can predispose the brain to activate the inhibitory pain control system. Administration of TENS may cause skin irritation, uncomfortable sensations, and excessive muscle contractions. The following is a table of the frequency distribution of pain levels in respondents with dysmenorrhea who were given TENS therapy.

Table 5. Frequency distribution of respondents based on pain levels before and after Transcutaneous Electrical Nerve Stimulation (TENS)

	No pain		Mild Pain		Moderate pain		Severe pain		Total	
	N	%	N	%	N	%	N	%	N	%
<i>Pre-test</i>	-	-	10	12,5	50	62,5	20	25	80	100
<i>Post-test</i>	2	2,5	37	46,25	37	46,25	4	5	80	100

$p=0,000$

Based on the table above, it can be seen that respondents experienced a decrease in pain after being given TENS therapy. Most (62.5%) of respondents experienced moderate pain before being given TENS therapy, but after being given TENS therapy, almost half (46.25%) experienced mild pain and no pain (2.5%). Meanwhile, based on statistical tests using the Wilcoxon sign Rank Test, the results obtained were $p = 0.000$ ($p < 0.05$), which means that there is a significant relationship between pain levels before and after TENS therapy.

Transcutaneous Electrical Nerve Stimulation (TENS) plays an important role in reducing respondent's pain. This therapy is given by placing an electrode pad on the supra pubis for 30 minutes. The way TENS works through a gate control mechanism is that TENS can activate large type nerve fibers (A-Beta), then can facilitate the dorsal horn of the spinal cord which contains substantia gelatinosa. With this the gate will close, this condition will be able to suppress small diameter nerve fibers (A-delta and C) so that pain will decrease. TENS also causes synchronized skin movements, which respondents perceive as a massage and have a calming effect. This is what causes a decrease in the level of pain in dysmenorrhea experienced by adolescents.

The TENS intervention was defined as pulsed electrical currents generated by a 'standard TENS device' administered across the intact surface of the skin using surface electrodes at the site of pain or over nerve bundles proximal (or near) to the site of pain, with the intention of

stimulating peripheral nerves to relieve pain. Patients report that TENS provides indirect benefits including enhanced function, improved psychological well-being, better sleep and medication reduction; Therefore, TENS is widely accepted by patients because it is inexpensive, can be self-administered and has no toxicity. 35 36 In clinical practice, users are advised to personalize their treatment strategy, including the electrical characteristics of currents, according to their personal needs (Johnson et al., 2022).

3.3 Effect of TENS with sims position on primary dysmenorrhea

The sims position is the right side or left side. This position is done to provide comfort and provide drugs per anus (suppositories). Body weight rests on the ilium, humerus and clavicle bones.

Table 6. Frequency distribution of respondents based on pain levels before and after Transcutaneous Electrical Nerve Stimulation (TENS) with sims position

	No pain		Mild Pain		Moderate pain		Severe pain		Total	
	N	%	N	%	N	%	N	%	N	%
Pre-test	-	-	10	25	28	70	2	5	40	100
Post-test	-	-	26	65	12	30	2	5	40	100

$p=0,001$

The table above shows that there is a decrease in the pain level of respondents who experience dysmenorrhea. Before being given TENS therapy, most (70%) experienced moderate pain, but after being given TENS therapy with the sims position, the pain responders who experienced moderate pain decreased to only 30%. While the results of the statistical test using the Wilcoxon sign Rank test showed that $p = 0.001$ ($p < 0.05$), which means that H_0 was rejected, that is, there was an effect of TENS with sims position on menstrual pain (primary dysmenorrhea) in adolescents at the Tahfidzul Quran Islamic Boarding School.

Sims position is almost similar to fetal position. This position is done by lying on one side with the knee of the leg pulled close to the chest. In this position, the pressure on the abdominal wall muscles decreases, thereby reducing menstrual pain. The sims position can also be combined with the side lying position. Lying on the side also reduces pressure on the abdomen and may enhance nighttime comfort. People who find side sleeping helpful during their period may benefit from placing a pillow between their knees. Experimenting with different pillow positions can help people find the best position. Determining the correct sleeping position depends on the individual and their period symptoms.



Figure 1. Use of TENS with the sims position

Giving TENS therapy with the sims position will have a double effect. TENS works by closing the pain transmission gate from the small nerve fibers by stimulating the large nerve fibers, then the large nerve fibers will close the pain message pathways to the brain and increase blood flow to the painful area. The synchronized movements in TENS activate the hypothalamus and trigger the pituitary gland's release of endorphins, which are endogenous chemicals that have a calming effect on the body (Nuach, Widyawati, Hidayati, et al., 2014). Meanwhile, in the sims position, the pressure on the abdominal wall muscles decreases, so that

dysmenorrhoea decreases. With these 2 working mechanisms, TENS therapy is more optimal if it is done in the Sims position

3.4 Effect of TENS with semi-Fowler's position on primary dysmenorrhea

Fowler's position is also known as the semi-sitting position, in which the top of the bed is partially raised, which is between 45 and 60 degrees. Low Fowler and semi-Fowler positions use a smaller angle. The high Fowler's position raises the head of the bed so that the patient is almost upright. The aim of this position is to help the patient to breathe more easily, it is usually used in patients who experience shortness of breath, mild to moderate respiratory distress, and placement of orogastric and nasogastric tubes. This is because the Fowler's position promotes maximum chest expansion, reduces tension in the abdominal muscles, and reduces the effect of gravity on the chest wall. The following is a cross distribution table for TENS therapy in the semi-Fowler's position

Tabel 7. Distribusi frekuensi responden berdasarkan tingkat nyeri sebelum dan sesudah dilakukan *Transcutaneous Elektrikal Nerve Stimulation (TENS)* dengan posisi *semifowler*

Pain Scale	No pain		Mild Pain		Moderate pain		Severe pain		Total	
	N	%	N	%	N	%	N	%	N	%
<i>Pre-test</i>	-	-	-	-	22	55	18	45	40	100
<i>Post-test</i>	2	5	11	27,5	25	62,5	2	5	40	100

$p=0,000$

The table above shows that there was a decrease in the pain scale in dysmenorrhea before and after TENS therapy. Most of the respondents before being given TENS in the semi-Fowler's position (45%) experienced severe pain, but after being given TENS therapy experienced a significant decrease, namely only 5% experienced severe pain. Based on statistical tests using the Wilcoxon sign Rank test, the results obtained were $p=0.000$ ($p<0.05$), which means that there was a significant effect before and after TENS therapy in semi-Fowler's position on menstrual pain. Complaints experienced by patients with severe pain during menstruation are extraordinary pain in the lower abdomen, not strong enough to do activities that make it take time to rest for several days. Usually if respondents experience severe pain during dysmenorrhea they take painkillers, but with TENS they no longer need to consume it.

Heavy bleeding during menstruation causes some respondents to complain of dizziness and weakness, this is due to a lack of hemoglobin levels in the blood. Iron is needed for the formation of hemoglobin (Hb) in the bone marrow. Iron deficiency causes a decrease in plasma iron levels, so that the supply of iron to the bone marrow is reduced, (Kartika, et al. 2016) In addition, hemoglobin also functions to bind oxygen which will be circulated throughout the body. If hemoglobin is lacking, only a little oxygen is bound and circulated throughout the body, as a result oxygen cannot be channeled into the blood vessels in the reproductive organs which experience vasoconstriction, which will cause pain (Masruroh et al., 2019).



Figure 2. Use of TENS in the semi-fowler's position

The use of TENS in a semi-Fowler's position provides double comfort for dysmenorrhea patients. When TENS is installed, the respondent is given a pillow as a support for the body, they can take deep breaths while using TENS. Another definition of the semi-Fowler's position is a bed position that elevates the torso and the head is raised at an angle of 15-45 degrees. Through this position, gravity pulls the diaphragm down allowing for greater chest expansion and ventilation of the lungs (Santoso, 2020). Thus allowing more oxygen flow in the lungs and all blood vessels in the reproductive organs so that it can reduce the pain scale in dysmenorrhea patients

3.5 The effectiveness of TENS with sims and semi fowler's positions against primary dysmenorrhea

There are many choices of sleeping positions to relieve menstrual pain. Can rest in a sideways position, both to the left and right which is similar to the sims position. Like the fetal position sleeping on the side can reduce back pain or cramps that often occur during menstrual periods. Semi-Fowler's position can also reduce menstrual pain because this position can increase blood circulation to the reproductive organs thereby reducing menstrual pain. The following is a cross-distribution table for the effect of TENS with sims and semi-Fowler's positions on menstrual pain

Table 8. Cross-distribution of respondents based on pain levels before and after Transcutaneous Electrical Nerve Stimulation (TENS) in the semi-fowler and sims positions

Pain Scale	Sims position				Semifowler position			
	Pretest		Post Test		Pretest		Post Test	
	N	%	N	%	N	%	N	%
No pain	0	0	0	0	0	0	2	5
Mild pain	10	25	26	65	22	55	11	27,5
Moderate pain	28	70	12	30	18	45	25	62,5
Severe pain	2	5	2	5	0	0	2	5
Total	40	100	40	100	40	100	40	100
$p = 0,046$								

Based on the table above, it can be seen that there is a difference in pain reduction in respondents who were given TENS therapy in sims and semi-fowler positions. In the sims position, none of the respondents felt no pain at all, but in the semi-Fowler's position there were 5% of respondents who said they did not experience pain. Statistical results with the Mann Whitney test also showed that there was a difference in the decrease in menstrual pain in respondents who were given TENS therapy in sims position and semi-Fowler's position with $p = 0.045$ ($p < 0.05$).

Semi-Fowler's position is a recommendation for implementing TENS therapy to reduce menstrual pain (primary dysmenorrhoea). Because this position apart from providing comfort, the patient can also more freely take deep breaths as a relaxation technique because gravity pulls the diaphragm down thereby allowing greater chest expansion and lung ventilation. In contrast to the sims position with left or right tilt, this position puts more pressure on the chest so that the chest expansion process is less than optimal.

The principle underlying the reduction of pain by relaxation techniques lies in the physiology of the autonomic nervous system which is part of the peripheral nervous system that maintains the homeostasis of the individual's internal environment. The difference in the intensity of the respondent's pain is caused by the administration of the deep breathing relaxation technique itself, if the deep breathing relaxation technique is done correctly it will cause a decrease in pain that is felt to be greatly reduced or optimal and the patient feels comfortable compared to before, on the contrary if the deep breathing relaxation technique is carried out If it is not correct, then the pain that is felt is slightly reduced but it is still painful

and the patient feels uncomfortable with the situation. This can affect the intensity of pain, because if the deep breathing relaxation technique is performed repeatedly it will be able to cause a feeling of comfort which will ultimately increase perception tolerance in reducing the pain experienced. If someone is able to increase their tolerance for pain then someone will be able to adapt to pain, and will also have good self-defense too (Fitriyanti & Machmudah, 2020)

4. Conclusion

Based on this study it can be concluded that TENS therapy can be recommended to reduce menstrual pain (primary dysmenorrhoea). There are differences in the effectiveness of TENS in the Sims and semi-Fowler positions in reducing menstrual pain. TENS therapy in the semi-Fowler's position is more recommended than the Sims position.

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Conflict of interest

I have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

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