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EDUCATION ON THE USE OF CHEMICAL MEDICINES AND NATURAL INGREDIENTS IN PAIN RELIEF THERAPY FOR STUDENTS AT SULTAN AGUNG 3 ISLAMIC HIGH SCHOOL IN SEMARANG

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Abstrak

Keadaan sensorik dan emosional yang tidak menyenangkan berkaitan dengan kerusakan jaringan dapat disebut nyeri. Nyeri bukanlah penyakit, melainkan suatu gejala yang dapat ditimbulkan akibat penyakit, contohnya sakit kepala, migrain, nyeri otot, sakit gigi, hingga nyeri haid (dismenore). Pengetahuan siswa di SMA Islam Sultan Agung 3 Semarang tentang dunia kesehatan, terutama obat masih sangat terbatas, padahal obat memiliki peran penting dalam pelayanan kesehatan. Maka dari itu, perlu Pengabdian Masyarakat untuk memberikan edukasi penggunaan obat kimia dan bahan alam dalam terapi antinyeri (analgesik). Tahapan yang dilakukan adalah pemberian kuisioner pretest, pemberian leaflet, pemaparan materi, tanya jawab, dan pemberian kuisioner posttest. Dari 80 populasi siswa kelas XII di SMA Islam Sultan Agung 3 Semarang, terdapat 40 siswa yang bersedia mengikuti kegiatan. Desain penelitian menggunakan one group pretest-posttest, untuk mengetahui perbedaan pengetahuan sebelum dan sesudah edukasi. Analisis uji komparatif statistik mengunakan paired t-test. Hasil menunjukkan peningkatan signifikan (p value <0,05). Hal ini menunjukkan bahwa edukasi merupakan cara yang efektif untuk meningkatkan pengetahuan penggunaan obat kimia dan bahan alam dalam terapi anti nyeri.

Abstract

Sensory and emotional discomfort associated with tissue damage can be referred to as pain. Pain is not a disease, but rather a symptom that can be caused by disease, such as headaches, migraines, muscle pain, toothaches, and menstrual pain (dysmenorrhea). Students' knowledge at Sultan Agung 3 Islamic High School in Semarang about health, especially medicine, is still very limited, even though medicine plays an important role in health services. Therefore, community service is needed to provide education on the use of chemical medicines and natural ingredients in pain relief therapy (analgesics). The stages carried out were administering a pretest questionnaire, distributing leaflets, presenting material, conducting a question and answer session, and administering a posttest questionnaire. Of the 80 students in grade XII at SMA Islam Sultan Agung 3 Semarang, 40 students were willing to participate in the activity. The research design used a one-group pretest-posttest to determine the difference in knowledge before and after education. Statistical comparative analysis used a paired t-test. The results showed a significant increase (p value <0.05). This indicates that education is an effective way to increase knowledge about the use of chemical drugs and natural ingredients in pain therapy.

Keywords: Education, Use of Chemical Medicines, Natural Ingredients, Pain Relief, Secondary School

1. INTRODUCTION

Sensory and emotional discomfort associated with tissue damage can be referred to as pain. Pain is not a disease, but rather a symptom that can be caused by disease, such as headaches, migraines, muscle pain, toothaches, and menstrual pain (dysmenorrhea) (Larasati et al., 2025). Headaches are discomfort in the head area, which can take the form of migraines triggered by academic stress such as accumulated assignments, demands for perfect grades, and lack of effective time management (H et al., 2025). The prevalence of headaches is around 40% of the adult population (Kusumaningsih et al., 2025). Muscle pain is pain characterised by damage to the musculoskeletal tissue due to fatigue, strenuous exercise, or carrying heavy school bags, with an overall prevalence of 23.6-31.3% (Nindela et al., 2022). Toothache is pain in the tooth structure caused by frequent consumption of fast food, especially foods high in sugar, high in fat, and carbonated drinks, with a prevalence of 1.89% (Shakila et al., 2023). Dysmenorrhoea is menstrual pain that often occurs in women in the abdomen, especially the lower abdomen, and can spread to the lower back, waist, pelvis, upper thighs, and calves (Umboro et al., 2022). The prevalence of menstrual pain in Indonesia in 2020, according to data from the World Health Organisation (WHO), reached 90% (Djafar et al., 2025).

In general, pain is categorised into three types based on its intensity, ranging from mild pain, moderate pain, and severe pain. Mild pain is pain that comes and goes during activities and disappears after sleep. Moderate pain is pain that occurs continuously and can interfere with activities; this pain can only be relieved by sleep. Severe pain is pain that occurs continuously, interferes with activities, and causes difficulty sleeping (Ningrum & Ummah, 2022). Pain can be relieved using painkillers, both chemical and natural. Painkillers are also known as analgesics.

Students who experience muscle pain are often lazy or lack the energy to participate in additional activities. Students who experience toothache may lose their appetite, resulting in weight loss and weakness. Students who experience dysmenorrhoea may experience mood swings. In essence, the inappropriate use of analgesics among students can reduce their quality of life and increase healthcare costs. Students experiencing headaches and migraines may have reduced motivation to study. Inappropriate use of medication can also increase morbidity and mortality (Setyowati & Cahyant, 2023).

To prevent morbidity and mortality due to limited knowledge of analgesic use, education on analgesics, both chemical and natural, is necessary. Chemical analgesics are classified into over-the-counter drugs, restricted over-the-counter drugs, and prescription drugs. Over-the-counter drugs are drugs that can be purchased freely at stalls, drug stores, and pharmacies, such as paracetamol. Over-the-counter medicines are medicines that can be purchased freely at kiosks, pharmacies, and drug stores, such as paracetamol. Restricted over-the-counter medicines are medicines that are available at pharmacies and can be purchased without a prescription at pharmacies with certain restrictions, such as ibuprofen. Prescription medicines are medicines that can only be obtained by redeeming a doctor's prescription at a pharmacy, such as mefenamic acid. (Berlian et al., 2023; Pusporini & Fuadiyah, 2020). A drug that is often purchased at pharmacies is mefenamic acid. Mefenamic acid belongs to the Non-Steroidal Anti-Inflammatory Drug (NSAID) class, which works by inhibiting the formation of prostaglandins at the site of inflammation by blocking the cyclooxygenase (COX) enzyme in peripheral tissues (Dewi et al., 2023). NSAIDs are medications that must be used with caution, given their side effects that can cause problems in the digestive system, such as nausea, vomiting, diarrhoea, stomach bleeding, stomach irritation, and dyspepsia (Purba, 2022).

Chemical medicines that are feared to cause side effects that irritate the stomach can be replaced with natural medicines. Analgesic medicines from natural ingredients, often referred to as herbal medicines, are ingredients, mixtures of ingredients, or products derived from plants, animals, microorganisms, minerals, or other ingredients that have been proven to be effective, safe, and of high quality empirically (passed down from

generation to generation) or scientifically. Natural medicines are classified into Jamu, Standardised Herbal Medicines (OHT), and Phytopharmaceuticals. Jamu are ingredients or concoctions derived from Indonesian cultural heritage for health maintenance, treatment, and recovery. Jamu were originally sold by traders carrying distinctive baskets, which is why they are often called jamu gendong. Currently, jamu is widely mass-produced and guaranteed to be safe. Standardised Herbal Medicine (OHT) is a natural medicine for health maintenance, treatment, and recovery that has been proven through preclinical trials, and its raw materials have been standardised. Phytopharmaceuticals are natural medicines used for health maintenance, treatment, and recovery, whose safety and efficacy have been scientifically proven through preclinical and clinical trials, with standardised raw materials and finished products. The side effects of natural ingredients are not significant when used in appropriate doses (GH & Ruslan, 2024; Pibryana et al., 2025).

Several students have used natural ingredients to treat pain, such as herbal medicine made from moringa and turmeric. Factors that influence the use of natural ingredients as medicine include predisposition, supporting factors, and reinforcing factors (Rini et al., 2025). The moringa plant has the Latin name Moringa oleifera and belongs to the Moringeaceae family. The part of the moringa plant that is often used is the leaves. Moringa leaves contain flavonoids that can relieve pain by blocking the cyclooxygenase (COX) enzyme in peripheral tissues as an inhibitor of prostaglandin production, thereby relieving pain. Moringa leaves can be used by brewing them and then drinking the tea or swallowing them directly in capsule form (Ma'ruf et al., 2023; Musyaropah & Cahyanto, 2025). Moringa leaves can also be processed into pudding to increase the appeal of food (Dewi et al., 2025). Turmeric plants have the Latin name Curcuma domestica and belong to the Zingiberaceae family. The part that is often used is the rhizome. Turmeric rhizome contains curcumin, which can relieve pain by inhibiting protein denaturation, thereby eliminating inflammation or inflammation that causes pain. Turmeric rhizome can be used by brewing it and then drinking it or swallowing it directly in capsule form (Pibryana et al., 2025). So far, education on the use of chemical analgesics and natural ingredients is still lacking, particularly among senior high school students. Therefore, the Community Service Team from the Faculty of Pharmacy, Sultan Agung Islamic University, Semarang, conducted education on the use of chemical drugs and natural ingredients in analgesic therapy for 80 students at Sultan Agung 3 Islamic High School, Semarang, as shown in Figure 1.

Figure 1. Sultan Agung 3 Islamic High School, Semarang

Sultan Agung 3 Islamic Senior High School is the only Islamic senior high school that will become a boarding school in 2025 and is located in the Genuk District of Semarang City. Students at SMA Islam Sultan Agung 3 Semarang have very limited knowledge about the world of health, particularly regarding medication, despite its crucial role in healthcare services. In fact, most students simply allow their pain to subside on its own without seeking treatment. Therefore, the objective of the Community Service programme is to provide education on the use of chemical medicines and natural ingredients in pain relief therapy (analgesics) for students, including for headaches, migraines, muscle pain, toothaches, and menstrual pain (dysmenorrhoea).

2. METHODS

The methods used in this Community Service activity included administering a pretest questionnaire, distributing leaflets, presenting material, conducting a question and answer session, and administering a posttest questionnaire. Of the 80 students in grade XII at SMA Islam Sultan Agung 3 Semarang, 40 students were willing to participate in the activity. The research design used a one-group pretest-posttest to determine the difference in knowledge before and after education. The Community Service activity was carried out on 14 November 2025. The stages of implementing Community Service can be seen in Figure 2.

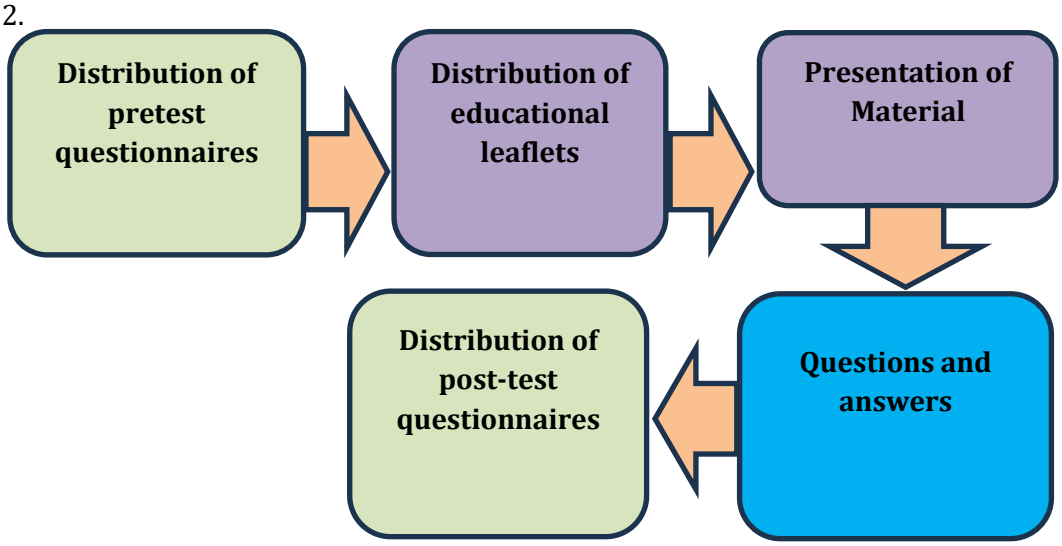

Figure 2. Stages of Community Service Implementation

3. RESULTS AND DISCUSSION

Outcome of the Community Service activities carried out on 14 November 2025 were the distribution of pre-test questionnaires, leaflets, presentation of material, question and answer sessions, and distribution of post-test questionnaires The distributing pretest survey to 40 willing students resulted in mostly incorrect answers. The distribution of educational leaflets on the use of chemical drugs and natural ingredients in pain relief therapy (analgesics) can be seen in Figures 3 and 4.

Figure 3. Educational Leaflet on the Use of Chemical Medicines in Pain Therapy

Figure 4. Educational Leaflet on the Use of Natural Ingredients in Pain Relief Therapy

After receiving the leaflet, students gained some new knowledge, but did not yet fully understand the material. Therefore, it was necessary to present the material and hold a question and answer session. The presentation on the use of chemical drugs in pain therapy (analgesics) was given by Rissa Maharani Dewi, M.Farm., M.H., and the presentation on the use of natural ingredients in pain therapy (analgesics) was given by Tri Diana Puspita Rini, M.Farm. These presentations can be seen in Figure 5.

Figure 5. Presentation of material on the use of chemical drugs and natural ingredients in pain therapy

Many students asked about the side effects of using chemical painkillers and actively discussed how to process natural ingredients into painkillers. The activity was concluded with a post-test questionnaire to determine the difference in knowledge levels before and after education in the form of leaflets and material presentations. The results of the pretest and posttest questionnaire comparison can be seen in Table 1. The descriptive statistical results (mean±SD) can be seen in Table 2. Changes in pretest and posttest scores in the form of bar graphs can be seen in Figure 6. Outcomes of the parametric Paired t-test comparative analysis to determine significance can be seen in Table 3.

Table 1. Results Of The Comparison Between The Pretest And Posttest Questionnaires

Questions	Pretest		Posttest	
	Wrong	Right	Wrong	Right
Definition of chemical painkillers	21	19	7	31
Name of painkiller	27	13	0	40
Side effects that occur when taking painkillers	38	2	1	39
What to do if pain persists for more than 3 days	10	30	0	40
Definition of natural medicine	17	23	0	40
Examples of natural medicines for pain relief	30	10	5	35

Table 2. Descriptive Analysis Results (Mean±SD) Of Pretest And Posttest

Questions	Pretest Mean±SD	Posttest Mean±SD
Definition of chemical painkillers	0.475 ± 0.499	0.775 ± 0.417
Name of painkiller	0.325 ± 0.471	1.000 ± 0.000
Side effects that occur when taking painkillers	0.050 ± 0.219	0.975 ± 0.111
What to do if pain persists for more than 3 days	0.750 ± 0.433	1.000 ± 0.000
Definition of natural medicine	0.575 ± 0.499	1.000 ± 0.000
Examples of natural medicines for pain relief	0.250 ± 0.438	0.875 ± 0.332

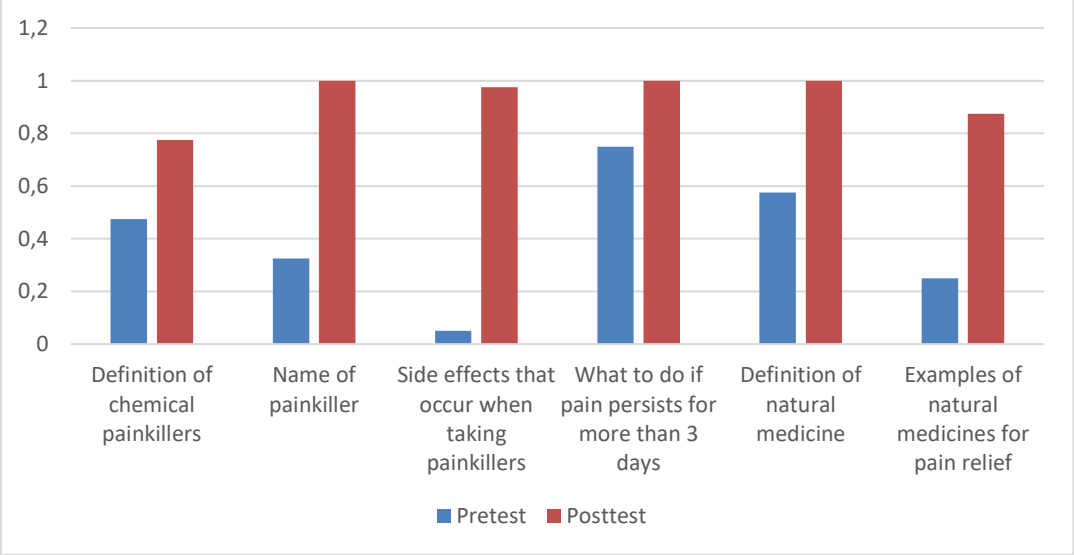

Figure 6. Changes in pretest and posttest scores

Table 3. Results of the parametric paired t-test comparative statistical test

Questions	*p-value*	Interpretation Significant (p<0.05)
Definition of chemical painkillers	0,0032	Significant
Name of painkiller	<0,0001	Significant
Side effects that occur when taking painkillers	<0,0001	Significant
What to do if pain persists for more than 3 days	0,0015	Significant
Definition of natural medicine	<0,0001	Significant
Examples of natural medicines for pain relief	<0,0001	Significant

Community service was provided to 80 students. The sample consisted of 40 students who were willing to participate in educational activities on the use of chemical drugs and natural ingredients as pain relief therapy. These students were in Year 12, with the inclusion criterion being students who were willing to participate in the activities, while the exclusion criterion was students who were unwilling to participate in the activities. In the pretest questionnaire, many students still answered the questions incorrectly. In the post-test questionnaire, many students answered the questions correctly.

Descriptive statistics (mean±SD) for the pretest and posttest on the first question, namely the definition of chemical painkillers (0.475±0.499 to 0.775±0.417). The second question was the names of painkillers (0.325±0.471 to 1.000±0.000). The third question was about the side effects of taking painkillers (0.050±0.219 to 0.975±0.111). The fourth question was about what to do if pain lasts for more than 3 days (0.750±0.433 to 1.000±0.000). The fifth question was about the definition of natural medicine (0.575±0.499 to 1.000±0.000). The sixth question was about examples of natural medicine for pain relief (0.250±0.438 to 0.875±0.332).

Statistical comparative test analysis using a paired t-test produced the following p-values (0.0032; <0.0001; <0.0001; 0.0015; <0.0001; <0.0001). A test is one of the statistical tests on the same sample with different treatments, such as pre and post-test. test aims to see the distinction in the average before and after treatment or intervention. The intervention carried out was the distribution of leaflets and presentation of material. A good significance requirement is (p value <0.05) (Nurba'id et al., 2022). The interpretation of the results is in accordance with the good significance requirement. This indicates that there is a significant distinction between before and after education, so it can be said that education is an effective way to increase knowledge of the use of chemical drugs and natural ingredients in pain therapy.

4. CONCLUSION AND RECOMMENDATIONS

From the above description and explanation, it can be concluded that the Community Service activities carried out by students at Sultan Agung 3 Islamic High School in Semarang proved to be effective. This is evidenced by a significant increase in the level of knowledge among students after participating in these activities. This significant increase reached a level of significance (p <0.05). This shows that education plays an important role in increasing students' knowledge about chemical medicines and natural ingredients in pain therapy. There is a need for re-monitoring to determine patterns of chemical and natural substance use in pain relief therapy, as this is an effective school-based educational strategy in Indonesia.

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