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REVIEW ARTICLE


The extract of Jeruju plant for anti-inflammatory: A literature review using nursing perspective


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Abstract

Jeruju plant has some benefits in reducing symptoms of a particular disease. However, there is little discussion about plants in nursing. Therefore, the literature review aims to identify the effectiveness of Jeruju plant extract as an anti-inflammatory. The method used is a literature review integrating electronic databases such as Google Scholar and ScienceDirect. The keywords used in Indonesian are "Acanthus ilicifolius as anti-inflammatory," and the keywords in English are "Acanthus ilicifolius AS anti-inflammatory." The Jeruju plant (*Acanthus ilicifolius*) contains flavonoids acting as an anti-inflammatory. Flavonoids help to reduce the inflammation in the disease. The clinical nurse may use the finding of this review for health promotion for the patient with chronic illness.

Keywords: Complementary therapy; community nursing; elderly care; quality of life; nursing intervention

Introduction

Inflammation is a response to the immune system in the body to harmful stimuli, such as pathogens, damaged cells, toxic compounds, or the presence of irradiation. The inflammatory process is the body's most important defense mechanism against health by forming cytokines or mediators that play a role in inflammation (Bare et al., 2019). Anti-inflammatory is a term for agents or drugs useful in suppressing an inflammatory process. The presence of an inflammatory reaction in the body destroys and reduces the injured agent or injured tissue and prepares the tissue for the healing process (Suryandari, Queljoe, & Datu, 2021). In this case, the nurse plays a role in identifying the signs and symptoms of patients with inflammation. In addition, nurses also act as direct drug providers to patients. Non-pharmacological techniques are one of the nursing interventions that can be done independently. One of the non-pharmacological techniques nurses can use complementary therapy using jeruju leaf extract (*Acanthus ilicifolius*), which is dried and made into tea (Risnah, HR, Azhar, & Irwan, 2019).

Jeruju leaf tea is consumed by brewing it with warm water only. Tea is easier to drink and very practical. In this case, the nurse must collaborate with pharmacists to know the content and dosage. Inflammation can usually be cured by topical or systemic means with glucocorticoids, immunosuppressors, monoclonal antibodies, and recombinant cytokines, the newest methods. But these alternative therapies are generally aggressive and ineffective in all cases (Yanuarini, Widiyantoro, & Destiarti, 2018). Many studies have been conducted to find a better treatment with a higher success rate. The Directorate for Supervision of Traditional Medicines has to make standardization by loading requirements *Simplicia* quality standards widely used by traditional medicine companies (Yuslianti, Bachtiar, Suniarti, & Sudjiatmo, 2016). One strategy for developing these drugs is to use natural medicinal plants, one of which is the jeruju plant (*Acanthus ilicifolius*) (Yanuarini, Widiyantoro, & Destiarti, 2018).

The jeruju plant (*Acanthus ilicifolius*) is a mangrove plant with many beneficial compounds and one anti-inflammatory. The content of chemical compounds can be used as anti-inflammatories and flavonoids. Many researchers have proven that the jeruju plant (*Acanthus ilicifolius*) can be used as an anti-inflammatory (Biswas et al., 2019; Mani Senthil Kumar et al., 2008; Rizeki, Safrida, & Supriatno, 2020; Ikhwan, Rachmadi, Putri, & Widiyantoro, 2020; and Yanuarini et al., 2018). One of the studies stated that jeruju leaves (*Acanthus ilicifolius*) are anti-inflammatory in edema mice (Ikhwan et al., 2020). Thus, one way to ensure this is to review the literature related to the research on the jeruju plant (*Acanthus ilicifolius*), which can be used as an anti-inflammatory. The purpose of this literature review is to identify the effectiveness of the jeruju plant, the methods of extracting the Jeruju plant, and

identify the compound in the plant. The study's findings may help clinical nurses promote health to patients with chronic illnesses.

Method

This literature review research uses a narrative review or literature review method. The population in this literature review research is scientific articles on the effectiveness of jeruju plant extract (*Acanthus ilicifolius*) as an anti-inflammatory. The sample used in this literature review is publications between 2008-2022, Indonesian and English articles, and original articles discussing *acanthus ilicifolius*. Meanwhile, the exclusion criteria are articles irrelevant to the topic published before 2008. The source of the literature search data is articles related to the jeruju plant (*Acanthus ilicifolius*) as an anti-inflammatory carried out using an electronic database. The databases used are Science Direct and Google Scholar. There are keywords used in Indonesian, namely "*Acanthus ilicifolius as an anti-inflammatory*," and in English, "*Acanthus ilicifolius AS anti-inflammatory*." Articles that meet the criteria are collected, and a journal summary consists of the author and year, extraction method, test method, plant parts, and solvents used in the extraction. This article review is grouped in a table using the narrative review method to answer the research objectives. The data grouping must follow the order of the author and year, extraction method, test method, plant part, and solvent used in the extraction. Then the data that has been grouped is analyzed and searched for the most data. After that, most data were analyzed using supporting journals to answer the research objectives.

Data analysis in this study used article reviews, namely by collecting data to obtain theories and findings from previous researchers to be used as results and conclusions and to answer the study's objectives. The data is presented in a table containing the author and year, extraction method, test method, plant part, and solvent used in the extraction (**Figure 1**).

Results

Many previous studies have stated that the jeruju plant (*Acanthus ilicifolius*) can be an anti-inflammatory—the content of chemical compounds in jeruju plants that can be used as anti-inflammatory compounds, namely flavonoids. Currently, preparations from the jeruju plant (*Acanthus ilicifolius*) can be consumed orally, for example, jeruju leaf tea, which many people have made. Research conducted by (Biswas et al., 2019) using the leaves and bark of the jeruju plant (*Acanthus ilicifolius*) shows that there are chemical compounds, namely flavonoids, that act as an anti-inflammatory. The results indicate that flavonoid compounds play a role in biological properties because they can show a significant positive relationship between metabolic content and biological activity.

In a study (Rizeki et al., 2020) conducted on ± 72 male white mice, it was stated that jeruju (*Acanthus ilicifolius*) is effective for treating the number of gastric ulcers and can reduce the severity of gastric ulcers in white rats. The use of ethanol extract also has a significant effect as an anti-inflammatory on the number of ulcers in white rats (*Mus musculus*). The content of biochemical compounds found in *Acanthus ilicifolius* The leaves contain alkaloids, saponins, and terpenoids, which function as antibiotics and anti-inflammatories which can reduce pain and improve blood circulation. Research conducted by (Mani Senthil Kumar et al., 2008) on adult male Charles Foster rats (weight 120-150 grams) and male Swiss albino rats (weight 20-25 grams) used the carrageenan-induced anti-inflammatory test method, namely jeruju leaf extract (*Acanthus ilicifolius*) was found to inhibit carrageenan-induced foot edema. But it depends on the dose given. In addition, the anti-inflammatory activity obtained from jeruju leaf extract (*Acanthus ilicifolius*) may be related to its inhibitory effect on the COX-LOX enzyme, which is influenced by the superior free radical scavenging activity of the components present in the extract.

The results of research from (Yanuarini et al., 2018) using jeruju leaf extract (*Acanthus ilicifolius*) with UV-VIS spectrophotometer analysis on isolate c3.1 stated that there was a higher wavelength shift due to the addition of NaOH from 204 nm to 210 nm, at the maximum wavelength can also be seen the presence of band I which is the cinnamoyl ring B band. Band II benzoyl ring A, a characteristic of the flavonoid compound group, is an anti-inflammatory compound. In a study (Ikhwan et al., 2020) on the reduction of edema of the feet of mice (*Mus musculus*) by carrageenan induction, it was shown that the ethyl acetate fraction of jeruju leaves (*Acanthus ilicifolius*) with a dose of 750 mg/kg BW could reduce induced edema of the feet of mice (*Mus musculus*). Carrageenan is better than crude extract and other partitioned fractions. The content of compounds that may provide anti-inflammatory activity is flavonoids and terpenoids.

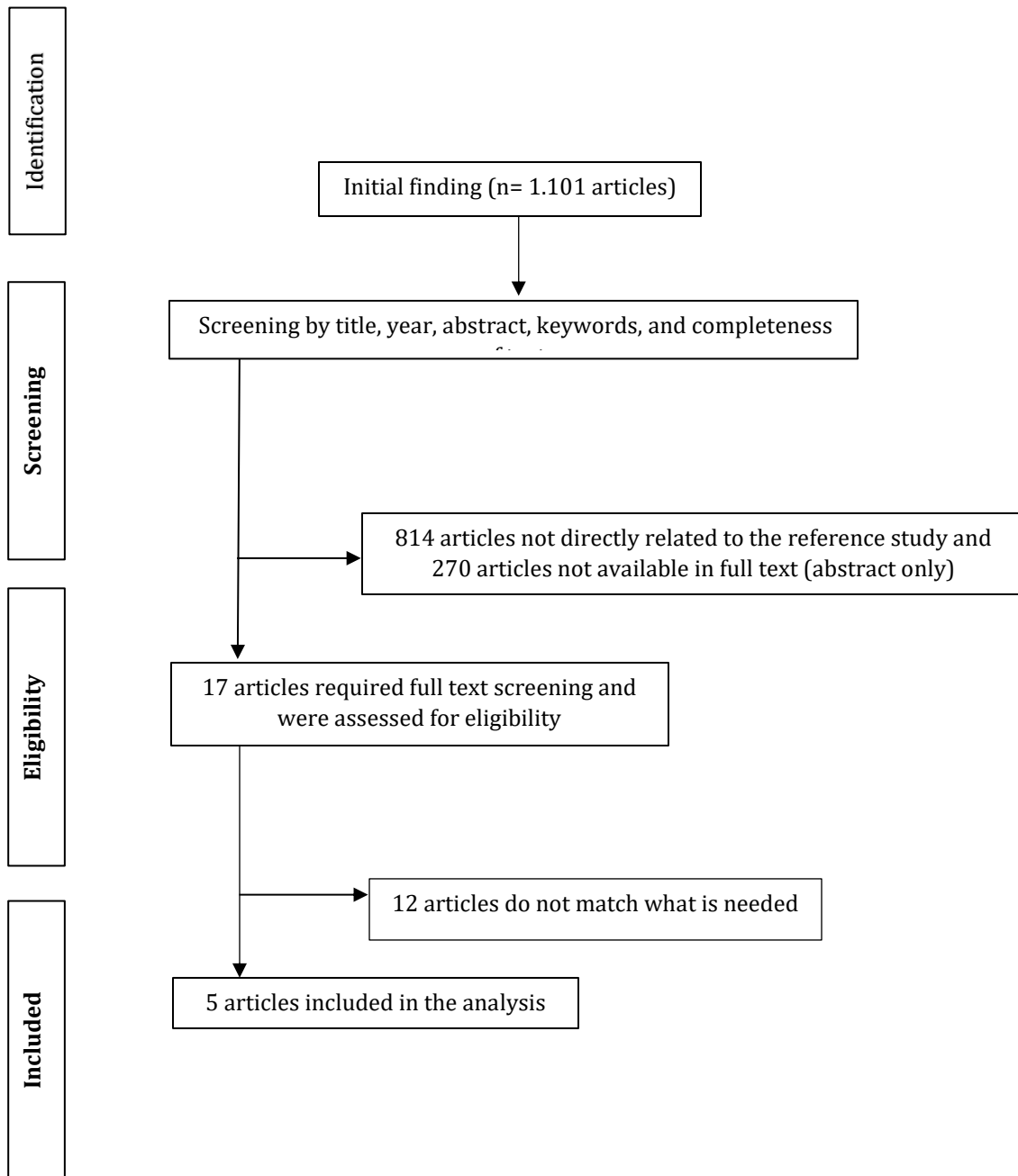


Figure 1. Study selection process

Discussion

Experts use maceration extraction methods, including (Biswas et al., 2019; Mani Senthil Kumar et al., 2008; Rizeki et al., 2020; Ikhwan et al., 2020; and Yanuarini et al., 2018). Maceration is one of the extraction methods by immersing *Simplicia* powder into a filtered liquid that does not use a heating process or can also be called cold extraction. Separating compounds in *Simplicia* using a particular solvent is based on the principle of like dissolved like, i.e., a polar solvent will dissolve polar compounds in *Simplicia* (Dewatisari, 2020). The maceration method is more widely used because this method uses simple, easy, uncomplicated equipment and does not require heating, so there is little possibility of natural materials being damaged or decomposed. This method can be done by immersing the sample in a solvent for a specific time, usually one day or 24 hours without heating (Wijayanti, 2015).

Table 1. Study finding

Author & Year	Extraction method	Test method	Plant parts	Solvent
Biswas et al., 2019	Maceration	Laboratory testing	Leaf	Ethanol
Rizeki et al., 2020	Maceration	Laboratory testing	Leaves, roots, and stems	Ethanol
Kumar et al., 2008	Maceration	Laboratory testing	Leaf	Methanol
Yanuarini et al., 2018	Maceration	Laboratory testing	Leaf	Methanol
Ikhwan et al., 2020	Maceration	Laboratory testing	Leaf	Methanol

Some experts choose the anti-inflammatory test method using carrageenan induction (Ikhwan et al., 2020) and (Yanuarini et al., 2018). Carrageenan was selected to test anti-inflammatory because it is not antigenic and does not cause systemic effects. Carrageenan will induce cell injury so that the injured cells release mediators, which begin the inflammatory process. After releasing inflammatory mediators, edema can last 6 hours and gradually subsides within 24 hours after injection. According to Sangi & Fatimah, 2020 carrageenan is one of the methods of testing anti-inflammatory activity that is simple, easy to do, and more widely used. In addition, the formation of inflammation by carrageenan does not cause tissue damage. Then (Kamal, Tibe, & Anggi, 2018) explained that the use of carrageenan as an inducer is that carrageenan does not leave scars, does not cause tissue damage, and provides a more sensitive response to anti-inflammatory drugs.

Overall, experts use plant leaf parts for extraction, including (Biswas et al., 2019; Mani Senthil Kumar et al., 2008; Rizeki et al., 2020; Ikhwan et al., 2020; and Yanuarini et al. 2018). The leaves of jeruju are elongated, the base and tip of the leaves are tapered, the edges of the leaves are pinnate with a sharp tip, and the leaf length is approximately 9-30 cm wide of 4-12 cm. Experts more widely use the leaves because the leaves are easier to extract. Jeruju leaves (*Acanthus ilicifolius*) contain flavonoid, terpenoid, and alkaloid compounds. This flavonoid and terpenoid compounds have the highest levels in the leaves of the jaruju plant (*Acanthus ilicifolius*). Compounds that are useful as anti-inflammatory compounds are flavonoids (Ikhwan et al., 2020). Most experts use methanol as a solvent in their research (Mani Senthil Kumar et al., 2008; Rizeki et al., 2020; Ikhwan et al., 2020; and Yanuarini et al., 2018). The methanol solvent was chosen because the methanol solution as a solvent in the extraction process of a material gave better results than the aqua dest extraction. Methanol, a compound with a molecular CH₃OH structure, is polar because it has a hydroxyl group (-OH) and non-polar because it has a methyl group (-CH₃). However, methanol is a polar compound (Ramdani & Chuzaemi, 2017). Flavonoids are the largest group in natural phenolic compounds. Flavonoids are polar compounds because they have several unreplaced hydroxyl groups or sugar, so they will dissolve in polar solvents, one of which is methanol. The ability to deliver services that promote completeness is a special privilege registered nurses enjoy. If they want to advocate holistic techniques for patients looking to achieve a higher quality of life, they need to have a complete understanding of complementary and alternative medicine (CAM), including its costs, patient knowledge, and drug interactions (Fowler & Newton, 2006; van Rensburg, Razlog, & Pellow, 2020; Christina, Abigail, & Cuthbertson, 2016).

Conclusion

From this literature review, it can be concluded that the Jeruju plant (*Acanthus ilicifolius*) can be used as an anti-inflammatory—the content of chemical compounds in Jeruju plants used as anti-inflammatory compounds, namely flavonoids. The study's findings may help clinical nurses promote health to patients with chronic illnesses. Further studies are needed to evaluate the use of Jeruju plant, particularly for chronic illness.

Author's declaration

The authors made substantial contributions to the conception and design of the study and took responsibility for data analysis, interpretation, and discussion of results. For manuscript preparation, all the authors read and approved the final version of the paper.

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Availability of data and materials

All data are available from the authors.

Competing interests

The authors declare no competing interest.

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