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Case Report: Grade II Hypertension Accompanied by Obesity with Consumption of Propolis Herbs

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Abstract

Hypertension is often said to be a silent killer, because it is a deadly disease without being accompanied by symptoms first as a warning for the victim. Hypertension with the incidence of obesity is still common. The prevalence of hypertension accompanied by obesity also continues to increase. According to some studies, obesity and hypertension have a meaningful relationship. One alternative treatment that can be an option to lower blood pressure is herbal therapy. Herbal medicine is classified as complementary medicine is a phenomenon that appears today among many other non-conventional treatment phenomena, such as treatment with herbs or herbal therapy, acupuncture, and cupping. The use of herbs is one of the alternative treatments chosen by the community other than conventional (medical) treatment.One of the natural products produced is propolis. Propolis is one of the natural products produced by bees and is widely used as a medicine or supplement, anti-inflammatory, disease treatment, accelerating wound healing, and others. The patient in this case is a woman with the age of 50 years. Patients come with complaints of dizziness, headache and low back pain accompanied by a history of hypertension, and obesity. The patient was diagnosed with Grade 2 Hypertension on Treatment, and Obesity was given therapy in the form of Amlodipine 10 mg 1x1, Paracetamol 500 mg 3x1 and Vitamin B Complex 2x1.Hypertension suffered by patients is hypertension obtained due to several predisposing factors in patients, namely diet, obesity, age, and gender.

Introduction

Hypertension or high blood pressure is defined as a continuous increase in blood pressure so that it exceeds the normal limit. Hypertension is often said to be a *silent killer*, because it is a deadly disease that is not accompanied by symptoms first as a warning for the victim. The (Khasanah et al., 2018) World Health Organization estimates that as many as 1.28 billion adults aged 30-79 years worldwide suffer from hypertension, most (two-thirds) living in low- and middle-income countries. The WHO (World Health Organization) also mentions that 46% of adults with hypertension are unaware that they have the condition, and less than half of adults (42%) with hypertension are diagnosed and treated.Only about 1 in 5 adults (21%) with hypertension can control their blood pressure. Hypertension is the leading cause of premature death worldwide. This is what underlies the WHO to set one of the global targets for non-

communicable diseases to reduce the prevalence of hypertension by 33% between 2010 and 2030 (Lukitaningtyas & Cahyono, 2023). The Makassar City Health Office stated that hypertension is the 2nd of the 10 most common diseases. The prevalence of hypertension in Makassar City in 2016 reached 27.61% while the mortality rate reached 18.6% (Ansar et al., 2019).

Hypertension with the incidence of obesity is still common. The prevalence of hypertension accompanied by obesity also continues to increase. According to some studies, obesity and hypertension have a meaningful relationship. From the research, Jullaman explained that if patients have BMI with obesity, they will have a risk of 1.64 times to suffer from hypertension compared to normal BMI. Based on the results of Riskesdas in 2018, the increasing incidence of hypertension in Indonesia is also followed by an increase in the proportion of the Indonesian population who are overweight or obese. Complementary therapy (Tiara, 2020) is one of the ways of treatment that is complementary to conventional medical care or as a treatment option outside of conventional medical care. One of the complementary therapies is herbal therapy. Complementary therapy aims to improve the immune system so that the body can heal itself when sick, because our body has white blood cells that are useful for protecting the body from disease.So that our body has the ability to heal itself as long as we provide complete nutrition and proper care.The use of herbal medicine as an alternative medicine has become a daily part of society. There are several herbal plants that are considered effective in lowering blood pressure in hypertensive patients (Ariwibowo et al., 2023). According to the Framingham study, a person with overweight or obesity has an eight times greater risk of developing hypertension. In a study by Monica, the percentage of hypertension in overweight individuals was 24.5% and in obese individuals was 27.5% (Te'ne & Karjadidjaja, 2020).

Patient-Specific Information

Patient Mrs. H is a 50-year-old woman with a job as a housewife. The patient is Muslim. The last education of the first level of advanced school. The examination was carried out on June 3, 2024 at the Layang Makassar Health Center.

Main Complaints and Symptoms of Patients

A 50-year-old female patient came to the health center for treatment with complaints of dizziness and headache that were felt since 1 week ago and aggravated since 1 day ago. Patients complain of pain in the lower back (+). Fever (-), Cough (-), Nausea (-), Vomiting (-), Diarrhea and normal bowel movements. The patient also came to check his blood pressure because of the headache he felt in the last few days. The patient has been suffering from hypertension since 1 year ago and is not routinely controlled at the health center.

Table 1. Medical, Family, and Psychosocial History

Category	Details
Previous Medical History	History of Hypertension (+) since 1 year ago. History of weighing up to ±60 kg about 1 year ago.
Habit History	Smoking history (-), History of alcohol consumption (-), History of frequent consumption high in salt such as salted fish.
Family History of Illness	None
Psychosocial History	Patients are the lower middle class who live at home as housewives and do housework every day. The patient's psychological condition is good with no history of mental disorders and has good social conditions, namely good relations with family and neighbors around him.
Past Interventions Relevant to Outcomes	Patients with a history of being given Amlodipine 5 mg.
Clinical Findings	

- General Circumstances	Mild Pain/Composmentis
- Vital Signs	Blood pressure: 178/99 mmHg Pulse: 116x/min Breathing: 22x/min Temperature: 36.6°C
- Nutritional Status	Weight: 62 kg Height: 157 cm IMT: 25.1 kg/m² (Obesity 1)
- Generalist Status	In the head to toe examination, no abnormalities were found.

Timeline

Patients began to be diagnosed with hypertension in 2023 when conducting a health examination at a health center with a blood pressure of around 140/90 mmHg. Since then, the patient began to consume hypertension medication, namely amlodipine 5 mg 1x1 and after the therapy, the patient's blood pressure began to decrease, which was around 130/90 mmHg. As time goes by, in 2023, patients also begin to consume propolis which is used as an herbal therapy to lower blood pressure and aches and pains in their bodies. Propolis is consumed every day, twice a day, in the morning and at night as many as 3 drops. The effect felt after routinely consuming propolis therapy made the patient feel better. Since then, patients have begun to not routinely control the health center.

Table 2. Diagnostic Assessment

Category	Details
Diagnostic Testing	From the results of the examination, the patient's blood pressure was 178/99 mmHg and on the measurement of nutritional status, BMI was obtained: 25.1 kg/m² which can be categorized as obesity 1.
Diagnostic Challenge	Before it was found that the patient had hypertension, the patient rarely checked his health so he did not know that he had hypertension. The consumption of herbs in the form of propolis makes patients skip control if there are no complaints. As well as the lack of health knowledge in the patient's family to conduct a health examination on him. The habits of patients who consume foods that contain high in salt.
Diagnosis	Grade 2 hypertension on treatment, accompanied by obesity.
Prognosis	In this case, a good prognosis is obtained if the patient takes medication regularly in combination with herbal medicines and reduces the consumption of foods that can trigger an increase in blood pressure.
Therapeutic Interventions	
- Types of Therapeutic Interventions	This patient is given therapy in the form of pharmacological therapy with drugs and non-pharmacological therapy in the form of education to patients and their families.
- Administration of Therapeutic Intervention	
-- Pharmacology	Amlodipine 10 mg 1x1 Paracetamol 500 mg 3x1 Vitamin B Complex 2x1
Non-Pharmacology	Cut down on fatty foods. Reduce foods high in salt. Reduce coconut milk foods. Reduce fried foods. More often exercise such as morning walks. Take medication regularly and if the medicine runs out, immediately return to the health center for control and get the medicine back. Consume propolis herbs. Try to eat fruits and vegetables. Ask families to always monitor patients to take medication and limit the consumption of sweet and fatty foods. Ask families to always accompany control patients to the health center so that the education delivered to patients can also be conveyed to their families.
Changes in Therapeutic Interventions	In this case there was no change in the provision of the intervention.

Methods

This study uses a case study research method. A case study in the medical world is a research method used to investigate in depth a particular medical phenomenon on a single subject or group of subjects. It involves a comprehensive analysis of the cases of individuals or groups experiencing a specific medical condition, including their medical history, symptoms, medications that have been administered, and the results. Case studies allow researchers to study rare or rare medical conditions where available data are limited. By focusing on a single case or group of cases, this research can provide in-depth insights into the causative factors, disease progression, and response to treatment. Through careful analysis of case studies, researchers can identify patterns and trends that may be relevant to specific medical conditions, aiding in the development of further diagnosis and treatment. Case studies are often the starting point for further research. The findings obtained from case studies may stimulate new research questions or lead to larger clinical study designs. The process of case study research in medicine usually involves steps, namely data collection, data analysis, and publication.

Result and Discussion

The administration of treatment in the form of amlodipine 5 mg as much as 1x1 can provide a good response to high blood pressure in patients. If accompanied by patient compliance to regularly take medication.

Other Diagnostic Results

The patient was not followed up with a follow-up examination.

Compliance and Intolerance of Interventions

Patients do not routinely consume the medication given and do not routinely come to control to check their blood pressure at the health center if there are no complaints. The use of pharmacotherapy can lower the patient's blood pressure but it is not routine so that blood pressure is not controlled again. As for the use of non-pharmacotherapy, in this case propolis, patients feel more comfortable after consuming the herbal medicine.

Bad Events and Unforeseen Events

There were no bad or unexpected events in this case.

Strengths and Limitations

The strength of the researcher is that in this case report, the patient routinely consumes propolis alone without any intervention from other plants that are used together as herbs in lowering blood pressure. Obesity is also a risk factor for hypertension in patients. The use of pharmacotherapy drugs in this case report has an effect in lowering the patient's blood pressure, but for non-pharmacotherapeutic treatment, propolis has not seen a definite change in blood pressure from the patient, so for the limitations of the researcher, the research time is limited and the information is not too complete, so it is hoped that for future research there needs to be a closer approach/supervision of patients in herbal treatment, in this case consumption Propolis.

Medical Discussion

Hypertension is one of the non-communicable diseases that is currently the main burden of health financing around the world. From the results of the anamnesis carried out to the physical examination, there are several factors in the patient that can be considered as predisposing factors so that the patient can develop hypertension (Vonsa & Anshari, 2022).

Age is an irreversible risk factor for hypertension. Hypertension is a disease of many factors due to the interaction of all risk factors that a person has. In this case, the patient was diagnosed with hypertension at around the age of 50. Increasing age due to physiological changes in the body such as thickening of the artery walls finally there is a buildup of collagen in the muscle

layer, therefore blood vessels result in narrowing and stiffness starting at the age of 45 years (Tumanggor et al., 2022).

Gender, in this case in patients, is a woman who is more susceptible to hypertension compared to men. Women clearly have a greater risk of suffering from hypertension after entering menopause. The production of the hormone estrogen decreases during menopause, women lose the beneficial effect of eventually high blood pressure (Tumanggor et al., 2022).

In this case, the level of education of junior high school patients/equivalent so there is a possibility that the patient lacks knowledge about the disease. Education is one of the internal factors that affect a person's knowledge and attitude. This is because a person's level of education is one of the factors that plays a role in knowledge about the disease, the higher a person's education, the more information the person has in disease prevention (Sihombing et al., 2023).

From the calculation of the nutritional status of the patient, it was found that the patient's BMI was 25.1 kg/m2 which was categorized as obese. Obesity is a major factor that affects blood pressure and also the development of hypertension. Obesity is an imbalance between calorie consumption and the need for energy stored in the form of fat which causes inactive fat tissue so that the heart's workload increases. High blood pressure equal to or above 140/90 is found in more than a third of obese people. Obesity itself can cause weakness of the heart muscle or cardiomyopathy, thus interfering with the pumping power of the heart. There are two ways obesity causes hypertension, namely direct and *indirect*. In *direct* terms, a person who is obese must have a BMI that exceeds normal so that the blood supply or *cardiac output* increases. Meanwhile, indirectly through stimulation of *renin angiotensin aldosterone system* (RAAS) activity which has a close relationship with fluid retention and Na so that stroke volume increases and also sympathetic activity related to increased pulse rate and vasoconstriction (Alfalah et al., 2022; Asyfah et al., 2020).

In a study conducted by Teguh Dhika Rohkuswaraa and Syahrizal Syarif, from 206 samples, the proportion of obesity was obtained at 54.9%. In addition, it is also known that the relationship between obesity and the incidence of grade 1 hypertension is 1,681 (CI 95%: 1,049-2,696), meaning that respondents with obesity have a risk of 1,681 times to suffer from grade 1 hypertension compared to those who are not obese after controlling for age variables, family history of hypertension and physical activity (Rohkuswara et al., 2017).

One alternative treatment that can be an option to lower blood pressure is herbal therapy. Herbal therapy is complementary therapy using plants that have medicinal properties. Indonesia is known to have a lot of medicinal plants. The use of herbal medicine as part of the treatment of hypertension has been increasing in the last decade. This is due to several factors, one of which is because side effects are considered fewer. In choosing herbal complementary therapy for hypertension, there are many types of plant parts that can be used to lower blood pressure such as roots, stems, fruits, leaves, and so on. The herbal therapy used can function as a vasodilator and vasorelaksan. Vasodilators are substances that can function to help dilate blood vessels so that they can have a relaxing effect on smooth muscles. While vasorelaksan is a substance that can help the process in lowering blood pressure (Suryaningsih & Septiari, 2023).

Currently, many herbal plants have been used as medicine to treat various diseases. Various components of active substances that have been extensively researched have therapeutic effects sourced from herbal plants (Hidayah et al., 2019).

Many factors can encourage the increase in the use of herbal medicines in developed countries such as Indonesia, the use of herbal medicines has been carried out for generations. One of the natural products produced is propolis. Propolis is one of the natural products produced by bees and is widely used as a medicine or supplement, anti-inflammatory, disease treatment, accelerating wound healing, etc (Hanapi et al., 2022).

Propolis is one of the sources of natural and *nutraceutical* nutrients derived from resin substrates collected by bees from the juice of leaf buds and plant bark mixed with enzymes and wax from honeycombs. Propolis has been used since 300 BC as a medicine to heal wounded skin because it has an anti-inflammatory effect. Propolis has a high value of micronutrients, namely vitamins (A, B, and C), minerals (Ca, Mg, Na, Fe, Mn, Cu, and Zn), and the enzyme succinate dehydrogenase. The active ingredients known to be contained in propolis are polyphenols (flavonoids, phenolic acids, and their esters), terpenoids, steroids, and amino acids. Flavonoids are substances that are known to be abundant in plants and have antioxidant effects in paralyzing free radicals. Propolis is known to have a high content of flavonoids. Other antioxidant contents that are also found in propolis are vitamins A, C, E and the mineral Zn. Animal studies show that propolis has antimicrobial, antiviral, antifungus, antiparasitic, anti-inflammatory, and antitumor effects. The potential for propolis in Indonesia is quite a lot while the propolis market in Indonesia is dominated by imported products, especially from Brazil. Until now, there has been no research that reveals the bioactive content and nutrients of Indonesian propolis compared to Brazilian propolis. Although the chemical composition of propolis has been clarified to some extent in recent years, there is still one problem that is the striking variability of the chemical composition depending on where it is collected (Castaldo & Capasso, 2002; Halim et al., 2013).

Some of the plants and their active constituents that may be beneficial in cardiovascular risk factors include obesity, hypertension, atherosclerosis, dyslipidemia, and diabetes. In terms of physicochemistry, propolis is a lipophilic material. Propolis is hard and brittle when cold and when warm it is soft, sticky, and pliable. It has a varied color associated with the plant's source, age, and geographic climate that varies from beige, green, or red to brown. Bees use propolis to seal gaps, coat the area inside the hive, keep humidity and temperature stable inside the hive, as well as protect it from invading microorganisms (Khoshandam et al., 2023).

Hypertension is also one of the risk factors for coronary heart disease. These mechanisms are involved in endothelial dysfunction, nitric oxide deficiency, oxidative stress, and proinflammatory cytokines. Hypertension also increases mortality and morbidity. The effect of propolis (200 mg/kg for 4 weeks) in Riau, Lampung, and South Sulawesi Islands was observed in rats with high-salt induced hypertension. The results of the study showed that propolis reduced systolic and diastolic blood pressure. LDL levels were lower in the group that received propolis from the Riau Islands and Lampung. However, HDL levels after propolis administration were higher than those that only got high in salt. This antihypertensive mechanism is caused by lipid metabolism, where LDL levels correlate with hypertension because they are related to leptin resistance. In addition, low HDL levels correlate with hypertension due to its relationship with decreased kidney function. Another mechanism owned by the Riau Islands and Lampung propolis is through vasodilation and removal of excess fluid. This suggests that propolis has an antihypertensive effect. Similar effects were also found in water-soluble Chinese propolis at a dose of 100 mg/kg/ over the last 4 days of 14 weeks administered to rats with high salt-induced hypertension. The results of the study showed that there were antihypertensive, antioxidant, and anti-inflammatory effects. In addition, this propolis also plays a role in increasing eNOS and NO which indicates the effect of arterial relaxation. In addition, there was a decrease in IL-6, TNF-α, Nox2, Nox4, and ROS. A high-salt diet is related to dysregulation of the intrarenal renin-angiotensin (RAS) system, oxidative stress, and inflammatory cytokines that lead to excessive Na+ retention, increased vascular resistance, and high blood pressure. High salt intake affects cardiovascular function through mechanisms involving TGF-β1 and NO. It also increases the formation of O2- of NOS which can later interfere with endothelium-dependent dilation through decreased NO bioavailability (Lasminiati & Noviyani, 2023).

In another study, the anti-hypertensive effects of propolis (200 mg/kg/day for 28 days) and CAPE in hypertensive Spraque Dawley rats were studied. Mice treated with CAPE and propolis had lower blood pressure than the hypertension group. Tyrosine hydroxylase (TH) and catecholamine levels were elevated in hypertensive mice. The recommended mechanism is to decrease TH levels and inhibit the biosynthesis of catecholamines by CAPE and propolis (Ekhteiari Salmas et al., 2018).

The antihypertensive effects of propolis are associated with antioxidant, anti-inflammatory, and vasodilating effects. The antihypertensive effects of ethanol propolis extract at a dose of 200 mg/kg and caffeic acid phenethyl ester (CAPE) at a dose of 50 uM/kg/day over the last 14 days of 28 days in Sprague Dawley rats with L-NAME-induced hypertension have been demonstrated. The mice treated with CAPE and propolis had lower blood pressure than the hypertension group. The group that received propolis and CAPE, experienced a decrease in blood pressure, total oxidative stress (TOS), oxidative stress index (OSI), asymmetrical dimethylarginine (ADMA), and NF-κB were lower compared to the L-NAME group. The group also experienced an increase in paraoxonase (PON1), total oxidant status (TAS), and NO levels compared to the L-NAME group. There is an increase in tyrosine hydroxylase and catecholamine levels in hypertensive rats so that the suggested mechanism is in the form of decreasing tyrosine hydroxylase levels and inhibiting catecholamine biosynthesis by CAPE and propolis. Based on research, the antihypertensive effect of propolis is shown by the activity of inhibiting hyaluronidase and angiotensin-converting enzyme (ACE) which is linked to the presence of phenolic compounds in certain propolis. The inhibitory effect of ACE determined by HPLC was higher than 78%, correlated with catechins and p-kumaric acid. Meanwhile, hyaluronidase inhibition activity ranged from 0% to 68.20% which correlated with ferulic acid content (Lasminiati & Noviyani, 2023).

Some studies also show that propolis can prevent the risk of obesity. Based on the study, propolis poplar ethanol extract at a dose of 20 mg/mouse/day for 12 weeks showed a decrease in body weight, a decrease in absolute and relative fat mass in epidermis, retroperitoneal, or inguinal fat pads. This is supported by the results of the research of propolis poplar powder extract with a dose of 4.5 mg of total polyphenols/mice/day for 12 days also showed weight loss. Chrysin as one of the chemical compounds contained in propolis also showed that giving chrysin at doses of 25, 50, and 100 mg/kg for 16 weeks in rats could lead to weight loss (Lasminiati & Noviyani, 2023).

In randomized controlled trial studies, the antihypertensive effects of propolis have been shown. Propolis (3%) is administered to the human population (n=32) in Talca for 90 days. Propolis mainly lowers systolic and diastolic blood pressure. Phenolic and flavonoid compounds, such as cinnamic acid, quercetin, p-vanillin, p-coumaric acid, and apigenin, are all present in the oxidative species of neutralized Chilean propolis. CAPE activates the Nrf2 transcription factor involved in the production of anti-oxidant mediators. Thus, the anti-hypertensive effects of propolis may be due to its antioxidant and anti-inflammatory effects. So, according to research, propolis and its constituents are effective in reducing hypertension through mechanisms such as increased NO levels, vasodilation, ACE inhibitory effects, decreased levels of oxidative stress, asymmetrical ADMA, and others (Khoshandam et al., 2023).

Hypertension does not cause specific symptoms but has many complications if blood pressure is not controlled. Patient non-compliance in taking medication is still a problem. The effect of controlling blood pressure cannot be achieved if you do not take medication regularly. There are 32.27% of people who suffer from hypertension do not comply with taking medication in Indonesia. Compliance is a multi-dimensional phenomenon that is influenced by the complex interaction between external factors such as socioeconomic conditions, systems in health facilities, health practitioners and internal factors of the patient himself. One of these internal

factors is consuming herbs. In addition to the use of standard drugs, people also consume herbs as a routine therapy because of the belief that herbs are natural, safe, and effective compared to standard drugs. Moreover, hypertensive patients also tend to believe that standard drugs cause negative effects on the body, such as side effects or complications. This leads to lower adherence to standard hypertension medication in herbal users and having uncontrolled blood pressure. Most hypertensive patients do not inform their doctors regarding the herbs consumed so there is no supervision in the use of herbs thus increasing the danger of potential interactions of the drugs consumed (Ekhteiari Salmas et al., 2018).

The antihypertensive drugs that the patient has taken are assessed to have an effect on blood pressure. These effects are divided into good effects and bad effects. What is meant by good effects is normal blood pressure or prehypertension or there is a decrease in blood pressure from previous blood pressure checks even though it is still high. Bad effects are intended for categories of blood pressure that have not dropped or experienced an increase from a previous blood pressure check (Gusmira, 2012).

In this case the patient consumes propolis as an alternative treatment for the patient. Patients feel more comfortable after consuming propolis. In this case, the patient is afraid to continue taking medication because he is afraid of having a negative impact on his kidneys. So that after consuming propolis, patients rarely go to the health center for control so that blood pressure is not controlled. Patients get information about this herbal treatment through the patient's neighbors and relatives.

Patient Perspective On The Disease And The Therapy Received

The patient considers that the disease he suffers from is very important, especially for the patient's survival in the future and the disease can also affect his children and grandchildren. Based on the therapy he received, the patient felt that it was very necessary to undergo early treatment and routine control at a health facility in order to control the high blood pressure that the patient suffered.

Explanation And Consent

Before the anamnesis and physical examination of the patient, prior informed consent has been carried out to the patient himself. The patient was given an explanation in the form of the purpose of the anamnesis and physical examination, and asked for consent to be used as a patient in this case report with the patient's name to be disguised.

Conclusion

Hypertension is a disease caused by various factors. These factors can be modified or cannot be modified. Various factors in this case, namely diet, age, gender, obesity, can be predisposing factors for hypertension in patients and it is possible to worsen the patient's own health condition. The use of pharmacotherapy in this case amlodipine can lower the patient's blood pressure in this case report, of course if it is accompanied by good adherence to drug consumption. Hypertension is one of the non-communicable diseases that is currently the main burden of health financing around the world. The number of cases continues to increase along with the improvement of living standards and lifestyle changes, especially those related to physical activity, diet, stress and most importantly, the degenerative process along with the increase in life expectancy. In this case report, obesity is one of the factors that cause hypertension. The use of drugs and herbs can be used as therapy in lowering blood pressure but still controlled in health facilities to monitor hypertension suffered.

References

Alfalah, Jihad, N., Hasni, D., & Febrianto, B. Y. (2022). Hubungan Obesitas dengan Kejadian Hipertensi pada Perempuan Minangkabau. *Poltekita: Jurnal Ilmu Kesehatan*, *15*(4).

Ansar, J., Dwinata, I., & Apriani, M. (2019). Determinan Kejadian Hipertensi Pada Pengunjung Posbindu di Wilayah kerja Puskesmas Ballaparang Kota Makassar. *Jurnal Nasional Ilmu Kesehatan*, *1*(3).

Ariwibowo, A. I., Hilmi, I. L., & Salman. (2023). Research Article: Efektivitas Pengobatan Herbal pada Pasien Hipertensi. *Jurnal Surya Medika*, *9*(2), 34–40. https://doi.org/10.33084/jsm.v9i2.5662

Asyfah, A., Usraleli, U., Magdalena, M., Sakhnan, S., & Melly, M. (2020). Hubungan Obesitas dengan Kejadian Hipertensi di Wilayah Kerja Puskesmas Sidomulyo Rawat Inap. Jurnal Ilmiah Universitas Batanghari Jambi, 20(2), 338-343.

Castaldo, S., & Capasso, F. (2002). Propolis, an Old Remedy Used in Modern Medicine. *Fitoterapia*, *73*. https://doi.org/10.1016/S0367-326X(02)00185-5

Ekhteiari Salmas, R., Durdagi, S., Gulhan, M. F., Duruyurek, M., Abdullah, H. I., & Selamoglu, Z. (2018). The Effects Of Pollen, Propolis, and Caffeic Acid Phenethyl Ester On Tyrosine Hydroxylase Activity and Total RNA Levels In Hypertensive Rats Caused By Nitric Oxide Synthase Inhibition: Experimental, Docking And Molecular Dynamic Studies. *Journal of Biomolecular Structure and Dynamics*, *36*(3), 609–620. https://doi.org/10.1080/07391102.2017.1288660

Gusmira, S. (2012). Evaluasi Penggunaan Antihipertensi Konvensional dan Kombinasi Konvensional Bahan Alam Pada Pasien Hipertensi di Puskesmas Wilayah Depok. *Makara Kesehatan*, *16*(2).

Halim, E., Hardinsyah, H., Sutandyo, N., Sulaeman, A., Artika, M., & Harahap, Y. (2013). Kajian Bioaktif dan Zat Gizi Propolis Indonesia dan Brasil. *Jurnal Gizi Dan Pangan*, *7*(1), 1. https://doi.org/10.25182/jgp.2012.7.1.1-7

Hanapi, R. R., Agustin, A. N., Ruhdiana, T., Suci, S. E., Indriyani, W., & Gunarti, N. S. (2022). Potensi Propolis Sebagai Antibakteri: Review Jurnal. *Jurnal Buana Farma*, *2*(4), 17–24. https://doi.org/10.36805/jbf.v2i4.601

Hidayah, Nurul, R., & Sulistiyaningsih, R. (2019). Review Artikel: Tanaman Dengan Aktivitas Anti Hipertensi. *Farmaka*, *17*(2).

Lasminiati, K. D., & Noviyani, R. (2023). Potensi Efek Terapeutik Propolis sebagai Pencegahan dan Pendukung Terapi Penyakit Jantung Koroner. *Prosiding Workshop Dan Seminar Nasional Farmasi*, *2*, 676–689. https://doi.org/10.24843/WSNF.2022.v02.p54

Khasanah, U. N., Imandiri, A., & Adianti, M. (2018). Terapi Hipertensi Dengan Akupuntur Serta Herbal Seledri dan Wortel. *Journal of Vocational Health Studies*, *1*(1).

Khoshandam, A., Hedayatian, A. H., Mollazadeh, A. R., Razavi, B. M., & Hosseinzadeh, H. (2023). Propolis and Its Constituents Against Cardiovascular Risk Factors Including Obesity, Hypertension, Atherosclerosis, Diabetes, and Dyslipidemia: A Comprehensive Review. *Irian Journal of Basic Medic Science*, *26*(8).

Lukitaningtyas, D., & Cahyono, E. A. (2023). Hipertensi: Artikel Review. *Pengembangan Ilmu Dan Praktik Kesehatan*, *2*(2).

Rohkuswara, Dhika, T., & Syarif, S. (2017). Hubungan Obesitas dengan Kejadian Hipertensi Derajat 1 di Pos Pembinaan terpadu Penyakit Tidak Menular (Posbindu PTM) Kantor Kesehatan Pelabuhan Bandung tahun 2016. *Jurnal Epidemiologi Kesehatan Indonesia*, *1*(2).

Sihombing, E. P. R., Hidayat, W., Sinaga, J., Nababan, D., & Sitorus, M. E. J. (2023). Faktor Risiko Hipertensi. *Prepotif: Jurnal Kesehatan Masyarakat*, *7*(3).

Suryaningsih, N. P. A., & Septiari, I. G. A. A. A. (2023). Penggunaan Herbal dalam Terapi Kompelementer Pada Hipertensi. *Medfarm: Jurnal Farmasi Dan Kesehatan*, *12*(1), 50–57. https://doi.org/10.48191/medfarm.v12i1.177

Te'ne, C. A., & Karjadidjaja, I. (2020). Hubungan Overweight dan Obesitas terhadap Hipertensi Pada Pengemudi Bus Antar Kota PT GM Jakarta. *Tarumanagara Medical Journal*, *2*(1).

Tiara, U. I. (2020). Hubungan Obesitas dengan Kejadian Hipertensi. *Journal of Health Science and Physiotherapy*, *2*(2).

Tumanggor, S. D., Aktalina, L., & Yusria, A. (2022). Karakteristik Pasien Hipertensi di Puskesmas Mandala Kecamatan Medan Tembung. *Jurnal Kedokteran STM (Sains Dan Teknologi Medik)*, *5*(2).

Vonsa, L. D., & Anshari, Z. (2022). Hubungan Pengetahuan, Sikap Dan Tindakan Dengan Kejadian Penyakit Hipertensi Di Wilayah Kerja Rumah Sakit Umum Sundari Medan Tahun 2020. *Ibnu Sina: Jurnal Kedokteran Dan Kesehatan-Fakultas Kedokteran Universitas Islam Sumatera Utara*, *21*(1).