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Alternatives Methods for Treatment of Allergic Rhinitis, Alzheimer's disease and Hypertension

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ABSTRACT: In Thailand, there are a variety types of Thai herbs. After gathering the information of the extraction methods and properties of herbs, it can be seen that some herbs can be used in treating and inhibiting diseases that have high incidence rate in Thailand such as allergies, Alzheimer's diseases and hypertension. The extraction of herbs including ginger, fingerroot, red galingale, spinach, garlic and hibiscus have abilities to treat and inhibit diseases that include high incidence rate in Thailand. The article provides information about chronic diseases and medications for treatment, including data on prices, types and their mechanisms of action. Additionally, it outlines details on herbal extracts, highlighting the effects of extraction on patient's' symptoms. Finally, the article offers recommendations for patients to select the best treatment method by presenting the advantages and disadvantages of both medications and herbal extracts. Overall, the article emphasizes the importance of choosing the best treatment option for the well-being of the patients' body system.

KEYWORDS: Allergies, Alzheimer's disease, Hypertension, Medication, Thai herbs.

INTRODUCTION

Herbal medicine (HM) is truly rooted in Thai culture since ancient times and it is presently incorporated into health services. It not only has benefits to health, but is also acknowledged for its economic and cultural value. The value of herbal medicinal products (HMP) manufacture has gradually risen throughout the period of 2008-2016 according to statistics from the Thai Food Drug and Administration (TFDA). In Thailand, there are a variety types of Thai herbs. After gathering the information of the extraction methods and properties of herbs, it can be seen that some of herbs can be used in diseases that include high incidence rate in Thailand and the increasing number of patients with these conditions each year results in the use of expensive medications. This research will discuss herbs with properties for treating or inhibiting diseases, including ginger and fingerroot compared to loratadine for treating allergies; red galingale and spinach for inhibiting enzymes associated with Alzheimer's disease; and garlic and hibiscus for lowering blood pressure. The overall aim of the review is to demonstrate the benefits of medicinal herbs in treating these diseases.

ALLERGIC RHINITIS

Rhinitis is broadly defined as inflammation of the nasal mucosa. It is a common disorder that affects up to 40% of the population. Allergic rhinitis is the most common type of chronic rhinitis, affecting 10–20% of the population, and evidence suggests that the prevalence of the disorder is increasing. Severe allergic rhinitis has been associated with significant impairments in quality of life, sleep and work performance. Allergens associated with AR include pollens (tree, grass and weed, including ragweed), molds and indoor allergens (house dust mites and animal allergens) and have a large geographical variability within and between countries14. Occupational AR includes both IgE (vegetal and animal proteins as well as certain chemicals) and non-IgE (isocyanates, persulfate salts and woods) mechanisms15. Risk factors for AR include antibiotic use, self-reported air pollution, exposure to farm animals (only in LMICs), exposure to cats and/or dogs, maternal and paternal smoking and vigorous physical activity in adolescents16. Of note, many of these risk factors are shared with asthma and atopic dermatitis16. Overweight and obesity are not associated with AR17. Of note, many of these exposures and lifestyle risk factors have not been established as major risk factors for AR18; for example, ambient air pollution and passive smoking do not seem to have a large effect on AR development, but pollution may be associated with increased AR severity19. AR symptoms are caused by biochemical products released in the nasal tissue during an allergic reaction. When a patient who has been sensitized by previous exposure to the allergen re-encounters the causative allergen, the allergen binds to allergen-specific IgE on mast cells in the nasal mucosa, resulting in IgE and FcεRI

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crosslinking and subsequent mast cell activation and degranulation. This leads to the release of prestored and newly synthesized mediators, including histamine, sulfidopeptide leukotrienes (leukotriene C4 and leukotriene D4), prostaglandin D2 and other products. These mediators interact with nasal sensory nerves, vasculature and glands, resulting in acute AR symptoms.

ALZHEIMER'S DISEASE

Alzheimer's disease (AD) is the most common type of dementia and can be defined as a slowly progressive neurodegenerative disease characterized by neurotic plaques and neurofibrillary tangles as a result of amyloid-beta peptide's (Aβ) accumulation in the most affected area of the brain, the medial temporal lobe and neocortical structures.

1.Aging : The most important risk factor in AD is aging. Younger individuals rarely have this disease, and most AD cases have a late onset that starts after 65 years of age. Aging is a complex and irreversible process that occurs through multiple organs and cell systems with a reduction in the brain volume and weight, a loss of synapses, and ventricles' enlargement in specific areas accompanied by SP deposition and NFT.

2.Genetics : Genetic factors were discovered over the years and were found to play a major role in the development of AD. 70% of the AD cases were related to genetic factors: most cases of EOAD are inherited in an autosomal dominant pattern and mutations in the dominant genes.

3. Environmental Factors : Aging and genetic risk factors cannot explain all cases of AD. Environmental risk factors including air pollution, diet, metals, infections, and many others may induce oxidative stress and inflammation and increase the risk for developing AD.

4. Medical Factors : Several risk factors are related to the development of Alzheimer's disease. Adding to this list, older people with AD usually have medical conditions such as cardiovascular disease (CVD), obesity, diabetes, and others. All of these conditions are associated with increased risk of AD.

Symptoms

1. Alterations in monoaminergic neurotransmitter functioning and brain metabolism underlying depression in AD.

2. Lower dopamine transporter binding has been associated with decreased initiative whereas lower cholinergic receptor binding in the left frontal cortex has been reported to be associated with motor and mood changes of apathy.

3. Agitation/aggression in AD is related to dysfunction of specific brain regions. There is growing evidence that structural and functional deficits may be related to deficits in cholinergic neurotransmission and with increased D2/D3 receptor availability in the striatum.

4, Neurotransmitter systems have been implicated in psychosis of AD. Increased availability of striatal dopamine (D2/D3) as well as increased dopamine D3 receptor density in the nucleus acumens has been found in AD patients with psychosis, compared with those without psychosis.

HYPERTENSION

The definition of hypertension is somehow arbitrary and usually taken as the level of blood pressure associated with a doubling of long-term risk. Perhaps the best operational definition is the level at which the benefits of action exceed the risk and cost of inaction. Most recommendation currently regards as 'high blood pressure' any pressure up to 140mmHg systolic and / or 90mmHg: diastolic.

Causes and risk factors

1. Genetic predisposition/hereditary- hypertension has been known to run in families. Hereditary and genetic expressions in hypertension are significantly influenced by multiple environmental factors.

2. Excessive salt consumption

3. Male sex- males have a higher predisposition for hypertension than pre-menopausal women. After menopause, sex prevalence appears to change significantly.

4. Age- blood pressure has been shown to increase with age. The prevalence of hypertension also increases significantly with age and becomes profound at ages >55 years for males and >65 years in females.

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5. Prolonged stress- chronic stress are known to affect blood pressure. Acute stress may transiently increase blood pressure but this usually would not be sustained. It is not fully appreciated how chronic stress affect blood pressure. Neuro-hormonal activity may be a factor here.
6. Significant tobacco use.
7. Excessive alcohol consumption affects blood pressure levels adversely and predisposes to the development of heart disease.
8. Obesity.
9. Physical inactivity is a recognized risk factor for hypertension. It also encourages increase in weight thereby providing an additional risk.
10. Diets low in potassium, vegetables, fish, fruits; and rich in saturated fats are known to promote the development of high blood pressure.

Renal causes
1. Renal parenchyma diseases such as acute glomerulonephritis, chronic nephritis, polycystic disease and diabetic nephropathy.
2. Renovascular disorders such as renal artery stenosis, intra renal vasculitis
3. Other renal causes include: renin producing tumors, primary sodium retention (Liddle syndrome) and Gordon syndrome.

Endocrine causes
1. Acromegaly
2. Hypothyroidism and hyperthyroidism
3. Hyperparathyroidism and hypercalcemia
4. Extra adrenal chromaffin tumors.

Exogeneous hormones
These include: estrogens, glucocorticoids, mineralocorticoids, sympathomimetics and erythropoietin.

Other causes
1. Tyramine containing foods and monoamine oxidase inhibitors
2. Coarctation of the aorta
3. Pregnancy induced hypertension
4. Increased intracranial pressure, sleep apnea, quadriplegia, acute porphyria, familial dysautonomia and Guillain Barre syndrome.

Most people with hypertension have no symptoms even when blood pressure reading reaches dangerously high levels. Although a few people with early-stage hypertension may have dull headaches, dizzy spells or a few more nose bleeds than normal, these symptoms and signs typically do not occur until hypertension has reached an advanced or even life-threatening stage.

MEDICATIONS FOR ALLERGY PATIENTS

Including 2 types
1. Conventional antihistamines is the older type of antihistamines result in relax and produce sleep, this type hardly effects for treat motion sickness and the research found that this type is able to cause the side effects such as blurred vision, fast heart beats and feeling sleepy. For example, Chlorpheniramine, Dimenhydrinate, Ketotifen, Oxatomide.
2. Non-sedating antihistamines is the new type of antihistamine, they do not make people drowsy, which means that they can be taken during the day. Moreover, this type produces less side effects and long-acting. Consider the case of Loratadine, Cetirizine, Levocetirizine and Fexofenadine.

This research focus on Loratadine which is known as an antihistamine drug with long-acting and non-sedating effects. For the prevention of allergic diseases such as urticaria, asthma and rhinitis, these medications widely used 10 mg per day. In addition, Loratadine is one of the significant medication types that has been chosen by patients that suffering from every kind of Allergy diseases. Loratadine can be seen commonly in commercial and the price is 8.37 USD per 500 tablets.

MEDICATIONS FOR ALZHEIMER'S PATIENTS

In recent, no known interventions that completely cured Alzheimer's. But the best ways for treat is using Galantamine, Rivastigmine and Donepezil which is Cholinesterase inhibitors for mild and moderate symptoms.

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Cholinesterase inhibitors is working for prevent the breakdown of acetylcholine, a brain chemical that important for memory and thinking. As the Alzheimer's progress, the brain produces less acetylcholine, an over time, the medications lose their effectiveness because Cholinesterase inhibitors work in the same way. So, the switching of medications to one another may not produce a different result.

Medications that used for treat in mild symptoms including

1. Galantamine work for preventing the breakdown of acetylcholine and stimulates nicotinic receptors to release acetylcholine in the brain. Possible side effects include nausea, headache, vomiting and weight loss. Capsule taken once a day. They can be seen in commercial and the price is approximately 28.23 USD per 60 tablets.
2. Donepezil work for preventing the breakdown of acetylcholine in the brain. Possible side effects include nausea, headache, vomiting and weight loss. Tablet taken once a day. They can be seen in commercial and the price is approximately 10.41 USD per 30 tablets.
3. Rivastigmine work for preventing the breakdown of acetylcholine and butyrylcholine. Possible side effects include nausea, headache, vomiting and weight loss. Capsule taken twice a day. They can be seen in commercial and the price is approximately 45 USD per 60 tablets.
4. Memantine used in some individuals that have severe symptoms. Memantine is believed to work by regulating glutamate, a brain chemical, and use for decrease symptoms. When produced in excessive amount, glutamate can lead to brain cell death because Memantine work in a different way from Cholinesterase inhibitors. Capsule taken once or twice a day. They can be seen in commercial and the price is approximately 14.98 USD per 60 tablets.

All of these medications should be monitored, having a side effect such as vomiting, headaches, dizziness and allergy. Following the doctor's descriptions are important.

This research focused on Memantine because in the U.S., approximately 896,917 patients were estimated to be using memantine in 2022, with around 3.7 million prescriptions filled for the drug that year. This makes it one of the more commonly prescribed medications for Alzheimer's disease, especially for those with moderate to severe cases.

MEDICATIONS FOR HYPERTENSION PATIENTS

In a contemporary world, medicines for treat Hypertension including 5 types

1. Diuretic is the type that remove water and electrolytes from body by increasing urination. After the water reverse dwindly the volume of blood will reduce lead the reduction of cardiac output, finally the blood pressure drops. When used as antihypertension, diuretics can prevent heart attack and stroke.
2. Beta-blocker is the type that action on multiple body mechanisms includes

2.1 The reduction of heart beats
2.2 The reduction of the force of heart contraction
2.3 Inhibit stimulation of beta-1 receptor
2.4 Inhibit sympathetic outflow from brain

However, this type has an exceptional for users such as Asthma and Heart failure because medications can depress the heart's function. In addition, this type can increase the side effect such as Fatigue, heart palpitations, hungry and easily sweating.

3. Calcium Channel Blocker (CCBs) can be separated to 2 groups

3.1 dihydropyridine CCBs which prevent the diffusion of calcium lead to the extension of artery which can decline the blood pressure. Nifedipine, Amlodipine, for instance.
3.2 non-dihydropyridine CCBs which depresses the action of SA node lead to the reducing of heartbeat rates which can decline the blood pressure. Consider the case of Verapamil and Diltiazem.

4. Angiotensin Converting Enzyme Inhibitors (ACEIs) take action by inhibiting the angiotensin converting enzyme, so it is possible to inhibit the conversion of angiotensin I to angiotensin II lead to prevent the stimulation of aldosterone. Resulting in vasoconstriction and less stimulate the sympathetic nervous system. Most og ACEIs drive out from kidney, so the patients with impaired kidney function have to considerate about the dosage. For example, Captopril, Enalapril, Fosinopril and Perindopril.
5. Angiotensin Receptor Blocker (ARBs)

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According to the production of angiotensin II, this production can be produced in many pathways. Make some inhibition of angiotensin II can not be worked. Leading to the enhancement of ARBs which effect the same type as ACEIs. This type acted by inhibition of angiotensin II from blocking angiotensin receptor subtype I. ARBs include less side effects so it can be replaced by the ACEIs user that causing some side effects such as angioedema and cough. Losartan, Valsartan, Telmisartan, Olmesartan and Irbesartan, for instance.

This research focus on which Olmesartan is the medications that have the most users approximately 233 users from 248 cases. All of medications in this type can be seen commonly in commercial and the price range from 13 USD to 81 USD, which depend on the kind of ARBs, per 30 tablets.

THAI HERBS

Thai herbs have properties to cure various diseases and illnesses. They are popularly used as a ingredient in cooking and cosmetics. Currently, Thai herbs have been studied and researched until they are widely accepted in global. Before using Thai herbs, user should accept advice and inform about the properties of each type of Thai herb.

THAI HERBS FOR ALLERGY PATIENTS

1. Ginger (Zingiber Officinale Roscoe)

Ginger is widely used as a spice. In Thai traditional medicine, it has been used as a part of herbal remedies for treating constipation, sleeplessness and flatulence, etc. There is an evidence to indicate that the ethanolic extract of ginger exhibited the highest anti-allergic activity by inhibited β-hexosaminidase. In addition, ginger extracts have been reported to have wide range of pharmacological properties and there is no report of the clinical effectiveness such as nausea, vomiting and diabetes mellitus.

Using the fresh rhizomes of ginger to the extraction. After that, the ginger extract was weighed and combined with necessary excipients, and then filled into 500mg capsules each containing 125mg of ginger extract.

2. Phlai (Zingiber cassumunar Roxb)

Phlai has long been used in traditional medicine for treatment of allergic and allergic-related diseases. Phlai has a potent bioactive component called compound D[E-4-(3',4'-dimethoxyphenyl) but-3-en-1-ol]. There are evidences that Phlai can improve the symptom severity in patients. In previous studies, Phlai capsules for 200mg can decrease bronchial hyperresponsiveness in asthmatic patients. However, there are no evidence of he clinical effectiveness after consuming.

Using rhizomes of Phlai to the extraction. Each capsule contained 100mg of Phail extract equivalent to 4mg of compound D.

THAI HERBS FOR ALZHEIMER'S PATIENTS

1. Chan-Daeng (Dracaena cochinchinensis)

Chan-Daeng is a member of the Asparagaceae family. The herbal extract of Chan-Daeng prevented the formation of Aβ fibrils and disassembled the aggregated Aβ in a dose-dependent manner. Moreover, it can prevent Aβ fibril-mediated cell death. It can be concluded that Chan-Daeng may be used for Alzheimer's treatment by targeting Aβ fibril formation and inducing neuron regeneration.

Using the stem wood of Chan-Daeng, it can be prescribed for heart disorders and other medical problems. The role of Chan-Daeng in blocking Aβ fibil-induced toxicity was determined. The stimulation of neuronal differentiation trigged by the extract. The stem wood is proposed as an alternative remedy for the treatment of Alzheimer's.

2. Spinach (Spinacia oleracea)

Spanish shows promise in preventing Alzheimer's disease due to its high levels of antioxidants, vitamins, and anti-inflammatory compounds. Diets rich in antioxidants, such as those provided by spinach, help counteract oxidative stress, a key factor in neurodegenerative disorders. Spinach contains significant amounts of vitamins A, C, and E, as well as other antioxidants like flavonoids, which collectively work to reduce cellular damage. Furthermore, its anti-inflammatory properties, including compounds like quercetin, contribute to alleviating chronic inflammation, thereby protecting brain health. Additionally, spinach's folate content supports cognitive function and may help lower the risk of cognitive decline. Thus, integrating spinach into the diet aligns with the evidence that foods high in these beneficial nutrients can positively impact brain health and potentially reduce the risk of Alzheimer's disease.

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The leaves of spinach are particularly beneficial for preventing Alzheimer's disease due to their high levels of antioxidants, vitamins, and anti-inflammatory compounds.

THAI HERBS FOR HYPERTENSION PATIENTS

1. Celery (Apium graveolens)

Celery can help lower hypertension primarily due to its rich content of bioactive compounds, including phthalides. These compounds are known to have significant effects on blood pressure regulation. Phthalides, particularly, work by promoting vasodilation, which is the relaxation and widening of blood vessels. This action helps reduce vascular resistance and consequently lowers blood pressure. Research has shown that phthalides can contribute to a decrease in both systolic and diastolic blood pressure, with some studies reporting reductions of approximately 38 mmHg. Therefore, incorporating celery into the diet can be an effective strategy for managing and lowering hypertension.

Celery, particularly its stalks, is effective in lowering hypertension due to its bioactive compounds, especially phthalides. These compounds have vasodilatory effects, helping to relax blood vessels and improve circulation.

2. Garlic (Allium sativum)

Garlic helps lower hypertension through several physiological mechanisms, as detailed in the provided research document. Key to garlic's antihypertensive effects is allicin, a sulfur-containing compound that is released when garlic is crushed or chopped. Allicin has been shown to promote vasodilation, which relaxes blood vessels and reduces resistance in the vascular system, thereby lowering blood pressure. Additionally, garlic influences the renin-angiotensin-aldosterone system (RAAS) by inhibiting angiotensin-converting enzyme (ACE). This enzyme is responsible for the production of angiotensin II, a peptide that causes blood vessels to constrict and raises blood pressure. By inhibiting ACE, garlic helps to prevent the formation of angiotensin II, leading to improved blood vessel dilation and reduced blood pressure. These combined effects make garlic a beneficial natural remedy for managing hypertension.

Garlic, primarily involving its bulb, which contains the sulfur-containing compound allicin. When garlic is crushed or chopped, allicin is released and promotes vasodilation, relaxing blood vessels and reducing vascular resistance, thereby lowering blood pressure.

ADVANTAGES AND DISADVANTAGES OF MEDICATIONS AND THAI HERBS

Medicines and Thai herbs have different advantages and disadvantages. These are some information for patient to look for alternative's treatment.

Information of Loratadine

Advantages	**Disadvantages**
1. Non - Sedating	1. There may be subtle effects on cognitive function in sensitive individuals.
2. Provides effective symptom relief for up to 24 hours.	2. Some individuals may experience headaches, dry mouth, or gastrointestinal issues.
3. Generally, have fewer drug interactions	3. May be less effective for severe allergic reactions or chronic urticaria compared to other antihistamines or additional treatments.
4. Effective for a broad range of allergic symptoms.	4. May not be effective for everyone

Information of Ginger and Phlai

Advantages	**Disadvantages**
1. Can reduce inflammation related to allergies.	1. More research needed to confirm effectiveness.
2. Helps in reducing oxidative stress.	2. Rare but possible, especially in sensitive individuals.
3. May influence immune responses beneficially.	3. Potential for interactions with certain drugs.

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Information of Memantine

Advantages	Disadvantages
1. Slow the progression of symptoms in Alzheimer's disease	1. Not effective for mild symptoms, as it used for moderate to severe Alzheimer's and not recommended for mild cases.
2. Protect neurons from excitotoxicity which caused by excessive stimulation	2. The benefits may take weeks to become noticeable.
3. Have fewer side effects compared to other Alzheimer's medications	3. High costs included, which may be concerned for some patients.

Information of Chan-Daeng

Advantages	Disadvantages
1. Cognitive Improvement	1. Limited Clinical Evidence
2. Neuroprotection	2. Side Effects and Interactions
3. Improved Quality of Life	3. The correct dosage and method of administration that need to be determined.

Information of Spinach

Advantages	Disadvantages
1. High in antioxidants.	1. Limited direct efficacy.
2. Spinach contains anti-inflammatory compounds which might help reduce the risk or slow down disease progression.	2. High consumption of spinach could interfere with absorption of minerals due to its oxalate content.
3. Spinach has flavonoids and polyphenols which have been shown to have neuroprotective effects.	3. High in oxalates, which could contribute to the formation of kidney stones in susceptible individuals.

Information of Olmesartan

Advantages	Disadvantages
1. Effective Blood Pressure Reduction	1. Potential for Hyperkalemia
2. Long Duration of Action	2. Possible Gastrointestinal Side Effects
3. Olmesartan does not adversely affect lipid levels, which is beneficial for patients with dyslipidemia.	3. Risk of Rare but Serious Adverse Effects
4. Kidney Protection	4. Olmesartan may be more expensive compared to generic alternatives.
5. Lower Risk of Cough	5. Potential for Drug Interactions

Information of Celery

Advantages	Disadvantages
1. Rich in Nutrients	1. Potential Allergic Reactions
2. Celery contains compounds such as phthalides, which may help to relax blood vessels and improve blood flow, potentially reducing blood pressure.	2. Interactions with Medications
3. Low Sodium Content	3. High Water Content and Sodium in Processed Varieties
4. Anti-Inflammatory Properties	

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Information of Garlic

Advantages	Disadvantages
1. Blood Pressure Reduction	1. Interactions with Medications
2. Garlic contains antioxidants that help reduce oxidative stress.	2. Garlic can cause gastrointestinal discomfort, such as bloating, gas, and heartburn.
3. Cholesterol Reduction	3. The effectiveness of garlic can vary depending on the preparation and dosage.

DISCUSSION

Choosing a treatment method, whether using conventional medicine or herbal remedies, depends on the disease and symptoms.

Recommendations for patients using medication-based treatments, suitable for

1. Patients with severe or acute symptoms, such as serious infections.
2. Seeking highly effective and rapid treatment.
3. Patients with diseases requiring specialized treatment which need drugs specifically tailored to treat these conditions.
4. Looking to prevent the spread of disease or complications.

Recommendations for patients using herbal treatments, suitable for

1. Patients with mild, non-severe symptoms.
2. Patients who are allergic to or experience side effects from conventional medicine. Herbal remedies might offer a safer alternative in such cases.
3. Seeking natural treatment, for patients who prefer to avoid chemicals and opt for more approaches.
4. Patients with chronic conditions.

CONCLUSION

Medication is especially important when patients are experiencing an exacerbation of an underlying medical condition, as different medications used to treat the condition vary in efficacy, duration of action, and cost. In addition, the choice of medication depends on individual factors, such as body weight, which is used to calculate the appropriate dosage for each individual to achieve the best and safest treatment results. Therefore, having a variety of medication options, both modern medicine and herbal medicine, will help patients have more appropriate treatment options for their illnesses. Consider the case of the use of Ginger and Phlai for Allergies treatment, Chan-daeng and Spinach for slow down the progression of symptoms in Alzheimer's disease, Celery and Garlic to reduce the blood pressure in Hypertension patients. Patients can choose the medicine that meets their needs and is consistent with their physical condition, whether it is choosing medicine for the best treatment results, reducing side effects, or choosing medicine at a price that is suitable for their financial ability. Having a variety of options is beneficial to patients in taking care of their health more appropriately and safely.

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