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AN ARTICLE ON ANALGESIC ACTIVITY OF VARIOUS HERBAL PLANTS

Pooja Kalchha*, Namrata Gupta and Lalit Verma

Swami Vivekanand College of Pharmacy, Indore (M.P.), India.

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***Corresponding Author**
Pooja Kalchha
Swami Vivekanand College of Pharmacy, Indore (M.P.), India.

ABSTRACT

Pain is a localized or general unpleasant sensation that cause minor or major body discomfort. This can be caused by hurt in any body parts or by disease. Pain can be reduced or treated by analgesics. An Analgesic A drug that give relieve from pain by acting on CNS or on peripheral pain mechanisms without any changes or alteration in consciousness. There are many synthetic drugs which are used as analgesic but they have some side effects, therefore we can use herbal plants or their parts which possesses analgesic activities. There are some pain reliving drugs example - Opoid analgesics, Aloevera Curcuma alismatifolia, Phoenix sylvestris, Stachys schtscheglee, Cissus quadrangularis, menthol, Bunts longifolia, Burns sempervirens, Fumaira vaillantii, Rumex crispus, Urtica dioica, Barbedensis, Andrographis Paniculata, \Elettaria cardamomum, Punica granatum, Eugenia caryophyllus, mimosa, Morinda Citrifolia etc. They does not have any side effects. In this review the analgesic activity of various herbal plants discussed.

KEYWORDS: Pain, Epidemiology, Etiology, Ananlgesic, Herbal plant.

1. INTRODUCTION

1.1 Pain

Pain is an unpleasant feeling which you have when your body or its part been hurt or when you have any disease. Pain is sensed by some receptors. These receptor are essentially the nerve ending of so called "first - order neurons" in the pain pathway. The axons of these neurons had surrounded by myelin. A fibers, or unmyelinated C type. My linated A fibers conducted at fast speeds and are responsible for the initial sharp pain perceived at the time of injury. Unmyelinated Cfibers first - order neurons travel to the spinal nerve to the spinal cord, where they synapse with second - order neurons in the dorsal horn. These neurons cross over

to the other side of the cord, before ascending to the brain. This is how information of pain on the left side of the body is transmitted to the right side of the brain, and vice versa. Pain an unpleasant sensation occurring in varying degrees of severity as a consequence of injury, disease, or emotional disorder. it can be steady, throbbing, stabbing, aching, pinching, or described in many other ways. components. Pain has both sensory and psychological mechanism. pain is a sensation or more then physical alertness. Anatomic pattern of sensory and motor neurons move quickly, nerve impulses alerting the fibers from the brain.[3]

Different types of pain include.

1) Somatic pain: Abdominal pain is discomfort or other uncomfortable sensations that you feel in your belly area. caused by the activation of pain receptors in either the body surface or musculoskeletal tissues, which can be caused by combination of many factors like inflammation, repetitive trauma, abnormalities, excessive activity, vigorous stretching and contraction due to paralysis.

2) Visceral pain: associated with the damage of internal organs and is most common form of pain, this is result by the activation of pain receptors in the chest, abdomen or pelvic areas.

3) Neuropathic pain: caused by injury or malfunction to the spinal cord and peripheral nerves associated with burning, tingling, shooting, stinging, pins and needles sensation.

4) Acute pain: results from tissue damage or injury, but usually goes away as the injury heals.

5) Chronic pain: This pain is ongoing regularly and lasts longer than six months. This pain can continue even after healing of the injury or illness that caused it has gone away. chronic pain can be a great challenge for physicians because it may has ability to change the function and quality of life.[4][6]

1.2 Analgesics:- Pain can be extremely debilitating and can cause long term morbidity. Analgesic are a group of various classes of medications which provide relief from pain. They are some of the most commonly prescribed medications worldwide.

Mechanism of action of Analgesic

i. Analgesics acts in many ways on the peripheral and central nervous system.
ii. Opioids product analgesic by binding to specific G- protein coupled receptors in brain and spinal cord.
iii. NSAIDs inhibit the activity of both cyclooxyxygenase-1 and (COX-2) and therby the synthesis of prostaglandins and thromboxanes.

iv. Inhibition of COX-2 lead to the anti-inflammatory, analgesic and antipyretic effects.

There are different types of analgesic, including.

Divided into two groups.

1. Opioid analgesic - Narcotics / morphine like analgesic.

- ❖ Nature opium alkaloids:- Morphine & Codeine.
- ❖ Semi synthetic opiates:- Pholcodeine, Diacetylmorphine oxymorphine.
- ❖ Synthetic opioids:- Pecthidine, Fentanyl, Ethoheptazine, Methadone, Tramadol, Dextropropoxyphene.

2. Non opioid analgesic -NSAIs/ non narcotics /asprin like analgesic.

- ❖ Non-selective Cox inhibitors.

i. Salicylates - asprin, salicylamide, diffunisal.
ii. Pyrazolone derivaties - phenyl butazone, oxyphenyl - butazone.
iii. Propionic acid derivatives :- naproxen ibuprofen, ketoprofen, flubiprofen, oxaprozin.
iv. Indole derivaives :- indomethacin, sulindac.
v. Anthranilic acid derivative - flufenamic acid, mephanimic acid.
vi. Arl acetic acid derivative -tolmetin, diclofenac.
vii. Oxicam derivatives - tenoxicam, piroxicam.
viii. Pyrrole derivatives - ketorolac

- ❖ Preferential COX-2inhibitors:-

i. Nimesulide
ii. Meloxicam
iii. Nabumetone

- ❖ Selective COX-2 inhibitors :-

i. Valdecoxib
ii. Rofecoxib
iii. Celecoxib

- ❖ Analgesic with poor anti-inflammatory action:-

i. Paraminophenol derivatives - acetaminophen
ii. Pyrazolone derivatives -propiphenazone, metamizol.
iii. Benzoxazocine derivatives - nefopam.

The medicines are commonly used to treat pain due to sore muscles, injury, arthritis, surgery, menstrual cramps, headache, and toothache, or other causes.

Analgesic choice is also determined by the type of pain: For neuropathic pain, traditional tissue damage, chemical agents/pathogens or nerve damage.[3]

1.2.1 Etiology

Pain receptors are free nerve endings that respond painful stimuli. Pain receptors are found throughout all tissue except the brain. And they transmit information to the brain. They are stimulated by stimuli such as biological, electrical thermal, mechanical, and chemical stimuli. Pain occurs when these stimulators are transmitted to the spinal cord and then travels to the central areas of the brain. to carry pain signal from the spinal cord to the brain.

The spinothalamic tract: - second order neurons travel up within the spinothalamic tract to the thalamus where they synapse with third - order neurons; third - order neurons then project to there designated locations in the somatosenory cortex. This pathway is involved in localization of pain.

The spinoreticular tract : - second - order neurons ascend to the recticular formation of the brainstem, before running up to the thalamus hypothalamus, and the cortex. This tract is responsible for the emotional aspect of pain. Pain signals from the face follow a different route to the thalamus.m, they synapse.

“First - order neurons” travel mainly via the trigeminal nerve to the brainste with second-order neurons, which ascend to the thalamus. Pain from the skin, muscles and joint is called somatic pain. pain from internal organs is known as visceral pain. Visceral pain is a different location in a phenomenon known as referred pain.

For example - pain from a heart attach may be, arm or back, rather than in the chest where the heart is located. This happens because of the convergence of pain pathways at the spinal cord level.

In this example spinal segments T1 to T5 receive pain signals from the heart as well as the shoulders and arms, and the brain cannot tell them aspect. Becouse superficial tissues have more pain receptors and are more often injured, it's common for the brain to make an assumption that the pain comes from the shoulder or arm instead of the heart. A branch of medical science concerned with the causes and origins of diseases Pathophysiology of Pain.[14]

1.2.2 Epidemiology

At present time, it is very difficult to define the epidemiology of pain because of the symptom's subjective nature and the lack of consensus for specific diagnoses and conditions, therefore it is hard to say about evidences for the true incidence of most painful conditions. People may experience pain as an acute, chronic, or a combination of the three. Specially chronic pain is a complex condition which posses physical, social and psychological factors.

As talked above, there is a lack of evidence for the incidence of pain. This is a world-scale epidemiolgy report of 2008 which produced by Tsang et al. That shows an age-standardized effects of chronic pain conditions in the previous 12 months of 37.3% in developed countries and 41.1% in developing countries, that have an overall prevalence of 38.4%. There is also crude generality of any pain condition in previous 12 months (%) among various countries with data from the Tsang et al. 2008's report.

Socio-demographic factors associated with chronic pain

Age : There is not a evidence of clear relation between age and onset of pain conditions. but, generally, there is a higher effects of chronic pain in older age. Recent studies have found that pain is a prevalent and serious problem in older age people, and can be estimated by the following data: the effect of chronic pain in older people (>65 years) living in the community ranges from 25.0% to 76.0%, while the prevalence of chronic pain in older people living in residential care is much higher and ranges from 83.0% to 93.0%.

Gender: Adult females shows a higher prevalence for chronic pain, and associated with lower pain effects and tolerance. Pain episodes are more regular or frequent and of longer duration in women than men. However, the greatest gender differences are seen in the related to chronic pain syndromes.

As of today, it is difficult to explain the epidemiology of pain because o shortage of evidence for specific diagnoses and conditions of pain, therefore it is hard to explain about evidences for the true frequency of most pain conditions. f its nature of the symptoms and the.

People can experience pain as an acute, chronic, or intermittent condition, or a combination of the three. Specifically, chronic pain is a complex conditions social, embracing physical, and psychological factors.

As stated above, there is a lack of amount of evidence for the incidence of pain. Aside this, a world-scale epidemiology report of 2008 produced by Tsang et al. shows an age standardized incidence of chronic pain conditions in the previous 11 months of 36.3% in developed countries and 40.1% in developing countries, with an overall prevalence of 37.4%. The pictures belows shows the crude prevalence of any pain condition in previous 11 months (%) among various countries with data from the Tsang et al. 2008's report.

Lifestyle factors: Some factors play a role in the development of pain conditions, such as obesity, smoking and poor health status.

Psychosocial variables: It is thought to have impact on pain effects include stress, anxiety, depression, low self-esteem, and the presence of chronic health problems.

Economic impact of pain: The pain aggravate the quality of life of sufferers, but it also represents an economic burden, for individuals and health care systems.

Socio-economic status: Population dependent studies of chronic pain have regularly shown that chronic pain occurrence is reversely associated with socio-economic status with evidence that people living in adverse socioeconomic circumstances suffer more chronic pain and greater pain severity, aside of other demographic, and clinical factors.

Other individual factors occupational factors: This have been related with the onset of musculoskeletal pain, such as number of job demands, job insecurity, sedentary work position, job dissatisfaction, low levels of social support in the workplace, and whole-body vibration.[4]

1.3 Various herbal drugs used in analgesic activity.

Drug Name	Scientific Name& Family	Chemical Constituents	Uses	Mechanism of Action	REF.
Clove	Name -Syzygium arcomaticum Family - myrtaceae	• Caryophyllen • Vanillin • Cretegolic acid • Methyl salicylate • Eugenitin • campesterol	• Antianalgesic • Antioxidants • Antiinflamation • Antibacterial • Anticancer • Improve liver health • In Stomach ulcers	Clove oil is inhibit the synthesis of prostaglandin, and reduce painful symptoms. Eugenol is the main constituent of clove oil which have anticancer action.	[9]
Turmeric	Name -Curcuma longa Family - zingiberaceae	• Turmerone • Curlone • Curcuphenol • Curcumin • Cyclocurcumin	• Antiinflamatory • Antioxidant • Anticardiovascular • Antiderm • Antianalgesic • Eye infections • Joint pain • Arthritis	Curcumin has wide range of action, it can be demonstrated by its activity in inhibiting lipoxygenase by binding lipoxygenase itself.	[7]
Neem	Name - Azadiachta indica Family:meliaceae	• Linonoids • Glyceride • Triterpenes • Polyphenols • Caroterpenes • Quercetin	• Aanticardiovascular • Antidiabetic • Anticancer • Antiulcer • Antidesrtification • Antimalarial • A.ntileprosy	Neem plant's parts shows antimicrobial activity through inhibitory effect on microbial growth.It is also a rich source of antioxidant.	[8]
Ginger	Name - Zingiber officinale Family: - Zingiberaceae	• Zingerone • Shogaols • Gingerols • Zingibain • Rennet • Cryteine protease	• Antioxidants • Cancer prevention • Alzheimer's diseaseprotection • Anti-inflammatory • Arthritis • Heart disease • Blood pressure • Antiviral • Diabetes • Improv digestion	The exact antiemetic mechanism of ginger is not clear, although some evidence suggests that it inhibits serotonin receptors and exerts its antiemetic effects directly on the gastrointestinal system and in the central nervous system	[11]
Mint	Name – Mentha Family:- Lamiaceae	• Menthol • Menthone • Menthyl acetate • Aubernol • Curvolne • β-elemene	• Antiallergic • Antianalgesic • Anticancer • Improve irritable bowel sydrom • Improve brain function • Breastfeeding pain	It appears that peppermint oil may have several mechanisms of action including: smooth muscle relaxation anti-microbial effects, anti-inflammatory activity.	[15]
Fenu-greek	Name - Trigonella foenum graecum Family -	• Reurin • Histidine • Lysine • L-tryptophan	• Antioxidants • Cancer prevention • Anti-inflammatory • Heart disease	This effect of the fiber content of fenugreek has been attributed to its ability to inhibit lipid	[11]

	Fabaceae	• Runtin • Lipids • Vitamins • Phosphatidychlin	• Blood pressure • Antiviral • Diabetes • Antibacterial	and carbohydrate-hydrolyzing enzymes in the digestive system	
Lemon balm	Name - Melissa officinalis Family - Lamiaceae	• Succinic acid • Protocatechuic • Stachyose • Ursolic acid • Eugenol • Citral B • Tannin	• Antiinsomia • Antianxiety • Antibacterial • Antialzheimer • Relive indigestion • Treat nausea • Relive stress	Lemon balm is a plant used as an herbal supplement. antiviral activity against some viruses, example, the herpes virus.	[2]
Fennel	Name - Foeniculum vulgare Family - Apiaceae	• β pinene • β myrcene • Anethole • Fenchone • Estragon • Furthermore • Linalool • Zingiberene • Limonene oxide • Germacrene-D	• Antiinflammatory • Anticarminative • Heartburn • Intestinal gas • Bloating • Loss foappetite • Upper respiratory tract infections • Coughs • Bronchitis	which accumulate in the cell membranes of microorganisms (food-borne pathogens), disturbing the structure and triggering an increase of permeability, leading to the electrolytes leakage (K + and Na +)	[5]
Rose - mary	Name - Salvia rosmarinus Family - Lamiaceae	• Camphor • Camphene • Limonene • Linalool • Terpinolene • Tricyclene • Tras-sabinene • Endo-fenchol	• Antioxidants • Antiinflamattory • Antidandruff • Antianxiety • Antibacterial • Stimulates hair growth • Relive pain	This essential oil was incorporated into meat reporting antibacterial activity against Brochothrix thermosphacta and Enterobacteriaceae	[10]
Sage	Name - Salvia officinalis Family - Lamiales	• Thujone • Camphor • Borneol • Viridiflorol • 1,8-cineol	• Antioxidant • Stomach pain • Heartburn • Antidepression • Antialzheimer • Loss of appetite	It is believed to provide therapeutic effect through beta-thujone, which is a major component of Sage leaf oil extract.	[1]

CONCLUSION

Plants have been used as medicine and food by animals since their life emerged. Plants contain a large number of pharmacologically active chemicals or ingredients and each herb has its own unique combination of chemicals and properties. Many number of plants have been described in Ayurveda and other traditional medicinal systems for treatment of different diseases according to the condition of the patient and according the chemical constituents of herbs. Pain and inflammation are a widespread and very common problem for humans. In this review there are some herbal medicine used by different medicinal system and peoples in

pain and inflammation. At Present the herbal plants are widely used by people regularly in daily routine. These plants are safe to use and effective.

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