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Ginger as an Alternative Medicine to Urban Population - A Review

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Urbanization with rapid changes in diet and lifestyle in various social classes, and possibly aging of the population seem to be responsible for many common diseases like cardiovascular diseases, respiratory problems, diabetes, cold, flu and cancer as well. In most of the urban diseases stress is a contributing factor and it can aggravate diseases caused due to polluted environment with lead fumes, chloroflouro carbons, CO_2, hydrocarbons and other green house gases. Ginger is known for its powerful antioxidant, antiviral, anti-inflammatory and antibacterial properties from time immemorial. It has been used in traditional Chinese and Indian medicine (Ayurveda) for over 25 centuries as a digestive aid and anti- nausea remedy, treat bleeding disorders, respiratory conditions, block excessive clotting (i.e. heart disease), reduce cholesterol etc. Hence, it can be used as an alternative medicine with zero side effects to suppress such common urban diseases and reduces stress from busy life. This article furnishes the uses of ginger concerning health care in urban areas.

Keywords: Ginger; Alternative medicine; Urban population.

Populations across India have changed dramatically in the 20th century. Most human societies have moved from agrarian diets and active lives to fast foods and sedentary urban lifestyle, increased alcohol consumption combined with increasing tobacco use and stresses in work place and less physical exercise have fuelled diseases like obesity, diabetes, hypertension and cardiovascular diseases. Environmental pollution in urban areas added to respiratory problems across all age groups (Xavier *et al.*, 2008 and Prabhakaran *et al.*, 2005).

India is a developing country with one of the most diverse populations and diets in the world. Cancer rates in India are rising and the rates of oral and oesophageal cancers are some of the highest in the world (Sinha *et al.,* 2003). Change of diet is among the factors that may be responsible for the changing disease rates. Other common diseases found in urban areas are common cold, flu, digestive problems, inflammatory, fever and many others which are caused due to dirty, unhealthy places in cities which provides breeding ground for many disease causing micro-organisms. In addition, migration and urbanization have resulted in an increase in the prevalence of risk factors such as cancer, diabetes and overweight (Ebrahim *et al.*, 2010). Chakravarthy *et al.* (2002) reported that the prevalence of asthma and nocturnal cough was significantly higher among urban children in the age group of 6-12 years. Children living in urban areas also reported 'recent wheeze' more often than rural children. Chhabra *et al.* (2008) reported higher prevalence of respiratory diseases in urban area in India. Direct exposure to atmospheric pollutants are major factors which increases cough, cold and allergy remedies in India which is high in urban areas. Childhood migraine is very common in urban areas which is mostly triggered by

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environmental (sun exposure, hot humid weather, smoke and noise) and stress related (Chakravarty *et al.,* 2009).

GINGER – The alternative medicine

Ginger is a natural herb used in our day to day life. It has potential health benefits which are yet to be explored. Its potential properties are known in natural medicine for thousands of years. Its use is more popular in south East Asia as a kitchen spice. Its uses are reported in many respiratory, digestive and inflammatory disorders. The Chinese have used ginger for at least 2500 years as a digestive aid and anti- nausea remedy and to treat bleeding disorders and rheumatism; it was also used to treat baldness, toothache, snakebite, and respiratory conditions. In Traditional Chinese Medicine, ginger is considered a pungent, dry, warming, yang herb to be used for ailments triggered by cold, damp weather. Ginger is used extensively in Ayurveda, the traditional medicine of India, to block excessive clotting (i.e. heart disease), reduce cholesterol and fight arthritis. In Malaysia and Indonesia, ginger soup is given to new mother for 30 days after their delivery to help warm them and to help them sweat out impurities. Some Africans believe that eating ginger regularly will help repel mosquitoes (Kemper, 1999)

Ginger chemistry

In the fresh ginger rhizome, the gingerols were identified as the major active components and gingerol 5-hydroxy-1-(4-hydroxy-3-methoxy phenyl) decan-3-one is the most abundant constituent in the gingerol series. The powdered rhizome contains 3-6% fatty oil, 9% protein, 60-70% carbohydrates, 3-8% crude fiber, about 8% ash, 9-12% water and 2-3% volatile oil. The volatile oil consists of mainly mono and sesquiterpenes; camphene, beta-phellandrene, curcumene, cineole, geranyl acetate, terphineol, terpenes, borneol, geraniol, limonene, linalool, alpha-zingiberene (30-70%), beta-sesquiphellandrene (15-20%), beta-bisabolene (10-15%) and alpha-farmesene. In dried ginger powder, shogaol a dehydrated product of gingerol, is a predominant pungent constituent upto biosynthesis3-5. Oleoresin, which is isolated by acetone and ethanol extraction, contains 4-7.5% of dried powder, pungent substances namely gingerol, shogaol, zingerone and paradol. The oleoresin has also been found to contain zingiberol, the principal aroma contributing component as well as zingiberene, gingediol, diarylheptanoids, vitamins and phytosterols.

Ginger against cardiovascular diseases

In traditional Chinese medicine, ginger is used to improve the flow of body fluids. It stimulates blood circulation throughout the body by powerful stimulatory effect on the heart muscle and by diluting blood (Shoji *et al.,* 1982). The improved circulation is believed to increase the cellular metabolic activity, thus contributing to the relief of cramps and tension. A Japanese study showed that active constituents in ginger reduced the blood pressure and decreased cardiac workload (Tanabe *et al.,* 1993). Ginger reduced the formation of pro-inflammatory prostaglandins and thromboxane thus lowering the clotting ability of the blood (Bordia *et al.,* 1997). Ginger can prevent the increase in cholesterol levels following intake of cholesterol-rich diet (Gujral., *et al.,* 1978).

Ginger as antioxidants/anti-cancer

Antioxidants are the chemical substances that reduce or prevent oxidation and have the ability to counteract the damaging effects of free radicals in tissues and thus are believed to protect against cancer, arteriosclerosis, heart disease and several other diseases (Bandyopadhyay et al., 2007). About 40 antioxidant compounds have been discovered in ginger. Some of them would be heat-proof and could even be released during cooking, what could explain the increase of antioxidant activity of cooked ginger (Shobana and Naidu, 2000).

Katiyar *et al.,* 1996 studied the inhibition of tumor promotion in SENCAR mouse skin by ethanol extract of ginger rhizome. The study revealed that the animals pre-treated with ginger showed substantially lower tumour body burdens compared with non-ginger-treated controls. The results provide clear evidence that ginger possesses anti-skin tumour promoting effects. Masuda *et al*., 2004 reported that both *in vitro* and animal experiments with ginger have shown this plant possesses antioxidant action and can have a protective effect against free radical damage. Some active compounds of ginger (gingerol and paradol) might exercise a preventive effect by leading apoptosis in cancer or transformed cells. Nigam *et al.,* (2009) suggest that these compounds suppress proliferation of human cancer cells through the induction of apoptosis.

Ginger as anti-migraine

Migraine is considered as a neurological disorder. Ginger is reported in Ayurvedic system of medicine to be useful in neurological disorders. It is proposed that administration of ginger may exert prophylactic effects in migraine headaches without any side effects. Ginger powder (500-600 mg) taken at the onset of migraine aura, followed by 4 hourly intake for 3-4 days, is reported to provide relief from migraine attacks (Mustafa *et al.,* 1990).

Ginger as anti-inflammatory

Some of the characteristic features of rheumatic diseases are polyarthritis with inflammation, swelling, and pain. In Ayurveda, ginger is reported to be useful in treating inflammation and rheumatism. One of the mechanisms by which ginger exerts its ameliorative effects could be related to inhibition of prostaglandin and leukotriene biosynthesis. Srivastava and Mustafa (1989) revealed that an average intake of 5 g of fresh ginger or 0.5 to 1 g powdered ginger reduced pain, swelling, morning stiffness in patients suffering from arthritis. None had side effects due to ginger intake.

Ginger as anti-microbial

Ginger has been traditionally used for the treatment of throat infections and been reported to inhibit the broad range of pathogenic microorganisms included gram positive, gram negative bacteria and fungi. Many in vitro studies proved the antimicrobial potential of *Z. officinale* extracts towards both gram positive and gram negative bacteria. Antimicrobial activity of the different organic extracts (n-hexane, ethyl acetate, ethanol and water) of *Z. officinale* rhizome was reported against *Colliform bacillus*, *Staphylococcus epidermidis* and *Streptococcus viridians*. The study showed that all the extracts except the water extract have antibacterial activity and that the inhibition of bacterial growth. Among all, ethanol extract showed maximum antimicrobial activity (Malu *et al,* 2009). Antifungal activity of the ethanol extract of *Z. officinale* was reported against two strains of Candida albicans (PTCC 5027 and ATCC 10231).

In vitro studies have shown that active constituents of ginger inhibit multiplication of colon bacteria. These bacteria ferment undigested carbohydrates causing flatulence. This can be counteracted with ginger. It inhibits the growth of *Escherichia coli, Proteus sp, Staphylococci*, *Strepto–cocci* and *Salmonella* (Gugnani and Ezenwanze, 1985). The ginger extract has antimicrobial action at levels equivalent to 2000 mg/ml of the spice. Ginger inhibits *Aspergillus*, a fungus known for production of aflatoxin, a carcinogen (Kapoor, 1997). Fresh ginger juice showed inhibitory action against *A.niger, S.cerevisiae, Mycoderma* SPP. and *L. acidophilus* at 4, 10, 12 and 14% respectively at ambient temperatures (Meena, 1992).

Ginger against diabetes

Ginger is used to control diabetes in traditional medicinal system. Many in vivo scientific studies have been conducted in animal models to evaluate the ant-diabetic activity of different organic extracts and fresh juice of *Z. officinale*. Hypoglycaemic potential of *Z. officinale* was reported in streptozotocin induced diabetic rats. Treatment with aqueous extract (500 mg/kg body weight, i.p.) of *Z. officinale* for a period of 7 weeks significantly decreased the serum glucose, cholesterol and triacylglycerol levels in the treated diabetic rats compared with the control diabetic rats (Al-amin *et al,* 2006). Fresh juice of *Z. Officinale* was reported to carry hyperglycaemic activity. The Fresh juice of *Z. officinale* (4 ml/kg body weight) produced a significant time dependent decrease in blood glucose level in streptozotocin induced diabetic rats (Asha *et al.,* 2011). The juice of *Z. officinale* was reported to control type I diabetes. Treatment

with *Z. officinale* juice in streptozotocin induced type I diabetic rats resulted in to a significant increase in insulin levels and a decrease in fasting glucose levels in diabetic rats. *Z. officinale* treatment also caused a decrease in serum cholesterol, serum triglyceride and blood pressure in diabetic rats (Akhani *et al.,* 2004).

Ginger against other common diseases

Traditionally, ginger is used in Ayurveda, Siddha, Chinese, Arabian, Africans, Caribbean and many other medicinal systems to cure a variety of diseases viz, nausea, vomiting, asthma, cough, cold, flu, hypertension, loss of appetite, constipation, indigestion and pain (Grzanna *et al,* 2005). For colds and headache 2 table spoon or several slices of fresh ginger can be added to boiled water can be consumed 2-3 times daily. Fresh ginger root can also be sliced and steamed and the vapors inhaled. For nausea and indigestion,

2-4 grams of ginger can be used daily. Alternately a 1D 4 piece of raw or crystallized ginger can be chewed. As with many herbal preparations, it can take up to two months before the full effects are noticed (Moore, 2013).

Ginger also provides good relief from hypertension (Bode and Dong, 2011) and improves blood circulation (Chevallier, 2000). The Chinese take ginger for a wide variety of medical problems such as stomachache, diarrhoea, nausea, cholera, asthma, heart conditions, respiratory disorders, toothache and rheumatic complaints (Wagner and Hikino, 1965). In Ayurveda, ginger has been recommended for use as carminative, diaphoretic, antispasmodic, expectorant, peripheral circulatory stimulant, astringent, appetite stimulant, anti-inflammatory agent, diuretic and digestive aid (Warrier, 1989).

CONCLUSION

Many of the ailments in urban areas can be cured using ginger as supported by the medicinal properties reviewed above. Most of the drugs used for treating diseases such as diabetes, cancer, migraine and others have side effects of varying degree. Therefore, ginger can be the alternative medicine with zero side effects to cure common diseases and can relieve stresses and hypertension. Pharmacological screenings of ginger revealed its medicinal potential and represents it as a valuable medicinal plant with several medicinal properties which can be use easily as the alternative medicine to cure common ailments in urban areas.

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