

A History of Traditional Usage, Efficacy and Prospect of Plant-Derived Medicine

Md. ABUL HOSSAIN¹

MPhil student, Bangladesh University of Professionals

BHABASINDHU TALUKDER

Executive, Microbiology, Medimate Pharmaceuticals Ltd.

Md. ADOL INSAN

Medical Officer cum Assistant Researcher

Training and Research Institute of Medicine, Agriculture & Nutrition

(TRIMAN) Nutraceuticals Limited

Abstract

The contributions of traditional and herbal medicine (TCM) in health care system as well as the source of modern scientific medicine have attained a great attention in most communities worldwide. Traditional and herbal medicine prescriber's knowledge remains an integral part of traditional health system also. To date, in some parts of the world, the maximum populations rely on their own traditional medicine to meet their primary healthcare needs. The most widely used traditional medicine systems today include of China, India, Pakistan, America, Africa, and presently in Bangladesh. According to World Health Organization (WHO), 60% of the world's population depends on traditional and herbal medicine and 80% of the population in developing countries depends almost entirely on traditional medicine practices and herbal medicines for their primary health care needs. Due to increase the demand of herbal medicine, the manufactures, exporters, even health care providers are facing many steps about the safety, standardization, efficacy, quality, availability, and preservation of herbal products. The acceptance of this system showed remarkable impact in the cost of health care interventions, prevention and self-healing health industry. A famous Pharmacopeia has described various

¹ Corresponding author: mahsujon71@gmail.com

medicinal plants like willow tree, in which Hippocrates is acknowledged as a father of western medicine used to control headache and body pain. After identification of salicylic acid as plant derived active molecule and based on that the aspirin, paracetamol, diclofenac, mefenamic acid, ibuprofen are synthesized and contributed as pain killer in modern medicine. The analytical techniques are improved in 19th century, these are being used to detect active ingredients through extraction and isolation from plants and find their pharmacologic and toxic effects which help to modern medicine. It is estimated that the growing trend of the market for Ayurvedic medicine at 20% annually. India earns 5.5 billion US dollars every year and Chinese export nearly Rs 18000-22000 crores and about 70 percent modern medicine derived from natural ingredients. Different parts of the medicinal plants like roots, tubers, pseudobulbs, stems, barks, flowers, seeds, berries, leaves even whole plants are used for therapeutic purposes. The usable plants and herbs are mostly indigenous, easily cultivable, and widely available. They are very cheap, environmental friendly and almost no/negligible side effects.

Keywords: Traditional Medicine, Herbal Medicine, Modern Official/Scientific Medicine, Medicinal Plants, Phytochemistry.

INTRODUCTION:

Herbal medicine is being used from the very ancient period of the human civilization before the application of modern science to health. In age old, people believed the diseases have been caused by spirits and ghosts and there were two types of treatment provider like the *Ashipu* or sorcerer, who diagnosed ailments by the spirit or sin that had caused illness and the *asu* who were specialist in herbal remedies (Coleman et al. 1997 and Mohit, 2001). The history of practices of herbal medicine varies in different countries depend on their culture and heritage. The archaeological documents suggest that plants have been being used since prehistoric times and from then in Europe, people used of phytotherapy which comes from a mummified body of a man who lived about 5300 years ago (Tyrol, 1991). Nature and its derivatives always a golden sign to show the prominent phenomena of coexistence. Uprooting remission of diseases and illness with maintenance of good

health, complementary and herbal medicine are old as mankind in healthcare practices in all cultures in all ages irrespective of sexes. Ancient Sumerian cuneiform tablets, dating back to 1600 BC, illuminate several centuries of medical knowledge and perceptions from Mesopotamia. The demand of the herbal or natural medicine is increasing day by day for its efficacy, availability due to indigenous, getting in absolutely raw, comparatively low cost and almost no or negligible side effects. According to the World Health Organization (WHO) survey at 2018, the member states of 107 had a national office for traditional and complementary medicine and 75 member states had a national research institute, a total of 34 member states across the six WHO regions with traditional or herbal medicine in their national essential medicine lists (NEMs), and many member states, such as Ghana had a separate list of essential herbal medicine (WHO Global Report, 2019). Presently, it is estimated that over 100 million Europeans are currently traditional and complementary medicine users (European Information Centre, 2020), in China 40%, Chile 71%, Colombia 40%, India 60%, Australia 48.5%, Belgium 31%, Canada 70%, France 49%, United States of America 42% (WHO, 2003) of total population use complementary or herbal medicine. In five years, the Traditional Chinese Medicine Manufacturing in China industry has grown by 11.0% to reach revenue of \$37bn in 2018. In the same timeframe, the number of businesses has grown by 6.8% and the number of employees has grown by 7% (Lee et al, 2011). The prevalence of traditional medicine users is increasing up to 80% (WHO Traditional Medicine Strategy, 2013). WHO estimation, among the traditional medicine users 50%-80% use of herb-based therapies and is lower than that in Japan and Singapore (Siti et al, 2009). About 70%-80% of population in the world confidently use and rely on traditional and/or herbal medicine to fulfill their primary healthcare needs (Farnsworth et al. 1991 and Shengji, 2001). In many countries like Bangladesh, India, Pakistan, China, Canada, United States of America, Australia Japan, South Korea and so on, modern scientific medicine and traditional medicine are being used parallel and recognized by the state (Asante et al, 2013). The herbalists of tribal community in Bangladesh play a significant role in primary healthcare by herbal treatment. The population of the Hill Tracts areas nearly hundred percent dependent on herbal treatment for both common and complicated disease and 78

diseases are completely treated by 198 various plant species (Rahman et al. 2007).

Traditional Medicine (TM) versus Modern Official Medicine (MOM):

The World Health Organization provided a definition of Traditional medicine as “the sum total of knowledge, skills and practices based on the theories, beliefs and experiences [of] different cultures that are used to maintain health, as well as to prevent, diagnose, improve or treat physical and mental illness” (Edwards, et al 2012). It’s also called by herbal medicine, natural medicine, phytomedicine, botanical medicine (Bent, 2008, Falodun, 2010). Different parts of the plant like roots, tubers, pseudobulbs, barks, flowers, stems, seeds, berries, leaves, even whole plants and herbs are used for therapeutic purposes (Bent, 2008, Falodun, 2010). Modern official medicine (MOM) is called as orthodox medicine is based on the knowledge attained from a scientific process through observation and research. In modern medicine, the practitioners treat the person according to symptoms. They believe it has enough power and knowledge to fix an innate system by increasing in its normal homeostasis using powerful man-made chemicals (Opoku et al. 2015, and The Orthox Medicine Model, 2020). Although present development of molecular biology and physiological chemistry have given us great understanding and treatment of diseases and a large number of population rely and depend on traditional (alternative) medicine as the preferred system of healthcare. Even though, in industrialized countries the meditation, acupuncture, relaxation, moxibustion (herbs burning on acupuncture points), hypnosis, qigong (energy healing) are promoting promptly. Not only that but herbal-based therapies are also applied for the treatment of many degenerative disorders and chronic diseases where modern official medicine are failed or proved inadequate (Maurice et al, 2000). The acceptance of these systems showed remarkable impact in the cost of health care interventions, preventive medicine and self-healing in health industry. On the other hand, modern official medicine (biomedicine) is derived from the belief in materialism and mechanism provided by experiments and verifiable theories (Maurice et al, 2000). Herbal remedies are increasing rapidly and being accepted as the source of therapeutic agents in modern biomedicine.

Many important active ingredients like morphine isolated from opium poppy (*Papaver somniferum*) is a strong pain killer and narcotic, quinine from *Cinchona* plant as an antimalarial, taxol from *Taxus brevifolius*, vincristine from *Catharanthus roseus* to treat cancer, serpentine from *Rauwolfia serpentina* as an antihypertensive drug (Gurib-Fakim 2006, Newman 2003, Gupta 2005, and Lesney 2004). Bioactive principles of many other plants have served and continuing still as lead compounds for design, synthesis and development of novel drugs (UNESCO FIT/504-RAF-48, 1998).

Interdependency between Traditional and Modern Medicine:

Nature creates interrelation and interdependency among species to species, individuals to individuals. The Pharaonic Pharmacopeia Papyri has described many medicinal plants including some of their bark of the willow tree, in which Hippocrates (~ 460-370 BC) is acknowledged as a father of western medicine used to control headache and body pain (Sneader, 2005). In 1889, active molecule salicylic acid is identified and based on that aspirin, paracetamol, diclofenac, mefenamic acid, ibuprofen etc. are synthesized (Sneader, 2005). Scientists discovered the anticancer drugs vincristine and vinblastine from Madagascar's rosy periwinkle *Catharansus roseus* (Newman, 2007). Modern medicine cannot afford to continue to ignore the social dimension of illness. Developments in human genomics have shown that no two individuals are identical in their composition, yet in a fundamental sense, all living organisms share the same building units. This new eyes into the nature of life is more acceptance with the traditional belief in the role of biological energy systems and order in healing, which raises the hope that in very near future science may develop a proper method for customized assessment and understanding of traditional medicine and practices. Meanwhile, the potentiality of medicinal plants or traditional medicine or herbal medicine and current contribution of this medicine for the treatment of different diseases to the hospital and everywhere in the world stand as very essential.

Herbal Medicine during the 19th and 20th Centuries:

Earlier to the 19th century, herbal medicine were used in crude form such as herbal tea, tinctures, decoctions, syrup and some products are applied externally like ointments and herbal baths (Griggs, 1981 and

Gurib-Fakim, 2006). However, from the late 19th century and onwards pharmacist, botanist, and other scientists had begun the isolation, purification and identification of bioactive principles from medicinal plants and this effort of scientists led to the discovery of several life supporting drugs which are used today (Kong et al, 2003, Goldman, 2001, Newman et al, 2003, and Gupta et al, 2005). Now, it is accounted that 90% in Africa, 70% in India, and 90% China of in general hospitals have traditional medicine units (Ernst et al, 2005, Barnes et al, 2008, and Verma et al, 2008). The World Health Organization Executive Board, 2013 has taken some decisions to achieve their goals and to promote the traditional and herbal medicine for universal health coverage by interesting into health care service delivery and self-health care and the strategy as “The first strategic direction towards this objective is to understand and recognize the role and potential of traditional and complementary medicine. The strategy recommends that Member States acknowledge and appraise, in detail, which types of traditional and complementary medicine are being used by their population and devise their own country profile for traditional and complementary medicine practice.” Fundamental approach from researchers-physicians in the 18th century regarding the European herbal medicine became a countable change, specially by William Withering (1741-1799), he assessed the effects and toxicity of digitalis through extensive clinical trial and able to form drug from the dried leaves of foxglove (*Digitalis purpurea L*) and in the 19th century analytical techniques were improved to detect active ingredients through extraction and isolation from plants and their pharmacologic and toxic effects (Heinrich 2012). Furthermore, nowadays, the degree of bioassay-guided fractionation significantly enhanced by the development of precision instruments such as high-performance liquid chromatography (HPLC/MS), liquid chromatography-mass spectrometry (LC/MS), magnetic field and nuclear magnetic resonance (NMR) is a recent major outcome for the categorization of the quantitative compounds (Schroeder et al. 2006).

Market value of herbal medicine:

The market value of traditional or herbal medicine is increasing day by day. On the other hand, in some countries due to absence of proper legislation or policy attention, the wild grow or cultivated plants based drugs trade is supposed to waste, secretive and unregulated.

Nevertheless, counting in common scenario of the world, it is estimated that the growing trend of the market for Ayurvedic medicine at 20% annually (Verma et al, 2008) and sales of medicinal plants have grown by nearly 25% in the past ten years from 1987-1996, it was the highest growth in the world (Masood,1997). Due to use herbal medicine, the lowest per capita expenditure on the medicine in India in the world and plants based medicine are main source of medicine of many other developing countries. India earns 5.5 billion US dollars every year but it is less than 0.5 percent of global herbal drugs export market and Chinese export nearly Rs 18000-22000 crores (Ali M, 2009). Some prominent herbal based pharmaceutical companies in India are showing the growth of trade about 15%. About 70 percent modern medicine derived from natural ingredients (Ali M, 2009). Now it is proved that isolated molecules from natural sources are with little or no side effects. The World Health Organization estimated that from the local source almost three fourths of the herbal drugs are used worldwide. Regarding the growth of demand and sales of herbal medicine the scientists, doctors, beauticians and pharmaceutical companies are looking countries like China and India because of their already occupied the top position in exports market of medicinal plants and their active ingredients. The whole sales of Chinese herbal medicine stood more than 83 billion in 2012 which was 20 percent more than in 2011. It has also been suggested that herbal medicine and supplements will reach more than US\$ 115 billion by 2020 that will be fastest in Asia-Pacific and largest growing markets in Europe (Jamshidi-Kia et al, 2018).

CONCLUSION:

The history of herbal medicine is rich enough in the field of treatment and as well as prevent various diseases or illness. The usage of natural or herbal medicine is increasing with time and it can be reported strongly that the modern medicine is being benefited from traditional medicine with similar effects and with different effects with those traditional medicine. Due to the efficacy and source of modern medicine, plants derivatives products have able to increase their demand across the world gradually. Proper utilization and management of medicinal plants and plants derived products might be a better alternative of synthetic medicine. In Hill Tracts of Bangladesh

herbalists treated 78 diseases both common and complicated by 198 medicinal plant species. Additionally, following the current sustained improvements in quality control and regulatory measures in many countries of the world, it is envisaged that in the near future, herbal medicine will be integrated into conventional medical systems.

Recommendation:

Government of different countries may establish the medical college hospital and research institute (i.e; Bangladesh, India, Pakistan, China) to provide Bachelor and specialized degrees on traditional medicine and research, and increase financial support for inventory and documenting the various medicinal plants, preservation of essential medicinal plants species in order to ensure a sustainable supply of safe, effective and affordable medicinal herbs and setting laboratories for establishing dosage forms for the proper administration.

REFERENCES:

1. Ali, M. 2009. "PRESENT STATUS OF HERBAL MEDICINES IN INDIA", *Journal of Herbal Medicine and Toxicology*, vol. 3, no. 2, pp. 1-7.
2. Asante, E. and Avornyo, R. 2013. "Enhancing Healthcare System in Ghana through Integration of Traditional Medicine", *Journal of Sociological Research*, Vol. 4, no. 2, pp. 256-257.
3. Barnes, PM., Bloom, B., Nahin, RL. 2008. "Complementary and alternative medicine use among adults and children: United States, 2007", *Natl Health Stat Report*, vol. 12, pp.1-23.
4. Barnes, PM. 2011. "Complementary and alternative medicine use among adults and children: United States, 2007". Hyattsville, MD, National Center for Health Statistics, 2008 (National health statistics reports, No. 12).
5. Bent, S1. 2008. "Herbal medicine in the United States: review of efficacy, safety, and regulation: grand rounds at University of California, San Francisco Medical Center", *J Gen Intern Med*, vol. 23, pp. 854-859.
6. Coleman, M., Scurlock, J. 1997. "Viral haemorrhagic fevers in ancient Mesopotamia", *Tropical Medicine and International Health*, vol. 2, pp.603-606.
7. Edwards, S., Da-Costa-Rocha, I., Lawrence, MJ., Cable, C., and Heinrich, M. 2012. "Use and efficacy of herbal medicines: Part 1- historical and traditional use", *The Pharmaceutical Journal*.
8. Ernst, E., Schmidt, K., Wider, BC. 2005. "AM research in Britain: The last 10 years", *Complement Ther Clin Pract*, vol. 11, pp. 17-20.
9. European Information Centre for Complementary & Alternative Medicine [web site]. (<http://www.eiccarn.eu/home.php?il=1&l=eng>)

10. Falodun, A. 2010. "Herbal medicine in Africa-distribution, standardization and prospects", *Res J Phytochem*, vol. 4, pp. 154-161.
11. Farnsworth, NR., Soejarto, DD. 1991. "Global importance of medicinal plants. In The observation of medicinal plants", *Cambridge University Press, Cambridge, UK*, pp. 25–51.
12. Goldman, P1. 2001. "Herbal medicines today and the roots of modern pharmacology", *Ann Intern Med*, vol. 135, pp. 594-600.
13. Griggs, B. 1981. "Green pharmacy: A history of herbal medicine", *J Morman & Hobhouse Ltd. London*.
14. Gupta, R., Gabrielsen, B., Ferguson, SM. 2005. "Nature's medicines: traditional knowledge and intellectual property management. Case studies from the National Institutes of Health (NIH), USA", *Curr Drug Discov Technol*, vol. 2, pp. 203-219.
15. Gurib-Fakim, A. 2006. "Medicinal plants: traditions of yesterday and drugs of tomorrow", vol. 27, pp. 1-93
16. Heinrich, M., Barnes, J., Gibbons, S., Williamson, E. 2012. "Fundamentals of Pharmacognosy and Phytotherapy. 2nd Edition", Churchill Livingstone, London (in press).
17. Jamshidi-Kia, F., Lorigooin, Z., and Amini-Khoei, H. 2018. "Medicinal plants: Past history and future perspective", *Journal of Herbmед Pharmacology*, vol. 7, no. 1, pp. 1-7.
18. Kong, JM., Goh, NK., Chia, LS., Chia, TF. 2003. "Recent advances in traditional plant drugs and orchids", *Acta Pharmacol Sin*, vol. 24, pp. 7-21.
19. Lee, EJ., Frazier, SK. 2011. "The efficacy of acupressure for symptom management: a systematic review", *Journal of Pain and Symptom Management*, vol. 42, no. 4, pp. 589–603.
20. Lesney, MS. 2004. "Nature's pharmaceuticals: Natural products from plants remain at the core of modern medicinal chemistry", *TCAW*, vol. 13, pp. 26-31.
21. Masood, E. (1997): Medicinal Plants Threatend by over-use. *Nature*, vol. 385(6617), p: 570.
22. Maurice, M.I, Gbodossou, E. 2000. "The Role of Traditional Medicine. Alternative Medicine, Nigeria", *The Lancet Perspectives*, vol. 356, pp. 3.
23. Mohit, A. 2001. "Mental health and psychiatry in the Middle East: historical development", *Eastern Mediterranean Health Journal*, vol. 7, pp. 336–347
24. Newman, DJ., Cragg, GM., Snader, KM. 2003. "Natural products as sources of new drugs over the period 1981-2002", *J Nat Prod*, vol. 66, pp. 1022-1037.
25. Newman, DJ., Cragg, GM. 2007. "Natural products as sources of new drugs over the last 25 years", *J Nat Prod*, vol. 70, pp. 461-477.
26. Opoku, JK., Addai-Mensah, P., Wiafe, F. 2015. "Traditional and Modern Medicine: A Survey of Views on Its Integration in Ghana. Journal of African Society", *Cultures and Traditions*, Vol. 3, no. 5, pp. 22-36.
27. Rahman, MA., Uddin, SB., and Wilcock, CC. 2007. "Medicinal plants used by Chakma tribe in Hill Tracts district of Bangladesh", *Indian Journal of Traditional Knowledge*, vol. 6, no. 3, pp. 508-517.
28. Schroeder, FC., Gronquist, M. 2006. "Extending the scope of NMRspectroscopy with microcoil probes", *Angew Chem Int EdEngl*, vol. 45, no. 43, pp. 7122-7131.
29. Shengji, p. 2001. "Ethnobotanical approaches of traditional medicine studies: some experiences from Asia", *Pharma, Botany*. Vol. 39, pp. 74–79.

30. Siti, ZM., Tahir, A., Farah, AI., Fazlin, SMA., Sondi, S., Azman, AH. 2009. "Use of traditional and complementary medicine in Malaysia: a baseline study", *Complement Ther Med*, vol.17, no. 5–6, pp. 292–299.
31. Sneader, W. 2005. "Drug Discovery: A History. West Sussex, England", John Wiley & Sons, Inc.
32. Sneader, W. 1985. "Drug Discovery: The Evolution of Modern Medicines. Chichester, England: Wiley".
33. The Orthodox Medicine Model. (www.heattreat.ca/orthodoxmedicalmodel.php: 12/04/2020).
34. UNESCO FIT/504-RAF-48, 1998, Terminal reports: Promotion of ethnobotany and the sustainable use of plant resources in Africa. Paris. pp.60.
35. Verma, S. and Singh, SP. 2008. "Current and future status of herbal medicines", *Veterinary World*, Vol. 1, no. 11, pp. 347-350
36. Verma, S., Singh, SP. 2008, "Current and future status of herbal medicines", *Vet World*, vol. 1, pp. 347-50
37. World Health Organization Executive Board, 2013. 134th session; Provisional agenda item 9.1
38. World Health Organization (WHO) Traditional Medicine. Fact Sheet No. 134; 2008. Available at: www.who.int/mediacentre/factsheets/fs134/en/ (accessed 31 March 2020).
39. WHO Global Report on Traditional and Complementary Medicine 2019.
40. WHO Fifth-Sixth World Health Assembly, 2003, provisional agenda item 14.10
41. WHO Traditional Medicine Strategy, 2013. WHO Traditional Medicine Strategy. *AlternIntegr Med*, vol. 1, no. 1, pp. 1–78.