



RESEARCH ARTICLE

PREVENTIVE STRATEGIES FOR NON-COMMUNICABLE DISEASES IN UNANI MEDICINE: A REVIEW

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Abstract

Non-communicable diseases are medical conditions that are associated with long durations and slow progress. Non-communicable diseases encompass a vast group of diseases such as cardiovascular diseases, cancer, diabetes, and chronic respiratory diseases. Non-communicable diseases constitute the leading cause of mortality globally, accounting for 70% of deaths worldwide. Unani System of Medicine provides a paradigm shift from the curative approach of conventional biomedicine to an approach in which preservation of health and prevention of disease is central. The different levels of prevention incorporated in Unani Medicine noted were, the Hifz-i-Ṣiḥḥat Mutlaq (Preservation of Health) that targets a healthy population in the form of proper dietary management, regimens, and lifestyle modification through moderation and modification. Hifz-ma-Taḳaddam (Measures for disease prevention) targets susceptible populations or apparently healthy individuals by identifying the early stage of disease through its precursors and starting preventive care at this stage of the disease that would halt its further progression. The present study is to review the effectiveness of strategies mentioned in Unani medicine in the management of non-communicable diseases and the impact of Asbāb Sitta Ḍarūriyya on individuals' health so that we can make lifestyle decisions for an individual. There is a global authoritative to create and implement effective prevention strategies because the future costs of diagnosis and treatment are likely to be exorbitant. Unani medicine has got a comprehensive plan to prevent chronic diseases.

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Introduction:-

Unani Tibb, often known as Unani Medicine, is practiced all throughout the world. The Arabic term "Tibb" means "medicine," and the name "Unani" is believed to have its origins in the Greek word "Ionan," which means "Ancient preferably to ancient Hellenistic people." The name was coined by the Indian famous religious scholar, Shah Waliullah Delvi in 17th century AD to differentiate it from Prophetic medicine. Unani Tibb is a place for invention and changes rather than just carrying on the ideas of the Greek physicians. The core philosophy of this system was conceptualized by Hippocrates. (Saad, 2014)

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Non-communicable diseases (NCDs) are chronic, non-infectious diseases that are associated with long durations and slow progress. NCDs are the result of several factors, including genetic, physiological, behavioural, and environmental factors. NCDs include cardiovascular diseases, cancer, diabetes, and chronic respiratory diseases. However, the term "NCDs" applied to include a number of medical issues, such as hepatic, renal, and gastroenterological illnesses, endocrine, haematological, and neurological disorders, dermatological conditions, genetic disorders, trauma, mental disorders, and other impairments. (WHO, 2019)

Every year, 41 million people die from NCDs, or 71% of all deaths worldwide. Between the ages of 30 and 69, more than 15 million people worldwide die from an NCD every year. In low- and middle-income nations, these "premature" fatalities account for 85% of the total. The majority of NCD deaths, or 17.9 million people per year, are caused by cardiovascular diseases, followed by malignancies (9.3 million), respiratory illnesses (4.1 million), and diabetes (1.5 million). These four groups of diseases account for over 80% of all premature NCD deaths. In India, NCDs contribute to around 5.87 million (60%) of all deaths. NCDs mainly responsible for mortality and morbidity are cardiovascular diseases, chronic respiratory disease, cancers, and diabetes, contributing to about 82% of all NCD deaths. (WHO, 2019)

Risk factors:

There are numerous variables that can enhance the likelihood of developing NCDs and they can be categorised in various ways. Risk factors may be categorised as modifiable or non-modifiable factors, depending on whether their conditions are subject to change or not.

Modifiable risk factors:

High blood pressure, smoking, diabetes, obesity, inactivity, and high blood cholesterol are risk factors that can be changed. Tobacco accounts for over 8 million deaths every year (including from the effects of exposure to second-hand smoke), more than half of the 3 million annual deaths owing to alcohol consumption are from NCDs, including cancer. Excessive salt and sodium intake has been linked to 1.8 million yearly deaths. Insufficient physical activity has been linked to 830 000 annual deaths.

Non-modifiable risk factors:

Age, gender, genetics, race, and ethnicity are risk factors that cannot be changed. Interestingly, although age and gender are non-modifiable factors, most of their associated factors are modifiable. (Budreviciute et al, 2020)

Unani System of Medicine provides a paradigm shift from the curative approach of conventional biomedicine to an approach in which preservation of health and prevention of disease is central. Approaches to the prevention of disease in Unani medicine depend on the state of the human body and provides predictive and personalized approach. If the body is in an optimum healthy state, it should be maintained by adopting a lifestyle that suits an individual's temperament. If the body becomes prone to develop the disease or having the debility without disease, both these types require additional care in terms of special diet, regimens, and even drugs. (Ibn-e-Sina, 2010), (Shah, 2007), (Kabiruddin, 2015), (Unani System of Medicine, The Science of Health and Healing, 2016)

The present study is to review the effectiveness of strategies mentioned in Unani Medicine in the prevention of NCDs and the impact of Asbāb Sitta Ḍarūriyya on individuals' health so that we can make lifestyle decisions for an individual.

Methodology:-

The survey of Unani literature was carried out to observe the causation of NCDs and the prevention strategies mentioned. The observations were further explored in light of the present knowledge base for evaluating the effectiveness of these strategies. Other sources such as "WHO international standard terminologies on Unani medicine" was also considered to obtain the appropriate English equivalent words for Unani terms that are mentioned in the article.

Observation and Results:-

Health promotion is the process of enabling people to increase control over and improve health. It is not directed against any particular disease but is intended to strengthen the host through a variety of approaches or interventions.

The well-known interventions are health education, environmental modification, national interventions, and lifestyle changes. (Ibn-e-Sina, 2010), (Kantoori, 2009), (Arzani, 2010)

Levels of prevention:

1. **Preservation of Health (Ḥifẓ-i-Ṣiḥḥat Mutlaq)**-It implies regulating or preserving the health of those people who are in an optimum healthy state. Traditionally, health is often thought of as the absence of disease, it is frequently discussed in terms of disease. According to this definition, a healthy state is "a condition in which the temperament is in a balanced state and the structures of the human body are such that its functions are carried out in a precise and whole manner. Here the aim is to remove the factors by which health is likely to be lost and maintain the conditions that promote health and targeting a healthy population in the form of diet, regimen, and lifestyle tailored to each individual's body type, he or she can prevent diseases. (Ibn-e-Sina, 2010), (Shah, 2007), (Kabiruddin, 2015)
2. **Measures for disease prevention (Ḥifẓ ma Taqaddam)**-This approach applies to the population at-risk within the context that an individual is predisposed to disease conditions depending on his/her temperament. Protection of susceptibility to reduce the incidence of disease and recognizing the prodromal symptoms and starting preventive care at that stage to prevent full-blown disease. It targets susceptible populations or apparently healthy individuals by identifying the early stage of the disease through its precursors and starting preventive care at this stage of the disease that would halt its further progression. (Ibn-e-Sina, 2010), (Shah, 2007), (Kabiruddin, 2015)

The best possible ways of health promotion are the modifications of *Asbāb Sitta Ḍarūriyya* what is called *Tadabīr* (Regimens). *Tadabīr* contains a number of recommendations for the moderation and modification of *Asbāb -e- Ḍarūriyya* and *Ghayr Ḍarūriyya*, including advice on their diet, beverages, exercise, massages, sleep, their surroundings, and factors affecting their psychological health. (Ibn-e-Sina, 2010), (Kantoori, 2009), (Arzani, 2010)

Everything depends on a cause for its occurrence, if these causes are in favour of health, health is gained. In Unani Medicine, it is emphasized that there are six causes from which nobody can escape during life known as *Asbāb Sitta Ḍarūriyya*. These six factors are among the efficient causes that are responsible for the preservation or transition of existing health. These six essential factors are:

1. *Hawā-e-Muḥīt* (Atmospheric Air),
2. *Ma'kūlāt-o-Mashrūbāt* (Foods and Drinks),
3. *Al-Ḥarakawa'l Sukūn al-Badanī* (Bodily movement and Repose),
4. *Al-Ḥarakawa'l Sukūn al-Nafsānī* (Psychic movement and Repose),
5. *Al-Nawmwa'l Yaqza* (Sleep and Wakefulness), and
6. *Al-Iḥtibās-wa'l-Istifrāgh* (Retention and Elimination). (Ahmad, 1983), (Ibn-e-Sina, 2010)

Preventive strategies for NCD

Hawā-e-Muḥīt (Atmospheric Air): Human beings need a continuous supply of air to exist because air is a vital *Rukn* (a constituent) for bodies. It constantly reaches to *Rūḥ* and becomes a source of its optimization and moderation.

The two main functions of air are:

1. *Tarwīḥ* is for the moderation of the hot temperament of *Rūḥ*. This change is accomplished by inspiration or inhalation through the lungs.
2. *Tanqīya* (purification) is for the expulsion of the waste products of *Rūḥ*. This purification is attained by means of expiration or exhalation.

Both of these functions are achieved when the air is in pure form. When it is contaminated, it leads to the *Sū'-i-Mizāj* (mal temperament) of *Rūḥ*. Therefore, the quality of breathing air is supposed to directly influence the *Mizāj* (temperament) of *Rūḥ* and thus, either health is maintained or lost. (Ibn-e-Sina, 2010) There is a direct relationship between air and temperament. Any contamination in the air may affect the healthy life either slowly or suddenly, it depends upon the intensity of contamination. If the air contamination is intense, it may result in immediate death by suffocation. But the slow effects most commonly linked with air contamination are chronic bronchitis, lung cancer, bronchial asthma, emphysema and respiratory allergies. (Park, 2005)

Avicenna, a renowned Unani scholar in his famous treatise, *Canon of Medicine*, says that the change of environment relieves the patients of many diseases. He has also emphasized the need for open, airy houses with proper

ventilation, playgrounds, and gardens in the cities so that everyone has plenty of fresh air and a proper ecological balance is maintained. Human life needs fresh and pure air to perform physiological functions and maintain health. Most chronic lifestyle disorders may be controlled & prevented through the strengthening of Rūḥ (pneuma), fresh and pure air. (Ibn-e-Sina, 1987), (Baghdadi, 2005), (Ilahi et al, 2012)

Ma'kulāt-o-Mashrūbāt (Food and Drinks):

Every individual differs in bodily conditions, temperament, age, dietary patterns, and habitat, etc., so there is a need to choose different foods according to their requirements. In healthy conditions, food is taken for the preservation of health and for the aid of Ṭabī'īyya (Physic) but the aim is different in abnormal circumstances. The foods and drinks act upon the body in three ways: by their Kayfiyat (quality), by their Mādda (matter), and by their ṢūratNaw'īyya (morph) or vice versa. Therefore, foods and drinks with the help of their quality, matter, and morph are believed to ensure a healthy state, if taken judiciously. (Razi, 1991), (Nafis, 1954)

The importance is further described by Gruner in his book, "A Treatise on the Canon of Medicine of Avicenna" which quotes that "the stomach is the house of disease and diet is the head of healing. And certain guidelines regarding water consumption are that water must be taken only after descending foods from the upper digestive tract or on severe thirst; this may prove beneficial to the digestive process. The water intake with foods either in little or in more quantity is very common among people due to lack of knowledge. By making those aware of its effects on the digestive process one can minimize the terrible outcome. (Gruner, 1973)

Galen, a renowned Unani physician suggested that four conditions should be kept in mind while making eating or drinking habits i.e.,

1. Time of the food
2. Type of the food
3. Quantity of the food
4. Temperament of the food (Jamil, 2006), (Tabri, 1981)

In fact, most chronic disorders of the present time result in part from malnutrition in one form or another. Diabetes, obesity, heart disease, inflammatory diseases, some skin disorders, and cancer can trace their origin back to poor or consumption of junk food – too much salt or fat; little fiber; not enough fruits and vegetables; bad eating habits, tobacco chewing and smoking, alcohol consumption, etc. In relation to food intake, Galen, says that food intake should be in accordance with the digestive ability of the stomach and taken at a limit, so that stomach can execute its function easily. (Zaid et al, 2011)

Al-Ḥarakawa'ISukūn al-Badanī (Bodily activity and Repose):

Whatever an individual executes the movements result in the liberation of Ḥarārat (heat). This Ḥarārat stimulates the Ḥarārat-e-Ghareeziyah (innate heat) and dissolves the waste product of the body. In Unani medicine, it is believed that Ḥarārat is the tool of all Quwā (faculties) especially, QuwāTabaiyah (vegetative faculties). Vegetative faculties perform the action of processing food, metabolism, and finally, expelling the waste materials out of the body. If these waste materials are getting accumulated and not expelled out of the body regularly, it leads to the extinction of Ḥarārat-e-Ghareeziyah. So, the Ḥarārat liberated by physical activity stimulates Ḥarārat-e-Ghareeziyah. Rest always produces cooling and moistening effects on the body because vital heat does not get excited during rest. Therefore, excessive rest produces Burudat (cooling) and may be responsible for the suppression of vital heat and affect the actions of Physis. (Ibn-e-Sina, 2010), (Nafis, 1954)

Being physically active is crucial for maintaining health and well-being, and there is a wealth of studies examining the advantages of exercise. The heart, skeletal muscles, bones, blood (such as cholesterol levels), immune system, and neurological system are just a few of the body areas that benefit from physical activity. It can also lower many of the risk factors for NCDs. According to Majusi, exercise strengthens the organs and increases their power. Exercise boosts Ḥarārat-e-Gharizia, which is responsible for better digestion and for general well-being. (Majoosi, 2010), (Warburton, 2006)

A range of objectives can be accomplished by physical activity, including improved glycaemic control, decreased insulin resistance, improved lipid profiles, lowered blood pressure, and maintenance of weight loss.

Al-Ḥarakawa'Isukūn al- Nafsānī (Mental activity and Repose): Psychic movement and rest influence human health in different ways. Unani scholars outlined various faculties that control the internal and external functions of the body in connection to psychic movement. They have categorized the faculties as:

- Quwwat-e-Mudarikah (Sensory Faculties)
- QuwwatMuḥarrika (Motor Faculties).

These two faculties are responsible for coordinated psychic movement and thus, all the psychological functions occur normally. All psychic states are followed by both internal or external movement of Rūḥ (pneuma), Khūn (blood), and Ḥarārat-e-ghareeziyah. Excessive psychic movement leads to the dissolution of Rūḥ. and finally, faculties become debilitated. Therefore, functions of the body become abnormal. After the psychic movement, rest is needed for gaining the substitute for the lost substances. This clearly indicates that the psychic movements cannot be performed continuously. (Ibn-e-Sina, 2010), (Nafis, 1954)

The emotional state of a person plays an important role in health maintenance because negative emotions make a person physically sick and positive emotions boost the immune system. Avicenna was the first physician who developed the relationship between psychology and medicine. Unani medicine emphasizes that the human mind and brain need adequate stimulation and proper relaxation. Body and mind have an impact on each other as psychological factors such as happiness, sorrow, fear, anger, etc. have a significant effect on the health of a human being. Excess of anger and joy causes cutaneous blood vessels to dilate which provides a reddish hue to the skin. (Donatelle, 2002), (John et al, 2013)

Therefore, balance with emotions, psychic rest, and movement is essential for the preservation of existing health or for restoration, if health is lost.

Al-Nawmwa'Yaqza (Sleep and Wakefulness):

Sleep is the natural periodic state of rest for the mind and body with closed eyes characterized by partial or complete loss of consciousness. Sleep and wakefulness are comparable to rest and movement, respectively. (Ibn-e-Sina, 2010), (Weller, 2005)

Sleep is a basic need of life because there is a continuous dissolution of LaṭīfBukhārat in the body due to wakefulness and during sleep, the replenishment of this LaṭīfBukhārat is provided because sleep facilitates into concoction and digestion of the nutriment and provides moisture to the body. Majusi stated that if the duration of sleep is less than normal, it creates Zoaf-e-Nafs, Zoaf-e-Ṭabī'at, and Khushkī-e-badan. He further stated that intentional wakefulness loosens the Quwā and body. Insufficient sleep is considered as an important risk factor for obesity, diabetes, cardiovascular diseases, and other health problems. (Rushd, 1987), (Razi, 2000), (Shah, 2007)

Normal sleep and wakefulness are beneficial for the body and potentiate vital heat. An eminent Unani scholar Zakariya Razi delineates that eight hour of sleep is very essential for health. He also says that sleep strengthens the vital faculty, pneuma, and promotes digestion by retaining Ḥarārat-e-ghareeziyah. (Weller, 2005), (Ilahi et al, 2012)

Ismail Jurjani stated that normal sleep is very beneficial to all, while sleeplessness deviates from the temperament of the brain. It interferes with the process of digestion and metabolism. It not only weakens the ability of thought, sense, and movement but also deteriorates them gradually and renders the person to take a decision. (Shah, 2007)

Today's lifestyle makes it difficult for people to get enough sleep because of their busy schedules. Health is undoubtedly impacted by this everyday imbalance, which could end up being a significant contributor to health decline.

Al-Iḥtibās-wa'l-Istifrāgh (Retention and Elimination):

The word Istifrāgh stands for the elimination of unnecessary or waste materials from the body and retention of the substances which must be eliminated causes certain diseases. In the same way, the elimination of the substances which must be retained causes the abnormal condition. Elimination is carried through normal channels such as the passage of urine, stools, sweat, menstrual blood, etc. but excess excretion results in an abnormal condition. (Ibn-e-Sina), (Baghdadi, 2005)

The excess loss of fluid, salts, and nutrients in the stools, causes abnormalities. The excessive elimination of any matter always causes the coldness and dryness of temperament, directly. Therefore, if elimination and retention are balanced and take place at the time when they are needed, they are beneficial and maintain health. (Ibn-e-Sina), (Maseehi, 2008)

Obesity is one of the lifestyle disorders and also a major risk factor for other NCDs like Type 2 diabetes mellitus, coronary heart disease, hypertension, etc. According to Unani concept, obesity is also known as Siman Mufrit. It is a Balghamī (Phlegmatic) disease and hence Khilṭ Balgham predominates in the body of the person and is a predisposing factor in the causation of obesity. In this condition loss of movements of A'dā' (organs) is due to excessive accumulated Balgham (fat) and cold temperament, hence the person becomes lazy and dull which leads to lifestyle diseases. Retention and deposition of Balgham (Atherosclerosis) obstruct Nufuz of Rūḥ (passage of oxygen) in the organs which finally causes death. (Maseehi, 2008) Since the beginning of time, Unani medical professionals have managed to treat a wide range of illnesses by controlling excretory functions.

Conclusion:-

The management of NCDs necessitates a variety of approaches at various levels, including the individual and country levels. Based on the observations from the literature it can be concluded that all preventive strategies for the control of NCDs should be oriented towards the individual level, where the individual is responsible for their health by simply following a healthy lifestyle. There is a global imperative to create and implement effective prevention strategies because the future costs of diagnosis and treatment are likely to be unaffordable. Unani medicine has got a comprehensive plan to prevent chronic diseases as all the six essentials of life described by eminent Unani physicians are vital. Balance through modifications in Asbāb Sitta Ḍarūriyya is necessary to preserve health.

Bibliography:-

1. Ahmad HSI. (1983): Kulliyat-e- Asri, New Public Press, New Delhi, p 2-3. Saad, B. (2014). Greco-arab and islamic herbal medicine: a review. European Journal of Medicinal Plants, 4(3), 249.
2. Arzani A. (2010): Akseerul Quloob, CCRUM, Delhi, p 201-276.
3. Baghdadi, I.H (2005): Kitabul Mukhtarat fit Tibb, Vol-1, Urdu translation by CCRUM, p 108, 121, 256.
4. Budreviciute, A., Damiati, S., Sabir, D. K., Onder, K., Schuller-Goetzburg, P., Plakys, G., & Kodzius, R. (2020). Management and prevention strategies for non-communicable diseases (NCDs) and their risk factors. Frontiers in public health, 8, 788. Qarshi, A (2010): Afada Kabeer (mujmal), Urdu translation by Hkm Kabiruddin, Idara Kitab us Shifa, New Delhi, p91.
5. Donatelle RJ (2002). Access to Health. Edn 7th, Benjamin Cummings, New York, p 46-47.
6. Government of India. Unani System of Medicine-The Science of Health and Healing. New Delhi: Department of AYUSH, Ministry of Health and Family Welfare; 2013. p. 33-7. Available from: http://ccrum.res.in/writereaddata/UploadFile/Dossier_1325.pdf.
7. Gruner, O.C (1973): A Treatise on the Canon of Medicine of Avicenna, AMS press, New York, p 173, 177.
8. Ibn-e-Rushd M (1987): Kitabul Kulliyat, Urdu translation CCRUM, New Delhi, p 348-50
9. Ilahi, A., Ansari, A., Zulkifle, M., & Mufti, M. (2012). Association of exercise, sleep habits, dietary habits, bathing and house status in the genesis of central nervous system disorders. Hamdard Med, 55, 33-8.
10. Jamil, A.W (2006): Tauzihaat Asbab-e-Sitta Zarooriya, Bharat Offset Printers, New Delhi, p 51, 63, 65, 127.
11. John. G, Nasira. B.V, Rashid. B; (2013): Dietotherapy: "Let food be your medicine".
12. Kabiruddin M (2015): Tarjama-o-Sharḥ Kulliyāt -i-Qānūn, Idāra Kitābush Shifā, New Delhi, p 20-25, 100-24.
13. Kantoori GH (2009): Tarjumakamile Sanah, Vol-2, Idara Kitab Alshifa, New Delhi, p 2-25.
14. Maseehi A.S (2008): Kitabul Miat fit Tibb, Urdu translation CCRUM, Vol-1, New Delhi, p 242-56.
15. Nafees, B (1954): Kulliyat-e-Nafeesi, (translation and elaboration) sharah by Hkm Kabiruddin, Vol-1, Idara -e - Kitab us Shifa, New Delhi, p 214-231.
16. Park K (2005): Park's Textbook of Preventive and Social Medicine, 18th ed, Banarsidas Bhanot, Jabalpur, p 542, 547.
17. Qarshi HMH (2011): Jami-ul-Hikmat, Idara Kitabul Shifa, New Delhi, p 229.
18. Razi AMIZ (1991): Kitabul Mansoori, Urdu translation CCRUM, New Delhi, p 152, 163.
19. Razi AMBZ (2000): Kitabul Murshid (Urdu translation by Nadvi RI), 1st ed, Taraqqi Urdu Beouro, New Delhi, p 34-54
20. Razi AMIZ (2007): Kitabul Hawi, CCRUM, New Delhi, p 23(7-8):11-12.

21. Shah M.H (2007): The General Principles of Avicenna's Canon of Medicine, Idara Kitabus Shifa, New delhi, p 17, 141, 154,181, 279-98, 300-55
22. Sina I (1987): Alqanoon Fil Tib, Vol-1. Inter Services Press, Karachi, Pakistan, p 211-213.
23. Sina I (2010): Al-QānūnFi'lṬibb (The Canon of Medicine), VoI-1, IdāraKitābush Shifā , New Delhi, p 13-4, 89-122,164.
24. Tabri. R(1981): Firdaus ul Hikmat, Hamdard Foundation, Pakistan, p115-118.
25. Warburton, D. E., Nicol, C. W., & Bredin, S. S. (2006). Health benefits of physical activity: the evidence. Cmaj, 174(6), 801-809.
26. Weller, A. S. (2005). Body temperature and its regulation. Anaesthesia& Intensive Care Medicine, 6(6), 206-209.
27. World Health Organization. Noncommunicable Diseases (NCD). (2019). Available online at: https://www.who.int/gho/ncd/mortality_morbidity/en/ [Last accessed on January 20, 2023].
28. Zakariya ARAMA, Alhawi Kabeer. Hyderabad: Daira Al Ma'aruf Al Usmania; 1858. 23:153.
29. Zaid, H., Said, O., & Hadieh, B. (2011). Diabetes prevention and treatment with Greco-Arab and Islamic-based natural products. Jāmi'ah, 95(253), 1-39.