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THE CHANGING FACE OF HYGEIA

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The lady in our college logo is Hygeia, the daughter of Aesculapi4s, the Greek physician, who lived, 1200 years BC. She is the sister of Panacea. Aesculapius is still remembered in the medical world, his staff entwined by a serpent remains the symbol of medicine. Hygeia was worshiped as the goddess of health and Panacea as the goddess of Medicine. Thus arose the dichotomy we observe even today, two dynasties of healers, healers in curative practice and healers in public health, public health being the science and practice of protecting and improving the health of the population or community.

In this paper I would like to take you on a brief journey through the paradigm changes in public health; the changing face of Hygeia.

Most ancient civilisations felt the need for public health and resorted to practices that promoted individual health, prevented disease and protected the health of communities. Inoculation against small pox was practised in ancient India and China long before Edward Jenner. Isolation as a measure of limiting epidemic spread was practiced in ancient times. Egypt, Greece and Rome built model towns. They had finely developed sanitary systems. Cordoba and other Arabian cities had departments of health and employed sanitary inspectors. Latrines and the flush closets were invented and used in ancient Crete. Mohendajaro and Harappa civilisations reveal advanced knowledge of sanitation and water supply (1).

Attention to personal health and hygiene was present from ancient times. In ancient Indian medicine, the laws of Manu was a code of personal hygiene. All major religious teachings provide insights on healthy living; sobriety, cleanliness, the avoidance of excretal pollution, the maintenance of family life, isolation of sufferers from infectious conditions, and ritual abstinence from foods likely to convey parasites.

The Buddha, the incomparable Physician that he was regarded health as the greatest asset in life. In the Dhiga Nikaya, health is listed as one of the five precious possessions (pancha sampatha) that a human being has and the Anguthara Nikaya lists, behaviours injurious to health (asappaya kiriya). He advocated physical exercise, moderation in eating, and the practice of meditation for the promotion of physical and mental well being. A high value was set on physical fitness not only for its own sake but as forming a solid basis for mental development. Buddha considered the mind a vital factor both in promotion of health and prevention of disease. He advised lay persons on how one could maintain mental health even when physical health was deteriorating. Many of his sermons for the lay people contained advice for promoting social health (2).

The community of sangha, was governed by strict vinaya rules that ensured sanitation, personal health and hygiene. Regulation and moderation in eating was recommended for monks. Monks were advised to walk, to go on foot meeting people and preaching the dhamma. When the lifestyles of the monks changed into living in monasteries, a special place was set aside for walking, chankamana became an integral part of the monastery (2).

One of the most significant influences of Buddhism on public health was that the state assumed responsibility for public welfare. Literary and archeological sources bear evidence that in ancient Sri Lanka, the state provided free medical care to all its citizens regardless of race, caste, sex, religion or status. The Girnar rock edict, credited to King Asoka in the 3rd century B.C. indicates that medical aid for men and animals, together with medicaments were provided in Thambapanni (3). A detailed town plan of Anuradhapura, the ancient capital of Sri Lanka in the 4th century B.C., refers to a hospital and a house of delivery in this hospital complex (4). Convalescent homes were established as early as the 3rd century BC and specialized hospitals were built by various kings at different times. I quote, from the editorial of a BMJ in 1928, “It is to Gautama and his followers that we owe, apparently, the hospital idea”; (5). Furthermore, inscriptions provide evidence that measures for environmental sanitation and guidelines for healthy living were in existence (6).

The Mahavansa records that King Pandukhabaya who reigned in the 4th century BC appointed 500 chandalas to clean the streets and the sewers. Sanitation and matters of public safety *were* entrusted to an officer

called the ‘nagaraguttika’. The importance accorded to this position is underlined by the fact that no less a person than the king’s uncle held this office (7).

The Western Monasteries complex, established around the 7th century AD in Anuradhapura, has remains of chankamana, baths, privies and urinals. Underneath the urinal stones was a filter system consisting of three large terracotta pots, placed one on top of the other, filled with sand and charcoal and one pot draining to the other an ancient version of a soakage pit. Paranawithana describes the remains of a more elaborate squatting type of latrine found at Abhayagiriya and a seat type of toilet in the western porch at Polonnaruwa (6).

The Greeks taught the world to think in terms of ‘how’ and ‘why’. They challenged the tradition of magic in medicine. Hippocrates who was born 740 years after Aesculapius, in 460 BC. studied and classified disease based on careful observation and reasoning, the basis of epidemiological inference. Hipocrates, distinguished between diseases which were epidemic and those which were endemic. He studied the effect of such things as climate, water, clothing, diet, habits of eating and drinking and the effect they had in producing disease. His treatise on ‘Airs, Water and Places’ provided the theoretical underpinnings for an epidemiological understanding of disease for more than two thousand years.

This is not unlike the thridosha theory in Ayurveda. It was believed that when these elements were in perfect harmony a person is healthy and a disturbance of this equilibrium resulted in disease. Although Ayurveda boasted of an extensive pharmacopoeia and treatise on medicine and surgery the primary emphasis was on remaining healthy. They advocated ‘charya’ or life styles that helped maintain health, the term Ayurveda itself implies ‘knowledge of long life’. By the first century BC, western civilisation had shifted to Rome. The Romans brought pure water to all their cities through aqueducts, built baths, sewers and drained marshes to combat malaria. If Hippocartes is considered the father of Medicine, Galen, who was the physician to Marcus Aurelius is the father of public health. He wrote extensively on public health, he was the author of a book call ‘Hygiene’, the first volume of which had a section on mother craft. Disease according to him was a result of predisposing factors, exciting factors and environmental factors. Very similar to the triad of host, agent and environment of modern epidemiology. He said “Since both in importance and time, health precedes disease, so we ought to consider first how health may be preserved, and then how one may best cure disease”(8).

During much of the first and second millennia there was little recognition by the rulers of the western world of any obligation to develop public health services. It is not surprising; this was a time when there were great disparities in society. The struggle for freedom from ill-health had necessarily to follow battles for universal privileges, freedom from tyranny, the right to vote and the right to be equal before the law. The need for an organised system of health protection for the population was recognised when diseases of squalor threatened the lives and health of the rich from time to time and when the health of workers became an important consideration in improving output (1).

From about 1500 AD there began in Europe a growth of ideas about public health, and many great minds started evolving schemes for improvement of the human race. One of the earliest such schemes was Utopia by Thomas More. He envisaged a land where hygiene protected the health of all and medicine restored health when disease occurred, where all that one needed was at hand from hospitals to pure water and sanitation, insurance against sickness and unemployment. But these and many other similar ideas remained dreams of Utopia (1).

An important event occurred in the beginning of the 16th century. In some European countries, including England, compulsory registration of births and deaths commenced and this marked the beginning of quantitative epidemiology. In 1662, when John Graunt, the haberdasher, published his book Natural and Political Observations Made upon the Bills of Mortality, attention was drawn to the social disparities in the distribution of mortality in England, especially the consequences of plague. Soon after in 1667, William Petty in his book Political Arithmetic provided a method to quantify the costs of mortality (9).

Public health as an organised system for the protection and promotion of health of the population came into being in the 19th century. It began in England because it was the first country to experience the industrial revolution. Industrialisation resulted in rapid mass migration of populations to urban industrial cities. All

the miseries of rapid unplanned urbanisation followed. Dwellings were packed together, and so were people inside them. Accumulation of refuse and unwholesome cess pools were common sights. Dirt, disease and malnutrition flourished. Diseases like typhoid, tuberculosis, small pox, measles, and cholera spread. The miasma theory had survived from ancient times and disease was thought to be the result of foul emanations from soil, air and water (10).

The remedies to disperse miasma were closed drainage and sewage systems, garbage collection and improved housing. Poverty was recognised as the cause rather than the consequence and reformers like Edwin Chadwick pointed that issues were societal and that the appropriate measures had to be applied across society (10).

Around 1839, in England, William Farr began using specific diagnosis in mortality statistics and epidemiologists started mapping excess mortality across the country. Although the sanitarians were mistaken in their causal theory of foul emanations, they demonstrated how and where to look for clustering of mortality and morbidity. Observations of persons such as William Budd and John Snow challenged the miasma theory. In 1849, Snow put forward the theory that cholera was a local infection of the alimentary canal. He suggested that, 'the cholera poison was introduced into the alimentary canal through the accidental swallowing of 'cholera poison, found in the diarrhoea of cholera patients' He suggested that cholera faces contaminated the public water supply 'either by permeating the ground and getting into wells or by running along channels and sewers into rivers' (11). A month later, William Budd discussed the outbreak of cholera in Bristol where more than 40 people died in one small locality. He reasoned that 'the poison to have been introduced into the bodies of the persons who took the disease, in the water they drank...' (12). However, it was during the 1854 epidemic out break of cholera in and around Broad Street, that John Snow was able to obtain substantive proof of his theory of polluted water causing the disease.

Despite the publication of a hypotheisis by Jakob Henley in 1840 that infectious minute organisms were a cause of disease, and John Snow's classic work, 25 years passed before Louis Pasteur demonstrated a living organism to be the agent in an epidemic affecting silk worms. The study of infection and contagion in human disease such as tuberculosis, leprosy and anthrax followed and in 1882, Robert Koch, a student of Jakob Henley established that a mycobacterium was the cause of tuberculosis (9).

This led to a new paradigm, the germ theory and a 'specific cause' model; relating single agents to specific disease came into being. When these agents of disease were discovered, attention shifted towards addressing these 'real causes'. This view dominated medical science as well as public health from the last quarter of the 19th century to almost the middle of the 20th century. Single agents of disease were sought and prevention was based on limiting transmission by isolating those affected, vaccination and cure with chemotherapy and antibiotics. The miasma theory died but so did the social dynamics of disease. It is rather ironical that looking back on the decline of infectious diseases in the developed world now, some argue that it was primarily due to economic development and ensuing social change resulting in improved nutrition and living standards.

Whatever the cause, the scourge of communicable diseases was controlled, life expectancy increased and chronic diseases of unknown cause emerged. Faced with major mortal diseases of unknown origin, epidemiologists started by describing case distributions, and exploratory sweeps for possible factors that enhanced risk. Then they moved on to test the emerging observations on risk factors using ingenuity in design. British epidemiologists such as Sir Richard Doll and Sir Austin Bradford Hill were in the forefront of these developments. Methodology to unravel the complexities of chronic disease emerged, matters of design, causal inference and newer methods of statistical analysis were developed and systematised.

The specific cause model of disease associated with the germ theory was replaced by the 'web of causation' and the role of multiple causes in the development of chronic disease. This new paradigm restored some of the population based inferences that had fallen into decline with the success of the germ theory. Some of the key figures of the new paradigm advocated a holistic view of disease and recognised the need for a multidisciplinary approach and specified the population group as the unit of study. However, the new risk factors that were studied were often conceptualised in individual terms and individual life styles received increasing emphasis. The approach was to detect individuals- at increased risk and focus on modifying individual

risk. This was an individual responsibility, typified by the famous comment by Margaret Thatcher 'there is no such thing as society, there are only families and individuals (13).'

The individual approach became more established with the development of biomedical techniques which enabled the understanding of disease at a molecular level. Furthermore, many health care professionals, taught in the traditional way that the individual patient has priority and that ethical and just actions are those that benefit the individual patient, were comfortable in this approach. This was an extension of the clinical role to embrace prevention (14). Persons arguing the population cause may point out high rates of childhood diarrhoea. seen in a village without a clean water supply, as evidence against the individual focus, but a person producing a counter argument would point out that infected water would not cause disease unless the individual consumed it and surely there is an individual difference in susceptibility determining why one exposed individual is more likely to develop disease than another(15,16).

In to this argument entered Geoffrey Rose. His thesis was that causes of increased disease in a population may be different from the causes of individual cases within a population. He showed that a large number of people at a small risk may give rise to more cases of disease than the small number of people in the population who are at high risk. The important approach here is that the etiologic framework is conceptualised at the population level (17). For example tobacco smoking at the individual level has a range of health effects, but the individual exposures at the population level may be governed by a host of historical, social, political, cultural and economic factors. Population based strategies which seek to shift the whole distribution of risk factors aim to make healthy behaviours and reduced exposures into social norms. This approach has a distinct advantage in that, the life style factors are often characteristics that are constrained by social norms. I quote from Geoffrey Rose. 'It makes little sense to expect individuals to behave differently from their peers; it is more appropriate to seek general change in behavioural norms and in the circumstances which facilitate their adoption' (18).

This led to a hierarchical way of thinking evident in the profound question asked by Potter (19) 'What gets cancer- the genes, cells, the organism or perhaps even the population? The potential answers are not necessarily exclusive, even given the reductionist tendencies and the genuine and justified excitement over discoveries in the molecular biology of cancer. Rather, these are levels of explanation that may be more or less coherent within themselves, but provide even more information when they exist in a framework provided by all of the explanatory models'.

Coronary heart disease is a result of bio physiologic and pathological processes. Individual characteristics and behaviours contribute to disease occurrence. These are influenced by a particular socio economic environment which in turn is influenced by the location of the socio-economic group in the social structure that is social position. The same is true of most chronic diseases. Rose in his book 'The strategy of preventive medicine' concludes that, 'a wider world view of ill health, its causes and solutions would lead to acknowledgement that the primary determinants of disease are mainly economic and social and therefore remedies must also be economic and social' (20).

Then, in 1981 the first case of AIDS was reported. Soon the problem assumed epidemic proportions. It soon became apparent that the classic proximal risk factor approach would not help to understand and contain the epidemic. Analysis was necessary at several levels. At the molecular level, the precision of molecular biology was required to understand the means and timing of transmission, and to find a way to interrupt transmission. At an individual level, specific social and sexual behaviours that help transmission of the virus had to be understood. At the population level, the dynamics of spread of the epidemic are governed by prevalence of infection, other characteristics of the population, patterns of sexual behaviour, prevalence of other sexually transmitted diseases etc., At the global level the interconnections between societies determine the path of infection and differential access to treatment determine outcome of disease. Analysis of this nature required a multidisciplinary approach and involvement of social sciences, and, quantitative methods of research to be supplemented by qualitative methods (21).

Into this period, there emerged the threat of new infections and re-immergence of old infections. This was a time when it was believed that infectious diseases were under control, at least in the developed world. A change in virulence as well as changes in geographic distribution of disease was observed. It was noted that

populations varied in their vulnerability to infection because of differences in geographic location, social and technical resources, concurrent health status, cultural inflexibility and political rigidity.

The demographic and epidemiological transition was producing a new middle and upper class in the developing countries whose disease characteristics were more like that of the developed countries. Many of the proximal risk factors for non communicable diseases had been identified and research into the wider causes of ill health was highlighting the fact that many diseases had their roots in unhealthy life styles and adverse physical and social environments. The influence of political, economic, social, cultural, environmental, and behavioural factors on health was increasingly researched and becoming increasingly evident. Attention was drawn to widening social inequalities, social injustice and disparities in health. It became necessary to bring in a wider perspective to interpret the interplay of forces resulting in disease as well as into planning strategies to deal with them (22, 23).

Thus, in 1986, as a response to growing expectations of a new paradigm, the Ottawa charter for health promotion came into being. The charter focused on the health end of the disease health continuum and the determinants that keep people healthy. Health is considered a key dimension of the quality of life. The conditions central to health creation were identified as, peace, shelter, education, food, income, a stable eco system, substantial resources, social justice and equity. Health promotion was considered as a process aimed at reducing differences in current health status and, as a way of ensuring equal opportunities and resources that would enable all people to achieve their fullest health potential. Improvement of health thus goes beyond healthy life styles to well being (24).

This change in paradigm to a social and ecological focus on health was hailed as the new public health revolution. It appears that we have come full circle, back to the holistic view of health associated with Hygeia in classical Greek thought.

What does the future hold? As we go into the new millennium, it appears that critical choices are required. As the Cheshire cat said to Alice ‘where we go from here depends on where we want to go’ (25). Do we go down the narrow path of addressing the proximal risk factors of ill health or do we go down the broader road that would address the sociocultural and ecological foundations of health. After all, it is nothing new; this is what William Farr did in the 19th century, when he used health statistics effectively for advocacy, for the development of policies towards poverty alleviation and equity in health.

May the path we choose lead us to the goal of equitable human development and well being; in to a world,

Where the mind is without fear,
and the head is held high
Where knowledge is free
Where the world has not been
broken up ……..into that
heaven of freedom,
my Father, let my country awake.

Rabindranath Tagore (26)

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