

Some Historical and Current Perspectives on Prevention and Control of Infections

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The first written health code in the world was believed to be Leviticus, a manuscript dated circa 1500 BC that focused on personal and community accountabilities and contained regulation concerning the cleanliness of body, sexual health behaviors, protection against contagious diseases and the isolation of lepers. The same period witnessed the issuance of The Code of Hammurabi, a set of laws and edicts created by the then monarch of Babylon, spelling out rules and punishments for thefts, farming, property damage, women's right, children's right, murder, death and injury. Hippocrates (460-380 BC), the founder of Western medicine, wrote a treatise titled "On Airs, Waters, and Places" an excerpt from which reads:

"Whoever wishes to investigate medicine properly, should proceed thus: in the first place to consider the seasons of the year, and what effects each of them produces. We must also consider the qualities of the waters and the mode in which the inhabitants live, and what are their pursuits, whether they are fond of drinking and eating to excess, and given to indolence, or are fond of exercise and labor, and not given to excess in eating and drinking."

Infections are not new to humanity. The black Plague or Black Death, also known as bubonic plague reappeared in Europe in 1348, after almost 1000 years, wiping out almost ⅓ of the population in major European cities in the first two years of the pandemic that ravaged Europe in 1348. This led to new Public Health initiatives that were established to arrest the spread of the deadly disease. The Renaissance of 1500-1700 brought about rebirth of thinking about the inter-relationship between nature and humans. This was due solely to world exploration and rise of mercantilism which valued healthy and productive population as well as increase in concern for infant mortality as a threat to long term availability of a productive working society. In the 18th Century, two prevailing views of epidemics from infection emerged – Miasma, a concept that epidemics originated from definitive atmospheric circumstances and from mists rising from carbon-based materials and Contagion, a concept that epidemics were as a result of spread of germs – both having Public Health implications.

In the 21st Century, the scope of infections is still global and prevention of infections is on a very large scale. Modern science has been very helpful in reducing, to a manageable extent, and controlling various types of infections that afflict humanity, though it has not completely eradicated infections.

Infections of humans, caused by organisms of various shapes,

sizes, and configuration, specificity and specification, vary widely ranging from bacterial, viral, fungal and mycosis types. These organisms are found not only in humans but also among animals and plants. While some of these organisms are harmless and co-exist on and within the human body such as the skin, nostrils, intestinal tract, others are quite virulent once they attach themselves to specific part of the human body. Moreover, some of the organisms that are thought to be harmless could reverse their disposition and become quite harmful under certain circumstances.

Infections appear to be tissue-specific, age-specific, gender-specific, time-specific and social-status-specific. Rubella and spirochetes are well-known infection in pregnancy that can affect the baby in-utero, Tetanus Neonatorum and Septicemia neonatorum are specific infections of the newborn, bronchitis and bronchopneumonia are infections at infancy while pneumonia, myocarditis and urinary tract infection appear in older age group. Some infections such as vaginal candidiasis are obviously specific to females.

Furthermore, transmission of these organisms could be from human to human, (e.g. sexually transmitted diseases (STD) and Human Immunodeficient Virus (HIV)), zoonotic or transmission from animals to humans such as Rabies, Bird Flu, SARS, and recently EBOLA virus. Nosocomial infections are infections that are contacted at health facilities. Some organisms such as Tuberculosis are airborne and can be breathed in unintentionally while others such as cholera, guinea worm and schistosomiasis are waterborne and can be contacted unknowingly.

The cost of preventing, treating or curing various infections runs to billions of US Dollars on a global scale. Large pharmaceutical

companies work day and night to meet human demands for antibiotics, antimicrobials, antiseptics, antifungal, and antimalarial medicine in forms of tablets, capsules, creams, intramuscular and intravenous injections without meeting the demands. Medications to cure viral infections such as HIV and Hepatitis, to mention a few, are on global scale that governments at local and international levels have promulgated policies on purchase, distribution and rational use of these medicines. However it must be mentioned that these organisms have found a way to develop resistance to current medications warranting multi-drug approach to treating infections. A good example is the case of Tuberculosis which needs a combination of three different drugs or malaria which now applies Artemisinin-based Combination Therapies (ACTs).

International and multilateral bodies such as World Health Organization (WHO), UNICEF, USAID, Global Fund for Aids, Tuberculosis and Malaria (GFATM) and Rotary International, among others, have been providing funds, technical assistances and materials in form of vaccines for prevention of vaccine-preventable infectious diseases such as measles, diphtheria, pertussis, tetanus and polio, Long Lasting Insecticide-Treated Nets (LLIN) against mosquitoes that bring malaria and antiretroviral drugs for patients afflicted with HIV. Their efforts are commendable and well appreciated. Governments in malaria-endemic regions of the world equally pay attention to In-Door Residual Spraying (IRS) to reduce mosquito bio-mass and the density of other insects of biological importance to humans. Some Non-Governmental Organizations (NGOs), on their part,

emphasis improvement in the standard of living, personal hygiene such as hand-washing and community-oriented activity such as environmental sanitation. Carter Foundation, as an example, has been instrumental in eradicating Guinea Worm (*Dracunculus medinensis*) from the world and the efforts of GFATM has drastically reduced the menace of malaria in the world.

Management of infections however goes beyond just treating. It involves strategic planning and policy formulation. Governments have to decide how much to spend on training personnel such as medical doctors, microbiologists, pharmacists, nurses, laboratory scientists and other health staff. Under considerations by decision-makers are laboratory space and equipment such as modern microscopes, reagents and other materials. Policy makers often decide on health programs involving environmental management, hospital management, surveillance and sentinel site establishment. Of recent, cross-border transmission of infection has captured the limelight in the wake of Ebola epidemic in West Africa. Of vital importance are Health Management Information Service and satellite imaging for prediction of rainfall, temperature and humidity, factors that are closely related to diseases, infections and their transmission. Furthermore, global warming, migration and internally displaced persons (IDPs) are global issues that are very relevant to infections and disease transmission. Therefore research and data gathering are essential in tracing, tracking and treating infections. Biennial world summit will definitely give a clearer picture on where the world needs more focus on prevention and control of infection.