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Health care and Geomedicine: A Review

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ABSTRACT

Health is on a continuum—one does not arrive at good health accidentally. Personal health begins before birth and continues throughout a person's life. There is a strong link between health and geography. For a better understanding of the oral health/disease process, it becomes interesting to explore the relationships between surroundings and Community Health. Unfortunately, today's medical record remains silent about the accumulation of environmental health impacts and risks of the patient. In 2012, an estimated 12.6 million deaths globally were attributable to the environment. The air we breathe, the food we eat, the water we drink, and the ecosystems which sustain us are estimated to be responsible for 23 per cent of all deaths worldwide. Hence this review is being designed to emphasize the importance of environmental factors towards the health of the population, making this information available to each and every individual.

Keywords: *Geo- Medicine; Environment; Pollution.*

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INTRODUCTION

Over the last three decades there has been increasing global concern over the public health impacts attributed to environmental pollution, in particular the global burden of disease. The World Health Organization(WHO) estimates that about a quarter of the diseases which mankind is facing today occur due to prolonged exposure to environmental pollution. Most of these environment-related diseases are however not easily detected and may be acquired during childhood and manifested later in adulthood.

Health is on a continuum—one does not arrive at good health accidentally. Personal health begins before birth and continues throughout a person's life.

There is a strong link between health and geography.(Tunstall, Shaw, & Dorling, 2004). For a better understanding of the oral health/disease process, it becomes interesting to explore the relationships between surroundings and Community Health.

Disease distribution and health outcomes are very much affected by the places where people live. The environmental risk factors like pollution, influence disease patterns, life expectancy, mortality, morbidity. In short, "places form people as much as places are formed from peoples.(Tunstall et al., 2004)

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Any shift away in a society from infectious, parasitic and nutritional diseases, reflect a higher share of people having access to safe water and sanitation. The higher prevalence of non-communicable diseases is definitely attributable to exposure of chemicals, poor air quality andunhealthy lifestyles. While the environmental effects on health represent 23 per cent of deaths globally, the figure increases to 26 per cent for children under 5 years and 25 per cent for adults between the ages of 50 and 75 years in the duration of ten years from 2002 to 2012 globally.(Prüss-Üstün, &Corvalán,2006).

Unfortunately, today's medical record is a vast collection of clinical facts, observations, test results, and diagnostic conclusions but remains silent about the accumulation of environmental health impacts and risks of the patient. Linking

one's own personal health status to specific geographic factors provides a powerful set of information that medical professionals can use to improve the quality of the care they deliver.(Davenhall, 2012).

Hence this review is being designed to emphasize the importance of environmental factors towards the health of the population, making this information available to each and every individual.

Need of an application

In this modern era, where Internet Of Things are growing by leaps and bounds like various Smartphone health applications that let you know about the calories you burn, resting heart rate and various fitness tracking applications,similar to them, a new application is needed for environmental monitoring which can collect data on air pollution, noise levels and various other environmental exposures, as we are still lacking behind in the innovative utilization of the address or geographical history of the patient. Such application can relate one's personal health status to the specific geographical risk factors by just entering the address of the patient, which will provide a powerful set of informationthat medical professionals can use for better diagnosis. This new approach is called as "GEOMEDICINE".

Geomedicine utilizes the technology of geographic information systems to add value to information for public health planning and decision making towards the impact of surroundings on human health.

GIS(Geographic Information System)

GIS is "computerized system that relates and displays data collected from a geographic entity in the form of a map.(Shaw, 2012). GIS has also played an important role in protecting communities from otherwise overlooked risks and toxic exposures.

Using GIS in deliveringgeomedical intelligence to health care practitioners could profoundly alter the quality of care.(Davenhall, 2012)

It is estimated that nearly 80% of the information needs of local health system decision and policy makers involve geographical positioning, which means using maps in one way or the other.(William, 1987). The health mapping, as an e-health application will be beneficial if it supports health systems development. WHO has been using mapping techniques coupled with surveillance to monitor the global health situation and present it through user-friendly systems. It improves the ability of decision makers, planners, academicians, researchers and health care professionals to organize and link thematic and spatial datasets. It provides the ability to create relations between datasets that may seem unrelated without using the geographical dimension.

The use of GIS is rapidly spreading around the world as one of the most important technologies to help nations addressing their most serious health goals including impact of surroundings on health of individuals and reducing disparity in available medical services.

Areas of public health mapping

A functional disease surveillance system depends on timely dissemination of surveillance data to health officials and the public. Temporal and spatial trends in disease outbreaks can be visualized by preparing maps showing for each location, the date of peak disease incidence, i.e. the week or month when the largest number of cases occurred. An integrated approach and enabling technology for disease surveillance can be supported by an effective public health mapping programme.(Cromley, &McLafferty, 2002). Health mapping can be used as a unifying factor for different disease surveillance activities, since location is the common element among them all. Examples of the diseases which can besurveillancedin India using GIS are tropical diseases, parasites, rabies epidemic, malaria,cholera, sleeping sickness and HIV/AIDS.

Epidemiology

Epidemiologists are able to trace the spread of a disease as they study outbreaks of the disease through time, location and population. By mapping the location of a population or subgroup and looking at the presence of ill health among the population over time, it is possible to identify the source of a disease and how it spreads. Identifying these elements can help the national authorities as part of the health system to create a plan to combat the spread of the disease.

Water supply and delivery.

The quantity and quality of water supply have a direct impact on the health of people. The first known application of health mapping was related to water sources, when John Snow mapped cholera cases during an outbreak in London in 1852 and linked it to a specific water source.

Mapping the location of water sources and the flood seasons connected to these locations facilitates control and prevention of diseases such as malaria, cholera and other water-borne diseases. Maps can also be generated to identify the relationship between water supply sources and areas of high dental caries prevalence.(Morgan, &Treasure, 2003)

Assessing air quality and other exposures

Air quality is important to our health and environment, but sources of contamination are often difficult to monitor. GIS technology manages statistical and spatial data to provide a tool that shows the relationship between poor air quality and environmental health. In this way, a GIS aids in monitoring pollutant emissions. GIS technology allows us to locate where pollutants are coming from and monitor those areas for change to conserve the quality of our air.Inorganic forms of particulate matter can be minerals, such as asbestos or silica, or a suite of minerals (quartz etc.) that can be found in a range of geological deposits, such as volcanic ash or sedimentary rock.(Boulos, & Blond, 2016).

Asbestos, which describes a group of minerals thatare heat and corrosion resistant and were used extensivelyas insulation, building materials and in frictionproducts (such as brakes), has subsequently beenshown to cause mesothelioma in humans after exposureby inhalation.(Baumann, Maurizot, Mangeas, Ambrosi, Douwes, &Robineau, 2011).

Arsenic (As), a metalloid and known carcinogen(World Health Organization International Agency for Research on Cancer, 2004) that is ubiquitous in the environment and can originate from both natural and anthropogenic sources. The ingestion of elevated Arsenic levels in drinking water and diet (mainly through seafood)(Borak, &Hosgood, 2007) has been a widely recognized issue, linked with an assortment of health problems, such as skin and bladder cancer, and other non-carcinogenic effects such as skin lesions, neurological and hepatic effects (e.g., (Appleton, Fuge, &McCall ;Thornton,1996)

Many leading public health organizations have endorsed the use of GIS in public health practice and research. CDC(Centers For Disease Control And Prevention) says, "GIS plays an important part in health promotion and protection

WHO has recommended GIS and have made following recommendations-

- Is "highly suitable for analyzing epidemiological data, revealing trends and interrelationships that would be more difficult to discover in tabular format"
- "Allows policy makers to easily visualize problems in relation to existing health and social services and the natural environment and so more effectively target resources"
- Is an "ideal platform for the convergence of disease-specific information and their analyses in relation to population settlements, surrounding social and health services and the natural environment"

Conclusion

GIS technology's ability to share critical information about the spatial dynamics of disease makes it, without exception, the technology of choice for accelerating the detection and identification of disease clusters.GIS has long been used to monitor the health of the planet. With geomedicine, GIS is now being used to monitor the health of individuals. It makes sense, because the health of people depends on the heath of the planet and that's the basic idea behind Geomedicine.Geomedicine has the potential to transform the way physicians see patients and to provide a more holistic view of the many hidden factors that often defeat achieving successful long-term health outcomes.The Government of Indian Ministry of Environment, Forest and Climate change, must adopt the GIS system in order to make the new generation disease free. The level of pollution has reached alarming levels in heavily populated cities of india. Hence such system implemented will allow the people to make correct choice in order to settle at places with less polluted surroundings.

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