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## **CHANGING ENVIRONMENT AND HEALTH PROBLEMS (with reference to Swine Flu in India)**

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### **INTRODUCTION:**

We are living in the 21st Century. Globalization is the soul of our life. In the world of globalization we are facing more and more competition and also fighting with various social and environmental problems like global warming, changing environment etc. These are the burning issues in our today's society.

Today people are actually suffering from the problems such as pollution, population growth, and imbalance in environmental cycles etc. All these things cause deadly diseases. Swine flu is one of the problems being faced by the human being in the society. Some have lost their lives.

Though there is inter-relation between man and environment from the ancient times, the environment has become the most discussed term in the recent times. The science of environment is getting interdisciplinary as the branches like economic environment, social environment etc. are coming into existence.

Generally, environment means the surroundings of man. Scientifically it means the sum of physical, chemical and biological conditions, affecting directly or indirectly mankind, including the factors like climate, soil, water, light etc. It includes all human beings as well as various living organisms that reside on the earth as other factors that exist on this planet. The atmosphere on the earth is suitable for the growth of all living organisms and it includes both biological and natural factors like air, oxygen, water, proper climate, rivers, vegetations, animals etc.

In modern times, owing to growth of industrialization, population, urbanization, transport and communication, various jobs have invaded nature. Nature itself changes in the course of time, but man-made changes have affected nature a lot. In the beginning, man started farming and it brought into existence human civilization. Later on there came economic, social, political and moral values. Whatever reforms man introduced, had a deep effect on animals and vegetation. Hence, the social and cultural

environment consists of man society, his dealings, and his way of living and his relation to all other factors in nature.

A healthy and beautiful environment can make man happy and content. But man has changed nature with his intelligence, speech, imagination and technical skills. Though he attempts all this for human welfare, it has created a number of problems, and now environmental pollution has become a global issue.

Environment is inseparable from living organism. It is necessary for birth, growth and existence of living organisms. Though it means, in the general sense, surroundings of man, scientifically, it denotes the factors that directly or indirectly affect the living beings and their surroundings. Proper and good environment is necessary to make human life happy and satisfied. Yet in the recent times, there is tremendous growth of population, urbanization and increase in industries and it has adverse effects on natural resources. Some resources are on the verge of extinction totally and some resources are getting polluted. As a result, there is environmental pollution. Pollution means affectation of natural conditions that are essential for existence of man on the earth. The problem of pollution has become global due to various factors like soot particles released in fire, sewage, waste water, poisonous gases, minute dust particles, harmful micro organisms, chemical fertilizers and pesticides, increasing heat, infra-rays and ultra-violet rays, noise etc. Urbanization and industrialization have greatly changed human life style.

The increase of carbon dioxide has depleted the ozone layer. This change in climate has endangered not only human life but entire living organism.

The increase of the level of sulphur dioxide in the air causes suffocation, irritation of eyes, nose and throat and cold and cough. Carbon dioxide and carbon monoxide cause poisoning and respiratory diseases.

(Gharpure Vithal : Environment: 2006 : 36 to 38)

### **OBJECTIVES:**

- 1) To study nexus between environment and society
- 2) To study changing environment
- 3) To study about Swine flu

### **RESEARCH METHODOLOGY:**

In this study various cases in India have been studied. Secondary data method has been used. Books, magazines and internet and News from Radio and T.V. have also been used.

**SYMPTOMS OF SWINE FLU:**

An acute Respiratory Tract Infection (RTI), caused by Influenza virus, characterized

by sudden onset of:

- Fever/chills
- Headache, myalgia
- Sore throat
- Cough
- Coryza
- Prostration
- Range of symptoms differs by age
- Vomiting and diarrhea in children/elderly
- Fever along in infants
- May be atypical in elderly
- Serious complications can occur among high risk groups.

The H5N1 and H1N1 virus infections cause classic flu-like symptoms as listed above. The general presentation is similar to any RTI cause by a host of organisms. Variations occur with age and type of influenza virus causing the disease. In addition H5N1 infection causes diarrhea frequently. In H1N1 infection, vomiting and diarrhea are more common.

**Influenza Virus - 3 types :**

- RNA virus
- Antigenically distinct types
- No cross-immunity between different types

<u>Type A</u>	<u>Type B</u>	<u>Type C</u>
Causes significant disease : epidemics, pandemics	Causes significant disease : milder epidemics	Does not cause significant disease
Infects both humans and other species	Limited to humans	Limited to humans
Frequent antigenic Variations	Infrequent antigenic variations	Antigenically stable

While there are three types of influenza viruses - A, B and C - only two of them (A and B) cause significant disease in humans. Types B and C are limited to humans, whereas type A virus can cause severe disease in humans and affect more species. From public health point of view type, A influenza

virus is the main concern for us because it affects both animals (including birds) and humans and as a result undergoes frequent antigenic changes.

### **Influenza Type A:**

Influenza Type A viruses are considered to cause the most serious disease as compared to the other two influenza virus types, although not all strains of type A cause clinical disease. Influenza Type A can cause severe epidemics (as well as severe worldwide epidemics or pandemics) among all ages leading to high morbidity and significant mortality. Influenza type A infects multiple species including humans, birds, pigs, horses, and other animals. The large pool of viruses in other species creates a reservoir for the emergence of viruses that can infect humans. Wild birds are the natural hosts for these viruses.

### **Influenza Type B:**

Influenza type B viruses are usually found only in humans. Influenza B viruses can cause some morbidity and mortality among humans, but in general are associated with less severe epidemics (chiefly among children) than influenza A viruses. Although influenza type B viruses can cause milder human epidemics, they have not caused pandemics.

### **Influenza Type C:**

Influenza Type C viruses are not a cause of worry as they do not cause significant disease and are also antigenically stable.

### **Influenza Terminology -1**

- Human Seasonal influenza
- Avian influenza
- Pandemic influenza

**Human seasonal influenza** is endemic and is seen every year at regular intervals. The same HA type circulates around the globe, mutating (antigenic drift) as it spreads. The season in which it occurs may be different in temperate countries, where it is a winter - time disease, and tropical countries where the seasonality is largely unstudied, though considered to be peaking in the monsoon and winter seasons.

**Avian influenza** is a disease of birds that can occasionally infect humans having significant exposure to infected birds/ poultry. The host factors that must be present to enable the virus to do this are unknown e.g. H5N1 virus.

**Pandemic influenza:** Pandemics occur when there is a shift in the type of HA with the introduction of a new type either by re-assortment or through direct entry into the human population from avian/other species with

a virus that has acquired the ability to sustain its spread easily from human-to-human.

## **Influenza Terminology - 2**

### **Seasonal influenza**

- Occurs every year with gradual variations in previous year's virus surface proteins (antigenic drift)
- Spreads around the world in seasonal epidemics, affecting 10 -20% of total population.
- Annual epidemics thought to result in 3-5 million cases of severe illness and 2.5-5 lakh deaths.

The mortality rate in seasonal influenza is quite high, especially in colder regions of the world. Vaccination is needed on a regular basis to protect oneself from this disease as there is constant antigenic drift in the virus. Disease and mortality burden due to seasonal influenza in India is not clearly known. Nevertheless the antigenic drift is regularly documented by the National Influenza Centre (NIV Pune).

## **Influenza Terminology - 3**

### **Avian Influenza**

- Primarily a disease of birds due to large group of different influenza A viruses
- Rarely jumps species and infects humans
- An influenza pandemic happens when a new subtype emerges that has not previously circulated in humans and is adapted to human to human transmission.
- Viruses in wild water fowl is the ultimate source of new viruses in humans causing pandemics

Avian influenza viruses affecting poultry can have variable pathogenicity (low and high). Highly Pathogenic Avian Influenza (HPAI) viruses cause large scale economic loss in the poultry sector. H5N1 virus is a HPAI virus which had emerged into a panzootic (i.e. worldwide outbreaks in animals/birds). It can cause significant human infections infrequently. Human mortality in avian influenza cases can be as high as 60 per cent. H5N1 virus is still evolving and close watch needs to be kept on this virus which can evolve into a pandemic strain.

**Influenza Terminology - 4****Pandemic Influenza**

- A worldwide surge in cases caused by the introduction of a new influenza type A surface protein (antigenic shift).

The best current example of this phenomenon is the novel A (H1N1) a new virus causing the current pandemic.

**Influenza : Key characteristics****Environmental factors****Seasonally**

- Temperate zones : epidemics occur in winter
- Tropics : epidemics occur in rainy season
- Sporadic cases : any month

**Overcrowding**

- Enhances transmission
- Higher attach rates in closed people groups (schools, institutions, ships etc.)

Some countries limit epidemics through school closures as soon as the initial cases appear in the school and allow children to return only after a week/10 days and after the children are immunized. Special seasonal influenza immunization drives are conducted in closed communities such as old age homes, prisons, hostels, military academics etc.

**Influenza : Key Characteristics****Disease Transmission****Mainly airborne**

- Droplet infection
- Droplet nuclei

Through direct contact

Transmission from objects Possible

Incubation period

- 18 to 72 hours

Human influenza is a respiratory infection that is spread through contact with respiratory secretions from an infected person (case or sub-clinical case) who is sneezing and/or coughing. The influenza virus is very contagious and can easily spread from person-to-person. Transmission from objects (such as contact with contaminated surfaces or clothing) is also possible. The ability of sub-clinical (asymptomatic) cases to spread the infection is a cause of concern.

**Pandemic Influenza**

- Depends upon virulence of virus
- 2009-10 H1N1 was severe
- 1957 H2N2 was moderately severe
- 1968 N3N2 was mild
- Impact is not limited to the year when the pandemic virus emerges
- Strains evolve through antigenic drift and continue to circulate.

Pandemic influenza can be caused by a number of viruses. Currently, a novel H1N1 virus has caused a pandemic which started around three months ago in Mexico and initially termed as swine flu. This virus initially caused large number of deaths in Mexico. It has since become milder and case fatality rate in H1N1 is currently less than 0.5 per cent. There are some unique features to this virus. Limited studies in USA have shown that antibodies have been found to this virus in the healthy elderly, unlike in the case of seasonal viruses although their protective value cannot be predicted at this stage. Also, this virus is resistant currently to adamantidine group of drugs as compared to seasonal viruses which are sensitive to this drug. There are fears that this virus may become more virulent in the second wave of the pandemic.

**Laboratory Diagnosis:**

- Every suspect or probable human case of avian influenza must be investigated to confirm the diagnosis.
- Respiratory and blood specimens are collected for laboratory testing as clinically indicated with appropriate precautions.
- Collect both nose and throat swabs in viral transport medium
- Diagnostic yields higher with throat specimens
- Nasal swabs are appropriate for detecting human influenza A and B.
- Collect tracheal aspirates, if available - higher viral titres and yields
- Repeated collection of multiple respiratory samples recommended
- Negative single sample does not rule out H5N1 infection.

Details of sample collection will be shown to you in the form of a video sufficient to say here that:

- 1) For seasonal and H1N1 influenza, nasal and or pharyngeal swabs are the recommended specimens.
- 2) For H5N1, the preference of sample is in the following order:
  - i) Endotracheal aspirate, if patient is intubated.
  - ii) Or pharyngeal swab.
  - iii) Nasopharyngeal swabs/secretions.

**Infection control in Health Facilities**

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- Isolation of cases
- Negative-pressure room, or
- Single, well ventilated rooms
- Cohort in ward with beds at least 1 meter apart, preferably separated by physical barrier
- Take standard, contact, droplet and airborne isolation precautions
- Only limited health care workers should have access to cases. If possible, they should not look after other patients.
- Cases should also use N-95 masks (three surgical masks, If N-95 masks not available)
- Visitors should not be allowed. Otherwise give them proper PPE
- Infection control is a very important aspect of case management. It would be dealt with in detail in a separate lesson on the subject.

### **Summary of Case Management**

- Treatment in isolation with facility standard, droplet, contact precautions.
- Cases should be provided separate rooms or cohorted with at least 3 feet distance.
- Anti-viral drugs (recent H5N1 viruses are resistant to Amantadine and rimantadine, but susceptible to Oseltamivir)
- Supportive therapy including mechanical ventilation if needed
- Good infection control practices in health settings.
- All health care workers involved in the management of cases are given oseltamivir chemoprophylaxis and appropriate PPE
- Patients should follow good respiratory etiquettes even during hospitalization.

To summarize, cases of influenza should be managed in well ventilated isolation wards. They may need supportive treatment apart from antiviral treatment. Good infection control practices should be followed. All health care workers involved in the management of influenza cases should be given chemoprophylaxis and PPE. (WHO)

### **Community and Swine flu (ACHINI FLU)**

#### **Misconception and misnomer**

Swine flu spreads from swine (pig, hog, bear) to person.

Current flu virus spreads from persons to person. No need of pig to spread, so no need of killing of pigs as in bird flu.



Initially it was thought to be spread through pigs, so named as swine flu, which is misnomer. Correct name is Influenza H1N1 or Novel Influenza as it is a new type of influenza. But popularly called "swine flu".

**Reasons for dread or panic in society:**

- 1) As with Influenza H1N1 any flu spreads in community within a short time and also spreads globally (Pandemic)
- 2) Being new type of flu, there is no resistance offered by person or community.
- 3) Spread through air, so difficult to limit spread of disease.
- 4) Currently no curative treatment for virus. Currently available drugs limit \ multiplication of virus and have to be started earlier. But as the disease develops in man very quickly and doctors are also learning to diagnose the disease, late starting of treatment proves less effective.
- 5) Swine flu has greater fatality rate. There is ineffective treatment.
- 6) Swine flu renders lungs non-functional. An artificial respiratory support is only useful. But facilities for that are scarce.
- 7) Drug treatment to prevent or cure disease is with much side-effects, in short supply and costly.
- 8) Diagnosis with tests is scarcely available and costly.
- 9) Currently available preventive measures - Vaccine is effective by 60-70 only and not cost effective and not sufficiently available.
- 10) In society or community, there is always dread or fear about unknown or new threat (Novel Influenza). Naturally response to it is always knee-jerk.
- 11) In the past pandemic influenza has effected deaths of millions of people in short time worldwide over. This clearly thought adds fear in community.
- 12) Government and private health care system in India is ill equipped to deal with such threats.
- 13) Public education through media is poor in India and sometimes misinformation and disinformation scare the community.
- 14) Personal and community hygiene in India is poor, which leads to spread of flu like diseases.
- 15) Poverty, illiteracy, superstitions lead to panic.
- 16) Vested interests of drug companies, medical community, so called NGOs add to scare in community.

**Way Ahead:**

**To assure society -**

- 1) Improving Government and private health care system will not allow the citizens to become easy prey of this flu.

- 2) Modern scientific research and technology will bring quick, effective, affordable measures to fight such dreaded diseases.
- 3) Social human index improvement will lead to less scar.
- 4) There is no scare or panic when millions more people perish by natural or man-made disasters, diseases like heart attack and cancer, then why society should get dreaded with pandemic of swine flu?
- 5) Is there any alternative for a right to right information and in turn right to education?

**Table No. 1: Percentage of Infected & Died Due to H1N1**

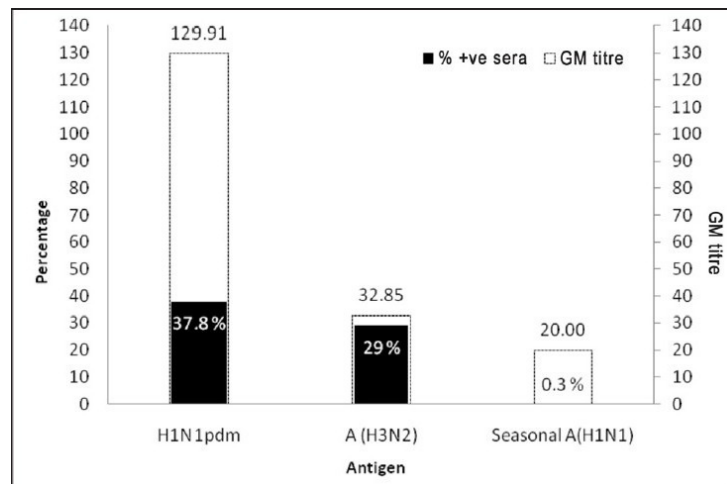
Sr. No	Year	Number of people infected	died	Percentage
1	2012	1551	135	8%
2	2013	643	149	23%

Source : Internet

**Table No.2 :Various District-wise sample collection from an abattoir**

Districts of Maharashtra	No. of Samples
Jalgaon	219
Dhule	190
Akola	30
Washim	33
Aurangabad	48
Buldhana	15
Nashik	56
Parbhani	30
Nandurbar	48
Ahemadnagar	20
Nagpur	25
Districts of Gujrat	No. of Samples
Surat	72
Navasri	50
Valsad	40
Bharuch	41
Gandhinagar	08
Total	925

Source : Internet

**Percentages of positive serum samples**

Percentages of positive serum samples and geometric mean titres of antibodies against pandemic influenza H1N1 (2009), influenza A (H3N2) and seasonal influenza (H1N1) viruses.

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