THE CHALLENGE OF EPIDEMIOLOGICAL TRANSITIONS

DEFINITIONS FOR TRANSITIONS AND EPIDEMIOLOGICAL TRANSITIONS

OMRAN’S THEORY ON EPIDEMIOLOGICAL TRANSITIONS

STAGES OF EPIDEMIOLOGICAL TRANSITION

DEMOGRAPHIC TRANSITION

FUTURE CHALLENGES

Key Terms
- Morbidity
- Mortality
- Epidemiologic Transition
- Demographic Transition
- Third World
- Infant Mortality
- Birth/Death Rates
- Life Expectancy
- Fertility
- Infectious Disease
- Non-Infectious Disease
- ‘Western’ Disease
- Modernization
Mortality and Mortality

Mortality - ‘the causes of death and the rates of death’
Measured by ‘crude death rates’: expressed as number of deaths per thousand population in a calendar year, either from all causes, or specific causes of death
Additionally there are ‘age adjusted or standardized death rates’ taking into account age-specific death rates

Morbidity - ‘the prevalence of illness within a community’
Measured by systematic routine reporting by medical professionals, relying on correct diagnoses

Mortality as a Health Indicator

- Mortality is not always the direct result of morbidity, people don’t necessarily die from the diseases they have during their lifetime

- While mortality is a crude indicator, its changing numbers and causes help monitor changes in society in terms of outlining longevity and population structure

- Mortality does not indicate the burden of disease on a community meaning that it often has a negative impact on the distribution and availability of health care

Other Key Health Care Indicators

Life Expectancy
'a hypothetical measure expressed in the average number of years a person may be expected to live if current mortality trends continue’

Population Increase
'measured as a rate of annual growth (percentage) or a natural increase, the excess of surviving births over death’

Infant Mortality
'a measure of the yearly ratio of deaths of children less than one year old relative to the number of live births in that year’
EPIDEMIOLOGY study of health and disease patterns, determinants and consequences in population groups.

No doubt that a powerful epidemiological change has been taking place in the world over the last several centuries in different populations.

EPIDEMIOLOGY incorporates the scientific capacity to analyze social, economic, health-care, technological and environmental changes related to health outcomes.

**CHANGES**  **TRANSITIONS**

- **HEALTH TRANSITION** - changes in health status plus changes in economic, sociodemographic and environmental health determinants.
- **DEMOGRAPHIC TRANSITION** - changes in population size and distribution: birth and death rates and population pyramids.
- **EPIDEMIOLOGICAL TRANSITION** - move from a disease pattern dominated by infectious diseases to one characterized by noncommunicable diseases (cancers, cardiovascular and injury).
- **HEALTH RISK TRANSITION** - changes in size and nature of population strata exposed to risk behavior and risk exposures.
- **TECHNOLOGICAL TRANSITION** - rapid advances in science, biotechnology, information technology and health sciences.
Epidemiological Transition

- Changing patterns in death and illness due to modernization are changed from generally infectious, parasitic and nutritional diseases to ‘western diseases’ chronic degenerative diseases.

Epidemiological Transition

- Most changes in epidemiological transition occur in relation to substantial changes in living standards, and ways of life.
- This includes access to medical care, preventative medicine and public health but also other factors such as adaptation of western lifestyle which includes stress, eating patterns, urbanized living etc.

Infections versus non-infectious disease

(Traylor and Burkitt)

*It has become conventional to distinguish between infectious and parasitic diseases and chronic or degenerative diseases*

**Western Diseases/Diseases of Affluence**

diseases which are often associated with ‘first world nations’ many that can be considered man-made or factors of the environment including circulatory disease, neoplasms, congenital or acquired handicaps etc.

**‘Tropical Diseases’/3rd World Diseases**
diseases classified in this category are essentially infectious, parasitic and nutritional diseases- many of which are considered ‘curable’ in the West such as malaria and TB
Omran’s Epidemiologic Transition Theory

Propositions:
1. Mortality decline is fundamental
2. Western diseases displace infectious disease as primary causes of death.
3. These changes are most profound for children and young women.
4. Shifts in health and disease patterns are closely related to demographic transitions
5. 3 basic phases of epidemiological transition are supported. (*age of pestilence and famine, age of receding pandemics, age of man-made diseases*)

Omran’s Epidemiological Transition Theory (1971)

- Mortality decline as a fundamental factor in population dynamics
- During transition, a long-term shift in mortality and disease patterns occur, in which the chief causes of disease become degenerative and man-made diseases, displacing pandemics and infection
- During transition, the most profound changes occur among children and young women

Omran’s Epidemiological Transition Theory (1971)

- Shift in health and disease patterns characterizing the transition are closely associated with demographic and socioeconomic transitions that are part of ‘modernization’
- Distinctive variations in the pattern, pace, determinants and consequences of population change support 3 basic models of change
Omran’s phases of Transition

STAGES

FIRST STAGE (1700-1800) Age of Pestilence and famine

- High mortality in peaks (epidemics, famine, wars)
- Life expectancy (20 to 30+) years
- Health care (indigenous systems, herbal and witchcraft)
- Fertility high (30 per 1000 population)
- Social standards (low)
- Maternal mortality (high)

SECOND STAGE (1800-1900) Age of receding pandemics

THIRD STAGE (1900-2000) Age of degenerative stress and human made Diseases

FOURTH STAGE (2000- ) Age of declining Cardiovascular mortality, ageing, lifestyle changes, emergent and resurgent diseases

FIFTH STAGE (Future) Age of aspired quality of life
High mortality = most likely explanation of the slow rate of world population growth pre-modern and pre-industrial times.

Later, 18th and 19th century the declining mortality (more than increasing fertility) caused the West's growth of population.

Determinants of mortality decline in the 18th or 19th was more socially than medically determined.

- Medical or health care developments were too limited to have a significant impact at that time. (Ref. See: Mc Keown)
- Much more influential were some personal, lifestyle, social, and environmental factors which alone, or in combination with marginal health care practices, made the change possible.

Improvements:

- **Nutrition** (new crops: maize, potatoes.....)
- **Personal hygiene** (soap, cotton underwear.....)
- **Ecological recession** (less epidemics: scarlet fever, plagues.....)
- **Better Housing** (ventilation, waste disposals)
- **Contraception**

After this decline FERTILITY takes over as primary cause for population growth
SECOND STAGE    (1800-1900)

Age of receding pandemics

✓ Mortality (relief from devastating pandemics = epidemics from country to country)
✓ Life expectancy (40 to 50 years)
✓ Some important contagious diseases

✓ Fertility (high with some reductions but emigration to colonies: Australia, Canada, USA)
✓ Health Care: (limited with improvements, starting public health and inoculations)
✓ Social better housing and sanitation (water)

Demographic Transition Process
THIRD STAGE (1900-2000)

Age of degenerative stress and human made diseases

- Mortality (chronic diseases, cardiovascular, accidents, strokes)
- Environmental problems (chemicals, pollution, side effects of drugs)

Infections versus non-infectious diseases

Diseases of Poverty

Diseases classified in this category are essentially infectious, parasitic and nutritional diseases - many of which are considered ‘curable’ in the West such as malaria and TB.

Diseases of Affluence or Civilisation

Diseases which are often associated with ‘first world nations’ many that can be considered man-made or factors of the environment including circulatory disease, neoplasms, congenital or acquired handicaps etc.

Mental health Problems (Life style, stress,

- Life Expectancy (50-75 years)
- Health Care (Organized systems, public and antibiotics private, new drugs, medical technology, malpractice, chemotherapy, x rays)
- Social (Significant improvements...)

Mortality (chronic diseases, cardiovascular, accidents, strokes)

- Environmental problems (chemicals, pollution, side effects of drugs)
Changes in lifestyle, cessation of smoking, low-fat diets, and regular and aerobic exercise, better nutrition and malnutrition.

Increases in life expectancy (which approach 80 to 85 years or longer, especially for females), with increased chronic diseases and ageing.

Changes in lifestyle, cessation of smoking, low-fat diets, and regular and aerobic exercise, better nutrition and malnutrition.

Care Health in the fourth stage

- Mounting medical costs for both the state and the individual on medical technology and care.

Medical breakthroughs in early diagnosis and management of cardiovascular diseases, including new decisive drugs; cardiac surgery, intensive care and advanced emergency care technology as well as preventative cardiology.

- Treatment of risk conditions (particularly hypertension, diabetes and stress).

- Private and public Health care plans.

- Exaggerated physician overspecialization and the continuing inequities in health care coverage and accessibility.

- Emphasis is placed on molecular medicine, genetic engineering, sports medicine, geriatrics, organ transplantation and rehabilitative medicine.
The WHO in 1998 listed some 30 such diseases recognized since 1970. Viral diseases are those caused by HIV, Hepatitis B and C, Ebola, Hanta pulmonary and renal syndromes, Monkeypox, Rift Valley fever and several hemorrhagic fevers.

### Emergence of new diseases and resurgence of old diseases

- **Factors influencing:** travel & trade, microbiological resistance, human behaviour, breakdowns in health systems and increased pressure on the environment
- Social, political and economic factors cause movement of people
- Infectious diseases will increase and life expectancy will fall
- Ill health will lead to lower levels of economic activity which leads to environmental degradation, depressed income and bad health

### Bacterial diseases

- Bacterial diseases include Toxic Shock Syndrome, Legionnaires’ disease, Lyme disease, ehrlichiasis and new strains of E-coli, and cholera
- Among the resurgent diseases are malaria, cholera, tuberculosis, dengue, Chagas’ disease, plague, diphtheria and others.
Discussion

1) Is it possible for humankind as a whole to live a sustainable and healthy life in regards to current socio economic and environmental trends?

2) With increasing economic growth will developing countries follow the same pattern of health transition as Europe and North America?

3) How can socially marginalized and excluded people improve their health situation?

4) To what extent is public health the responsibility of governments or of individuals?

Most countries mortality decline has been accompanied by major changes in the causes of death and disease, primarily Increased Western diseases (Phillis, 1990).

From a public health standpoint, what should be priority in achieving long term health effects...focusing on preventing western diseases? Or focusing on treating the current infectious diseases that dramatically impact the Third World?

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THE END