REVIEW ARTICLE

The Epidemiological Transition: Policy and Planning Implications for Developing Countries

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Abstract

Background: *Medical Scientists are beginning to understand better some of the trends in the changing disease and mortality patterns but policymakers need to know how to use this information to make decisions about the priorities for the health sector. This Paper is aimed at x-raying this shift in morbidity and mortality patterns and make recommendations for possible shift in planning and policies.*

Method: *Relevant literatures were reviewed from medical journals, library search and internet source using Google search engine as well as international, national and local journals. The key words employed were: Epidemiological Transition with particular emphasis on policy and planning implications in developing countries.*

Result: *Several studies have outlined definitions, stages and historical perspectives of epidemiological transition, as well as the scenarios in developed and developing countries. The impending challenges and policy and planning implications in the developing countries were suggested and outlined in this paper.*

Conclusion: *It is very obvious that epidemiological transition is here with us as there are transformations in the age, cause, and sex structure of death in developing world. Yet not much progress has been made towards averting the dire consequences. A fundamental policy shift therefore needs to be put in place.*

Keywords: *Epidemiological Transition, Policy Planning, Developing Countries.*

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Introduction

As child survival programs continue to achieve their goals of reducing infant and child mortality, the age structure and overall health status of the populations of most developing countries are changing. A decline in fertility in many parts of the world has resulted in a shift towards an older population. With an increasing proportion of the population falling into the adult and elderly age groups, thus the epidemiological profiles of developing countries increasingly reflect the diseases and health problems of adults rather than of children. In particular, traditional health problems like communicable diseases are declining while chronic and degenerative diseases, and accidents and injuries, are becoming more important causes of death.

In most countries, this process has been accelerated by a more rapid reduction in infant and child mortality rates than those of adults. This shift in demographic and disease profiles, referred to as the epidemiological transition, is currently under way in most developing countries. This theory of epidemiological transition as stated above was originally proposed by Omran in 1971. [1, 2, 3.]

Epidemiological transition refers to changes from relatively high to low mortality regimes associated with transformations in the age, cause, and sex structure of death. [1] A change in the pattern of disease in a country away from infectious diseases towards chronic and degenerative diseases

Stages of Epidemiologic Transition

The “epidemiologic transition "as a concept, describes the shifting patterns of nutrition and health indicators in the human history. It is divided into four sequential stages: [1, 4.] Pestilence and famine, receding pandemics, degenerative and man-made diseases, and delayed degenerative diseases. Each defined by a unique pattern of disease that is intimately related to modes of subsistence and social structure.

This transition occurs as a country undergoes the process of modernization or economic development. Less economically developed countries have higher rates of infectious diseases as standards of medical care are lower than that found in more economically developed countries.[6] In more economically developed countries, more people die from degenerative diseases ,as infectious diseases such as cholera and typhoid are easily treated, causing more people to die from cancers as they live longer.[6]

The first epidemiologic transition was associated with a rise in infectious diseases that accompanied the Neolithic Revolution. The second epidemiologic transition involved the shift from infectious to chronic diseases mortality associated with industrialization. The recent resurgence of infectious disease mortality marks a third

epidemiologic transition characterized by newly emerging, re-emerging, and antibiotic resistant pathogens in the context of an accelerated globalization of human disease ecologies(ecological transition).[1,6,7.]
Epidemiological transition occurs at different paces in different places, depending on the following:

- Rate of fertility changes,
- The distribution of risk factors that contribute to the incidence of disease, and
- The health system's ability to respond to the changing epidemiological profile.

Inequalities in health arise because different groups in a population progress through these transitions at different rates. Typically, more affluent groups make these transitions more rapidly than poor or ethnic minority groups. Following the patterns of the epidemiologic transition, the progression from one stage to the next tends to proceed in a predictable manner. In other words, the patterns of emergence of chronic diseases in developing countries are expected to be similar to what has already happened in the developed world. However, while it took a longer period of time for developed countries to move from a time of infectious diseases to their current state of high prevalence of NCDs, the time frame for the transition in the developing world will be compressed.[8]

Sub-Saharan Africa (SSA) is greatly affected by stage 1 of this transition, whereas developed countries experience a higher burden of non-communicable chronic diseases (NCDs). However, with rapid urbanization in many parts of SSA, there is evidence that this transition to a greater burden of chronic diseases is occurring in Africa.

The prevalence of NCDs still remains higher in developed countries, but the patterns of their rise in developing countries are becoming evident and are expected to increase with the aging of the population.[4] Many developed countries may be entering a fifth unnamed phase of the epidemiologic transition but some of the developing world, especially SSA, are caught in between two or more stages.

The World Health Organization (WHO) has conducted studies such as the Global Burden of Disease (GBD) study, which have helped elucidate the epidemiology and trends of NCDs in developing regions of the world. This study suggests that by 2020, the proportion of the overall burden in sub-Saharan Africa due to NCDs will increase to somewhere between 26% and 34%.[9]

Rodolfo Bulatao estimated and projected the cause-of-death pattern for six age groups (0, 1 to 4, 5 to 14, 15 to 44, 45 to 64, and 65 and older), by sex for four calendar years (1970, 1985, 2000, 2015) and by six country groupings (industrial market economies, industrial non-market economies, Latin America and the Caribbean, sub-Saharan Africa, the Middle East and North Africa, and Asia and the Pacific).[10] This exercise clearly demonstrated an impending decline in mortality from communicable diseases and the relative emergence of NCDs.

But chronic diseases have not simply displaced acute infectious diseases in developing countries. Rather such countries now experience what is called a polarized and protracted "double burden of disease." [11] Nigeria is an example of the SSA countries where the double burden of disease is evident. This is manifested in the increasing prevalence of lifestyle associated diseases like diabetes mellitus, and of overweight and obese individuals, as well as the dominance of infectious diseases. As many countries in Africa continue to deal with issues such as immunization, eradication of infectious diseases, and problems of HIV; NCDs such as diabetes mellitus, CVA, and hypertension are also public health issues that need to be addressed.

Non-Communicable Diseases

Defined by the Commission on chronic illness in USA as; [12] all impairment or deviations from normal, which have one or more of the following characteristics: are permanent; leave residual disability; are caused by non-reversible pathological alteration; require special training of the patient for rehabilitation; may be expected to require a long period of supervision, observation or care.

Statement of Problem

- Life Expectancy increases hence people live into old age.
- Health development -Modern medical care enables many with chronic diseases to survive also there is improved diagnosis.
- Socio-economic development hence change in lifestyle

The populations of developing countries are gradually shifting from environments with greater exposure to infectious diseases (poor water and food quality, unhygienic sanitary practices) to areas with a higher prevalence of risk factors for non-communicable diseases, such as motor vehicles, unsafe workplaces, and air pollution.[1, 13.] At the same time, personal behaviours are often changing in ways that increase the

chances of developing a chronic disease. In addition, there is constant threat of emergence of new infections and re-emergence of old diseases.

Gender Differentials and Epidemiological Transition

Changes in gender differentials are a major component of epidemiological transition. E.g. in all developed and great majority of developing countries, female life expectancy is now greater than that of males, but there is considerable variation in the extent of this difference. Low mortality countries have larger sex differences in life expectancy than high mortality population, reflecting association between falls in mortality and an increasing female advantage .[10]

In certain countries, this seems to be different because of discrimination against females, preference for male offspring, sex selective abortion (female infanticide), more disability in older women, harmful widowhood practices. As with all causes of mortality, an epidemiological transition is underway for maternal deaths. The leading causes of death now hinge on NCDs.

Policy and Planning

The term "Policy" derives from the conceptualization by Lasswell and Kaplan of policy as consensus, that is, a" projected programme of goal values and practices." They saw the policy process as the "formulation, promulgation and application of identifications, demands and expectations." Policy is a proposed legitimized course of action addressed to a problem or a class of problems in an effort to reach a goal or realize an objective or a purpose. Health policy deals with the way a society makes decisions about the health of its people and the services they receive.

Planning is the process by which we select goals and objectives, and determine how best to achieve them.[14] Involves setting objectives and choosing alternative courses of action towards their attainment.It is a systematic decision making process of setting objectives and taking decisions on HOW, WHEN, WHERE to deploy resources in order to achieve the set objectives.

The Nigerian Situation

There is a limited capacity for policy/ plan/ programme formulation, implementation and evaluation at all levels.[15]There is no health act describing the national health system and defining the health functions of each of the three tiers of government.[15] These were considered in the 2004 revision of the National Health Policy, however issues on epidemiological transition have not been put into consideration. Even the Vision 2020 plans of Mr. President did not include health as a key issue.

Although scientists are beginning to understand better some of the trends in the changing disease and mortality patterns, policymakers need to know how to use this information to make decisions about the priorities for the health sector.

Transitions in Mortality and Epidemiologic Patterns

Policy and planning implications of the epidemiological transition are based in part on an understanding of how population and mortality structures are likely to change as these are the principal outcome indicators by which the epidemiological transition is assessed. Heligman et al., show that whereas 27.3 percent of deaths in less developed regions occurred at ages 50 and above in 19601965, 41.9 percent were in that age range in 19801985 and 63.0 percent are projected for these ages in 20102015.[10]

Changing mortality patterns are the product not only of changes in age structure but also of changes in the distribution of risk factors and in age-specific incidence and case-fatality rates of various diseases. The presence of a risk factor however, does not necessarily imply that a disease will be observed at the level expected on the basis of relationships in developed countries. In some cases, mortality rates may be declining faster than morbidity and disability rates because better treatments for diseases have reduced their case-fatality rates. E.g. Oral Rehydration Therapy, has not reduced the incidence of diarrhoeal diseases, but has contributed to a reduction in the number of fatalities per case.

Nevertheless, epidemiological studies indicate that smoking, hypertension, dietary fat, motor vehicles, occupational hazards, and poverty are among the leading risk factors for death from non-communicable diseases in developing and developed countries alike. Smoking, for example, although known to be responsible for a number of diseases, has grown in popularity. The increase between 1970 and 1985 in tobacco consumption per adult amounted to 41.6 percent in Africa.[10] Increasing numbers of motor vehicles, bad roads and unsafe workplaces are risk factors for accidents and injuries.

Worldwide, an estimated 1.2 million people are killed in road crashes each year, (an average of 3242 people every day) and as many as 50 million are injured.[16] Projections indicate that these figures will increase by about 65% over the next 20 years unless there is new

commitment to prevention.[16] Road traffic injuries are the 11th leading cause of death and the 9th leading cause of disability-adjusted life years lost worldwide but as motorization increases road traffic injuries are predicted to rise to become the eight leading cause of death by 2030.[16]

Injuries in the workplace tend to be much more common and severe in developing countries.[17] As urbanization and economic growth occur, there are significant changes in diet and activity patterns. Households shift from consuming diets based on cereals and vegetables, to diets richer in fat, added sugar, diary and animal products. At the same time the energy requirement of their work decreases as fewer people work in blue-collar agriculture, and more work in urban white - collar occupations. The result is that the main nutritional problem begins to shift from under nutrition to over nutrition.

Nutrition Transition

The weight problem where with increasing westernization, the prevalence of overweight and obesity appears to be rising in less developed countries where emphasis had been on under nutrition and food security. Barker et al suggest that these individuals are particularly susceptible to a range of diseases including heart diseases, CVA, adult onset diabetes mellitus.[18]The relative risk of these diseases increases with the democratization of foods high in fats, sugar, along with sedentary lifestyle. Even places more familiar with asthenia than obesity are starting to worry about increasing waistlines. Africans now have weight loss clinics, and the craze for gymnasiums is now on the rise.

Data Deficiencies

A number of factors prevent a precise understanding of the epidemiological transition and impede policy formulation. Paramount among these is the absence of good data on mortality. Cause-of-death data either do not exist or are unreliable for most developing countries. Most African countries don't have data on death registration or cause of death.[10]

Urban-based or hospital-based studies may represent one segment of the population, but results from such studies are not readily generalisable. The poorer subpopulations of developing countries are often thought to suffer more from infectious and parasitic diseases, and the wealthier segments are thought to suffer more often from non-communicable diseases. [10]However, the poor have greater exposure to many of the risk factors associated with communicable and non-communicable diseases alike. Studies in Brazil by Briscoe J, indicate that the highest levels of hypertension, smoking, alcohol use, lack of exercise, and obesity are to be found among those with the lowest educational level. [19]Cause-specific death rates for cancer, cardiovascular disease, respiratory disease, and external causes were higher among poor men than wealthy men in Porto Alegre, Brazil. [19] In other words, the population needs to be disaggregated, and the changes taking place within the major subpopulations must be examined.

A projection of the mortality structure is also useful in planning for the specific types of services that will be needed. The shift towards an aging population and the resulting changes in the epidemiological profile call for a better understanding of the complexity of chronic and degenerative diseases. Combining data sources to produce longitudinal data that include the levels of risk factors in developing countries yields more accurate forecasts than using the generally available data from developed countries. Setting priorities in a changing epidemiological environment in determining whether the focus of health investments should be on childhood or adult diseases, a number of indices have been developed that assess the different outcomes based on the types of inputs used.

A commonly used index is the healthy years of life saved by specific interventions. Samuel Preston critically examined this index, identifying circumstances in which it yields reliable and unreliable information. A distinction was drawn between interventions that occur over only one year and those that extend into the future.[10] He also discussed whether and how the index accounts for the benefits accrued by those who are not yet born when the intervention was initiated. He argued that population projections can often provide a better vehicle for assessing the consequences of interventions and incorporating other dimensions such as total gain in production or changes in per capita income.

José Luis Bobadilla and Cristina Possas examined health policy issues arising from the epidemiological transition in Mexico, Brazil, and Colombia.[10] They developed a framework for health policy decisions based jointly on population dynamics, which provides an idea of the magnitude of the health needs, and on the available health system, which describes the configuration of services available to meet the current level of need. However, it is not possible to formulate a homogeneous health policy agenda for developing countries because each country's transition is different. Each health system should be more responsive to its

population's needs: redistribute welfare through providing health services, reform the health care model, improve the efficiency and quality of care, and build a national capacity for strategic health planning. In summary, chronic diseases have an impact on the health of the population, and if they continue to be ignored, huge consequences will result.

There is also need to tackle the issue of the duality of disease burden in SSA. Firstly, chronic diseases need to be placed higher on the political agenda. Its exclusion from the Millennium Development Goals (MDGs) is already an impediment to addressing the problem in places like SSA, which are the main targets of the MDGs. Because chronic diseases affect all parts of economic development, it cannot be excluded from initiatives, goals, and policies, intended to improve economic development.

Secondly, risk factors for NCDs need to be controlled in SSA. One major risk factor is the lack of education about NCDs, appropriate lifestyle habits, and preventative methods, to mention but a few. The role of health educators and healthcare providers need to accommodate educating individuals on these issues. The last but not the least, the health care system in SSA is already strained dealing with just infectious diseases, talk less of handling a double burden of disease. Therefore, there should be an increased focus on NCDs prevention methods like exercising, eating healthy diets, and reducing tobacco intake. Also the health systems in SSA need to be realigned to include NCDs planning and program implementation.

Policy statements should be put forward that set goals for reducing mortality, morbidity, and the prevalence of risk factors. There is need to focus on durable programs that will have sustained effects on children's health rather than pursuing numerical goals. The changing health environment raises questions on whether the "child survival" strategy is the best approach for improving children's health in the 21stcentury and whether some of the goals can be achieved without improving health care infrastructure.

As noted earlier, the demographic and epidemiologic changes that are taking place in developing countries are often aggregated into national-level numbers, but within each population are groups, in widely differing circumstances. The wealthy and poor typically follow different epidemiologic and demographic trajectories.

In examining the distributional implications of alternative policy strategies focused on children and adult health, Davidson Gwatkin comparesd the least healthy segment of the population with the healthiest segment. The comparison was made both for high- and low-mortality scenarios.[10]He demonstrated that paying greater attention to the health problems of adults and the elderly may often exacerbate social inequalities in mortality. Similarly, he showed that the least healthy are likely to benefit more from a reduction in mortality from communicable diseases, whereas a decline in non-communicable diseases would differentially benefit the healthier segment of the population. Perhaps surprisingly, he showed that a health policy tilt towards adult non-communicable diseases would be likely to increase inequalities more in low-mortality than in high-mortality developing countries. Providers of Services: Government, Private Sector, and Families -who should provide services, considering the roles of government, private medicine, and the informal sector.

Nancy Birdsall and Estelle James stated the case for shifting more of the provision of services to the private sector because of the inefficiencies and inequities associated with government spending. [10]They suggested that informational programs and basic services that cannot be supported in a private, competitive market, such as maternal and child health programs in rural areas, receive public funding. However, services such as hospitals, which presently represent a large percentage of health budgets and serve only a small portion of the health needs of the population, may warrant privatization, with fees covered by mandated health insurance. Regardless of whether the public or the private sector finances and provides the majority of health services, the informal sector will continue to play a vital role in caregiving.

John and Pat Caldwell examined the roles of women, families, and communities in preventing illness and providing health services. They observe that in many parts of the world, mothers are constrained in their ability to care for sick children because of social and economic impediments.[10] Societies that are relatively unaffected by cultural and technological imports often have health beliefs that promote incautious behavior. In some cases, women view child care as a community activity and may be less attentive to their children's survival because family systems can induce a sense of being powerless to influence events. In some societies, the mother must submit to her mother-in-law or husband regarding the type of care a sick child will receive. In more modern, transitional societies, some women are educated and may take advantage of the health care system. The less educated women are often alienated from the system and, because of their traditional health beliefs; do not use the system as effectively as they

could. Women's groups and female health visitors are ways of empowering young mothers to care better for themselves and for their children.

In a sense, the adaptation-to-change paradigm is itself rather arbitrary because government policy will play a central role in the pace and direction of future changes. Nevertheless, the widespread declines in fertility and child mortality, both of which contribute to the shifting age structures of developing countries, are not likely to be reversed and have imposed significant changes in the context for thinking about health policy. The demographic changes will have far-reaching consequences in the social and economic sectors of developing countries

The formulation of health initiatives in this new context involves many considerations, including assessments of the likely cost and effectiveness of specific programs. But there are dangers in prematurely narrowing discussion to technical issues of cost and effectiveness:

> How governments and families actually behave,
> How interventions affect various social groups,
> What long-term effects programs may have on the cohorts that experience them, and even how program effects should be measured and modeled, are questions that need to be addressed before cost-effectiveness calculations can be confidently invoked

Economic Costs

In China, the average hospital stay for cancer costs more than annual per capita GDP, and the same is true in India for "heart diseases ".[20,21.] Diet related non-communicable diseases accounted for almost one-quarter of hospital costs in China in 1995, and almost 15% in India.[20,21.]

Criteria for setting priorities in the health sector must be defined. As populations move towards an older age structure and with economic and social development, there are important implications for food and nutrition, for promotion of exercise, for health policy and agricultural policy;

> How much emphasis on child survival will be needed?
> What mechanisms will be used to allocate resources into different health programs?
> Who will be responsible for providing health care services?
> What cross-sectoral collaborations are needed?

These are the Policy and Planning issues for Developing Countries.

Policy Implications

It is an urgent priority to implement policies to avert the growing epidemic of diet related and non-communicable diseases in developing countries. Diet and exercise patterns may be set relatively early in life (in childhood and adolescence) although their effects on morbidity and mortality may take several decades to emerge. Developing countries have for so long been preoccupied with under nutrition and communicable diseases that appropriate policies for over nutrition and non-communicable diseases have not been well tried tested.A wide range of policies may be useful including comprehensive food and nutrition plans, school exercise programs, and agricultural research and food price policies.

There should be a shift in budgetting to accomodate this shift. Allocational efficiency is also key to achieving good policy implementation.There should be integration and strenghtening of the PHC system to help in the attainment of the health for all goals of the National Health Policy.It is important to note that sometimes "quick fixes" for problems of under nutrition and communicable diseases may exacerbate the growing epidemic of over nutrition and non-communicable diseases. Developing appropriate policies may be akin to walking a tightrope. However, further research on these issues in the context of developing countries is important as the transition is here with us.

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