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will be interpreted, and perhaps experienced, differently in these two cultures.

Second, and following from this, health and illness representations have implications for what people do when they experience distress. For one thing, these representations provide a definition for when bodily distress represents illness and requires assistance from a medical professional or other healer. For example, research with heart attack patients points out that one reason for delay in seeking treatment is that the person misinterpreted the symptoms and failed to recognize the seriousness of the situation. In addition, disease representations serve to direct the person's help-seeking behavior. For example, research in Singapore has noted that degree of adherence to beliefs associated with Chinese traditional medicine is a key determinant of whether the person seeks help from a practitioner of Western or Chinese traditional medicine (Bishop 1998).

Third, once help is sought, disease representations play an important role in determining whether the person stays in treatment and follows the treatment advice. A good example of this is research with hypertension patients showing that the cognitive 'model' they had of hypertension and its relationship to specific symptoms was a major determinant of whether they stayed in treatment (Leventhal and Diefenbach 1991).

Finally, illness representations play a key role in how people respond to potential health threats. Specifically, the beliefs that people have about particular diseases, how they are contracted, and their consequences have a strong influence on how they respond to people having the condition as well as what precautions, if any, they take to prevent the disease. For instance, beliefs among some Africans that anyone who has ever had sex with a person who has died of AIDS will automatically die as well appear to lead to refusal on the part of those holding such beliefs to seek medical advice, be tested for HIV, or change their sexual behavior so as to reduce their risk of infection (Ankrah 1991).

4. *Remaining Questions*

In many respects work to date has only scratched the surface of this fascinating topic. As noted, progress has been made in the theoretical understanding of mental representations of health and illness but much more can be done to flesh out this understanding and, in particular, explicitly account for cultural differences. Also much remains to be done in further exploring the content of health and illness concepts in different cultures and relating these to other aspects of the cultures in question as well as to dimensions, such as individualism-collectivism and power distance, used to describe cultures.

See also: African Studies: Health; Cultural Psychology; Culture as a Determinant of Mental Health; Illness Behavior and Care Seeking; Latin American Studies: Health; Psychosomatic Medicine; South Asian Studies: Health; Southeast Asian Studies: Health; Western European Studies: Health

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G. D. Bishop

Health and Mortality, Body Stature as a Measure of

In recent years a rapidly expanding research on the determinants and consequences of human stature has become central to the study of health and mortality processes. Human stature—as measured by height, weight, body mass (which combines height and weight), and a host of other anthropometric measures—has been shown to reflect health status and mortality risk across the life course. Stature is an indicator of health *in utero*, in infancy, and in childhood, and is an important predictor of chronic disease and mortality among adult populations. Moreover, anthropometric measures can be used to com-

pare health and nutritional status across populations, social classes, and historical time periods.

1. Stature as an Indicator of Nutrition, Health, and Mortality

1.1 The Importance of Height

Although auxology (the study of human growth) began as early as the seventeeth century, it was not until the nineteenth century that scholars began realizing that environment can systematically affect human growth. For instance, Villerme argued, based on a study of French soldiers, that poverty was much more important than climate in influencing growth. A few decades later, Charles Roberts estimated fitness for factory employment using frequency distributions of key anthropometric measures such as weight-for-height and chest circumference. In the early 1890s, Franz Boas conducted a national growth study, which was used to develop national standards in the USA. In later years, Boas was a pioneer in the use of statistical methods to analyze growth and furthered the work of linking environment and heredity to growth (Steckel 1995).

In the twentieth century, it became clear that a child's growth rate is likely the best single indicator of his or her health and nutritional status. Furthermore, mean values of childhood heights and weights provide powerful summary statistics of the public health of the population, and childhood anthropometric measures can be used to make meaningful comparisons of health and nutritional status across populations (Eveleth and Tanner 1990).

Adult height can also be used as a measure of public health, since adult height is a proxy for the childhood nutritional status of a population. However, adult height reflects a complex interaction of genetics, environment and the timing of nutritional shortfalls. If nutritional deprivation occurs during the 'sensitive periods' of development, differences in adult height may be quite striking. The sensitivity of growth to nutritional deprivation depends upon the age at which it occurs. Catching up is possible, but prolonged and severe deprivation results in stunting or a reduction in adult size.

Height is a significant predictor of older age mortality. Overall, mortality risk declines as height increases. One of the most comprehensive modern studies was completed by Waaler (1984) on the entire Norwegian population. He found that men measuring 165 cm in height face a mortality risk that is 71 percent greater than those measuring 182.5 cm. Obviously height is also strongly influenced by genetic factors, but genetics cannot explain the significant differentials in height that exist today according to socioeconomic status, nor the narrowing of differentials in industrialized nations (Floud et al. 1990).

1.2 Weight and BMI

In both children and adults, weight is an important anthropometrical measure. Whereas height is typically used as a proxy for past nutritional development, weight is seen as a measure of current health and nutritional status. In the developing world, low weight remains a significant indicator of nutrition and health. In the developed nations, high weights are the principal concern. Obesity rates, especially in the USA, have risen over recent decades and obesity is frequently found to be a risk factor for serious chronic illnesses, including cardiovascular disease, a leading cause of adult mortality in developed nations. Obesity has also shown to be correlated with race and social class.

Obviously weight can be more effectively exploited in epidemiological analysis if it is standardized for height. A common standardization is to use body mass index (BMI), which is defined as height (in meters) divided by the square of weight (in kilograms). The mortality risk is relatively constant in the range of 21–28. However, as BMI falls below 21, adult mortality rises sharply. Mortality also rises for BMI higher than 28. BMI is associated with higher mortality from all causes, though the relative importance of BMI may be confounded by a history of smoking and by previous diseases, and the impact of BMI declines with age. Some studies suggest that much of the increased mortality risk from low BMIs in the USA can be attributed to smoking. Interestingly, excess mortality among African-American women in the USA is not attributed to BMI, even though they have high rates of obesity.

2. Determinants of Stature

Over the last century, scholars have made considerable strides in characterizing and understanding human growth and how various genetic, nutritional, and environmental factors interact with the growth process. Clearly the most important time is infancy, in which the growth rate is greater than at any point thereafter. Not coincidentally, infancy is also the time when humans face the greatest risk of mortality. After infancy, the growth rate declines irregularly until adolescence, during which it rises, at its peak, to about one-half the rate during infancy. The most important study on human growth is by Eveleth and Tanner (1990), and the following sections draw heavily from this work.

2.1 Genetics

Within a community facing similar environmental influences, the distribution of heights is dominated by genetic influences. Systematic studies of heights within families confirm this everyday observation. Studies of twins and other sibling relationships provide the most

convincing evidence. Wilson (1976) reports that monozygotic (MZ) twins, who share the same genes and, in most cases, a common family environment, have, on average, only 1.1 cm difference in height at age four, while dizygotic (DZ) or fraternal twins have a 3.2 cm difference at the same age. Furthermore, differences in height in MZ twins decline as the twins get older, but the difference increases for DZ pairs.

Numerous studies of twins and other siblings provide strong evidence that the closer the genetic relationship, the closer the growth patterns. MZ twins are more closely intercorrelated than DZ twins, but siblings in general are much more similar to each other than they are to nonrelated individuals. Furthermore, the heights of parents and children are highly correlated, though no evidence exists that one parent is more important than the other.

2.2 *Nutrition*

Even though genetic influences are an important determinant of *individual* variation in height, differences in average height across *populations* are almost entirely the product of environmental influences, not genetics. Although many environmental factors affect body stature, chief among them is nutrition. Of particular importance is nutrition in early life. Numerous scientific studies have shown that severely malnourished children have a greatly increased mortality risk relative to normal children (Behrman and Deolalikar 1988).

Infancy is the period of life in which both the human growth rate and the risk of mortality is at its highest. It is not surprising, therefore, that it is also the time during which nutritional intake is the most critical. Indeed, the concern for nutrition may begin *in utero*, and several studies have shown that supplementing the diet of pregnant women in developing nations significantly increases birth weights—the most important predictor of infant mortality. Even in developing nations, infant mortality is higher than any other period of life. By the age of two, much of the deficit characteristic of adults has already accumulated. Nutrition during the adolescent growth spurt may be important, though the evidence is mixed. In any case, the impact on morbidity and mortality of adolescent malnutrition is nowhere near as dramatic as it is in early childhood.

Many sub-populations in developing nations have mean birth weights that are similar to those in developed nations. In these developing nations, however, weight gain begins to diminish at about six months, the time when mothers' lactating ability declines and children are often weaned. Although food supplements can help, the prevention and treatment of infectious diseases is also critical in this period in developing nations.

2.3 *Infectious Disease*

Infectious disease interacts closely with nutrition in the growth process. Even in nutrition-rich environments, the undeveloped immune systems of children make them more susceptible to disease. When diet is poor, most of the body's resources are devoted to basic maintenance; malnourished children, therefore, are even more susceptible to disease. Furthermore, infection reduces the body's ability to absorb nutrients, which can make children even more malnourished. Infectious disease in childhood, therefore, can have long-term consequences on growth. Some controversy does exist on this topic, however. An alternative 'small but healthy' hypothesis has been promoted by a few researchers, though it has not received widespread support.

2.4 *Socioeconomic Correlates*

Economic growth (which results in better nutrition, public sanitation, improved hygiene, improved medical treatment, etc.) has been the driving force behind the secular increases in height around the globe. Variation in national income can also explain much of the variation in mean heights across nations. Steckel (1995) calculates correlation coefficients between mean height and the log of per capita income that are between 0.8 and 0.9. National income remains a powerful correlate of height, even after controlling for other demographic characteristics of the nations such as urbanization and age. And in nearly all nations, both developed and developing, children with moderate to high socioeconomic status are larger than their counterparts with low socioeconomic status, where socioeconomic status is determined by education, occupation, and income.

Of course the effect of socioeconomic status is interwoven with nutritional intake and infectious disease environments. Consequently, socioeconomic differentials are much more pronounced in developing nations. Socioeconomic differentials in height are most pronounced in childhood, but exist for adults as well. Several studies show that the social class effects are greater for boys than for girls.

3. *Stature and the Study of Health and Mortality*

3.1 *Historical Populations*

In the last decades of the twentieth century scholars began using body stature, and height in particular, to determine the living standards and health status of populations for several historical time periods and in various locations around the globe. Health and mortality details, particularly at the individual level, are generally unavailable in historical data, but height data are available (typically from military service records) in several American and European popu-

lations since the seventeenth century. Height, therefore, is the most important indicator of health status we have when investigating the historical record.

These studies have confirmed traditional notions of public health, such as the abysmal living conditions in eighteenth- and nineteenth-century urban areas. There have also been some unexpected findings. For example, the USA, in contrast to European nations, achieved near-modern average height as early as the mid-eighteenth century, though heights declined somewhat over the nineteenth century (from 173 cm in 1800 to 171 in 1900 for adult men), mostly during the middle part of the century. Mortality evidence from genealogies and from plantation records indicates that life expectancy deteriorated while heights declined during the ante-bellum period. The cause of the nineteenth-century decline in height is still a puzzle. Hypotheses include increased urbanization, nutritional decline, an increase in infectious diseases created by trade, migration, and public schooling, and the disruption of the US Civil War.

Before the twentieth century, European men were smaller than Americans, probably due to far poorer diets, but there was significant diversity in height across European nations. In the early nineteenth century, residents of Ireland and Scotland were the tallest (168 cm) followed by Norway, Sweden, England, France and Austria-Hungary (163 cm). In the twentieth century, geographic distributions of height shifted. Based on data collated by Eveleth and Tanner (1990), the Dutch and Norwegians were now the tallest, followed by Americans, British, French and Austrians. Socioeconomic differentials were pronounced in Europe. Floud et al. (1990) report, for instance, that in nineteenth-century England, 14-year-old Sandhurst boys (mostly the children of aristocrats, high-ranking officers, and professionals) exceeded the stature of boys from the Marine Society (mostly from the slums of London) by 10 to 15 cm.

3.2 *The Modern World*

The period from the late-nineteenth to the mid-twentieth century was characterized by dramatic increases in stature and equally dramatic reductions in mortality. Life expectancy was about 40 years in 1860 but had risen to 68 years by 1950 (see *Mortality: The Great Historical Decline*). There is no single cause for this dramatic increase, but several contributing factors have been identified. Widespread public health programs were implemented, such as vaccinations, purifications of water supplies, sewage disposal, and milk pasteurization. Medical advances, such as an understanding of the germ theory of disease and the development of antibiotics, as well as increasing access to medical care, also contributed. Increases in income also facilitated better diets and housing.

Stature remains an important variable in modern studies of health and mortality, though its use varies by the economic development of the population under study. In developing nations, stunting and wasting are still critical indicators of nutritional status and the overall health of the population. In developed nations, most of the focus is on increased mortality of the obese, as indicated by high levels of BMI. Significant differentials in all health indicators, including anthropometric measures, still exist across cultures and social classes.

Central to the improvements in the twentieth century was the fight against infectious diseases. In a wide-ranging study of numerous populations from 1900 to the early 1960s, Preston (1976) attributed 25 percent of the mortality decline to influenza, pneumonia, and bronchitis; 15 percent to 'other infectious and parasitic diseases'; 10 percent to respiratory tuberculosis; and 10 percent to diarrheal diseases (the remaining portion of the decline is most likely attributable to cardiovascular disease). As noted earlier, the impact of infectious disease, particularly among children, is impacted significantly by nutrition.

Many factors, such as the development of antibiotics, contributed in the twentieth century to the decline in infectious disease prevalence and in the associated reduction in mortality. During the period between 1950 and 1970, life expectancy in developed nations increased only slightly (see *Life Expectancy and Adult Mortality in Industrialized Countries*), which many attributed to the successful fight against infectious diseases. Some argued that because so much early mortality was due to infectious disease, modern populations were facing an era of increased life but worsening health. People with frailer constitutions were living to older ages and, it was thought, would face higher rates of chronic illness than previous cohorts of elderly (Verbrugge 1984). However, most recent evidence suggests that age-specific morbidity and disability rates have been declining in the elderly population. Also surprising to most demographers has been the sharp increase in life expectancy after the period of stagnation between 1950 and 1970. The sources behind this increase remain largely a puzzle, and little consensus exists on future projections of life expectancy.

Towards the end of the twentieth century, birth weight, as well as other infant anthropometric measures, was linked not only to infant and child mortality, but also to disease and mortality in later life. The work of Barker (1994) suggests that development *in utero* may be critical to long-term health. This and other research suggests that anthropometric measures will remain an important component in an understanding of the complex and changing relationship between nutrition, health and mortality.

See also: Genetics and Development; Longevity, Genetics of; Mortality, Biodemography of; Mortality Differentials: Selection and Causation; Mortality, Epidemiological, and Health Transitions

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S. E. Wilson

Health: Anthropological Aspects

Health and health practices are part of the inmost complexities of social existence, permeating the domains of politics, economics, and religion and almost always connected with dimensions that go beyond the body, such as interpersonal, family, and community relationships. Health is at once an end and a means. Explanations of the causes and patterns of health and disease often convey value judgments, senses of right and wrong, and of accountability and blame, as well as revealing what is morally at stake in definitions of health and its failures. Medical anthropological studies have built upon historical and cultural analyses over a long period of time that indicate an array of difference with respect to the metaphors and meanings that signify health. These studies have emphasized cultural fabrics that give coherence and depth to these meanings such that cosmology and ethical traditions come to define the body in states of sickness and well-being.

Anthropological studies of health focus on local contexts where health and illness are recognized and responded to. Such studies also trace the effects of global flows of commodities, information, finance, images, people, and pathogens on such worlds. Anthropologists have been as interested in the social roots and consequences of health (and illness) as in their cultural representations. But what most particularly characterizes the anthropological perspective is the use of ethnography to understand health, illness, and health care. Anthropological perspectives on health bring together individual and collective realities in the way they are organized, narrated, contested, and in every sense lived as social trajectories (Kleinman 1995).

What anthropologists have learned through research in different societies is a story of diversity in experiences of health and health care giving, as well as of the ways social relationships and emotional processes interfuse in the mediation of health-relevant experiences. The meanings of health range from holistic and organic interpretations to hyperindividualistic ones. While biomedicine has treated health as a separate domain, popular meanings and interpretations of healthy states are often inseparable from other moral, political, and economic domains. Anthropologists have been particularly concerned with the transformations in health as those transformations express differences in power, social position, and social inequality, particularly as experienced by marginal groups and individuals. But in recent years, equal interest has been devoted to studies of health professionals, bureaucrats, and scientists who contribute to the public definition of health and health problems. Culture affects health as much through the culture of biomedicine and bureaucratic institutions as through the popular culture; indeed in the age of the Internet the two are closely related.

Applied medical anthropology addresses issues such as the ones raised and addresses them at the policy level. In heterogeneous societies such as North America and Western Europe, cultural differences continue to matter in the health field in large part because of differences in health conceptions which affect the panoply of health-relevant practices, from popular assessments of risks and responses to them to the uses and misuses of health care resources. Those differences contribute to different health outcomes for people, but they also contribute to different health systems, which are themselves undergoing transformation owing to both local and global economic and social changes.

1. Images of Health and Diverse Experiences of Health

The contemporary world contains impressive variations of images of health, modes of health maintenance, efforts at prevention, and illness experiences. Much of this variation is subsumed under what demographers and epidemiologists have termed the

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