International Scholars Journals

African Journal of Gender and Women Studies ISSN 2516-9831 Vol. 2 (3), pp. 076-088, March, 2017. Available online at www.internationalscholarsjournals.org © International Scholars Journals

Full Length Research Paper

A study of gender differential in life expectancy

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Accepted 22 October, 2016

Within populations, differences in life expectancy exist; that is, with regard to gender. The longevity gap between male and female has been in existence since the creation of man and the gap persists across the globe, from developed to developing nations. Females tend to outlive males in all populations, and have lower mortality rates at all ages, starting from infancy. However, the degree to which females outlive males varies; the difference is around three years in the less developed countries and approximately seven years in developed countries. The interaction of genetic and environmental risk factors and socialization are responsible for longevity difference by gender. A sex-specific consideration of risk behavior and quality of life suggests that a healthy lifestyle, relevant information and preventive measures particularly in males must be initiated before puberty if they are to have a positive effect on mortality and morbidity during the course of a person's life.

Key words: Gender, life expectancy, longevity, determinants.

INTRODUCTION

Life expectancy refers to the number of years that people in a given country or population is expected to live. Conceptually, life expectancy and longevity are identical; but the difference between them lies in measurement issues. Life expectancy is calculated in a very precise manner, using what social scientists call "life table analysis." Longevity is not associated with any particular statistical technique. Both life expectancy and longevity are distinct from life span, which refers to the number of years that humans could live under ideal conditions. While life expectancy is based on existing data; life span is speculative. Partly because of its speculative nature, the possible length of the human life span is therefore debatable. Some social scientists argue that Western populations are approaching a biologically fixed maximum or finite life span, probably in the range of 85 to 100 years. Others believe; for example, that the human life span can be extended by many more years, due to advances in molecular medicine or dietary improvements. An intermediate position is taken by other researchers, who suggest that there is no rigid limit to the human life span and as-yet-unforeseen biomedical technological breakthroughs could gradually increase life span.

A considerable amount of research, based on the foundational assumption of a finite human life span, has focused on the concept of dependency-free life expectancy (also called dependence-free life expectancy, healthy life expectancy, active life expectancy, disability-free life expectancy, and functional life expectancy). These varying terms refer to the number of years that people in a given population can expect to live in reasonably good health, with no or only minor disabling health conditions. Most of the research on dependency-free life expectancy tests, in varying ways, the validity of the compression of morbidity hypothesis, was originally formulated by the researcher James F. Fries in 1983. This hypothesis states, that at least among Western populations, proportionately more people are able to postpone the age of onset of chronic disability; hence, the period of time between onset of becoming seriously ill or disabled and dying is shortening or compressing. Research findings on morbidity compression are variously supportive, negative, and mixed. The hypothesis for this study is that “Female lives longer than

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Male" The objective of this study is to investigate differences in total life expectancy between male and female.

The Measurement of Life Expectancy

Life expectancy is a summary measure of mortality in a population. Statistics on life expectancy are derived from a mathematical model known as a life table. Life tables create a hypothetical cohort (or group) of 100,000 persons (usually of males and females separately) and subject it to the age-sex-specific mortality rates (the number of deaths per 1,000 or 10,000 or 100,000 persons of a given age and sex) observed in a given population. In doing this, researchers can trace how the 100,000 hypothetical persons (called a synthetic cohort) would shrink in numbers due to deaths as they age. The average age at which these persons are likely to have died is the life expectancy at birth. Life tables also provide data on life expectancy at other ages; the most commonly used statistic other than life expectancy at birth is life expectancy at age sixty-five, that is, the number of remaining years of life that persons aged sixty-five can expect to live.

Life expectancy statistics are very useful as summary measures of mortality, and they have an intuitive appeal that other measures of mortality, such as rates, lack. However, it is important to interpret data on life expectancy correctly. If it is reported that life expectancy at birth in a given population is 75 years in 2000, this does not mean that all members of the population can expect to live to the age of 75. Rather, it means that babies born in that population in 2000 would have a life expectancy at birth of 75 years, if they live their lives subject to the age-specific mortality rates of the entire population in 2000. This is not likely; because, as they age, age-specific mortality rates will almost certainly change in some ways. Also, older people in that population will have lived their life up to the year 2000 under a different set of age-specific mortality rates. Thus, it is important to be aware of the hypothetical nature of life expectancy statistics.

Life tables require accurate data on deaths (by age and sex) and on the population (by age and sex); many countries lack that basic data and their life expectancy statistics are estimates only. However, age-specific mortality tends to be very predictable; thus, if the overall level of mortality in a population is known, it is possible to construct quite reasonable estimates of life expectancy using what are called model life tables.

Theoretical frame work of gender difference in health

There is clearly a sex differential in health status. Men have higher rates of death (mortality) and more serious and chronic illnesses (morbidity) than women (NSW Health, 1999). It is worth noting at this point that there is some disagreement over sex differentials in health. Broom (1998), suggests that women suffer from a greater level of sickness than men. However, this is inaccurate - the primary data which could be used to support this contention is women's greater use of health services. This data, however, does not indicate that women suffer greater health problems, except that they utilize health services to a greater degree. There are valid alternative explanations (other than greater need) why more women frequently utilize medical and health services - one being that the range and availability of these services may make it easier for women to access them. In fact, this possibility is logically preferable to Broom's argument.

The degree of presence or absence of health services alone cannot account for gender differences in health. While timely and appropriate services can reduce the consequences of illnesses and injuries, they cannot reduce the incidence of these in the first place. The differences in incidence of illness between genders fall into one of three categories:

1. Biological explanations: These often refer to the fact that boys are more likely to have problems in utero or early infancy due to having a single X chromosome. Occasionally, reference may be made to the hormonal differences between men and women as contributory. Overall, while biology must play some part, it does not seem to account for much of the gender difference - the largest variations in health status within a given population can be directly attributed to social factors, not biological.

2. Behavioural/cultural explanations: Most emphasis on explaining men's health issues in recent times has been given to explanations based on cultural analysis. Grbich, 1996 and Germov, 1998 stress the factor of "masculinities" as causal in men's mortality and morbidity data. This approach suggests that factors inherently male - men's "risk-taking" behaviours and the "male role" are the real culprits of poor health. This perspective implies that attempts to improve men's health must focus on changes in lifestyle, behaviours and attitudes.

3. Material/structural explanations: These are based on the belief that social factors (such as employment patterns, income, educational opportunities, government policies, provision of health services etc.) largely determine health outcomes. This perspective is commonly used in discussions of women's health (Broom, 1998; Grbich, 1996), and suggests that structural factors are the main cause of women's health problems. It leads to the conclusion that attempts to improve women's health must focus on changes in social systems, such as government policies. Aggregation of data can conceal as much as it reveals, and has hindered our understanding of the causes of poor health in men, thereby preventing appropriate responses to attempt to

improve the situation. Aggregate data has led to generalisations about "male culture" and men's behaviours as being causal in their poor health. But the reality is that not all men experience relatively poor health compared to women. It is one sub-group - low socio-economic status (SES) males - who suffer a disproportionate burden of health problems, and skew illness data in a way that suggests all men face massive health problems. The National Health Strategy's Research Paper (1992), notes that men from low Socio Economic Status (SES), compared to their high SES counterparts, are:

55% more likely to die from lung cancer
74% more likely to die from diabetes
54% more likely to die from ischaemic heart disease
102% more likely to die from cerebro vascular disease
265% more likely to die from pneumonia/influenza
98% more likely to die from bronchitis/ emphysema/-asthma
77% more likely to commit suicide.

Where poverty is compounded with other forms of social disadvantage, such as aboriginality, the picture is even grimmer for men. While the average life expectancy of an Australian non-aboriginal male living in the 1980s was around 72 years, that for an Aboriginal male was between 49 and 56 years (Davis and George, 1988, p84).

The degree to which people sense they belong to a society or community, and which translates into levels' of social support. That social cohesion enhances well-being is an established fact. Since Emile Durkheim's study (1897) of the social basis of suicide rates, numerous studies have shown that people who are socially integrated live longer and that socially isolated people die at two to three times the rate of people with good networks of support (Kawachi and Kennedy, 1998). These authors suggest that this reflects the former's limited access to sources of emotional and instrumental support. They go on to note that presence or absence of support is not an individual phenomenon, but that entire communities or societies might be lacking in social connections. This is supported by Quick and Wilkinson (1991, p5), who claim that there "is something about the quality of life in an unequal society that is damaging to people's health, over and above the direct effects of material conditions themselves", and that this inequality "has its main effect through psychological and social processes". And it seems entirely plausible that these processes will differ across genders, and thus may be contributory to the poorer health of men of low SES. Support for this view comes from UNICEF (1996) which analysed the deteriorating patterns of mortality in Eastern Europe following the collapse of the communist bloc. UNICEF notes that:

"Increases in 'paternal mortality' are in fact mainly responsible for the overall deterioration in crude death rates and life expectancy rates at birth. Most affected are men between 30 and 59, especially in the 30-39 age group. Together with "inherited weaknesses" (poor lifestyles, bad nutritional habits, environmental degradation), psycho-social stress is recognized as a major cause in the 'mortality crisis' among young male adults, in particular in Russia, Ukraine and the Baltic countries.... In Russia, life expectancy at birth has fallen to a record low of 58.2 years for men, a value lower than in Pakistan. The gap between genders has further widened, with Russian women having a life expectancy at birth 13.2 years greater than men".

One of the specific mechanisms that may be at work in differentiating men and women of low SES is employment. While women have no less need than men for the financial benefits of employment, it may be that the incidental benefits of employment are more important for men. While much of the work available to men of low SES is arduous, boring and hazardous (95% of all industrial deaths are men), it appears that the lack of work is even worse. For many men, work is central to their social identity and self-esteem, and is a primary site for developing social networks and support. Women, who have a history of being excluded from the paid workplace, have a long and successful tradition of developing social networks outside of the workplace, so are not as reliant as men on work as a source of social connections. Additionally, a woman who is not working can be perceived, and perceive herself, as socially valuable through child bearing and parenting, an option not readily available to men.

Trends in Life Expectancy at Birth in Developed Nations

In the developed countries, the available data suggest that life expectancy at birth was around 35 to 40 years in the mid-1700s, rose to about 45 to 50 by the mid-1800s, so that by the middle of the twentieth century, it was approximately 66 to 67 years, probably because of that rapid improvements that began at the end of the nineteenth century (Encyclopedia of death and dying, 2011). Since 1950, gains in life expectancy have been smaller, approximately eight more years have been added (Table 1). The major factors accounting for increasing life expectancy, especially in the period of rapid improvement, were better nutrition and hygiene practices (both private and public), as well as enhanced knowledge of public health measures. These advances were particularly important in lowering infant mortality; when mortality is not controlled. The risk of death is high among infants and young children (and their mothers), and the major cause of death is infectious diseases.

Since a large proportion of deaths occurs in infants and

Table 1: Life expectancy at birth by world region, 1950–2000

Area	Years					
	1950-1955	1960-1965	1970-1975	1980-1985	1990-1995	1995-2000
World	46	52	58	61	64	66
Developed countries	67	70	71	73	74	74
Less Developed Countries	41	48	55	59	62	64
Africa	38	42	46	49	53	54
Asia	41	48	56	60	65	66
Latin America (and Caribbean)	51	57	61	65	69	70
Europe	66	70	71	72	73	73
North America (U.S. and Canada)	69	70	72	75	76	77

Source: Yaukey, David, and Douglas L. Anderton. Demography: The Study of Human Population. Prospect Heights, IL: Waveland, 2001.

young children, their improved longevity plays a key role in increasing life expectancy at birth. From the late 1800s to 1950 in the West, there was reduction in the mortality of infants and children (and their mothers); it was this reduction in their mortality that led to the increase in life expectancy ever experienced in developed countries. It is noteworthy that medical advances, life saving through smallpox vaccination, played a relatively small role in reducing infant and childhood mortality and increasing life expectancy.

Since the middle of the twentieth century, the gain in life expectancy was due to more medical factors that have reduced mortality among older persons. This reduction was harder to achieve than decreases in infant mortality. However, due to reductions in deaths from cardiovascular disease, cancer (at least for some kinds), and cerebrovascular disease (strokes)—the three major cause of death in developed countries— as well as other chronic degenerative diseases, life expectancy continues to improve. Nevertheless, looking at the twentieth century as a whole, reductions in mortality among younger persons played the major role in increasing life expectancy at birth; More than half (58%) of the gain in American life expectancy over the century was due to mortality reductions among persons aged under 20 and a further 17 percent can be accounted for by reductions among the age group 20 to 39 (Encyclopedia of death and dying, 2010).

Trends in Life Expectancy in Developing Nations

Very little improvement in life expectancy at birth had occurred in the developing world by the middle of the twentieth century. Unlike the developed countries, which had a life expectancy at birth of 67 years at that time, the developing world life expectancy is approximately 41 years—a difference of 26 years. However, after the end of World War II, life expectancy in the developing countries began to increase very rapidly. For example, between 1950 and 1970, life expectancy at birth improved by 14 years (Yaukey 2001). Mortality decline was faster than in the West during this period of most rapid decline, and it was much faster than in the West over the second half of the twentieth century. By the end of the century, the 26-year difference had been reduced to 10 years (although Africa lags behind the rest of the developing world) (Yaukey, 2001).

The rapid improvement in life expectancy at birth in the developing world occurred for different reasons than in the West. In the West, mortality declined paralleled socioeconomic development. In contrast, in the developing countries, mortality reductions were, in large part, due to the borrowing of Western death-control technology and public health measures. This in part was the result of the post-cold-war that saw the United States and other Western countries assist nonaligned countries with public health and mortality control in order to win their political allegiance (Encyclopedia of death and dying, 2010). Whatever the political motives, the result were very successful. As in the West, life expectancy at birth was initially improved by controlling the infectious diseases to which infants and children are particularly susceptible and was accomplished by improvements in diet, sanitation, and public health. In addition, the developing world was able to benefit from Western technology, such as pesticides, which played a major role in killing the mosquitoes that cause malaria, a leading cause of death in many countries. This exogenously caused reduction in mortality and led to very rapid rates of population growth in most developing world countries, creating what became known as the "population bomb." It also left these poor countries without a basic health (and public health) infrastructure (Encyclopedia of death and dying, 2010), making them vulnerable to the effects of cutbacks in aid from foreign (Western) governments and foundations (Encyclopedia of death and dying, 2010). It is in such a context that many developing world countries (especially in sub-Saharan Africa but also in Southeast Asia and the Caribbean) are attempting to deal with the

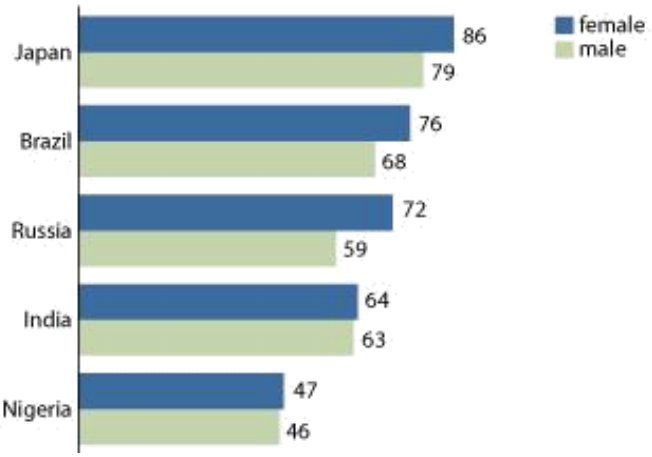

Figure 1: Life Expectancy at Birth by Sex, 2007
Source: C. Haub, *2007 World Population Data Sheet*.

Table 2: Life expectancy at birth by gender and by world region, 2001

Area	Total	Males	Females
World	67	65	69
Developed countries	75	72	79
Less developed countries	64	63	66
Africa	54	52	55
Asia	67	65	68
Asia (excluding China)	64	63	66
Latin America (and Caribbean)	71	68	74
Europe	74	70	78
North America (U.S. and Canada)	77	74	80

Source: Population Reference Bureau. 2001 World Population Data Sheet. Washington, DC: Population Reference Bureau, 2001

HIV/AIDS crisis, as well as a number of infectious diseases that were believed to have been conquered but have resurfaced through mutations.

It is difficult to predict if life expectancy differences at birth between the more and less developed countries will continue to converge. On the one hand, further increases in life expectancy in the West will be slow, resulting from improvements in the treatment and management of chronic diseases among older people (Encyclopedia of death and dying, 2010). Theoretically, it would be expected that the developing world could, thus, continue to catch up with West. However, new infectious diseases such as HIVS/AIDS and the re-emergence of "old" infectious diseases, sometimes in more virulent or antibiotic resistant forms, are attacking many developing world countries that lack the resources to cope.

Trends in Life Expectancy at Birth in Developed and Developing Nations Compared

Gender differences in mortality and life expectancy vary by country. But in most countries, men live shorter lives than women (figure 1 and 2). In Russia, for instance, the difference between male and female life expectancy is 13 years (59 vs. 72). In other countries, such as the United States, the male disadvantage is smaller: 5 years (75 vs. 80). And in some countries, such as Afghanistan, there is little or no male disadvantage (42 vs. 42) (Carl, 2007).

In developed countries, men's more risky unhealthy behaviors are a major reason they die younger (Sandra 2007). Their higher rates of cigarette smoking, heavy drinking, gun use, employment in hazardous occupations, and risk taking in recreation and driving are responsible for males' higher death rate due to lung cancer, accidents, suicide, and homicide (Sandra 2007). Risky male behavior may be fueled by biology and culture. Research suggests that testosterone contributes to males' greater physical activity and aggressiveness; this "domino effect" leads to their higher death rate due to accidents and homicide (Sandra, 2007). But when looking at gender disparities in health and mortality, it can be hard to get at biological differences. "

Men's risky behaviors also contribute to their having higher mortality rates in developing countries, but in developing countries, the gender gap in mortality has been smaller than in developed countries. Environmental factors such as unsafe water and inadequate nutrition increase the death rate due to infectious diseases for both sexes. Women, however, face additional risks associated with childbirth. Maternal mortality is high in sub-Saharan Africa, and there are higher suicide rates for women than men in China (Sandra, 2007). Another reason the gender gap in mortality is smaller in developing countries is because in many of these countries, women have much lower social status than men. As women's status catches up with men's in these countries, the gender gap is expected to increase in the developing nations. But in developed countries, the gender gap is expected to decrease as women adopt unhealthy behaviors similar to men's—drinking and smoking more, experiencing more job-related stress (Sandra 2007).

Differentials in Life Expectancy at Birth

Within populations, differences in life expectancy exist; that is, with regard to gender. Females tend to outlive males in all populations, and have lower mortality rates at all ages, starting from infancy. However, the degree to which females outlive males varies; as seen in Table 2, the difference is around three years in the less developed countries and approximately seven years in developed countries.

Another difference in life expectancy lies in social class,

as assessed through occupation, income, or education. This research tends to deal with life expectancy among adults, rather than at birth. The earliest work on occupational differences was done in England using 1951 data; Bernard Benjamin (1969), grouping occupations into five classes, found that mortality was 18 percent higher than average in the lowest class, and 2 percent lower than average in the highest class. In the United States in 1973, Evelyn Kitagawa and Philip Hauser, using 1960 data, found that both higher education and higher income were independently associated with longer life expectancy, that is, having both high income and high education was more advantageous than just having one or the other. This was later replicated by Pappas et al (1993), with the additional finding that the socioeconomic difference was widening over time.

Data on social class differences in life expectancy are difficult to obtain, even in highly developed countries. A 1999 study by Tapani Valkonen contains exceptionally good data on occupational differences in life expectancy in Finland. This study shows life expectancy at age 35 for four classes of workers, by gender, for the period of 1971 to 1996. While this study indicates that life expectancy differences by occupation show a female advantage for all occupations and that male longevity differentials are much bigger than female ones, the most important information conveyed here for the purposes of this study is that the occupational gap in life expectancy increased over the period. This finding concurs with that for the United States. It is not clear why socioeconomic differences in adult life expectancy are growing in Western populations (Encyclopedia of death and dying, 2010). The major cause of death responsible for the widening differential is cardiovascular disease; persons of higher social classes have experienced much larger declines in death due to cardiovascular disease than persons of lower classes (Encyclopedia of death and dying, 2010). It is possible that the widening is only temporary, the result of earlier declines in cardiovascular mortality among higher socioeconomic groups. Or, it may be that the widening reflects increasing polarization in health status and living conditions within Western populations. It does not appear that differences in access to health care are responsible, as the trend appears in countries that both have and do not have national medical/health insurance.

Another difference in life expectancy relates to race/ethnicity. For example, in the United States, the expectation of life at birth for whites is six years higher than for African Americans. However, the difference in life expectancy at age sixty-five is less than two years (Encyclopedia of death and dying, 2010). The narrowing gap with age suggests that mortality associated with younger age groups is an important factor; this inference is reinforced by high rates of homicide among African Americans, especially young males (Encyclopedia of death and dying, 2010). Ethnic differences in mortality are not unique to the United States. Among countries with reliable data, it is known that the Parsis in India and the Jews in Israel have lower mortality than other ethnic groups (Encyclopedia of death and dying, 2010); they share, along with whites in the United States, a place of privilege in the socioeconomic order.

Determinants of differential in life Expectancy by Gender

Policy makers and insurance companies are depending on demographic forecasts in order to asses future conditions. However, to define the assumptions for reliable projections, first, a deeper knowledge of the causes of male excess mortality is required. A simple sex separation projection on the basis of past developments is insufficient since mortality differences are generally caused by a complex pattern of different factors. These factors change their impact as the environment changes in terms of economic, political, and societal conditions, medical progress, as well as individual health behaviors and life styles affecting survival conditions on the macro level. Recent studies indicate that the female survival advantage can be attributed mostly to behavioral and environmental factors whereas the impact of purely biological factors seems to be limited to one to two years in life expectancy at birth (Pressat, 1973; Wingard, 1982; Ram, 1993; Luy, 2002b, 2003). However, the quantitative contribution of the different behavioral factors to mortality differences between women and men is subject to controversy. This is partly due to the fact that research on the influence of health behavior on mortality differences suffered from the lack of suitable survey data. Thus, in most studies, only the impact of a few behavioral or environmental factors could be directly controlled in analyzing male excess mortality.

The hypothesis advanced to explain male excess mortality can be divided into two basic categories: the biological approach (focusing on biological and genetic factors, thus factors largely beyond human control) and the non-biological approach (focusing on behavioral and environmental factors, thus factors directly or indirectly influenced by human action). According to the biological approach, women are less prone to disease for anatomic and physiological reasons (e.g. Lopez, 1983; Waldron, 1983a, 1985; Nathanson, 1984. The female survival advantage is assumed to be a consequence of the additional X chromosome (Smith and Warner, 1989; Skuse et al. 1997; Puck and Willard 1998; Kraemer 2000; Christensen et al., 2000, 2001) and of endogenous female hormones (Winkelstein et al. 1958; London et al. 1961; Kannel et al. 1976; Grodstein et al., 1997; Horiuchi 1997; Klotz and Stauffer, 2003), which are held to protect women especially against ischemic heart disease. Male excess mortality exists in most animal species (Hamilton, 1948; Comfort, 1979; Smith, 1989; Carey and Judge,

2000), and among humans. Higher male mortality rates hold among children (Aaby, 1998), even among infants, and in the prenatal period. Here, the higher rates cannot be caused by gender-specific behavioral differences (Wingard, 1982; Lopez, 1983; Dinkel, 1984; Waldron, 1985; Hazzard, 1986). Thus, the existence of at least a biological basis for the female survival advantage is undoubted (Hayflick, 1982). In the other side, the advocates of the non-biological approach argue that society and culture influence men to lead lifestyles that are increasingly detrimental to health and life (in terms of smoking habits, alcohol consumption, diet, exercise, reckless driving, and so on), that men are subjected to greater health risks at work, that environmental factors lead to survival disadvantages for men, and that men are generally more exposed and susceptible to different kinds of social and psychological stress than their female counterparts.

Probably the largest contribution to increasing male excess mortality is made by nicotine consumption (Retherford, 1975; Nathanson, 1984; Waldron 1985; Pampel and Zimme,r 1989; Rogers et al., 2000), as expressed by higher male mortality caused by lung cancer and heart failure (Waldron 1976, 1986; United Nations Secretariat 1988). This phenomenon has been documented in many studies (e.g., Hummer et al. 1998; Nilsson et al., 2001; Payne, 2001). Furthermore, smoking also appears to play a considerable role in the currently observed slow narrowing of the sex-specific mortality gap since the share of female smokers increased considerably in the last decades (Waldron 1993; Lopez et al., 1994; Nathanson, 1995; Trovato and Lalu, 1998; Pampel, 2002, 2003).

A survival advantage among women may additionally be conferred by the tendency for women to consult a doctor earlier and more often than men, both in the case of noticing symptoms of illness and for health care needs related to child-bearing (Hazzard, 1986). This gives rise to the possibility to recognize serious diseases in time to treat them successfully (Lang et al., 1994). However, the contribution of this factor to the mortality differences between women and men is discussed controversially (Dinkel, 1984; Verbrugge, 1985; Johansson, 1991). Social stress is seen as another basic causal factor of increasing male excess mortality, above all in connection with ischemic heart disease (Waldron 1995). In this context, Jenkins introduced the term “Type A behavior”, which is characterized by intensive striving for achievement, competitiveness, the tendency to be easily provoked, impatience, time urgency, abruptness of gesture and speech, over-commitment to vocation or profession, and excesses of drive and hostility (Jenkins 1976: 1034). In Western societies, Type A behavior is found more frequently among men since it is strongly linked with professional life and social status (Waldron, 1978, 1985; Hayes and Feinleib, 1980;Nathanson, 1984). Because lifestyles generally differ with the level of social status, sex differences in mortality may also be affected by the fact that men and women are not equally distributed within the social classes (Davidson and Townsend, 1982; Marmot et al., 1984; Schepers and Wagner, 1989; Lahelma and Valkonen, 1990; Johansson, 1991; Klein, 1993; Valkonen, 1993; Vallin, 1995; Helmert et al., 1997; McDonough et al., 1999; Rogers et al., 2000; Anson 2003). Nathanson and Lopez (1987) hypothesized that the extent of male excess mortality is almost exclusively determined by the harmful lifestyles of men of low socio-economic status. This hypothesis was confirmed by the finding that the gender gap in mortality remained almost constant among the cloistered population, caused by the fact that monks (with lifestyles and environmental risk factors more similar to men of higher rather than lower social class) show almost identical gains in survival during the 20th century as nuns and women of the general population (Luy, 2003).

Also, Wingard et al. (1983) found that sex differences in mortality are larger at lower than at higher levels of social class. Another factor probably connected with lifestyles and living conditions is that the mortality of both sexes is differentiated by marital status, with stronger effects for men, resulting in a smaller male disadvantage among the married than among the unmarried population (Carter and Glick, 1976; Nathanson, 1984; Gärtner, 1990; Rogers 1995a; Martikainen and Valkonen, 1996). Most of the arguments under the non-biological approach combine behavioral and societal factors.

Beside this group of arguments, there are also explanations exclusively based on environmental factors that exert a different influence on male and female mortality and call for a more gender-oriented research design. Preston (1976) pointed out that economic modernization has improved the status of women more than that of men, and thus has led to a greater reduction in mortality among women. Similarly, Ram (1993) identified the societal position of women and the degree of modernization of society as the decisive causes for the extent that male excess mortality has taken. This hypothesis gains support from a study by Luy (2004), who found that during the last three centuries in terms of female and male excess mortality, the mortality of monks belonging to former mendicant orders was constantly closer to the mortality level of the female population than to the mortality level of the general male population (thus regardless whether female mortality was higher or lower than male mortality). Furthermore, some evidence exists that the characteristics of welfare state regimes may have a differentiated impact on health by sex. For example, in Britain, Finland, and Japan – representing ‘liberal’, ‘Nordic’, and ‘conservative’ welfare state regimes – they produce broadly similar patterns of socioeconomic health differences among men. However, different patterns of labor-force participation and welfare provision may be associated with different patterns of socioeconomic differences in health for employed women (Martikainen

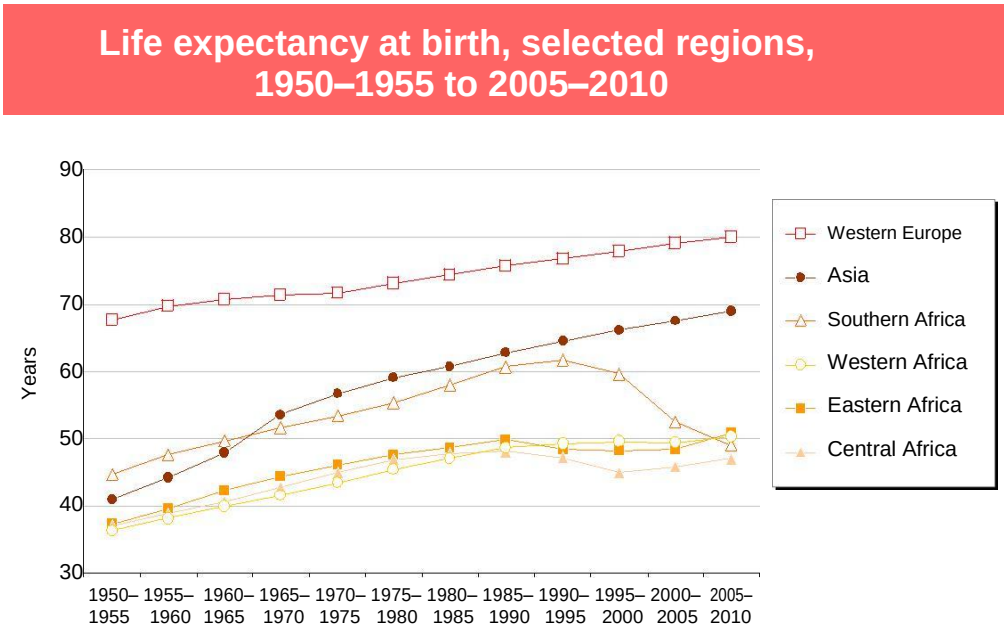

Figure 2: Life expectancy at birth, selected regions, 1950-1955 to 2005-2010
Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2006 Revision, http://esa.un.org/unpp

et al., 2004).

Impact of HIV/AIDS on Life Expectancy at Birth in African Countries

The HIV/AIDS (human immunodeficiency virus/ acquired immunodeficiency syndrome) epidemic has, thus far, hit hardest in parts of Africa, especially sub-Saharan Africa, which contains approximately 70 percent of the world's population with HIV/AIDS. Many of the African countries with the lowest life expectancies have the highest rates of HIV/AIDS infection. However, this is not always the case; for example, Niger and Rwanda, with very low life expectancies, do not have high rates of HIV/AIDS in their populations. Thus, AIDS cannot solely account for low life expectancy in Africa; social and political upheaval, poverty, and the high risk of death due to other infectious (and parasitic) diseases cannot be discounted in the African case. Nevertheless, HIV/AIDS does have a devastating impact on life expectancy in many places in Africa.

The United Nations (2001), projects that by 2050 the effect of the AIDS epidemic will be to keep life expectancy at birth low in many sub-Saharan African countries, perhaps even lower than that experienced in the latter part of the twentieth century. Figure 3 shows two projected life expectancy at birth statistics for seven sub-Saharan African countries, one based on the assumption that HIV/AIDS continues to claim lives prematurely, and the other based on the optimistic assumption that HIV/AIDS was to disappear immediately (Figure 3). The effect of HIV/AIDS is to keep life expectancy in 2050 at level well under 50; in the absence of the pandemic, life expectancy at birth would improve to the 65 to 70 year range. The projections based on the continuation of HIV/AIDS mark a sad departure for the demographers who make them. Until the 1990s, projections were based on a taken-for-granted assumption that life expectancy would gradually improve. And, for the most part, subsequent mortality trends backed up that assumption (Table 3)

Links between Gender Equality and Combating HIV/AIDS, Malaria and Other Diseases

Today, 40 million people live with HIV/AIDS, over 95 percent of them in developing countries. Globally, women account for 48 percent of infected adults, but among young women, the percentage is far higher and likely to become worse (Table 4). In Sub-Saharan Africa, 55 percent of those infected are women and in many African countries, females aged 15- 24 have prevalence rates of up to six times higher than those of males of the same age. In many Caribbean countries, women are the

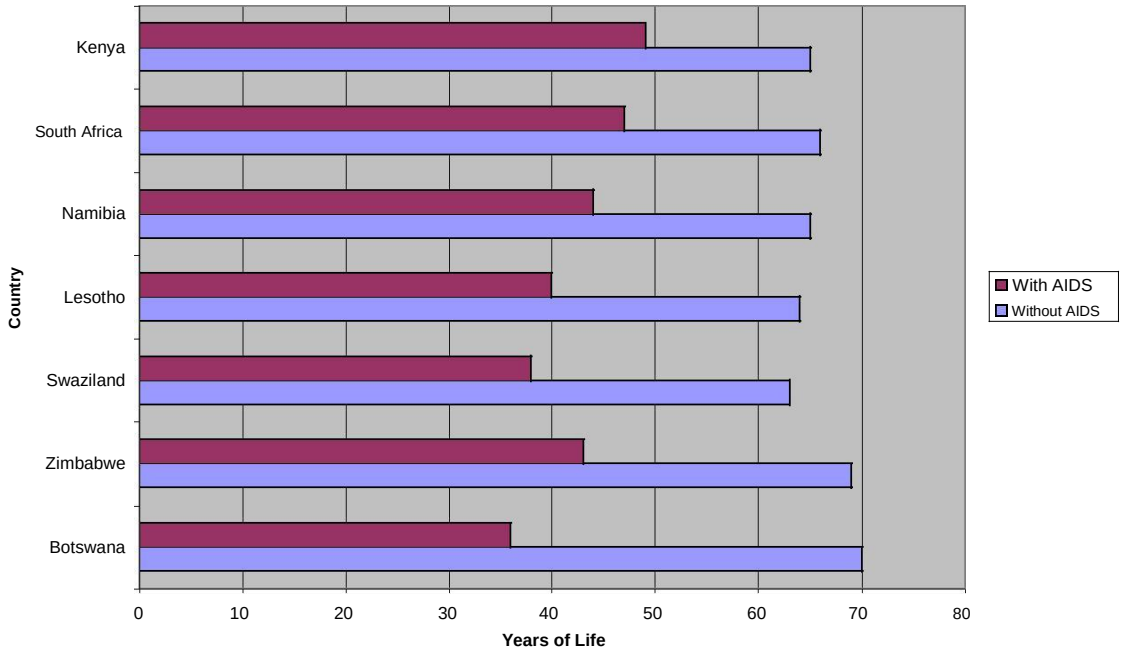

Figure 3: Expectations of life (at birth) with and without AIDS, in some African Countries
Source: United Nations. World population prospects. The 2001 version, New York: United Nations 2001

majority of new HIV cases. AIDS has orphaned more than 13 million children aged 14 or younger (UNAIDS, 1999). Female-headed households, including households headed by very young women or elderly grandmothers, are increasingly responsible for the care of orphans. Already more vulnerable than boys to HIV infection, girls are also more vulnerable to dropping out of school, being more often retained at home to care for sick relatives or assume other domestic duties. Furthermore, in parts of southern Africa, where women are the main providers of food for their families, high HIV/AIDS rates among women contribute to famine, as women who are sick or caring for sick family members are unable to farm. Communicable diseases, such as tuberculosis, malaria and, to a growing extent, HIV/AIDS, are all diseases of poverty. Poor women are especially vulnerable because of their low nutritional status and restricted access to education and gainful employment. Moreover, once infected, women are more likely to avoid or postpone seeking care because of gender-based constraints such as domestic responsibilities and the cost of travel and treatment. When seeking treatment, women are often given low priority due to their low social status.

Links Between Gender Equality and Reducing Child Mortality

Each year, approximately 11 million children under five in developing countries die, mostly from preventable diseases. Low levels of maternal schooling and high illiteracy rates contribute to this mortality through poorer quality of care for children and higher infant and child malnutrition. Rigid social norms about the appropriate gender division of labor also often restrict women's ability to earn income and take children to health care providers, which tends to degrade child survival rates. Addressing these and other gender inequalities would facilitate the achievement of the health and nutrition goals:

• A study of 25 developing countries found that, all else being equal, one to three years of maternal schooling would reduce child mortality by about 15 percent, whereas similar increases in paternal schooling would achieve only a 6 percent reduction (Kirk et al, 1998).

• If Sub-Saharan Africa had had the same female-to-male ratio of years of schooling as Eastern Europe had in 1990, the under five mortality rate could have been 25 percent lower, even after controlling for income, average levels of schooling and other regional differences (Klassen, 1999).

Greater control of income by women also tends to lower child mortality, even when the household's total income is taken into account. Generally, increases in household income are associated with reduced child mortality risks, but the marginal impact is substantially greater if the income is in the hands of the mother rather than in the hands of the father. The marginal effect of female income is almost 20 times as large for child survival, about eight times as large for weight-for-height measures (an

Table 3: Life Expectancy for the World and Selected Regions, 1950-2005, with Projection to 2050

Period	Africa	Sub-Sahara Africa	Asia	Europe	Latin America & the Caribbean	US & Canada	Oceania	World
	Years							
1950-1955	39	38	41	66	51	69	60	47
1955-1960	41	40	44	68	54	70	62	49
1960-1965	43	42	48	70	57	70	64	52
1965-1970	44	43	54	70	59	70	65	56
1970-1975	46	45	57	71	61	72	66	58
1975-1980	49	47	59	71	63	73	68	60
1980-1985	50	48	61	72	65	74	70	62
1985-1990	51	49	63	73	67	75	71	63
1990-1995	52	49	64	73	69	76	72	64
1995-2000	52	49	66	73	71	78	73	65
2000-2005	53	50	68	74	72	78	75	66
2005-2010	54	51	69	75	73	79	76	68
2010-2015	56	53	70	76	75	80	77	69
2015-2020	58	55	72	77	76	81	78	70
2020-2025	59	57	73	78	76	81	79	71
2025-2030	61	59	74	79	77	82	80	72
2030-2035	63	61	75	80	78	82	80	73
2035-2040	64	63	75	80	79	83	81	74
2040-2045	66	64	76	81	79	83	82	75
2045-2050	67	66	77	82	80	83	82	76

Source: Compiled by Earth Policy Institute from U.N. Population Division, World Population Prospects: The 2008 Revision , CD-ROM Edition (Rome: May 2009).

indicator of child nutrition), and about four times as large for height-for-age (another child nutrition indicator) (World Bank, 2001). Child mortality rates are also linked to gender-related norms and customs. In countries where parents regard the health and survival of sons as more critical to their well-being than the health and survival of daughters, sons may receive preferential treatment in nutrition and health care, thereby reducing the survival chances of girls. In India, at one time, gender differences in health care of young children, particularly for higher order female births in rural families, helped account for higher female child mortality (Das Gupta, 1987).

Gender Sensitive Approaches that may Help Meet the Health Related Goals of MDGs

Meeting the health goals requires an awareness not only of the biological aspects of disease transmission and treatment, but also of the social and cultural factors that promote or reduce good health. Issues such as the different health risks faced by men and women; the implications of these differences for health service delivery; the effect of differences in the availability of and access to health services; and the ability of women to independently decide on the use of health services are important when designing strategies aimed at meeting the health goals. Similarly, understanding the issues associated with female and male vulnerability and risk is central to combating HIV/AIDS. For example, physiological differences make transmission of the virus through sexual contact more efficient from men to women than vice versa. In addition, girls and young women may lack the knowledge, self-confidence or economic independence to resist sexual advances or persuade older men to use a condom.

MDGs Goals and Gender Equality

In Mellium Development Goal, the poverty goal calls for reducing by half the proportion of people living in extreme poverty by 2015—from 29 percent to 14.5 percent of all people in low and middle income countries. It also calls for halving the proportion of people who suffer from hunger. The definition of poverty has traditionally been based on per capital income. Focusing solely on this indicator, global poverty at present encompasses more than a billion people who live on less than a dollar a day, or, more broadly, over 2.5 billion who live on less than $2

Table 4: Women and Men (15-24) Living with HIV/AIDS in 2001

REGION	WOMEN	MEN
Sub-Saharan Africa	5,700,000	2,800,000
South & Southeast Asia Latin America 170,000 260,00	930,000	590,000
North Africa & Middle East	110,000	41,000
East Asia and Pacific	87,000	200,000
Eastern Europe & Central Asia	85,000	340,000
Caribbean	72,000	59,000
North America & Western Europe	80,000	155,000
World Total	**7,300,000**	**4,500,000**

Source: UNAIDS, 2001.

a day. But the definition of poverty has been broadened to encompass other dimensions, such as lack of empowerment, opportunity, capacity and security (World Bank, 2000). Meeting the poverty goal will therefore require a multi-dimensional approach. Because many aspects of gender inequality influence the different dimensions of poverty, interventions that promote gender equality are critical in the design of strategies and actions to meet the poverty goal. By raising the productivity of labor and improving the efficiency of labor allocation, gender equality has a direct impact on economic growth and the reduction of income poverty; it also increases economic opportunities and empowers women. Gender equality's importance for economic growth makes it critical in accelerating progress towards achieving the income poverty target. Many variables are critical for poverty reduction, both on the investment climate side and on the empowerment side. However, one of the key conclusions of recent research is that, other things being equal, gender inequality retards both economic growth and poverty reduction (World Bank, 2003). Among the links between gender equality and growth is:

• Investment in human capital, especially girls' and women's education and health,raises productivity. Educated, healthy women are more able to engage in productive activities, find formal sector employment, earn higher incomes and enjoy greater returns to schooling than are uneducated women who suffer from poor nutrition and health, or are victims of domestic violence. Moreover, educated women give greater emphasis to schooling their own children, thereby improving the productivity of the next generation (World Bank 2003).

CONCLUSION

It is important to note that the described trends in rising as well as in decreasing male excess mortality also coincided with a considerable change in gender roles in the societies. Ultimately, a more specific gender view can help in understanding how the social status level, and then lifestyles, influence mortality differences between men and women.

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