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Tropical Diseases and the Gender Approach[1]

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THE CONCEPT OF GENDER

The word *gender* is used to convey more than the sexual identity of a person; it encompasses the broad range of behaviors, expectations, and roles that society assigns to and imposes upon men and women. In the field of health, the *gender approach* refers to study of the social, cultural, and economic reality in which men and women live and work in order to determine how that reality creates health differences and what those differences are. Health is analyzed not as a function of reproductive role but from the general perspective of human needs, priorities, and personal preferences, and each person is considered to have the right to be in charge of his or her own health (*1, 2*).

The modern concept of gender is the product of a long historical, political, and social process shaped by the French Revolution and the Industrial Revolution. Recent interest in the subject has come in large measure from the health sector, starting with the Declaration of Alma-Ata and continuing through the international conferences of the last 20 years (*3–5*), and is related to the quest for well-being and equity. The modern idea of health is deeply rooted in the principle that each person has the right to aspire toward self-realization according to his or her characteristics and potential and to live in harmony with the environment. The determinants of health, therefore, go beyond simple medical care to include the influence of persons, groups, and social institutions in the spheres of politics and power; the health status of the population becomes a type of social yardstick (*6, 7*). From this perspective, policy represents decision-making in the centers of power, while health is a right and a valuable commodity that only can be obtained collectively through the mobilization of all of society (*8, 9*).

It is well known that throughout history women have been placed at a lower social rank than men, which has subjected them to great injustices and impediments. The World Health Assembly in 1992, calling attention to the sociopolitical and economic inequities that adversely affect health, underscored the issue of gender and the disadvantaged position of women, who have traditionally been denied power and viewed as dependent (*3, 4, 10, 11*). However, in recent years women have been progressively assuming new tasks, partici-

[1] Condensed translation of a presentation at the workshop "Research and Gender in Tropical Diseases," which took place at PAHO Headquarters, Washington, D.C., on 25 and 26 January 1996. Also published in Spanish in the *Boletín de la Oficina Sanitaria Panamericana*, Vol. 121, No. 3, 1996.

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pating more extensively in the formal economy, and acquiring a new consciousness of their place in society (*1, 7*).

In order to improve the quality of life of everyone, it is necessary to improve our understanding of the consequences of society's demands on men and women (*12*). The Pan American Health Organization has worked to bring to light gender-related inequities and encourage beneficial changes in the relations between the sexes as an integral part of human development (*13*). Tropical diseases provide an appropriate framework for the study of social, economic, and biological variables linked to gender differences. This paper, born of an ethical, holistic, and ecological approach to gender, is meant to provoke thought on the subject and, it is hoped, the desire to study it in more depth.

TROPICAL DISEASES AND GENDER IN THE THIRD WORLD

Three aspects of tropical diseases are closely related to the subject of gender and health: (1) These diseases, which are characteristic of developing countries, result from and at the same time are secondary causes of underdevelopment; (2) from the gender perspective, they illuminate the social inequity that limits and oppresses women—especially the poorest; (3) they are projected against the backdrop of a political and productive structure conducive to underdevelopment, disease, and inequity (*2, 4, 11, 14*). Tropical diseases reveal the profound social disequilibrium that keeps the quality and length of life below the limit necessary for human dignity. Schistosomiasis, malaria, and Chagas' disease should not be found in populations who enjoy reasonably good working conditions, income, housing, medical and social care, and environmental sanitation (*14–16*).

There can be no doubt that tropical diseases are afflictions of poverty, the product of social inequity. They are most prevalent among persons and population groups that are at the margins of society. Little is known about their effect on the psyche, emotions, and energy of their victims, but it is known that they limit productivity and noticeably impair survival. They also exact a very high price in terms of medical care and control programs—costs which those affected cannot afford to defray (*8, 17*).

Originally, the study of diseases such as malaria and yellow fever reflected the interests of the European colonizers and led to the founding of a number of institutes of tropical medicine. However, the ethical component of such research—the goal of enhancing development and human well-being—has become more significant in recent times, especially with the increased participation of scientists who are native to endemic areas (*18*).

In the study of tropical diseases, there is still a need to overcome the mindset of "research for its own sake," which is rooted in the hyperspecialization that characterizes much of modern science and separates many scientists from the concept of social responsibility (*15, 19*). Researchers today are faced with a moral and ethical dilemma as well as a scientific one: can they remain indifferent to the populations affected by the problems they are studying and not take upon themselves a social responsibility and commitment, or should they abandon the scientific traditions that instruct them to keep their studies at the theoretical and reductionist level, impeding involvement with the study subjects (*20, 21*)? No matter how clearly it is understood that the principal health problems in the Third World are the untreated diseases of the poor, circumstances still do not favor research that gives priority to the masses and their health problems. The scientific community lacks political power and the technocrats and bureaucrats do not have a realistic view of the problems. Moreover, poor countries have few resources to put into research and the training of scientists. For that reason it

is essential that the rest of the world participate in these endeavors, for the sake of both ecology and equity (*4, 9, 14, 22*).

Attention to the subject of gender in tropical disease research is relatively new, having been lent visibility by the advent of organized groups agitating for a new social order (23). However, the social inequality of women has been in evidence since antiquity, as an ancestral paradigm that separates the world of men from that of women. The cultural and social universe of humans has always been organized along the axis of sexual dichotomy, where each pole is associated with a set of attributes and qualities that express differences and complementarity. The order of life is grounded in the opposing properties of the sexes and in a dynamic union of opposites (*24*). In the masculine imagination, women are perceived as inferior but dangerous—the threat that the female might decide she does not need the male puts at risk the established order and even the survival of the species (*24*). At the end of the 19th century in Europe, as understanding began to grow that women were victims of capitalist exploitation, male logic characterized them as intellectually deficient (*25*).

The origin of male dominance has been explained with a variety of theories, the most prevalent being biological, anthropological, and sociological. Women find their activities limited in time and space by their reproductive functions; pregnancy, breastfeeding, and raising children restrict their participation in the labor force. The maturation time of humans is proportionately much longer than that of other species, which implies a very high price for maternity. Nevertheless, from myths and ancestral cultures it is clear that the reproductive functions of women, which are obviously fundamental for the success of the species, are also part of something intangible—a paradigm of the victory of life over death. There are some who believe that contemporary culture has sacrificed this profound quality of womanhood at the altar of equal rights (*26*).

Women's access to paid work and the possibility of controlling their own fertility opened up the path toward intellectual achievement and political presence. Unfortunately, the fight for equality has often been a fight for access to male roles, and at the beginning of the feminist movement some intellectuals committed the error of "masculinization" (*27*). The ideal situation would be recognition of equal dignity in irreducible qualitative differences, since where there is a difference of nature and not of degree, there cannot be inequality. In the 1980s women's defense of equality came to signify their right to be different from men (*24*).

Tropical diseases and the subordination of women superimpose ethical considerations on the sociocultural and economic inequities that contribute to underdevelopment. In fact, the new model proposed for overcoming these problems is called the *ethic for development* (*14, 28, 29*). Its aim is to reorient economic growth toward satisfying fundamental human needs, with a new social order that presupposes, among other things, the value of information, the ascendancy of production over consumption, and a commitment to democracy.

GENDER AND HEALTH

The great majority of women at risk of contracting a tropical disease live at the fringes of social development and change. Infant mortality and overwork are prominent features of their circumstances. Male oppression occurs within the framework of a more general social oppression generated by backwardness, the external debt, lack of information, and endemic diseases (*11, 15, 23*). These women's lives are an unending struggle (*6, 30–32*). Society has handed them an inferior rank and economic dependence, which is most severe in poor rural regions (*1*). Nevertheless, most of them resist and survive.

The tenacity of women is one of the most important factors in the survival of poor and oppressed populations; their contribution includes producing children who represent additional laborers as well as continuity. The characteristics routinely attributed to women (patience, loyalty, sensitivity, faith, valor, solidarity, persistence, altruism) have been underappreciated as practical values but have generated strength throughout history (*10*). Some of these qualities have poorly understood implications in the realms of immunology and neuroendocrinology.

Although studies of men's health never consider their role as fathers or members of a family, the health of women has always been examined from this functional viewpoint, with an emphasis on motherhood and, more recently, on the mother–child pair. Until lately, no effort had been made to help women better understand their own bodies.

In the decentralized health services the traditional hierarchy has been maintained, and consideration of women's health has continued to overlook their work load and the culture of male dominance. The same gender-based hierarchy prevails in the home. Even birth control has been appropriated as a way to tacitly blame women for the population explosion in poor countries, as if men had little to do with the problem (*2*).

The following examples will serve to clarify the idea of the interaction of gender and health:

☐ Women live longer than men, which results in more medical consultations during their life, greater likelihood of experiencing the chronic diseases of old age, and the possibility of psychosocial problems stemming from financial dependence (*2, 3*). For women, who may be primarily appreciated for their reproductive role, the sunset years are usually a difficult and lonely period.

☐ Male mortality from accidents and violence is associated with behaviors and personality traits (competitiveness, aggression, thrill-seeking, alcoholism, etc.) that are considered typically male, as well as with greater exposure to life outside the home, including social upheavals such as war (*3*). In addition, men suffer more frequently from certain work-related illnesses and disorders.

☐ Women talk about their symptoms, worries, and needs more than men do, which may be a symbolic and unconscious protest against oppression (*2, 11*). Depression is also more common among women (*3*), and the decrease in self-esteem when they fall ill is more pronounced. The latter might be due to a worsening of body image or to a feeling of failure in maternal duties (*33*).

☐ Higher prevalences of malnutrition have been observed among girls than among boys (*4*), which has been attributed to boys receiving preference in the distribution of household food. As an adult, a woman is usually obligated to neglect her own health in order to care for her family (*34*). When there is not enough to go around, it is the woman who sacrifices. This, of course, affects children yet to be born. In the Gambia, it was observed that many more low-birthweight babies were born during the rainy season, when food was scarce and agricultural work was demanding, than during the dry season (*32*).

☐ In Latin America, it is the woman who is responsible for birth control in more than 80% of couples. Women have an overwhelming proportion of the surgical sterilizations (300:1), put up with the side-effects of oral contraceptives, and feel guilty if they do become pregnant and increase the size of the family (*2, 3*).

The subject of women as health promoters deserves more attention, given their enormous potential impact in this role (*4, 10, 11, 30*). In their own mini-universes, women naturally take on the functions of health promoter, teacher, and social helper, tasks which they view as an extension of

their household functions (*34*). Women are in charge of maintaining a certain level of welfare and health in their homes. They often treat common illnesses using traditional remedies passed down from generations of other women. In the household, the woman is also the psychologist and educator who mitigates family tensions and anxieties and socializes the children (*7*). Poverty inhibits and slows these processes by blocking access to good sources of information and often forcing women to let their own health deteriorate while they care for others (*1, 34*).

PRESENT SITUATION OF THREE TROPICAL DISEASES

In the last 30 years, several historical and methodological trends have changed the way tropical diseases are viewed. At the same time, worldwide sociopolitical transformations have had profound implications for gender issues. Epidemiology has evolved toward a multidisciplinary practice that encompasses ecological, historical, social, cultural, political, and economic components (*15, 35, 36*). Scientific research, once the domain of the colonial powers, has spread to the Third World (*16*). New types of models for evaluation of the macro and micro environment have contributed much to the understanding and control of endemic tropical diseases such as Chagas' disease, malaria, and schistosomiasis (*15, 19, 37–39*). In addition to revolutionary advances in medical technology, transportation, and communication, health promotion and disease control programs have been decentralized to permit greater participation in peripheral areas (*8, 23*).

Despite these advances, tropical diseases continue to impose a large medical and social burden on the populations of developing countries. By affecting almost exclusively the poorest groups, they are both a cause and a consequence of inequity and underdevelopment (*14, 15, 19, 32*). They cause stress and malnutrition and also become more severe in the presence of those factors. It is well known that these diseases exact a very high price from nations in terms of lost work days as well as resources spent on needed medical care and prevention programs (*37, 40*). However, most tropical disease problems could be solved with available scientific and technological resources, if the political, administrative, and social mechanisms existed to bring these benefits to the people who need them most (*17, 22, 23*).

Susceptibility to tropical diseases is closely linked to people's living and working habits, which, as already noted, differ by gender (*7, 41*). The treatment and prevention of these diseases and, above all, their epidemiologic surveillance increasingly depend on education and community participation—elements in which gender also plays a determining role (*16, 17, 28*).

Malaria

Malaria is endemic in nearly 100 tropical and subtropical countries, affects close to 280 million people, and has an estimated incidence of 110 million clinical cases per year (*42*). More than 2 billion people are at risk of infection—around 43% of the world's population. In Africa, over a million children die each year from malaria (*37*). More than 99% of malaria cases are transmitted by the bite of a vector mosquito; the remainder are a consequence of congenital or transfusional transmission, use of contaminated needles, or laboratory accidents (*42, 43*).

The presence of malaria among the poorest populations in endemic areas reflects their greater exposure to the vector and lower degree of access to antimalarial drugs, as well as delays in seeking treatment when it is needed. In general, preventive measures are either not known or not implemented (*44*). As humans are the only reservoir of the four common malaria para-

sites, the person who is not treated or who delays getting treatment increases the risk that the infection will pass to healthy people in the community if vectors are present.

The epidemiology of human malaria is relatively complex, involving four species of plasmodium and many species of anopheline mosquitoes with differing habits and habitats, which leads to a variety of transmission and disease patterns (*39, 42*). The tremendous variation in human behavior in relation to the environment also has epidemiologic importance. In general, malaria is most prevalent in areas of economic transition or instability, especially where there is intense exploitation of natural resources, social conflict, illegal commerce, and influx of refugees and immigrants (*37*).

Migration—stimulated by underemployment, lack of land, and colonization policies, among other motivations—serves as one of the most important epidemiologic factors in the spread of malaria to new areas, its entry into cities, and even the parasite's introduction into blood banks. In addition, the expansion and maintenance of malaria are inversely proportional to the existence, quality, and degree of coverage of health services. In some hyperendemic areas in the Amazon region of Brazil, the disease has not become established because the appropriate health infrastructure exists in the projects or settlements. Conversely, poor and isolated areas with little or no health infrastructure have experienced epidemic explosions (*37, 39*).

Men and women are equally susceptible to the infection, but the prevalence is always higher among men because of their greater exposure to mosquitoes. They usually spend more time outside the house at the time of day when the vectors are active, and they wear little clothing while working in fields and mines in the intense heat of the endemic areas. Women spend much more time in the kitchen, where smoke protects them from infective bites (*44*). The degree of exposure by sex can also vary according to a combination of biological, ecological, and social factors. In rainy agricultural areas of Latin America, where *Anopheles darlingi* thrives, if houses are situated at least 200 to 300 meters into the forest, women's risk of becoming infected is much less than that of men (*45, 46*). The prevalence is substantially higher among youths and adults of both sexes than among children or the elderly, also because of the degree of exposure (*39, 44*).

In general, malaria affects both men and women the same way, and there is no indication that either the vector or the parasite acts differently in relation to the sexes (*42, 44*). However, the immune reaction against plasmodium weakens during pregnancy, resulting in significant harm to the woman and the fetus. In western Africa, a hyperendemic area for *Plasmodium falciparum*, numerous studies have shown a reduction in antibodies and an increase in susceptibility, parasite density, morbidity, and mortality among pregnant women (*37, 44*). The biggest dangers are miscarriage (especially in the first three months of a first pregnancy), premature birth, and low birthweight. Cerebral malaria (with close to 40% mortality), hypochromic anemia, hypoglycemia, and pulmonary edemia also cause devastating effects (*44, 47*). Anemia and placental alterations are more often seen in primigravidas than in multigravidas (*48*). All these conditions are more severe in immunodepressed women and in those without previous contact with the parasite and its antigens, especially in "new" malarial areas (*42, 47*). Even in endemic zones, women pregnant for the first or second time always show higher parasite incidence and densities if they have had little or no prior exposure to the disease (*44, 49, 50*). In Zaire, a relationship was found between anemia in mothers suffering from malaria and low birthweight and microcephaly in their newborns (*48*).

Congenital transmission of malaria is more likely to occur when the pregnant

woman has high parasitemia and has not had previous contact with the infection. The placenta is always involved, and placentitis frequently occurs without transmission to the fetus. In older and more stable malarial zones, congenital transmission is rare. Passive transfer of maternal antibodies to the fetus during pregnancy partially protects the infant in its first 5 to 6 months of life (*44, 45, 49–51*).

The rates of congenital transmission of malaria vary greatly and depend on a number of factors, such as the pregnant woman's age, number of prior pregnancies, immune status, and the parasite density. In Africa rates ranging from 0.4% to 6% have been found, and in Papua New Guinea four cases of congenital transmission were recorded among 104 pregnant women infected with *P. falciparum*, for a rate of 3.8% (*45, 51*). In Tanzania, the parasite was found in the cord blood of 15 out of 233 infected pregnant women, and in 14 of them the placenta was also infested. Malaria was diagnosed in one of these women's newborns 14 days after birth, for a congenital transmission rate of 0.4% (*51*). Maternal parasitosis can harm the fetus by affecting the intrauterine environment and the placenta and by exacerbating maternal anemia (*48, 49*). There is consensus that pregnant women in endemic areas should be protected against infection and those who are sick should be treated, giving priority to women in the early stages of a first pregnancy (*37, 45, 47, 50*). In the Gambia, chemoprophylaxis reduced infant mortality by 50% in primigravidas but less than 5% in multigravidas (*52*). After birth, breast milk protects the child by supplying maternal antibodies, which, although they do not prevent infection, limit the disease's severity and lethality (*44, 46, 49*).

Malaria and the Gender Approach

Questions surrounding the medical and social aspects of malaria in pregnancy, lost work time, and pregnant women's access to health services and appropriate drugs in extremely poor and isolated regions offer many opportunities for research (*44, 46*). A study in the malarious area of Zaire found that 89% of women had not completed even one year of basic schooling, which made short-term educational efforts very difficult (*53*). In another study carried out in Kinshasa, a negative correlation was found between indicators of malaria and the level of education of the family, especially of the mother (*54*).

The World Health Organization has devoted much attention to the problems posed by malaria, among the most serious of which are resistance of the parasites and vectors to drugs and insecticides, respectively, and the lack of organization and of human and material resources for prevention activities (*55*). As with other diseases of poverty, the areas that are most needy and isolated are the ones where malaria poses the biggest threat (*4, 15*).

From the perspective of the gender approach, it is easy to see that malaria can have adverse long-term consequences for the mother. A sickly and weak child is an additional burden on her, demanding more attention and protection, allowing her less time and energy to care for herself, and helping to perpetuate the vicious cycle of malnutrition, illiteracy, and other deficiencies.

Health workers and community health aides may discriminate against women by not actively searching for malaria cases among them (*44*). This is especially egregious in the case of pregnant women, when preventive and curative care of the mother and fetus is an absolute priority (*46, 53, 56*). This gender-conditioned conduct of health workers restricts the access of women—generally poor, unassertive rural women—to a doctor or hospital. In addition, a woman will commonly postpone her own treatment in order to care for sick family members or have them receive treatment in her place (*11, 44*). This tendency has received little attention as a risk factor for transmission. Another topic that deserves

investigation is the emotional status of women who lose a pregnancy or a child to malaria. Also of interest is the effect on their malaria status of women's mobility, which is generally much less than that of men because of their household tasks and commitments as well as cultural and religious restrictions (*10, 11, 13*).

Acute malaria is debilitating and recurrent, causing significant absenteeism with the consequent economic losses (*37, 46*). Added to the lost productivity is the cost of drugs. Malaria also slows agricultural expansion, highway construction, and similar activities. A study of various indicators of the social cost of malaria, done several years ago in Colombia, concluded that women lost more hours per month from this disease than men did. The greatest losses were caused by backlog in domestic chores, care for other sick persons, and replacement of sick men in agricultural work (*57*).

Unfortunately, antimalarial programs have always been bureaucratic processes concerned primarily with technical and administrative functions. Little or no consideration has been given to the sociocultural and ecological aspects of malaria (*36, 45*). For a long time programs were characteristically vertical and carried out well-defined actions aimed at the vectors and infected individuals. Later, the programs gradually established closer links with primary health care systems, reflecting the principles of Alma-Ata and new democratic trends (*17, 34, 36, 56*). This transition has presented problems, as the peripheral services usually lack the structure and resources needed to fight effectively against malaria (*45, 58*).

The belief that chloroquine and DDT would solve the malaria problem led to carelessness in epidemiology and education units. Today, the need for new integrated approaches is recognized. These approaches must take note of the specific and essential role of women in controlling malaria (*11, 44*). First, however, it is necessary to gain an understanding, based on research, of the way women influence their surroundings (*7, 16*). In particular, family habits, domestic hygiene, and the interaction of the family unit with local health and education systems depend in large part on women; this must be borne in mind in the establishment and implementation of actions in local areas (*11, 44, 54*).

The decentralization strategy emphasizes decision-making at the peripheral level. This strategy is a way to increase equity, efficiency, and the appropriateness of actions, as well as giving people control over the bureaucracy and the work carried out for their benefit (*58, 59*). Achieving successful decentralization will require traversing a long road and making profound social, political, and attitudinal changes. In doing so, the topic of gender is of special interest, since the participation of women is still very weak in the spheres of politics, planning, and decision-making. In Brazil, where women have formed local health committees, their actions have been very effective (*11, 31, 60*).

Schistosomiasis

Although data on schistosomiasis are incomplete, it is known that nearly 200 million people in 74 countries are infected and some 600 million more are at risk of infection. The most important forms of human schistosomiasis are caused by five species of schistosomes, a parasitic flatworm whose adult phase lives in the veins of various parts of the body (*61, 62*). *Schistosoma mansoni* occurs in 52 countries of Africa, the Middle East, the Caribbean, and South America and produces intestinal schistosomiasis. *S. japonicum, S. mekongi, S. intercalatum,* and *S. haematobium* are endemic to African and Asian countries and produce various clinical forms with low rates of mortality, generally from vascular and hemorrhagic disorders in severe cases.

Schistosomiasis is a prime example of a disease that is influenced by and fundamentally linked to human behavior, living conditions, and relationship to the natural environment (*7, 38, 62*). The varied socioeconomic, cultural, and behavioral factors are interwoven in a biological and ecological substrate, resulting in an enormous range of disease patterns, degrees of transmission, morbidity, mortality, and control needs (*63*). In the basic epidemiologic cycle, schistosome eggs are passed in the feces and urine of an infected person, enter a body of water, and liberate larvae that seek out a snail host. The immature forms of the parasite develop in some species of snails and, finally, are released into the water as cercariae, the infective form capable of penetrating the skin of susceptible individuals.

The various types of snails that serve as intermediate hosts generally prefer warm, alkaline waters containing abundant microflora and organic matter (*62*). The main reservoir of the disease is man, but shore-dwelling small rodents can also serve as the final hosts for *S. mansoni*, perpetuating the cycle.

Schistosomiasis is usually a widely dispersed rural disease, but population movement, the construction of artificial lakes and pools, and extensive irrigation and urbanization projects have produced enormous changes in the epidemiologic pattern during this century. Today, schistosomiasis travels with populations as they move and establishes itself among the poorest groups (*61, 63*). The disease's expansion is linked to the displacement of people, which means that the human and social context of schistosomiasis must be understood in order to plan ways to prevent it (*61, 62*).

The principal variables influencing transmission of schistosomiasis to humans are the strain and density of the cercariae in the water, the frequency and amount of people's contact with water, the time of that contact (risk is greatest at mid-day when cerceria density increases), the age of the person (risk is greatest for those between 10 and 25 years old), and the individual's genetic predisposition (*61*). There do not seem to be sex-based differences in susceptibility, but the peaks of maximum prevalence occur at younger ages for females (between 6 and 15 years) than for males (between 11 and 25 years). The prevalence is somewhat higher among males, but this appears to be related to the degree and type of exposure (*62, 64*).

In Egypt, the higher prevalence found in men was related to their exposure to water in the predominantly male occupations of fishing and agriculture. The prevalence in female agricultural workers was lower than in male workers, but higher than in men who did not work in agriculture (*65*).

The risk factors are interrelated with each other and with gender. In rural areas of Japan, infection rates in women increase with age, presumably because married women help their husbands in agricultural labor and thus have a greater risk of exposure (*66*). This work takes place during the hottest hours, when more cercariae enter the water. In addition, traditional female tasks such as washing clothes and obtaining water for cooking increase women's risk of infection in endemic zones, especially where basic sanitation is lacking. Other variables include seasonal use and availability of water and gender-specific cultural patterns. For example, adolescent males are freer to go swimming than their sisters, who would be exposed to infection in a river only when they participate in domestic work with other women (*64*). In addition, there are religious or cultural restrictions (for example, among Muslims) on the mobility of females and their presence in public places, which limit their opportunity to become infected (*61*).

In rural areas sanitation is often deficient, but the population is more widely scattered than it is in poor and underserved urban areas (*7*). Concern over the urbanization of schistosomiasis reflects the rural exodus to

the cities, where social class determines who contracts certain diseases (*38*). In Egypt, significantly higher prevalence rates of *S. mansoni* and *S. japonicum* were recorded among inhabitants of mud and adobe houses (lower social level) than among those who lived in brick houses, a pattern that is also seen in Latin America (*38, 65*).

The symptoms produced by *S. mansoni* are more severe in whites than in blacks and also differ according to blood group. The data are inconsistent regarding differences by sex; some indicate greater morbidity and severity in women and others do not (*61, 67*). The severity of the main clinical forms (intestinal, hepatosplenic, urinary) depends on the parasite load, which in turn depends on factors such as age, nutritional status, immune status, and frequency of reinfection, among others (*62*). These factors constitute the nexus between the medical and the sociocultural aspects of the disease and should be studied from the gender perspective with a multidisciplinary approach (*64, 67*).

Schistosomiasis also produces quantifiable socioeconomic losses. Even though its incipient clinical forms cause little difference in the work productivity of infected persons, its advanced forms are completely incapacitating. A study of Brazilian sugarcane cutters showed that those afflicted with the hepatosplenic form of *S. mansoni* infection experienced a 35% decline in productivity compared to those who suffered from the milder intestinal forms (*68*).

There have been relatively few studies of schistosomiasis in women (*67*). In addition, most of the ones that have been done only pertain to the reproductive period and functions of women, ignoring other life stages. The following facts deserve in-depth investigation:

☐ In endemic regions the mild forms are more common, and sex-related differences are not observed in the intensity of symptoms or the socioeconomic damage they produce. However, a study in Sudan showed that the 18% of female cotton-field workers who were infected with *S. mansoni* were more likely to be absent from work in the afternoon owing to fatigue than were noninfected female workers (*67*).

☐ Several studies indicate that female hamsters and mice are more resistant to infection than males, shed fewer eggs, and present less severe lesions. Data from Tanzania and Zanzibar on *S. haematobium* suggest the same trends in humans, with a higher prevalence of ureter and bladder deformities being found in school-age boys than in girls, especially after 10 years of age (*64*). Data from Ethiopia and Brazil indicate that more severe forms of *S. mansoni* infection occur in boys, but some findings from the Northeast region of Brazil have been contradictory (*64, 69, 70*).

☐ Gynecologic alterations are relatively frequent, particularly in the case of *S. haematobium* infection, but they often go undetected by physicians. Among the alterations are granulomatous lesions in the uterine cervix, vulva, vagina, Fallopian tubes, and ovaries, together with varixes and venous congestion, which produce pain (including during coitus), menstrual abnormalities, menorrhagia, salpingitis, endometritis, endometriosis, oophoritis, and vulvovaginal papillomas. Hepatic alterations can cause delayed puberty, amenorrhea, infertility, early menopause, and diminished libido, as well as glandular lesions and diverse types of hormonal problems (*61, 62, 64, 71*).

☐ In pregnancy, schistosomiasis depresses the immune system, with marked effects on the woman, especially if she already has genitourinary alterations, anemia, or hypoproteinemia. Placentitis is commonly seen, mainly in *S. haematobium* and *S. mansoni* infections, as are abortion, ectopic pregnancy, premature birth, and fetal death. There have even been a very few cases of congenital transmission of *S. japonicum* (*64*).

☐ It has been noted that maternal antibodies transferred during pregnancy and breast-feeding protect the child during the first 6 months of life. This effect might reduce the child's susceptibility to infection as well as tissular reaction to the parasite's eggs (*62, 71, 72*). Interestingly, the development of hepatosplenomegaly in children is more frequent when the mother, rather than the father, is infected with *S. mansoni*. It has been suggested that predisposition to this clinical form has a genetic component modulated by the mother (*64, 72*).

Treatment and Prevention

Treatment has improved greatly in the last 20 years, and the new drugs are more effective, safer, and easier to administer. Consequently, high cure rates are seen and transmission has been reduced (*38, 62, 73*). In *S. mansoni*-endemic areas in Brazil, regular treatments with oxamniquine and praziquantel have led to a reduction of hepatosplenic forms of the disease in all age groups and both sexes (*61, 73*). Over a five-year period, patients treated with praziquantel had a cure rate of 83%, improvement in liver function, and regression of hepatomegaly in 81% and of splenomegaly in 79% (*70*).

These potent drugs, easily administered orally and with few contraindications, have made treatment of schistosomiasis relatively simple compared to prevention, which remains very complex because of the multiple factors that must be tackled (*61*). These involve economic, cultural, and lifestyle changes to prevent contact with contaminated waters or contamination of clean water; maintenance of basic sanitation and provision of treated water; and elimination of the snail vectors (*74*).

Many of the same problems that plague the organization and implementation of malaria treatment programs also hamper schistosomiasis programs, including those related to gender differences. The target groups are similar, as is the social, political, and economic context (*1, 15, 16*). However, schistosomiasis is a disease with a more chronic course, lower mortality, and fewer problems regarding resistance of the parasite to drugs, which are administered on a walk-in basis in a single dose. The prognosis is much more favorable—that is, the treatment effectively prevents the development of grave and debilitating forms. Most endemic countries are more interested in controlling morbidity from the disease than in controlling or eradicating transmission, even though that is possible in some places (*74*). Nevertheless, medical treatment presupposes a diagnosis, access of the community to health services, and a certain level of operational capability, all of which are generally difficult to ensure in developing countries owing to a lack of appropriate resources (*22, 23, 58*).

As they do in malaria prevention, women have an essential role to play in the prevention of schistosomiasis. They have primary responsibility for both the family's medical care and the development of children's sanitation habits, but this fact has received little study (*67*).

Disease caused by *S. haematobium* is usually noted with the appearance of macroscopic hematuria or abdominal swelling and digestive hemorrhagic episodes (*5, 71*). These signs appear mainly in persons 10 to 25 years old, many of whom are already living outside the family home and therefore away from their mothers. Other cases go unnoticed or manifest only vague symptoms, hindering recognition of the disease and early initiation of treatment (*38*). Nevertheless, mothers and teachers continue to be the main agents of treatment and prevention (*7, 75*). The incipient community organizations offer good opportunities for women to participate in municipal committees, where their competence in matters of water quality, waste disposal, and periodic examination of children is evident (*11, 30*).

Chagas' Disease

American trypanosomiasis is a parasitosis endemic to Latin America. It stems from an ancient sylvatic cycle in which the parasite, *Trypanosoma cruzi*, circulates in small forest mammals and insects of the order Hemiptera. The disease affects 16 to 18 million people in 18 countries, and 80 to 100 million more are exposed to infection (*18, 76, 77*). It is estimated that 1 million new cases of Chagas' disease occur each year, along with 45 000 deaths attributable to it (*78*). Like malaria and schistosomiasis, Chagas' disease persists in the poorest social strata. Originally it was strictly a rural disease, but it has become urbanized throughout the Region owing to internal population movement (*15, 37*). Unlike the two endemic diseases discussed earlier, trypanosomiasis is difficult to treat, but its prevention is highly feasible (*76*).

The domestic cycle of Chagas' disease is of relatively recent origin. It spread out from isolated foci to become endemic as a result of the population displacements that followed Spanish and Portuguese colonization (*15*). Most people are infected through contact with the feces of the insect vector inside rural houses. However, there has been an increase in the relative importance of two other types of transmission: congenital and transfusional (*37, 76, 77*).

In endemic areas, contact with the vector generally occurs by the age of 10 years. A transient acute phase can be severe in small children, who may develop heart and neurological problems; it causes death in 1% to 10% of cases. Most infected persons survive and enter the chronic phase, which is usually asymptomatic and without detectable lesions (indeterminate form), although some may develop a potentially fatal clinical form that produces motor alterations in the digestive system and chronic chagasic cardiopathy. The latter causes almost all the deaths attributed to Chagas' disease (*37, 77*).

Chagas' Disease and Gender

Like malaria and schistosomiasis, Chagas' disease has been studied more in men than in women. In addition, there have been few studies focusing on gender-related differences. The available information is summarized below (*77, 79–82*).

The incidence and prevalence are equal in young men and women. Patterns of morbidity and mortality in the acute phase are similar in both sexes. However, the prevalence rate tends to be higher in women 40 to 60 years of age, which reflects the higher mortality of men.

In the chronic phase, the intensity of the morbidity differs between the sexes. Up to 50 or 60 years of age, men suffer more frequently than women from the cardiac and digestive forms, and chronic cardiopathy in males is more severe. Men are also more likely to experience evolution of the chronic disease. Male mortality in the chronic phase is higher than female mortality, especially between the ages of 20 and 59, as a result of men's greater susceptibility to the cardiac form.

It is still not known why the chronic form of Chagas' disease is milder in women than in men. The hypothesis that the disease in men is influenced by their heavier work load has never been proved. In addition, in rural endemic areas, the work load of women is also onerous, almost equal to men's. Expenditure of effort likewise does not explain the higher prevalence of megaesophagus in men that has been observed in the clinical setting (*80*) and in the general population of endemic areas (*82*). Instead, it seems that there are sex-linked biological factors that would explain both the greater resistance of women in some experimental models and the tendency for men to have higher levels of parasitemia in the chronic phase (*82, 83*). Endocrine and immune factors in women may serve to modulate the infection and the body's response to the parasite. This is a field of great potential interest in which further study is warranted.

The differences in the clinical disease between the sexes are mainly quantitative. Parasite localization in the sexual organs of humans and laboratory animals has been described, but with clinically insignificant consequences. The exception relates to congenital transmission, first described by Carlos Chagas (*18*).

In a pregnant woman, the disease generally follows a normal course. Some data suggest that immune defenses decrease during pregnancy and parasitemia increases (*84*). This is an interesting observation, as there are indications that the level of maternal parasitemia has a direct correlation with transmission to the fetus (*84, 85*). However, the increase in parasitemia does not seem to have serious clinical effects, since infected pregnant women are usually asymptomatic and even those with cardiopathies do not experience problems when giving birth (*37, 81, 86*).

From 0.5% to 4% of the children of infected mothers acquire the infection *in utero*, usually between the fifth and seventh months of gestation. Transmission can occur when the mother is in either the acute or chronic phase of the disease, independent of the clinical form. The placenta is often affected, causing premature births and stillbirths. Placental complications can be exacerbated by the use of certain drugs during pregnancy, such as aminophyllines, but this effect is not known to many doctors or their patients (*77, 85, 86*).

There is little evidence to suggest that the rate of spontaneous abortion in cases of congenital transmission exceeds that occurring in noninfected women of the same area (*77, 86*). The infected newborns usually present a clinical picture similar to the acute disease, with high parasitemia and visceral hypertropy. However, in 97.5% of the cases studied by one author, there were no changes in these children's growth or viability, nor in the neonates' predisposition to specific pathologies. Consequently, Chagas' disease is considered to pose low perinatal risk (*86*).

It is important to point out that infected newborns respond satisfactorily to treatment, a fact that should motivate efforts to detect them in endemic areas (*76, 85–87*). In Bolivia, where the incidence of congenital transmission is close to 10%, more female newborns have been found to be infected (12%) than males (7%) (*88*).

The practical way to deal with the possibility of congenital transmission is to screen pregnant women for Chagas' disease and to monitor their pregnancies thereafter. If congenital transmission is confirmed, treatment should be begun immediately and the child should be kept under observation for two to three years (*89*). No special therapy for the infected pregnant woman is specified, nor is it recommended that women with chronic disease be discouraged from having children (*89*). Likewise, the observation of one or two exceptional cases of transmission of *T. cruzi* in mother's milk does not justify prohibition of breast-feeding, which should be encouraged unless the mother is ill (*85*). The milk carries antibodies and immunogens that protect the newborn, even against Chagas' disease (*86, 87*).

The threat of transfusional transmission is increasingly important for every country of the Region, regardless of whether the disease is endemic there (*37, 76, 77*). On average, from 1% to 8% of the blood donors in Latin America are seropositive for Chagas' disease, and from 12% to 20% of susceptible recipients of contaminated blood will become infected (*76*). While most blood donors are men, the number of female transfusion recipients is equal to or greater than the number of male recipients. Obstetric indications for transfusion make women the main victims of this type of transmission (*37*).

The health system itself should take steps to prevent transfusional transmission, but that setting offers few prospects for individual action or gender analysis. Efforts are being made to select appropriate blood donors by means of good-

quality serologic tests and to offer chemoprophylaxis to suspected cases. However, because of beliefs, taboos, and a range of psychological, social, and cultural factors, fewer women than men donate blood. Also aggravating the situation is the worldwide upsurge in unnecessary surgical procedures, especially cesarian sections, which has increased the number of transfusions and thereby the risk of transfusional transmission of Chagas' disease. Social organizations can exert significant pressure to ensure that measures are taken to reduce this risk (*37, 77*).

Topics for Gender-related Study

A very interesting topic related to Chagas' disease, and one that has received little study so far, is the evolution of autonomic nervous system disorders, especially those affecting the parasympathetic system. During the acute phase, environmental and social stimuli sometimes produce biological and psychological hyperreactivity, with intense sweating and other secretory increases, emotional imbalance, and other symptoms. Vieira, who studied this phenomenon, compared it to a continuous state of stress combined with a decreased excitability threshold (*90*). Further study and comparison of the atypical reactions and behaviors produced in men and women would be worthwhile.

Another topic of medical and social importance that could give rise to interesting gender analyses is mortality from Chagas' disease. A longitudinal study of 16 years' duration in Brazil (*91*), which included 853 female patients and 520 males, showed statistically significant differences in mortality between the sexes—8% in women versus 17% in men. Mortality of Chagas' patients of both sexes was significantly higher than that of noninfected subjects. The age distribution of deaths indicated that men die earlier from Chagas' disease than women do and that it affects the adult population, particularly males, during the most productive years of their life (*77, 80, 89, 92*).

Studies should also be done on the psychological and physical burden that the death or disability of their husbands or companions from Chagas' disease places on women. In the endemic areas it is common to find a large number of poor widows without social security or work training, some with three or more young children and many with *T. cruzi* infection themselves. This situation poses such questions as: What do they do to survive? What are the implications of their efforts for their own health and the stability of their immediate family? How does this situation contribute to perpetuating the cycle of poverty and disease in the community and the country?

Some of these questions are being investigated in field studies. One such study took place in endemic areas of Minas Gerais, Brazil, where 70% of the male population routinely travels to São Paulo to work on the sugarcane harvest for six to eight months of the year. The periodic absence of husbands and companions obliges the women to assume tasks otherwise done by the men, such as repairing their houses and attending community meetings. Consequently, the women have begun to express their own opinions and be listened to by the men on subjects related to community development. A surveillance system for Chagas' disease transmission has been set up and many of the houses have been improved on the women's initiative (*30*). Something similar has been observed in Venezuela, where a community project related to Chagas' disease vectors gave rise to a new social dynamic centered around the women (*19*).

Prevention of American trypanosomiasis is highly practicable. Nevertheless, it requires the political will to strengthen programs and activities at the community and family level (*76, 77*). The participation of women is essential in this effort, especially in the aspects noted below:

☐ After the attack phase, in which peridomiciliary sanitation activities are begun and the initial spraying of residual-action insecticides in infested houses and environs is carried out, it is necessary to maintain permanent epidemiologic surveillance. Broad participation of local residents is needed to detect and report the remaining foci, and women are well suited for this task by their presence in the home. In areas endemic for Chagas' disease, women must be included in the planning and implementation of surveillance measures, but care must be exercised not to burden them excessively with these added responsibilities (*7, 30, 93*). All this requires better knowledge of their circumstances, reasoning, and interests.

☐ In traditional endemic zones, men are usually in charge of the structural and financial aspects of housing improvement and women take care of organization and cleaning. This division of labor should be the object of study, since the household is the seat of many of the economic and social determinants of Chagas' disease as well as its control. An example of this kind of research is the study done a few years ago in Paihuano, Chile, which analyzed the role of women in the control of the disease (*94*).

With respect to the congenital transmission of *T. cruzi*, the work that is pending requires the acknowledgment and participation of women and, above all, a new perspective on the health care of women for their own sake.

As we approach the close of the twentieth century, any further delay in the control of Chagas' disease is unacceptable. To succeed in that task, all aspects of the process—from the technical and social challenges to political agreements and cooperation between governments—must be dealt with. In this historic effort, scientists, administrators, and politicians are tentatively but steadily venturing forth to discover communities, the people, and the advantages of shared work (*11, 15*).

The studies proposed herein would reveal a panorama to complement that shown by incidence and mortality statistics. Above all, they would spotlight women as both victims of these diseases and key players in their prevention, rather than forgotten figures relegated to the lower planes of society and research.

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APHA Meeting Focuses on Social Justice

The 124th Annual Meeting and Exposition of the American Public Health Association (APHA), to be held from 17 to 21 November in New York City, will address the theme "Empowering the Disadvantaged: Social Justice in Public Health." The 1996 program is a comprehensive collection of scientific sessions, roundtable workshops, meetings, lectures, and films designed to facilitate the exchange of information about public health. Over 12 000 participants are expected.

The meeting will include more than 900 sessions with thousands of scientific presentations, as well as poster sessions, award lectures, and receptions. Program sessions will look at the specific health needs of women, men, infants, adolescents, the elderly, people with disabilities, workers, and communities of color. In addition to this broad spectrum, several special sessions will feature prominent officials and experts addressing topics related to the theme, such as the environment, public health, and social justice; an international perspective on social justice in health; children and economic inequality; and access to health care.

For more information, contact the APHA by telephone through its Automated Convention Line at (202) 789-5646; by fax at (202) 274-4577; or by mail at APHA Convention Services, 1015 15th Street, N.W., Washington, D.C. 20005-2605, U.S.A. Information is also available via the Internet at http://www.apha.org.