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The gender agenda in the control of tropical diseases: A review of current evidence

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The gender agenda in the control of tropical diseases: A review of current evidence

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

All functioning societies are built on the abilities of individual members to adopt specific roles and responsibilities. Sex provides a fundamental feature, a biological difference, by which roles are assigned; these are primarily reproductive, but also cut across all aspects of life. The roles that are assigned to males and females by culture and society, how they are played out, and how they relate to each other at the individual and broader socio-political levels are described by the concept of gender. That there are gender differences is not in dispute; the problem arises with the different values placed on the various roles and responsibilities, and the consequences of this in creating disadvantage. Because issues of gender are basic to the ways in which individuals and societies operate, the effects of the disadvantage created permeate all aspects of life, from production, allocation and distribution of resources to exposure to disease and health promoting services.

The determinants of health include factors such as poverty, level of education, race and class, all of which are affected by, or interact with gender to influence health positively or negatively. These are also the factors that underpin the persistence of tropical diseases mostly affecting people in low income, developing countries. Tropical diseases provide powerful illustrations of social disequilibrium, and the last two decades have seen an increase in research that has produced gender analyses of a number of tropical and infectious diseases. The qualitative data from this research have largely demonstrated that there are major differences in the risks, experiences and sequelae of most of the tropical diseases identified by WHO as priorities for control. The research highlights the disadvantage suffered by women who are faced with multiple roles, poor access to health services and treatment, and therefore poor health outcomes.

A 'gender agenda' has been embraced by most international agencies, and governmental and non-governmental organizations, to enhance our understanding of, and ability to address disadvantage created on the basis of gender. Commitments towards gender equality have been made at an international level, through the Millennium Declaration, and many organizations are restructuring to ensure the mainstreaming of gender in their work. But does all this add value to health related outcomes?

The intuitive answer to this is 'yes'. At the very least, retaining a gender focus on any agenda provides information on new ways of approaching health issues and identifying points of intervention. However, on the basis of the conventional health indicators provided through quantitative methodologies, current data are not strong enough to support a definitive response. The quality of the data are poor and often draw largely on biased samples; sex disaggregated data are often not available. In addition, the qualitative data usually focus on women without reference to the interaction with men within their societies, so there is little information to proffer explanations of gender differences from the perspective of men.

There are very few data that demonstrate the effectiveness of gender based programmes where these have been developed and implemented. The advocacy approach employed on the current gender agenda promotes particular models of interventions that focus on women, often increasing their responsibilities, while excluding men and precluding potential interventions that could be more acceptable to communities. A further problem is that the outcome measures, which are usually based on reductions in morbidity and mortality, are unable to reflect what is largely a social phenomenon. A real commitment to mainstreaming gender throughout health research, policy development, planning and implementation needs to reflect the balanced investigation and reporting of gender analysis.

1 THE GENDER AGENDA

1.1 Introduction

The determinants of health include social relations, distribution of power, and the ability to mobilize and utilize resources. The gender approach enables the study of the determinants of health and the social, cultural and economic reality in which men and women live and work in order to determine how that reality promotes health and prevents disease (Dias, 1996). In light of the clear inequalities between men and women evident in most societies, promoting a 'gender agenda' in the management of health and disease therefore seems an intuitively just and effective strategy. However, the empirical evidence base[1] for this agenda is less robust due to a lack of consistency in the definition and operationalization of what is meant by gender and to persistent gaps in the relevant data on which the effects of gender can be evaluated.

This review provides a background to the current agenda on gender and health, particularly as it pertains to tropical diseases. Undertaking this review entailed not only a critical analysis of the plethora of peer reviewed and grey literature on gender, health and tropical diseases, but also an examination of the genesis and evolution of the concept of gender as it applies to public health more broadly. Based on the available evidence from gender and tropical diseases studies, we highlight the impact of gender on exposure to, experience of, and management and prevention of tropical diseases. We conclude by highlighting the continuing challenges to research, policy development, programme planning, implementation, and service delivery in this area of public health.

1.2 Gender and health: clarifying the definitions

Current use of the term 'gender' has its roots in Western feminist literature from the 1970s. In an attempt to address sexism, academics and activists sought to discredit the widely held assumption that social roles and relations were largely determined biologically (Rosaldo & Lamphere, 1974) by making distinctions between the biological and the psychosocial. 'Sex' described the biological attributes that differentiate males from females. 'Gender' captured the culturally and socially constructed aspects of being 'male' or 'female', reflecting both the relations between individuals at a personal level and the values and norms permeating the broader social structure. 'Gender' was used to highlight the importance of the socially and culturally defined roles, responsibilities and contributions to the broader society. Critically it also described the differential value placed on the prescribed roles, which formed the basis for stereotyping and discrimination. These issues are fundamental to all societies; gender dynamics are pervasive across all societal groups, irrespective of class, ethnicity, age and economic status.

More recent discourses challenge the clarity of the sex/gender dichotomy. Constructs such as transgender (gender identity differs from physiological gender), intersex (both male and female sexual characteristics and organs), and transsexual (sexually identifying with the opposite sex; may have undergone surgical sex change) underscore the distinctions not only between the male/female dichotomy but also within each construct.

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[1] Evidence is defined here as knowledge obtained from objective findings (but not broad interpretation) derived from analysis of objective data obtained from formal observational or experimental procedures that are potentially repeatable (verifiable) and meet currently accepted standards of design, execution, and analysis. Empirical evidence is weakened by the opportunity for other explanations, due to weakness in methods, to account for the findings (Last, 2000).

While debates on the supremacy of one concept over the other may have academic appeal, the significant interdependence of sex and gender, and the fluidity of the interaction of these concepts with other external factors, are issues of critical relevance to the determinants of health. The general position taken in this document is that, while biology provides diverse potential, culture and society limits, selects and channels this potential into what is considered appropriate and acceptable (Goldstein, 2001). In other words, the notion of gender is manifested in the expression of biological attributes within the context of socially and culturally defined roles. The consequences of this dynamic on health are the subject of this review.

1.2.1 The gender and health agenda

The use of gender in the health agenda can be traced back to the development of women's health as a special interest topic in health and health care delivery. Biomedicine was perceived to focus on the male body as the norm and the female body as a deviation from this norm, and consequently, health service provision was often reported by women as being unsatisfactory, inequitable and inadequate (Schiebinger, 1993). Women's health was defined to involve the entire range of issues that touch on illness, disease and well-being, as well as activities for prevention, diagnosis, healing, caring, and curing (van der Kwaak et al., 1991). These issues are also relevant to men. However, gender discrimination resulting from the higher value placed on men's roles, means that men command greater access to resources including those that promote health and prevent and cure disease (Allotey & Sundari Ravindran, 2002; Okojie, 1994; Raikes et al., 1992; Vlassoff, 1995; Vlassoff & Bonilla, 1994; Vlassoff & Manderson, 1998; Vlassoff & Moreno, 2002).

An increase in advocacy for women in sectors other than health, such as development and education, served to support the gender agenda in order to enhance equity and achieve equality of opportunities for women. As a result of the genesis of the terminology however, there is frequently a conflation of 'gender' with 'women' and 'gender and health' with 'women's health'. In reality, the focus on women's health provides the opportunity to address and redress the inequities that have resulted from gender inequalities. However, the focus on women to the near exclusion of men creates difficulties in analysing the dynamics between gender and health including outcome of specific diseases. A gender analysis is a useful way of exploring the dynamic processes taking into account the individual effects of the sex/gender interactions and the broader relations between the genders.

1.2.2 Gender analysis

Gender analysis in health provides a specific tool for systematic assessment of the influence of gender on risk factors, exposure, intensity of infection, duration of illness, care during illness, access to and utilization of health services, impact of illness on family life, and the sequelae of different diseases in men and women of similar ages and social status (Gender and Health Group, 1999). The value of this assessment is in the identification of the similar and varying needs of men and women, providing the tools with which to enhance the effectiveness of disease control programmes and work towards equity and equality of opportunity to attain optimal health (Vlassoff & Moreno, 2002). The following section provides a gender analysis of infectious diseases, drawing specifically on data from tropical diseases.

1.3 Gender analysis of tropical diseases

1.3.1 Roles and exposure

Gender accounts for the type of work males and females engage in, and influences exposure to infection and risk of disease (Manderson et al., 1996). Men are often responsible for heavy physical labour or work in forest areas, exposing themselves to industrial accidents or disease transmitting vectors. For

women however, domestic activities such as cooking over wood fires can have a protective effect against vectors such as sandflies and mosquitoes because smoke acts as an insect repellent (Vlassoff & Bonilla, 1994). Occupational exposure has been reasonably well documented epidemiologically.

Explanations of the effects of gender and exposure are also evident in local explanatory models of disease occurrence. Exposure to magic powders or spells during 'spiritual war' provides the local explanation for *Natintim* or *Napimpim* (elephantiasis in the legs) in Ghana (Allotey, 1995; Gyapong, Adjei & Sackey, 1996) and Haiti (Coreil et al., 1998; Eberhard et al., 1996). Particularly in Ghana, this is a hazard to which men rather than women are exposed, as local treatment through the soothsayer indicates (Allotey, 1995).

However, exposure is not limited to occupation; it may also be influenced by culturally determined gender norms and religious beliefs that govern daily activities such as the type of clothing worn by men and women. Modesty is a particularly important cultural value in some Arabic and Islamic countries, where women may be fully covered at all times. This means that, for diseases such as cutaneous leishmaniasis that rely on direct contact of a vector (in this case, the sandfly) with the skin, not only is incidence of the disease lower in women, but also the lesions tend to be mostly limited to exposed parts of the body such as the face. While this may limit the clinical severity of the condition, the presence of disfiguring facial lesions presents a different problem that affects experience of the disease. Men however, wear minimal clothing during hot evenings and therefore show a higher incidence and more generalized lesions (Khoury et al., 1996). Sleeping outdoors without bednets during the hot season is also more common in men; it exposes them to the sandfly that causes leishmaniasis (World Health Organization, 1990) and to mosquitoes that cause malaria (Abdulla et al., 2001; Rathgeber & Vlassoff, 1993; Vlassoff & Bonilla, 1994). Boys generally have more social contacts than girls of a similar age, who remain at home or work locally; this has been proposed as one explanation for the higher rate of tuberculosis infection in young adult males (Barnhoon & Adriaanse, 1992). The complexity of the interaction of exposure with biological susceptibility is evident in the specific sites of infection, severity of disease, and outcome of infection.

1.3.2 Gender and perceptions of disease

All cultures create processes by which they identify illness[2] and classify disease[3] within the framework of their own cultural experience (Nations, 1986). It is important to examine local perceptions and interpretations of disease because this information contributes to our understanding of cultural reactions to disease (Helitzer-Allen et al., 1993). Men and women often have different perceptions of conditions based on cultural knowledge and attitudes, and these can be important in establishing their response to illness, management of the disease, and help-seeking behaviour. Female dengue patients reported perceiving the condition to be more debilitating than did men, and this is reflected in the higher rate of presentation to health services and the reporting of symptoms (Cobra et al., 1995). Weigel et al. (1994) showed that women were more likely than men to perceive cutaneous leishmaniasis (CL) as serious, even though they are at lower risk. In Columbia, CL is considered to be a disease that affects only men, so lesions are less likely to be recognized and treated in women (Velez et al., 1997).

Explanatory models provided within a culture can affect the interpretation of symptoms and to a lesser degree the treatment options. The general perception that filariasis may have been hereditary for women meant that it was not recognized as a condition that could be treated clinically; this was given as a reason why women in India were unlikely to present to health centres for treatment (Bandyopadhyay, 1996). For men in Ghana, even though having a hydrocele was thought to be hereditary, this had no bearing on health-care seeking, though there was some concern about the risks of surgery and the potential loss of the family breadwinner (Gyapong et al., 2000).

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[2] Based on the patient's perception of suffering

[3] The classification of what is wrong with the patient based on the paradigm in which the 'clinician' operates.

The perception of a disease also has major implications for the level of stigmatization experienced by people with the condition. When stigmatization is manifested as discrimination, there is real potential for those affected to be deprived of material and social goods within their community, affecting access to health services, basic rights within their communities, and ultimately the severity of their condition. How social and cultural factors interact to determine the level of stigma is not well understood. Current discourses are largely based on the notions of contagion and fear of the unknown, and consequently interventions have focused on improving knowledge of the conditions. Interestingly, discrimination for reasons of public health safety is sanctioned under the international instruments protecting human rights (Gruskin & Tarantola, 2002). However, the stigmatization experienced by individuals within the community is often in excess of the risk of contagion that they pose (Liefooghe et al., 1997; Velez et al., 1997). An examination of gender differences in stigmatization and discrimination suggests that, for any given condition, stigmatization and certainly discrimination changes according to several factors including the sex and social context of the person affected and the manifestations of the particular condition.

In a multicentre study of stigma related to onchocercal skin disease, Vlassoff et al. (2000) found that, in descriptions of key events and quality of life, experience of stigmatization was qualitatively different between men and women. Women's descriptions were of reduced desirability for marriage, and lack of sexual intimacy if they were married because of a perceived fear of contagion. Similarly, based on interviews with young men in Haiti, Coreil reports that a woman who shows signs of elephantiasis before marriage is less likely to find a partner unless she is very beautiful and has other qualities that make her 'outshine' other girls (Coreil et al., 1998). For men, reports of the effects of stigmatization were less related to physical appearance and involved reports of 'gender-specific idiom for stigma among men' or diminished sexual function (Vlassoff et al., 2000). Stigmatization associated with hydroceles has also been reported in Haiti, the Philippines and Kenya (Eberhard et al., 1996; Lu et al., 1988).

Blame presents an important reason given for stigmatization. Women's signs and symptoms are often regarded as punishment for immoral behaviour, so that while urinary schistosomiasis, for instance, is celebrated as an indication of coming of age or virility in men (Feldmeier et al., 1993; Vlassoff & Bonilla, 1994), in young women, the same haematuria is considered a venereal disease with all the stigmatizing associations (Cofie & Adjei, 1999).

There is a long history of stigmatization due to conditions that cause disfigurement (Kaur, 1997), and where there are other forms of discrimination against women this compounds the effect on their ill health. In societies where women's status is defined by their marital and maternal roles, women are particularly dependant on their physical appearance to get and remain married, and skin diseases such as leprosy can strongly affect these prospects (Vlassoff & Bonilla, 1994; Vlassoff et al., 1996). Studies on leprosy in Brazil and India support the findings that women experience more discrimination based on physical appearance than men (Oliveira & de Pessini, 1997; Rao et al., 1996; Vlassoff et al., 1996).

A study in New Delhi found that 25% of women leprosy patients had strained relations with their husbands, and that 33% reported discrimination from family members. A third of the women were not allowed to use community venues (Kaur & Ramesh, 1994). Zodpey et al. (2000), in their survey of 486 patients with leprosy in India, reported that 36.2% of the women were not allowed to cook for the family and 22.9% were not allowed to eat with the rest of the family. One third of the women compared to 14.2% of the men were not allowed to touch others, including their family, and half the mothers with young children were not allowed to breastfeed them. Given the level of importance attached to domestic roles in determining status within the family and community, the rejection caused by these restrictions has important implications for self-esteem and sense of value within the society.

An important effect of stigma is to restrict access to resources. In separate studies, Vlassoff et al. (2000) and Coreil et al. (1998) both cite the experience of women whose husbands did not want to spend money on their medical care because of (and in spite of) their conditions. Similarly, Allotey (1995) found that, although filariasis is generally not expected to affect clinical pregnancy outcome,

women with filariasis in Navrongo had poorer outcomes because they were the least favoured wives in polygamous households and therefore also the least likely to have access to antenatal and maternal health care during pregnancy and child birth.

1.3.3 Gender and the response to illness and disease

Response to illness describes the actions taken in recognizing illness, diagnosing the specific disease, seeking care, and accessing health services. All these are influenced in one way or another by gender.

The threshold of illness recognized by a society dictates the level of endurance that males and females need to limit social disruption, and thus dictates the promptness with which an illness episode is presented to various forms of health services. In general, women display an unwillingness to disrupt household activities, including child care, due to their own illness unless symptoms are sufficiently severe (Hibbard & Pope, 1983; Rathgeber & Vlassof, 1993).

There is a growing body of literature on the health effects of caring for relatives with chronic and infectious diseases (see for example Cancian & Oliker, 2000; Twigg et al., 1990). The implications of the caring role on health are particularly relevant within traditional societies because of an assumption of support for care from immediate and extended family members. In reality, this does not always exist (Morrison, 2000). The responsibility of caring significantly restricts the type of employment in which an individual can engage and the length of working hours, and limits the opportunities that may present for education and other forms of engagement with the broader community (Australian Bureau of Statistics, 2001). Caring for ill or dependent family members largely remains a role for women particularly those who live in poverty and under traditional extended family structures, where obligations remain to children, elderly family members and husbands. Illness of other household members has economic consequences for women, whose working day is lengthened when a member of the household is ill (Hibbard & Pope, 1983). There is a socio-psychological disposition from childhood for this role to be maintained in society, even for women in urbanized nuclear families. Women in this context may have more power, but responsibilities may still be heavy as they do not have the help of an extended family (Morrison, 2000).

Lack of decision-making power to seek external health care has been recorded in several studies on gender and health in Asia, Africa and Latin America (Okojie, 1994). A study funded by TDR found that Hausa women in Kaduna, Nigeria, were kept in purdah, which limited their mobility and opportunities to participate in community activities. In addition, they were dependent on their husbands for permission to seek care outside the home (Kisekka, 1995), causing delays and presentation of severe cases. Men interviewed about the health of their wives described laziness, jealousy and competitiveness between co-wives as the cause of ill health in women (Kisekka, 1995).

Reviews of gender roles, particularly as they relate to caring and seeking help in developing countries, focus largely on the multiple roles assumed by women and the effect of these on creating an excessive burden (Hibbard & Pope, 1983). However, these discussions frequently presume a static culture. Current political, social and economic events have led to some modifications in family structure and social networks (Morrison, 2000). Other changes have been created by the HIV epidemic and conflict, which have altered family and social structures, individuals who assume the caring role, and power dynamics within the household (Isiugo-Abanihe, 1994). In many households affected by adults with HIV, children may have to assume the caring role if the mother is ill. While these changes may put women in the decision-making role in the household, the overall effect may not necessarily be positive. It is increasingly important to have a clear understanding of the effects of changing household dynamics in order to facilitate appropriate targeting of health interventions.

There are still gaps in our knowledge about how power is negotiated within households. There has been some effort to explore power negotiation in the area of reproductive health and reproductive rights, highlighting the complexities of sexual relations, safe sex practices, and family planning choices (Ezeh, 1993; Fatima, 1991). Decision analyses on health care consultations also touch on some of the com-

plexities of negotiation. A number of studies on household dynamics and access to resources for health care have been carried out specifically on infectious diseases, particularly malaria. Women have been found more likely to access health services and treatment when they have access to resources, and will actively seek treatment even if it means a trip away from home (Velez et al., 1997). What remains unclear is why men in a household are less likely to spend money on health related activities, how men prioritize expenditure, and how this could be altered if there were an appropriate intervention. Information in this area is not consistent, and the extent to which some African women, for instance, can take decisions depends on whether they live in a matrilineal or patrilineal system, their level of education, whether they are one wife of many in a polygamous marriage, and so on. For others, post-colonial changes in the economy have reduced the value of subsistence and domestic life, and placed greater emphasis on urbanization and a cash economy which involves men (Potash, 1995). This has increased women's reliance on men, and increased gender inequality (Morrison, 2000). There is a need for a more critical analysis of the changing roles of women to enable better understanding of the effects of rapid social change.

The flow of financial resources within the household, and the prioritization of expenditure on the health of individual members of the household, is determined by the roles assigned to males and females in any particular society. In broad terms, men are dominant in the allocation of resources, making gender one of the principal sources of power and inequality in most societies (Doyal, 1995). There has been substantive discussion in the feminist, health and development literature on the gender power dynamics within households; the general consensus is that gender gaps are widespread and women are discriminated against in the control of resources and other economic opportunities (Vlassoff, 1995; Vlassoff, 1997; World Bank, 2001). It is also clear that giving women greater control over household resources would have a direct positive impact on the health and welfare of family members. Given financial resources, women are more likely than men to spend money not only on curative care but also on prevention of disease and health promoting activities (Agyepong, 1992; Lampietti et al., 1999; Rashed et al., 1999; Thomas, 1997).

A number of surveys have demonstrated that, for various reasons, women have a greater tendency to consult with traditional healers than to visit health centres for tropical and other diseases (Hudelson, 1996). In particular, stigmatized diseases such as leprosy, TB and gynaecological conditions, are first referred to traditional healers (Kisekka, 1995). Consultation with traditional healers remains popular and, in many places, is increasing with the higher levels of poverty and the establishment or increase in user-pay health services through structural adjustment programmes and health sector reform packages. Payment options to traditional healers are more flexible and negotiable in communities that do not rely solely on a cash economy (Allotey, 1995). In addition, there is a perception that traditional healers are more likely to understand the context in which the condition occurs, and the level of satisfaction with the treatment options presented is higher because patients have a better idea of what to expect from the healer (Ager et al., 1996; Coreil et al., 1998; Kaur, 1997; Weigel et al., 1994). Furthermore, the knowledge gained from consultation with a traditional healer becomes informal knowledge, and treatment is easier to obtain following self diagnosis. Women were found to know more about methods of treating leishmaniasis with traditional therapies including indigenous plants, chemicals, acids, hot metals, and antibiotics, while only 7% knew about treatment with pentavalent antimonials (Weigel et al., 1994). Treatments that women are likely to use for cutaneous leishmaniasis are also easily obtainable; these include caustic substances such as battery acid, gunpowder, silver nitrate, hot unrefined sugar, hot water, petroleum and hot metal objects. Unfortunately, these treatments also exacerbate disfigurement (Velez et al., 1997) and can cause extensive tissue necrosis (Weigel et al., 1994). Although traditional methods of burning seem drastic, there is some evidence that they are effective (Phillipson, 1991).

1.3.4 Quality of care

Quality of care is a major consideration in seeking help for an illness episode. There are gender differences in the expectation of quality care from health services, and differences in the treatment of patients by health care providers (Kaur, 1997). Women in both developed and developing countries have expressed concerns about the lack of explanation and dissatisfaction with investigative and treatment procedures, and with the quality of interaction with health care professionals. There is a large body of literature that highlights the particular vulnerability of women in all of these contexts (see for instance see Okojie, 1994; Raikes et al., 1992).

Factors that affect the perception of quality of care include diagnostic procedures, the sex of the care provider, and the perception of the benefit of the care received against the material and opportunity cost. Diagnostic technique may present a barrier where, for instance, there remain taboos to the provision of body specimens such as urine, blood and stool and which taboos may change for women depending on the stage of life (e.g. pregnancy, puberty, lactation or menstruation) (Feldmeier et al., 1993). The use of male health workers is particularly inappropriate where modesty presents an obstacle to physical examination by an unfamiliar male (Abiose, 1992). Similarly, there are instances where men have refused to be examined when they presented with a hydrocele because the health worker was female (Gyapong et al., 2000). Information provided to women was often found to be inappropriate in content and mode of delivery, and not relevant to their priorities (Vlassoff, 1997). Further concerns about the quality of care related to treatment by health professionals, particularly of women patients when they presented themselves or brought their children in for care. Health workers were reported to demand bribes for providing care, be rude and condescending, blame women for their ill health, and humiliate women publicly by failing to provide an atmosphere for private consultation and examination (Allotey, 1995; Fonn & Xaba, 1995; Haaland & Vlassoff, 2001).

These concerns are reflected in health centre attendance data for infectious diseases (Booth et al., 1996). In addition, several studies have shown that delays in seeking treatment can contribute to the severity and often fatality of various conditions (Vlassoff, 1995). Interventions developed by the TDR Gender and Tropical Diseases Task Force include the *Healthy women's counselling guide*, designed to involve women in the compilation and delivery of health education data, and the *Health workers for change* methodology, designed to promote social change within the health services culture (Vlassoff, 1997). Based on research on where women obtained information, the kind of information and the preferred format, (Kisekka, 1995) the *Healthy women's counselling guide* provided a framework for engaging women in identification of priority health issues for which they needed further information, and in producing education resources for delivery of the information in media that were appropriate for them, including calendars, radio programmes, posters and plays (Kisekka, 1995; Vlassoff et al., 1995). The guide highlighted the use of appropriate communication strategies and messages, making use of existing distribution points such as women's clubs, shops and health centres (Vlassoff, 1997). *The Health workers for change* methodology is based on the premise that improvements in the quality of care can occur from the primary level of engagement with a patient, and does not necessarily have to focus solely on increasing available funding to provide technology and material resources for health care delivery (Fonn & Xaba, 1995). The methodology, which involves engaging health workers in an interactive series of workshops to explore their commitment to service provision, attempts to raise social consciousness and promote change in the treatment of patients (Fonn & Xaba, 2001; Haaland & Vlassoff, 2001).

The *Health workers for change* methodology has been very well evaluated.[4] It was found to improve provider-client relations as well as facility level functioning and aspects of staff interrelationships. It was also found to have some impact at the system level (Onyango-Ouma et al., 2001).

[4] See special issue of: Health Policy and Planning, 2001, 16 (Supplement 1)

1.3.5 Compliance with treatment

Compliance with treatment for infectious diseases (whether during mass administration or after case detection) is critical not only to ensure management of the condition in the affected person but also to reduce the risk of mutation of an infective agent to a drug-resistant form (TB and malaria), and to ensure that control programmes based on destroying the reservoir of infection within the community (as in mass treatment programmes for onchocerciasis and filariasis control) are effective. It has been documented, for instance, that on average, 20% of leprosy patients do not complete their treatment and remain a potential source of infection (Le Grand, 1997). Treatment for most tropical diseases is complicated by the issues of affordability (cost of the treatment as well as the cost involved in presenting to the health services), acceptability (unpleasantness of side-effects), appropriateness of administration (health service factors such as quality of care, complexity of regime, and availability of treatments), and other sociocultural factors such as stigmatization. Compliance requires a shared responsibility between the health services that administer the treatment and the patient who needs to follow the recommended guidelines. In general, compliance is better in self-referred patients (Cassels et al., 1982), but this requires adequate knowledge of the condition and a level of control over extraneous factors that affect access to treatment. Gender implications arise from access to both the health services and the financial resources required to obtain treatment (previously discussed), and from differences between men and women in drug reactions, particularly relevant in pregnant women.

Studies on compliance with treatment for conditions such as tuberculosis have shown some evidence of gender differences. One of the main reasons for the persistence of tuberculosis is poor compliance leading to drug resistance and low cure rates. A high default rate has been recorded, particularly in pregnant and lactating women in the Philippines, because of fear of harming the infant or 'drying up their milk'. Men defaulted because they were not allowed alcohol while taking the treatment and they were reluctant to change their lifestyle (Nichter, 1994). The directly observed treatment short-course or DOTS programme depends on microscopic detection, availability and affordability of drugs over a six-month period, and daily supervision of drug administration for at least the first two months. The system requires monitoring, political commitment and resources from both the health sector and the patient. Because tuberculosis has the potential for re-infection (Small, 1999), rigorous monitoring of treatment is important and, consequently, participation can rarely be discrete, particularly in small communities. There has been some suggestion that an authoritarian approach may further undermine the status of women and present an obstacle to their willingness to seek treatment (Thorson, 1999). Zwarenstein et al. (1998) reported that, for this reason and in a randomized control trial, DOTS was less effective for women than self-supervised treatment.

Other evidence from the treatment of tuberculosis has shown that fear and stigma have a greater effect on women than men (Hudelson, 1996), and therefore are more likely to affect their willingness to openly participate in a DOTS programme. Major barriers identified for women in a Vietnam study were in accessing health care, due to stigma in the society and poor treatment from health staff. Men's knowledge of their treatment was poor, and the cost of treatment was reported to be an obstacle to compliance; although the drugs were free, there was no compensation for loss of income or cost of travel, or for staying in hospital during treatment (Johansson et al., 1999).

There are some exceptions to this general pattern. Studies in Ghana and Vietnam have shown compliance with treatment to be higher in women than in men (van der Werf et al., 1990; Johansson et al., 1999). Unfortunately, the reasons for the difference were not investigated in either study. It is known, however, that women in the area of Ghana where the study was conducted have access to financial resources because they are heavily engaged in trading activities; overcoming the cost and access factors may have been sufficient to supersede any other barriers. Other studies have reported no difference in compliance between males and females (Nuwaha, 1997).

Treatment for leishmaniasis may include inpatient care or daily visits to the primary health care facility because of the toxicity of the drugs. This intense interaction with the health services makes treatment

inaccessible to many, including women who are unable to leave their daily household responsibilities. Non-treatment and delayed treatment is responsible for the fatality rate in kala azar (Bora, 1999; Wijeyaratne et al., 1994). Treatment of cutaneous leishmaniasis requires a series of injections over 20 days (Velez et al., 1997). A study in Columbia, funded by TDR to assess the effects of gender on leishmaniasis, demonstrated that men were more likely than women to comply with treatment provided through the health services. Health workers were not sufficiently trained to recognize and treat the symptoms, and women could not access the services as easily (Velez et al., 1997). Men from many rural communities however attend market in the nearby town on a weekly basis to sell produce, and they were able to make the incidental trip to the health centre for the required tests, diagnosis and treatment for cutaneous leishmaniasis. Trips from the village solely for treatment were more difficult for women to undertake.

Compliance is also a problem with diethylcarbamazine treatment in filariasis control because of the recorded side-effects; these include fever, malaise and gastrointestinal problems (de Almeida & Freedman, 1999). While most people can live with the chronic nature of filariasis, the side-effects of the treatment present acute problems that can affect daily functioning within the community. Significant gender differences were reported in living with filariasis.

For women with leprosy, compliance with treatment was poor because they needed to be accompanied to the clinic by a male member of the family, who was not motivated because of the stigma of the condition (Kaur & Ramesh, 1994). Women stopped treatment when they became pregnant because of fear of adverse effects on the infant.

1.3.6 Enhancing the value of gender analysis

As demonstrated above, gender analysis makes an essential contribution to the identification of points of intervention (Vlassoff & Moreno, 2002). It is important not only to identify the type of data needed to explore differences in health and disease, but also to explain any epidemiological data that are available. Clearly this relies on having accurate health and health services-related data available, that provide sex disaggregated figures for various age groups. However, like most other sources of health data in resource-poor countries, there is a general lack of sex-disaggregated data, and the quality and accuracy of existing databases cannot be guaranteed. For example, tuberculosis rates are acknowledged as being subject to significant error in most developing countries, with up to a two-fold difference between higher and lower estimates of incidence (World Health Organization, 2001a).

Health information systems in many developing countries are based largely on health services data. However, service-based records reflect *presentation for care* and not *prevalence of disease*. As described above, gender contributes significantly to the utilization of health services and, consequently, data from the health services exclude sections of the population unable to attend for reasons of inaccessibility due to distance from the services, lack of financial resources to pay for travel, health care and medication, and reluctance to use limited resources on oneself (Vlassoff & Manderson, 1998). Reuben (1993) argues that the tendency to use clinic-based information as the main source of health related data has resulted in the perception of higher risk in men; reliance on this source of data introduces major biases in their interpretation.

Other points at which gender bias occurs in data are in notification of disease (by the patient), detection of cases (by the health services), and diagnosis (Hudelson, 1996). For instance, case detection in schistosomiasis is often carried out through schools, but girls are underrepresented in the education system. On the other hand, in household surveys, females are over-represented - it is conceivable that men and young boys would have gone to work or to the fields, or would be migrant workers and not at home (Feldmeier et al., 1993). The interpretation of data on disease occurrence has to be considered within the context of these gender biases.

While primary data on the sex distribution of infection and disease may be collected in some studies, most reports present aggregated results (Michael et al., 1996). There is often an assumption that, if there is no significant difference in distribution, then disaggregated data are not worth reporting. A

lack of sex difference in morbidity and mortality, however, does not repudiate the importance of collecting or reporting sex disaggregated data, and this limitation is a reflection of the need for gender sensitization within the biomedical and health community (Vlassoff & Moreno, 2002).

Overcoming the lack and inaccuracy of reported epidemiological data in the short term is, unfortunately, not necessarily the highest priority of most health managers. Some work is being done to improve data collection at all levels of the health services without overly increasing the pressure on existing providers (Mathers et al., 2001), and this presents an ideal opportunity to advocate the importance of including sex-disaggregated data in this process.

It is important to note that collecting and reporting of sex disaggregated data is not sufficient for a gender analysis; the data can continue to mask important gender effects. For example, equal rates of infection may be recorded for a particular condition, but the source of exposure may be different for men and women as a result of occupation. While men and women may have similar rates of infection and disease, there are often differences in their experience of the disease. This may be relevant to the outcome of the infection, and may also provide critical information about points of intervention in control of the conditions.

In the absence of robust quantitative data, current knowledge of the impact of gender on health has drawn heavily on sources of qualitative data (Vlassoff, 1997; Vlassoff & Manderson, 1998). Techniques used in anthropology, such as observation, in-depth interviews, focus group discussions and participatory research, have yielded critical information that has expanded our knowledge base on the relevance of gender to the experience of health and provided some explanation for the gender differences in infectious disease epidemiology. Qualitative data have also identified sources of bias in available data. In the following section, we present the available data on gender and ten priority tropical diseases, many of which support the arguments presented in the gender analysis above. The section also highlights the gaps where accurate data are needed.

2 GENDER ANALYSIS OF DISEASES IN THE TDR PORTFOLIO

Communicable diseases in general, and tropical diseases in particular, can largely be controlled through the improvement of environmental conditions, early diagnosis, and treatment. However, with persisting poverty and increasing wealth disparity, these diseases continue to be a major cause of death and disability, with the poorest 20% of the world's population experiencing 47% of deaths from communicable and related diseases (Gwatkin & Guillot, 1998). Public health efforts to control communicable diseases continue to have a predilection towards biomedical models which discount the systematic long-term evaluation of social and environmental interventions in disease control. The outcomes of interventions are based primarily on reductions in morbidity and mortality. While recent measures promulgated through the global burden of disease methodology have been instrumental in redirecting the focus of health planners towards conceptualizing the implications of non-fatal outcomes of diseases (Murray & Lopez, 1996), the exclusion of sociocultural contexts, such as gender, in which disease is experienced remains a major shortcoming (Allotey & Reidpath, 2002; Reidpath et al., 2001).

Programmes such as TDR have made a significant contribution to the enhancement of communicable disease interventions through promoting basic and applied social science research in tropical diseases (Vlassoff & Manderson, 1998). The current focus of TDR is on schistosomiasis, onchocerciasis, filariasis, malaria, African trypanosomiasis, Chagas disease, leprosy, tuberculosis, leishmaniasis and dengue, which are endemic in resource poor countries in sub-Saharan Africa, Asia and Central and South America. These conditions are considered to have been neglected in spite of the high associated disease burden, and are endemic not only because of environmental conditions but also due to poverty, as reflected in poor housing, low literacy and nutritional status, and lack of access to often inadequate health services. Infections such as Chagas disease are directly associated with quality of housing and other poverty related conditions including malnutrition and diarrhoea (Dias, 1996); data on dengue show significant association with slum housing, lack of screening, and construction of wooden houses (McBride & Bielefeldt-Ohmann, 2000).

Further reasons for the continuing high burden of these diseases, and for the re-emergence of previously controlled infections in non-endemic areas, include easier access to travel, conflict, complex humanitarian emergencies, and population displacement. These result in greater global movements of people. There is evidence for increased rates of malaria and tuberculosis in refugee camps housing people who have fled their countries or internally displaced persons who have left their homes due to conflict or natural disaster (Kloos, 1992). The 40 million refugees and internally displaced people worldwide constitute a substantial, high risk population (UNHCR, 2001).

High risk populations do not occur at random. Strong political, cultural and social reasons contribute to the distribution of poverty. Women constitute approximately 70% of the world's poor (Hartigan, 1999); women and children constitute 80% of refugees and internally displaced people (UNHCR, 2001). These numbers make a compelling argument for examining the potential contribution of gender to the vulnerability of populations (Hudelson, 1996; Vlassoff, 1995; Vlassoff & Bonilla, 1994; Vlassoff & Manderson, 1998).

In 1989, the TDR initiated a number of activities to assess the status of biomedical and social research relating to women and tropical diseases (Kaur, 1997) and, in 1994, the critical need to develop an evidence base on the interrelationship between gender and health in developing countries resulted in the establishment of a task force to stimulate exploratory and intervention-based research on gender differences in exposure, intensity of infection and morbidity, access to and utilization of health services, and impact of illness on productive and reproductive capacity, social activities and personal life (Vlassoff, 1997). The focus on gender was in line with an increasing awareness internationally of the effects of disparities between men and women on development and health.

Within the limitations of available data, there is a growing body of evidence to demonstrate some sex differences in the occurrence of most of the tropical diseases targeted by TDR. The information presented below is a summary of current data on these conditions, highlighting the interdependence of biological and gender explanations of differences where they occur and where data are available.

2.1 African trypanosomiasis

African sleeping sickness is transmitted by the bite of bloodsucking male and female infected tsetse flies (*palpalis* group), which require substantial levels of humidity and prefer dense riverine habitats (Smith et al., 1998). Cattle and other wild mammals act as reservoir hosts of the parasites. This mode of transmission makes herding cattle, a predominantly male activity, a high risk occupation in endemic countries. The disease may also occur in people sporadically exposed to vectors, e.g. poachers, hunters, honey gatherers, firewood collectors and tourists (Smith et al., 1998). Transmission is also possible through contamination with infected blood or through the placenta.

There is a general dearth of sex-disaggregated information, and information on the effects of gender on African trypanosomiasis. So, while there appear to be differences in exposure, this is not reflected in the available prevalence data.

2.2 Chagas disease

Chagas disease or American trypanosomiasis is also vector-borne; it is transmitted by triatomine bugs. The disease is endemic to Central and South America, causing the third largest disease burden in the region. The preferred habitat of the vector is crevices in the walls and roofs of rural and urban mud-based slum homes (Moncayo, 1999). Blood transfusion has also been identified as a significant mode of transmission of Chagas disease; up to 53% of blood in some blood banks is infected (Moncayo, 1992). Current data suggest transmission may also occur through ingestion. This would explain the growing number of family micro-epidemics (da Silva Valente et al., 1999), although the mechanism is not yet well understood.

Chagas' disease is directly related to poverty; women and children who remain close to the home have higher peridomestic exposure to the vector (Azogue, 1993). There are very few sex disaggregated data. One study reports that the seropositivity in Chagas' disease is higher in women than men, with a rate of 56.2% in women and 43.8% in men (Kaur, 1997). In another study, comparing positivity in males and females among an indigenous Colombian population, Corredor Arjona et al. (1999) found no difference in any age group after the application of the Montenegro skin test, suggesting that the exposure risk is equal among women and men (Corredor Arjona et al., 1999). The paucity of data in this area needs to be addressed.

2.3 Dengue

The mosquito which transmits dengue (the principal vector is *Aedes aegypti*) breeds mainly in artificially created water receptacles, and is therefore concentrated in periurban domestic settings. Dengue is a disease with three presentations: dengue fever, dengue haemorrhagic fever (DHF), dengue shock syndrome (DSS). A detailed observation study noted the potential for higher exposure of women, who are responsible for the home and for household tasks including water storage, laundry, cleaning, and house pots (Whiteford, 1997). However, in areas where responsibility for the maintenance of large 55-gallon drums kept outside the home falls on men, this responsibility increased their risk (Whiteford, 1997). Dengue also occurs following transient or sporadic exposure, such as in tourism, accounting in part for its occurrence in non-endemic areas. Approximately 84% of soldiers returning from Somalia in 1992 reported symptoms of dengue fever (McBride & Bielefeldt-Ohmann, 2000).

Data on the gender differences in prevalence rates for dengue are inconclusive. Women in Thailand are hospitalized for DHF at twice the rate of men (Halstead, 1990). In Singapore, however, 1.5 times more male admissions were recorded. A study in Malaysia reported a higher incidence of DHF in males, but a higher case fatality rate in females (Shekhar & Huat, 1992). No reasons were proposed for the differences. Other studies demonstrate a more even distribution among males and females (Cobra et al., 1995; Hayes & Gubler, 1992).

McBride (2000) suggested that biological differences may be a possible factor in the prevalence variation, but there is little evidence to support this. There is, nonetheless, an association between the development of DHF and DSS and secondary-type antibody response, which is affected by age and sex, with a higher incidence in young children and females than in males, particularly in Asia (Cobra et al., 1995).

2.4 Filariasis

Filariasis is a painful and disfiguring disease that has a major social and economic impact in Asia, Africa, the Western Pacific and parts of the Americas (Ottesen, 1997). It is one of the leading causes of permanent and long-term disability in the world (Raviglione et al., 1995). Filariasis is caused by filarial worms, and is transmitted at night by the bite of female *Culex* and *Anopheline* mosquitoes when taking a blood meal from infected individuals. Filariasis causes acute, then chronic, lymphatic disease and results in lymphoedema when left untreated.

Men and women were found to be equally susceptible to filarial infection (Bancroftian filariasis) in a study in Orissa, India. But prevalence of the chronic disease was significantly higher in males (17% compared to 6.2%) (Sahoo et al., 2000), and this is consistent with studies elsewhere (Gyapong, Gyapong & Adjei, 1996; Kazura, 1997; Pani et al., 1997). These reports of chronic disease being more prevalent among males may be due to the incidence of hydroceles (Michael et al., 1996). Both infection and lymphoedema cases are more prevalent in men in all areas endemic for Brugian filariasis (Michael et al., 1996).

The incidence of Bancroftian filariasis is on the increase in Thailand, with high prevalence in migrant workers (mostly males) from Myanmar (Triteeraprapab & Songtrus, 1999). In Ghana, in the southern part of the country, women who are engaged in fishing and trapping of shrimps in the mangrove swamps are exposed to the filariasis mosquito, and this may be a reason for the higher prevalence of lymphoedema in women than in men in this region (Gyapong, 2000).

For reasons that are not understood, lymphoedema in Bancroftian filariasis affects women more frequently than men (Coreil et al., 1998; Sahoo et al., 2000), reflecting a global review showing that lymphoedema occurs 1.5 times more in women than men (Michael et al., 1996). Available data support the possibility that immunological factors play a role in this difference. Sex differences in susceptibility are only apparent in the reproductive years, and de Almeida and Freedman (1999) suggest a pregnancy associated immunological response. Further evidence of the body's response to filarial infections reveals that IgE and IgG4 antibodies are evident in children as young as eighteen months in endemic areas. The prevalence of these antibodies was found to be higher in males than females in a study of children under six in Indonesia. It is not clear, however, whether this difference is attributable to gender related exposure, sex hormones, or genetics (Terhell et al., 2000).

Although limbs are the most common sites of lymphoedema, the condition often affects the breasts and vulva in women and the scrotum in men (Pani et al., 1991). According to a study in Haiti, women are ten times more likely than men to have lymphoedema of the leg (Coreil et al., 1998). However, the high number of urogenital symptoms seen in men is an important cause of disability. The development of hydroceles is relatively common in men with filariasis; some studies have shown that as many as 7 of 8 of men with elephantiasis also have hydroceles (Simonsen et al., 1995). Lymph scrotum, which is experienced in a minority of cases, results in the leaking of lymph through the scrotal skin (Dreyer et al., 1997). Data suggest that hydroceles can alter testicular function or cause decreased spermatogenesis (Dreyer et al., 1997). The prevalence of urogenital symptoms in women may be underestimated

because of reluctance of both women and health providers to examine the genitals of female patients. In a survey of the clinical manifestations of filariasis in Tanzania, physical examination of males included the genitals, arms and legs, whereas examination of women was restricted to the arms and legs (Simonsen et al., 1995). There is evidence that women have a lower prevalence of microfilaraemia and lower worm densities, but this does not necessarily provide any information on clinical disease (Vlassoff & Bonilla, 1994).

2.5 Leishmaniasis

The leishmaniases are a complex group of parasitic diseases caused by various species of *Leishmania* that are transmitted directly (from one human host to another) or indirectly (zoonotically - from household animals and rodents to humans) through the bite of a sandfly. Transmission of the disease reflects people's behaviour as well as sandfly and reservoir activity (Wijeyaratne et al., 1994). There are three main forms of the disease: cutaneous leishmaniasis (CL), which causes largely self healing but disfiguring lesions; mucocutaneous leishmaniasis (ML), which attacks the mucous membranes of the nose, mouth and throat, resulting in mutilating lesions that require reconstructive surgery; and visceral leishmaniasis (VL), the most severe form, which affects the liver and spleen and is fatal (up to 90% mortality) if untreated (Bora 1999; Klaus et al., 1999). VL has re-emerged from near eradication, largely due to extensive population movements following civil unrest, and to human encroachment on the sandfly's natural environment through agricultural and development projects (Wijeyaratne et al., 1994).

Leishmaniasis was declared an occupational disease affecting men because of its association with the building of roads and railroads (Klaus et al., 1999), oil and gold extraction, deforestation, farming, hunting and military service (Wijeyaratne et al., 1994). Most of the cases identified in a study in Jordan were soldiers serving in the Jordan Valley (Khoury et al., 1996). In Ethiopia and Kenya, most of those affected were livestock herders and coffee plantation workers. A longitudinal study by Weigle et al. (1993) found that the greatest risk factor for CL in Columbia was entering the forests after sunset, hunting, lumbering and farming - all predominantly male activities. The risk to farmers was nine times higher than to those in other occupations. Armijos (1997) found a three-fold difference based on occupational role.

The risk of infection with VL under the age of seven years appears to be independent of sex, but males report higher rates as they get older (Velez et al., 1997). Ratios of up to five times more in men than women are evident from hospital morbidity figures (Bora, 1999), which may also be a reflection of the higher likelihood of reporting and treatment for males. Bora (1999) found higher rates of leishmaniasis in men in India, with post kala-azar (visceral leishmaniasis) dermal lesions (PKDL) affecting the face, trunk, scrotum and penal shaft. Infection ratios of 2:1 (males:females) were found in the 5-9 year age group (Bora, 1999). Similar sex ratios are reported for VL in Bihar (Thakur, 2000). Community surveys however, reveal much higher rates among women than is evident from hospital records, indicating that VL and PKDL remain under-reported by the community. Bora (2000) suggests that this is due to the prevailing sociocultural and economic circumstances that hinder women's presentation in hospital (Bora, 1999). The extent to which the differences between men and women are due to exposure or to under-reporting is unclear. There is some indication that part of the difference may be attributable to limited access to services (Wijeyaratne et al., 1994).

Gender was not found to be significant in a study of CL in Brazil, even though the study was based on a village level survey (Brandao-Filho et al., 1999). Other studies have found that adult males have 2.8 times the risk of getting CL as women (Armijos et al., 1997). However, with active case finding, Velez et al. (1997) found a high peridomiciliary infection rate without preference for men (Velez et al., 1997). A study of the prevalence of Chagas disease and VL in Columbia reported similar estimates in men and women, suggesting equal exposure (Corredor Arjona et al., 1999).

Armijos (1997) suggests the possibility that women have an enhanced immune response related to hormonal influences, and that this may in part account for the apparent lower risk for leishmaniasis. There is some evidence of greater immunity to VL in women, with seroprevalence studies demonstrat-

ing that exposed females are less likely to develop clinical symptoms of VL than exposed males (Brabin & Brabin, 1992). However, while men appeared to be at higher risk than women, no sex differences with respect to lesion number, size or type of parasite species in those already infected were reported in the latter study. Weigel et al. (1994) suggest that the differences in risk are more likely to be due to exposure, and are therefore gender related, since there was no evidence of elevated risk in males aged 6 months to 17 years. Neither case detection nor exposure related factors provide a satisfactory explanation for the lower rate of VL in women. Reasons could include hormonal influences, response to treatment, and differences in immune response (Wijeyaratne et al., 1994).

2.6 Leprosy

Leprosy is transmitted from person to person through inhalation or skin-to-skin contact (Noordeen, 1993). Throughout history, leprosy has been characterized as a disease that is responsible for serious deformities and disabilities resulting in stigmatization and psychological and social suffering (Visschedijk et al., 2000). At the end of the 20th Century, leprosy was still endemic in many developing countries, particularly affecting the poorest segments of these societies. The South-East Asia region accounts for 90% of the global leprosy burden; India alone accounts for 55% of the burden, making it the country with the largest number of leprosy cases (Visschedijk et al., 2000; Zodpey et al., 2000).

The interaction between gender, socioeconomic status, sociocultural factors and disease is well illustrated by an analysis of leprosy. Across Africa and Asia, it has been noted that there are common exposure problems for all women in the lower socioeconomic groups. These groups tend to have poor housing, inadequate ventilation, low nutritional status, and higher risk of coming into contact with leprosy. Poor nutrition can also compromise immunological status (Morrison, 2000). However, the incidence of leprosy in general, and of multibacillary leprosy in particular, has been found to be higher in males than females (Ulrich et al., 1993, van Beers et al., 1996). In most areas of the world, case detection rates are also higher among men, with a ratio for men:women of about 2:1 (Kaur, 1997; Le Grand, 1997), which raises the question of whether female cases are under-reported. A WHO publication (World Health Organization, 2001a) indicated that, in Brazil, case detection of leprosy has been increasing since women started working outside the home, and the ratio is now 1:1 (men:women). New cases of leprosy detected in a study that examined trends over an 18-year period in Bangladesh also showed a decrease in the male:female ratio, from 2.3 to 1.6, with the introduction of active case finding (Richardus et al., 1999). Again, it remains unclear whether this difference is due to biological or to programme factors. The study also showed that, while there is a general increase in the total number of new female cases detected, this trend is not reflected in the 15-30 year age group. Suggested explanations for this finding included a possible reduced exposure to leprosy of women in this age group due to cultural restrictions in social activities, a fear of presenting for diagnosis because of the possibility of jeopardizing marriage prospects or of separation from husbands and children, or reluctance to present and be examined by male health workers (Richardus et al., 1999). In countries like Burkina Faso, Kenya, Uganda and Malawi however, a higher prevalence is recorded in women (Tiendrebeogo et al., 1996).

Women have been found to develop stronger and more effective immune reactions to subclinical leprosy and tuberculosis (Rao et al., 1994, Ulrich et al., 1993). Women also show lower incidence and less severe clinical forms of the disease in most areas of the world, and they show stronger cell-mediated immunity after prophylactic vaccination (Ulrich et al., 1993). Some data suggest higher subclinical than overt infection in women, i.e., lower incidence and less severe clinical forms of the disease are associated with presence of oestrogen and other female hormones (Ulrich et al., 1991). A study in Ethiopia showed that combined effects of puberty and first pregnancy in young mothers resulted in relapse in women considered to have been cured of leprosy. In addition, subclinical infection resulted in overt signs during pregnancy, even in patients receiving active chemotherapy (Noordeen, 1985). Nerve damage is accelerated in pregnant and lactating women, with 45% of women developing silent neuritis, including those on chemotherapy and those considered cured (Duncan & Pearson, 1982). These findings further establish the influence of hormones in leprosy.

Differences in the site of infection have obvious implications for complications and severity of infection. The frequency and type of deformities seen in leprosy differ according to sex. Males experience twice as many grade I and grade II deformities as women (Tiendrebeogo et al., 1996; Ulrich et al., 1993). The incidence of disabilities is not only associated with sex and type of leprosy, but also with nerve trunk involvement and duration of disease. However, reversal reactions are more common among women (47% in women cf. 26% in men in a cohort study in Thailand) (Scollard et al., 1994).

The experience of living with leprosy has clear gender differences. A study in India demonstrated that the proportion of illiterate and unemployed female leprosy patients is considerably higher than the proportion of illiterate and unemployed males (Rao et al., 1996).

2.7 Malaria

Malaria is an infectious disease caused by the *Plasmodium* parasite. Malaria is endemic in 90 countries, half of which are in Africa, where the World Bank ranks the disease as the leading cause of lost disability adjusted life years (DALY's) (World Bank, 1993). The prevalence and geographical range of malaria have increased, facilitated in part by tourism and other travel, particularly of refugees from conflict areas. There has also been resurgence of the disease in countries in temperate zones where it has previously been controlled, such as Azerbaijan, Turkey, Tajikistan, Iraq. Other factors responsible for the spread of malaria are environmental; they include changes in land use and global climate (Nchinda, 1998).

In general, biological susceptibility of humans to malaria is universal; the bite from a single infected mosquito is enough to infect the host. However, the risk of acquiring the infection and developing the disease generally depends on a number of factors. In highly endemic areas, some immunity develops in adults due to constant re-infection. Those at highest risk are infants and children aged 6 months to 5 years, pregnant women, populations in unstable malaria areas, and travellers from non-malarious areas (Tanner & Vlassoff, 1998). The total number of deaths from malaria is slightly higher for males than for females in the 0-4 year and 5-14 year age groups. From 15 years onwards however, there are more female than male deaths from malaria. The same is true for malaria incidence and for DALYs lost to malaria (World Health Organization, 2001b).

Like other vector-borne diseases, malaria incidence relies on exposure to the vector (in this case, the mosquito), which is usually dependent on occupation. In general, there is a greater occupational risk of malaria for adult males (Reuben, 1993). In farming communities, men may stay out in the fields during peak times of sowing and harvesting, sleeping out in the open with little protection. It was reported that gem miners in Thailand, predominantly men, had higher mortality from malaria. However, malaria deaths in children aged below 15 years and in adults over 65 years who remained in the village showed no significant sex difference (Wernsdorfer & Wernsdorfer, 1988). Observations in a village in India showed that, while women and children slept indoors, men and boys over 10 years slept outdoors even in cold weather (Reuben, 1993). In communities in Cameroon, men tend to engage in cash crop farming while women are responsible for subsistence farms. As in India, men were found more likely to stay out overnight. However, women who harvested maize before daylight in order to get the cobs to the market by dawn were exposed to the mosquito during peak biting times (Vlassoff & Manderson, 1998).

Recent evidence suggests that pregnant women are more "attractive" to mosquitoes and are therefore more likely to be bitten, increasing their exposure to malaria (Dobson, 2000; Lindsay et al., 2000). A study in the Gambia found that pregnant women attracted twice the number of mosquitoes, possibly because the 21% increase in exhaled air and 0.7°C increase in body heat make them easier to detect by the mosquitoes (Lindsay et al., 2000). There is ample evidence of the effect of malaria in pregnancy; the disease accounts for higher morbidity and mortality in women of childbearing age.

2.8 Onchocerciasis

Onchocerciasis, or river blindness, is caused by the parasitic filarial worm *Onchocerca volvulus*, for which human beings are the only known reservoir. The vector is *Simulium*, the blackfly which breeds in fast flowing rivers, bites during the day, and deposits infective larvae in the skin. The adult worm, which has an average longevity of 10-11 years, produces millions of microfilariae that are usually found in subcutaneous nodules. The microfilariae are the main cause of clinical manifestations of the disease; these include dermatitis (resulting in very severe itching, depigmentation and atrophy of the skin, and lymphadenitis which may lead to a hanging groin and elephantiasis of the genitals). The most severe manifestation of onchocerciasis is irreversible ocular lesions of the eye, resulting in impaired vision and, finally, total blindness (Molyneux & Morel, 1998). Of the people living outside the areas where this disease is controlled, 6.4 million infected live in areas with severe blinding onchocerciasis and 8.6 million infected live in areas with parasite strains which, although less damaging to the eye, are responsible for severe skin disease. Onchocerciasis remains an important public health problem throughout much of sub-Saharan Africa and is estimated to affect over 17 million people in 26 African countries (Boatin et al., 1997; Ogunrinade et al., 1999). Onchocerciasis is also endemic in Yemen, Guatemala, Mexico, Venezuela and Columbia (Vlassoff et al., 2000; World Health Organization, 1995).

Differences in the prevalence of onchocerciasis relate to exposure to the vector. In a study in Nigeria, Brieger et al (1997) observed that variations in onchocerciasis prevalence are related to vector ecology and density, which in turn are related to the village in terms of distance from a river and geography of this river (Brieger et al., 1997). Exposure *in utero* has also been documented (Brinkman et al., 1976). However, sex differences are not consistent between studies. No difference was found in the prevalence of *Onchocerca volvulus* in a study in Sierra Leone (Gbakima & Sahr, 1996), but a study in Malawi found a higher prevalence and intensity of infection in men than women, reflecting the nature of the infection as well as exposure during migrant work. For residents who had never lived outside the study area, the prevalence for males and females was similar (Courtright et al., 1995).

Experience of the symptoms may also differ between males and females. Women with reactive lesions of onchocercal skin disease tend to report itching more commonly than men. Women find the itching socially embarrassing, and it affects their sexual and marital lives (Kaur, 1997).

2.9 Schistosomiasis

Schistosomiasis, also known as bilharziasis, is caused by five species of schistosome. The worm is transmitted by infected snails which live in freshwater habitats and release infective larval forms of the parasite. Consequently the people most at risk are those who engage in agriculture and fishing, and who use water for household chores. Ecotourism also partly accounts for the persistence and, in some instances, increasing prevalence of the disease (Chitsulo et al., 2000).

Men in fishing and farming communities report higher rates of schistosomiasis than women. Estimates from China show higher levels of infection and morbidity from schistosomiasis in men than women (Booth et al., 1996). Males in Egypt were found to have a higher infection rate (1.6 times) and higher schistosoma ova count than females in all age groups in a stratified random sample survey of nine districts (El-Khoby et al., 2000). This was clearly attributable to exposure to canal water during farming. However, in communities where women wash utensils and clothes in, and obtain household water from, waterways infested with the vector snail, they have equal or higher rates of schistosomiasis than men (Kaur, 1997). In a study in Kenya, both male and female children were found to spend most of their time playing in water. As they got older, playing time was reduced, but girls continued to spend more time in water than boys of the same age, washing dishes and clothes (Fulford et al., 1996). The different patterns of exposure were reflected in the prevalence.

There are clear differences between men and women in the manifestations of schistosomiasis. Recent research has highlighted the pathological process of schistosomiasis as it affects women, and atten-

tion has been drawn to the genital, rectal and ectopic localization of schistosomiasis, particularly to the implications that a damaged vaginal epithelium has for sexually transmitted diseases (Feldmeier et al., 1995; Polderman, 1995). Feldmeier et al. stress the importance of recognizing female genital schistosomiasis (FGS) and the need to investigate possible predisposition to the development of malignant tumours. Current evidence suggests that genital lesions may either resolve spontaneously or may become chronic and result in ulceration that destroys the hymen and clitoris, with the most debilitating sequelae being incontinence and vesico-vaginal fistulae (Feldmeier et al., 1995). Other sequelae such as infertility have an important social if not pathological impact (Anyangwe et al., 1992). The effectiveness of standard treatments such as prizaquantel on genital lesions is currently unclear because of lack of research in this area. It is also likely that the condition may be under-diagnosed because women would be more likely to present to a gynaecologist than an infectious diseases specialist, and FGS it is not well recognized. FGS also increases the risk of HIV infection because the lesion provides easier access to deeper vaginal cell layers during intercourse with an infected partner. However, there are still major gaps in our understanding of the genital manifestations of schistosomiasis, including a lack of data on the possible psychological effects of dyspareunia and post coital bleeding in women with genital lesions (Feldmeier et al., 1993).

2.10 Tuberculosis

Tuberculosis (TB) is a chronic bacterial infection usually affecting the lungs. In 1993, it was declared a global emergency. By 1998, WHO estimated that TB claimed more lives than any other infectious disease and that about one third of the world's population was infected. The increasing trend is a result of rural to urban migration and population displacement, both of which are associated with poverty, poor social conditions, conflict, declining public health infrastructure, and the HIV epidemic (World Health Organization, 1998). Cases also increased in eastern Europe following the break up of the former Soviet Union (World Health Organization, 2001a).

Data on TB demonstrate gender differences in case detection and notification, and differences in the rate of progression to disease after infection, reinfection, and disease outcome. Based on case detection figures, men are more highly infected than women (Holmes et al., 1998, Martinez et al., 2000), and this is shown consistently using different diagnostic tests (Holmes et al., 1998; Hudelson, 1996). TB accounts for 199.8 million DALY's for women and 264.7 for men (World Bank, 1993); however, these rates vary by age and there are large regional variations. In young people, the incidence and mortality rates are higher in females than males (World Health Organization, 1998), but after the age of 25 years, the incidence in males increases and may reach three times that for females (Martinez et al., 2000). In their US based study, Martinez et al. (2000) reported that the greatest differences were in the population aged over 45 years, when women have the highest health-seeking behaviour, providing compelling evidence that the differences are not due solely to bias in reporting. Their interpretation of the data was that males either have a greater opportunity for exposure, or are more likely to progress from infection to disease (Martinez et al., 2000). A similar argument regarding progression to disease is proposed for the higher rates of disease seen in young women (Fine, 1993).

The two main hypotheses for these differences are under-diagnosis or under-reporting in females, and poorly understood sex differences in the pathology of the disease (Hudelson, 1996). It is well established that significantly more men than women access tuberculosis diagnosis and screening services (Boeree et al., 2000), and it has also been highlighted that, after the age of 14 years in most developing countries, males have a higher notification rate (Holmes et al., 1998). In a study in Nepal, active and passive case finding demonstrated that women made up 28% of the 159 cases that were self-referred to clinics, whereas with active case finding, the percentage of women with tuberculosis rose to 46%. This reduction in the male:female prevalence ratio following active (cf. passive) case finding is consistent across a number of studies (Cassels et al., 1982; Hudelson, 1996). Socioeconomic and cultural factors such as higher levels of stigmatization in women play an important role in gender differences in case finding.

Data on re-infection in tuberculosis also show higher rates for men, but the ratio varies between regions. Greater sex differences are reported in Asia than in Africa. Borgdorff et al. (2000) suggest that the apparent lower re-infection rate in Asian women may reflect lower exposure imposed by cultural restrictions on women's participation in society. An alternative explanation may be that African women have poorer nutritional status, which is an important risk factor for TB (Borgdorff et al., 2000).

Further analysis of TB data shows that, while infection may be higher in males, progression to clinical disease is equal or greater in women during the reproductive years (Holmes et al., 1998; Murray, 1991). A study in India that followed up subjects with positive tuberculin reactions over eight years found that women had a 130% higher risk of progressing from infection to disease between the ages of 10 and 44 than males of this age (Olakowski, 1973). A follow-up study in Puerto Rico of passive cases found that reproductive-aged women had a 17% higher rate of progression (Holmes et al., 1998). At older ages, the rate of progression in men was two and a half times greater than in women (Olakowski, 1973). A possible explanation for the latter occurrence may concern gender related lifestyle factors such as smoking and alcohol consumption (Holmes et al., 1998). Similar TB trends have been identified in higher income countries (Holmes et al., 1998). It is interesting to note that a study of progression to disease in the US found that, while this trend was mirrored in the African American population, fewer white Americans progressed to disease following infection, and men's rates remained higher than women's at all ages. Race and socioeconomic factors are possible contributors to this finding, but more research is required.

Case fatality rates are often not sex disaggregated. However, based on available data, mortality attributable to TB is higher in females under the age of 35 years (Rao, 1982). A longitudinal study showed that females under 24 years had a 27-41% greater case fatality rate than males in the same age group (Olakowski, 1973). Possible reasons for this include poor nutritional status and delays in seeking health care (Vlassoff & Bonilla, 1994).

While research on biological differences is not definitive, TB is the single biggest infectious killer of women in the world and the leading cause of death among women of reproductive age (Martinez et al., 2000), suggesting a hormonal influence. However, there is a lack of research; an alternative explanation might be that detection is higher in this group of women because of increased exposure to health services for antenatal care (Hudelson, 1996).

The reproductive concerns of schistosomiasis, identified above, also extend to TB. Genitourinary tuberculosis is difficult to diagnose and has therefore received little attention. However, it is a major contributor to extrapulmonary tuberculosis, and one in eight women with pulmonary tuberculosis is estimated to also have genital tuberculosis (World Health Organization, 2002).

Women use health services less than men, and consequently, higher female death rates in health centres (in India for example) are a reflection of late presentation of conditions such as pneumonia, TB and other diseases (Hudelson, 1996). The gap between suspecting the disease and seeking treatment was found to be considerably longer for women (up to 31 months) than men (up to 17 months) (Rao et al., 1996).

2.11 Maternal and infant health concerns in TDR conditions

Gender and sex interdependence is critical in maternal and child health because of the effect of pregnancy on the natural course of many conditions and the influence of diseases on pregnancy and its outcomes. Pregnancy is associated with immunosupression and, in general, parasitic infection in pregnancy may lead to maternal disease and malnutrition, pre-term delivery, intra-uterine growth retardation, and placental and perinatal infection (Brabin & Brabin, 1992). In addition, pre-pregnancy health status and maternal health related factors such as nutritional status, age at pregnancy, parity, are heavily influenced by role within the community and are important factors in the exposure and response to infectious diseases.

Conditions such as malaria, schistosomiasis and VL are associated with maternal anaemia (Wijeyaratne et al., 1994). Alteration in immunity status during pregnancy is particularly marked in primigravid women, and increases their susceptibility to severe forms of *falciparum* malaria (Steketee & Mutabingwa, 1999; Steketee et al., 1996). Pregnancy is thus associated with a higher risk of infection, increased frequency of episodes, increased severity and complications, and high case fatality rates. Mortality due to cerebral malaria is 40% in pregnant women, twice the mortality in non-pregnant women with the condition. Pregnant women with malaria also have higher parasite loads and are more likely to develop hypoglycaemia and pulmonary oedema (Reuben, 1993).

Schistosomiasis may result in disruption of pregnancy, maternal and infant mortality, and fetal wasting (Michelson, 1993). Haematuria can also result in severe anaemia during pregnancy. Similar results have been found for VL.

The immunological response in leprosy is modulated by pregnancy (Ulrich et al., 1993). In Ethiopia, the effects of pregnancy and lactation included a diminished and unstable immune response in leprosy with higher risk of developing neuritis and relapse, usually more common in men (Le Grand, 1997). The intensity of infection in lymphatic filariasis and clinical disease is lower in women of reproductive age (Brabin, 1990). However, it is unclear whether this is due to pregnancy related changes or to gender. For many of these conditions, there are insufficient data on non-pregnant, reproductive age women.

Gender analysis in pregnancy also has important implications for the unborn child because of the strong links between health of the mother and outcome of pregnancy. There is particular concern for infectious diseases that can be congenitally transmitted. There is some indication that Chagas disease might be transmitted *in utero;* cases have been identified in children (under the age of 13 years) of migrants in urban slums in Asunción. The mothers of the children, most of whom had migrated from endemic areas, were serologically positive, but none of the children had received a blood transfusion or had travelled to an endemic area, providing strong evidence for congenital transmission (World Health Organization, 1997). Similar findings were reported from a study in Argentina. Azogue (1993) estimates congenital transmission to occur in approximately 11% of cases in children, and Chagas programmes have now been integrated with maternal and child health services to address this issue (World Health Organization, 1997).

There is epidemiological evidence to support the concept of increased susceptibility to filarial infection by *in utero* exposure to filarial antigens. A study in Haiti showed that children born to mothers with *W. bancrofi* microfilariae were almost three times as likely to be microfilaraemic as children whose mothers did not have the antigens. There was no such relationship to paternal status (Hightower et al., 1993). There were no sex differences in the prevalence in children although there was a difference in adults. The immunological mechanism of the increased risk is not clear.

In African trypanosomiasis, also, the risk is increased for children if the mother has had the disease, although it is not clear if this is a result of familial clustering due to exposure rather than genetic susceptibility (Khonde et al., 1997). In TB, children are also more likely to be infected if their mother has the infection, although there needs to be systematic research to back up this claim (Hudelson, 1996). Studies of dengue in infants suggest that maternal dengue antibodies play a role in the development of dengue haemorrhagic fever in infants; it has been hypothesized that maternal antibodies are protective before the age of seven months, and thereafter are enhancing (Cobra et al., 1995).

Pregnancy presents important gender related issues in the control of infectious diseases. In general however, women, and pregnant women in particular, are excluded from research programmes focused on aetiology, natural history of disease, and evaluation of treatment protocols, largely to protect against possible risks to pregnancy outcomes for the women themselves and for teratogenic effects on the fetus. However, this exclusion means that little is understood about control of infectious diseases in women of reproductive age. In the last decade, the United States National Institutes of Health (NIH) and Food and Drug Authority (FDA) have recommended the inclusion of women of childbearing age in trials. In 1998, drug and device companies were required to report on the age, race and gender of trial

participants, and in 2000, companies undertaking trials for life-threatening conditions were required to include women in their research (Ferguson, 2000; McGowan & Pottern, 2000; Meinert et al., 2000; Vivader et al., 2000).

During a campaign to assess the use of ivermectin in mass treatment of onchocerciasis, some women were inadvertently treated during the first trimester of pregnancy (Yumkella, 1996). Because of the general exclusion of women, however, the effects of ivermectin in pregnancy and lactation are not well understood. This remains an important question for mass treatment campaigns aimed at destroying the reservoir of infection within communities, and needs to be addressed. Furthermore, there is some indication that onchocerciasis may reduce the response to tetanus toxoid vaccination given routinely during pregnancy (Abiose, 1992), highlighting the importance of understanding the pathological processes of tropical diseases in pregnancy.

2.12 Emerging issues for TDR conditions: a gender perspective

The emergence of HIV/AIDS adds a level of complexity to previous information on the TDR conditions. Following infection, people who are HIV positive have an increased risk of co-morbidity with most infectious diseases because of the state of immuno-compromization. Murray (1990) reports that the risk of developing tuberculosis is increasead 100-fold compared to those who are not HIV positive. HIV-leishmaniasis co-infections have been increasingly reported in Sicily (Cascio et al., 1997), a trend that has also been observed in Spain and France (Alvar, 1994; Marty et al., 1994; World Health Organization, 2000).

Understanding the gender implications of co-infection of tropical diseases with HIV would involve integrating the growing body of literature exploring risk factors for HIV infection that are highly gendered, such as commercial sex work, sexuality, negotiation of safe sex relationships, high risk behaviours such as injecting drug use, with what is currently known about gender and tropical diseases. The HIV pandemic continues to create rapid social and demographic change; the high morbidity and mortality present a significant challenge to public health control programmes. More than any other, this challenge provides the rationale for seeking a truly comprehensive framework for the incorporation of gender considerations into all aspects of health as matter of course, in favour of selective 'add-ons' to projects with a single disease focus.

2.13 Gender and participation in control programmes

More than most health conditions, the control of communicable diseases requires the engagement of public health and other health professionals with community members to ensure the effectiveness of programmes. Scientific knowledge gained about the agent, the host, or the environment, cannot be applied without the participation of communities because the transmission and maintenance of these diseases are reliant on human behaviours, poor living conditions, and sociocultural factors that support the continued existence or re-emergence of the conditions. The control of filariasis, for instance, requires mass treatment of at least 80% of an endemic population for the strategy to be successful (de Almeida & Freedman, 1999). The need for community participation, and for continued engagement with communities, provides an obvious rationale for gender analysis in control programmes.

Control programmes involve interventions to destroy or control the breeding of the vector (in vector-borne conditions), mass drug therapy, immunization, and information, education and communication (IEC). Evaluation of programmes has not produced consistent reports of success, for reasons that include poor articulation of indicators, and use of indicators that differ across projects, with some evaluating process and others outcome. However, the results of some qualitative studies have identified gender as one of the reasons for the limited effectiveness, or in some cases the outright failure, of particular interventions (Katabarwa et al., 2001).

2.14 Vector control programmes

The control of malaria, African trypanosomiasis, dengue fever, lymphatic filariasis, leishmaniasis, schistosomiasis and onchocerciasis involves vector control. The literature indicates that, for some of the conditions, efforts have been made to target messages and programmes at a particular group who can make an impact on the control effort. Public health messages about covering water containers to reduce mosquito breeding sites in the Dominican Republic, for example, were targeted at women because several studies had documented women's traditional responsibilities for the health and nutrition of their families, as well as for the household labour activities related to water handling (Whiteford, 1997). However, this generalization does not acknowledge the variations in specific tasks, so the larger outdoor containers maintained by men, which were a major breeding site for the vector, remained uncovered and exposed to *Aedes aegypti* (Whiteford, 1997).

Bednet use in general and, more recently, impregnated bednet use, is a major intervention in the control of mosquito-borne diseases such as malaria. The nets provide a physical barrier to protect against contact with the mosquito, while impregnation with insecticide (e.g. pyrethrum) enhances the protection by repelling mosquitoes and may lead to death of the mosquito on impact with the net. Problems encountered in the promotion of bednet usage have included persuading people to spend money on a preventative activity. The highest predictor of bednet ownership is family income, with those in the higher income groups up to three times more likely to own a bednet (Abdulla et al., 2001). In addition, the acquisition of bednets is also higher if a woman in the household is employed or has access to an income (Rashed et al., 1999). In Ghana, a number of programmes supported by nongovernmental organizations are attempting to mobilize women to form cooperatives which will enable them to purchase items such as bednets.

The push towards involving communities in public health programmes has coincided to some extent with the involvement of women in projects designed to empower by increasing their engagement in community activities. This has largely been driven by development and poverty alleviation projects. A major concern of the approach is that, in spite of its basis in improving circumstances for women, it discounts women's household and other unremunerated work. Therefore, recommendations for increasing women's participation in control programme do not take account of the extra burden the increased responsibility places on them.

2.15 Mass treatments

Mass treatment may involve mass immunization of the total population, which provides cohort immunity to an infectious disease, or mass chemotherapy, which destroys the reservoir of infection and interrupts the life cycle of the infective agent. This area of infectious disease control appears to have drawn least on information from gender discourses and, for this reason, has attracted some criticism (Vlassoff & Manderson, 1998). The concern has been based on the development of vaccines and other treatments with limited or no information on teratogenic effects or hormonal differences in response to treatment because of the exclusion of women from trials.

One of the obstacles to the success of mass treatment programmes has been the perceived similarity to, and therefore association by communities with, family planning programmes. In a study which investigated the factors affecting participation in mass chemotherapy with ivermectin among Moslem women in Nigeria, focus group results showed that many women had no objection to being given a free tablet because they were under the impression that it was also effective in controlling most other aches and pains they had. However, their participation was limited by their suspicions of fertility control by the government (Abiose, 1992). The findings suggest that there needs to be a greater focus on effective community education prior to the administration of mass chemotherapy.

A similar programme in Sierra Leone treated 30-51% of women between the ages of 15 and 49 years based on the exclusion criterion of possibility of pregnancy or breastfeeding. While evidence on the

effects of ivermectin during pregnancy and breastfeeding is unclear, the proportion of women who remain untreated within the community continue to provide a reservoir of infection (Yumkella, 1996). Nearly one third of women in one of the treatment villages had not been treated since commencement of the mass treatment campaign. While women excluded during the mass campaigns did have the option of seeking treatment after the first month of breastfeeding, less than 2% were able to seek treatment due to the cost of transportation or ignorance about where to obtain the treatment. The obstacle was one of competing priorities such as child care, domestic responsibilities, and costs. With the option of a half-yearly mass campaign, there was really no motivation for the women to pursue treatment that was preventive or would ensure destruction of the reservoir of infection within the community.

2.16 Discussion

Data on gender and tropical diseases are not balanced across the TDR conditions. While there are sufficient data to support a hypothesis that adopting a gender perspectives will enhance the effectiveness of infectious disease control programmes, there are no "hard data" in all instances. The main limitation of the use of gender analysis frameworks is their tendency to become mechanistic and to exclude analyses that consider other forms of social disadvantage (Standing, 1999). However, they remain very useful for assessing priorities, and for conceptualizing and designing research and intervention programmes (Gender and Health Group, 1999).

Questions on specific diseases (e.g. African trypanosomiasis, Chagas disease) remain to be addressed, as do major gaps in the integration of gender perspective in control programmes. Analyses on gender and health also need to move away from the presumption that gender has the same significance in all contexts to a more empirically informed approach (Standing, 1999). In other words, there is a need for evidence that is responsive to changes in the context in which the conditions occur.

Further data on disease specific information required for programme planning and implementation need to:

- Incorporate or maintain a focus on gender, which means both sex disaggregated data and systematically collected qualitative data to explain and enrich the quantitative data.
- Provide a balanced account of the gender dynamics that impact on the disease and its control, reporting on the multiple factors and perspectives of both women and men. Some of these data may already be available, but they tend to be selectively reported to meet the specific agenda of those who are using them.
- Take account of demographic changes and the needs of women and men in different age groups.
- Provide evidence/information based on operational research to allow knowledge to be put into practice. Rapid changes in health systems through the health sector reform agenda has blurred the line between opportunity for empowerment of vulnerable groups, particularly women, and negative factors such as increased costs of access to health care (Vlassoff, 1999). However, the momentum created by the changes in health systems provides an ideal opportunity for introducing a gender perspective and developing the structures necessary for systematic evaluation (Vlassoff & Moreno, 2002). For instance, models that integrate tropical diseases programmes into maternal and child health services need to be rigorously assessed within the contexts of the settings in which they are implemented.
- Include a gender perspective in clinical trials and in clinical research on the effects of tropical diseases; the need is demonstrated by the different presentations of various conditions hitherto unrecognized in women.

3. CONCLUSIONS

Some advances have clearly been made in improving gender inequality over the last few decades (World Bank, 2001). However, the overriding message of current evidence is that gender disparities remain pervasive and that the pattern is generally similar. This notwithstanding, the nature and extent of the disparities are largely dependent on context and vary across regions. The importance of context needs to be emphasized because there has been a tendency in the literature for gender disadvantage in one context to be broadly generalized as a universal reflection of gender effects (Standing, 1999). This generalization is largely due to lack of evidence in some contexts. Sex disaggregated data, which would be the most basic to compile, are still unavailable at many levels of health services planning, implementation and evaluation (Corrigan, 2002; Grant, 2002; Vlassoff & Moreno, 2002), while indicators for the success of programmes that incorporate gender are poorly articulated or inappropriate. This problem is manifest in most interventions that require broad social change, and there is a general paucity of systematic and well documented evaluations of application of the gender perspective to interventions. In spite of these problems, evidence on the contribution of gender to the impact of disease makes mainstreaming gender issues imperative because, more than anything else, the gender perspective provides a framework that allows us to deconstruct social conditions and processes that influence health and to develop interventions for the management of diseases, taking account of the realities of the different needs of individuals and groups within a population.

The complex interaction of gender on health and disease is clearly demonstrated by the gender analysis of the conditions in the previous chapter. What is less obvious is the differential impact of disease on cultural, social and economic life. Much of the burden of these conditions is experienced by the young and economically productive age groups. In countries still highly reliant on primary production, women are responsible for up to three quarters of the food produced annually. This figure is as high as 80% in many African countries (Tinker, 1994) and when home production is included, women earn 40-60% of household income and produce about half of export crops.

Conducting this review highlighted a lack of progress in the general approach to addressing gender issues. As mentioned in the introduction, the gender agenda has been driven by advocacy and the need to introduce measures to compensate for the extreme disadvantage that women, in many places, continue to suffer. As with most advocatory approaches, it is necessary to identify the "victim" to provide justification for the focus of research. There are a number of shortcomings with this approach. Firstly, much of the gender and health literature has treated women as a homogeneous group, with most of the examples pertaining to women with young children. While fertility rates are high in many developed countries, they are clearly declining and, though there may not be vast differences in demographics, with a large number of women still in childbearing years, the issues may not necessarily be as strongly skewed towards motherhood related problems (Morrison, 2000). There is an almost total absence of issues relevant to older women, a demographic that it has become important to consider because of the increasing prominence of older women in heading households where younger parents have been lost to HIV or, in some cases, to conflict.

Secondly, the advocacy approach for women gives supremacy to gender over other critical hierarchies and factors such as class, caste, socioeconomic status, race and ethnicity, around which societies are organized. There is an underlying assumption that, once gender equity and equality are achieved, the effects of other issues will either be reduced or will become easier to manage, and this is reflected for instance in descriptions of the cumulative effects of multiple layers of disadvantage (Okojie, 1994; Vlassoff, 1995; Vlassoff , Khot & Rao, 1996). However, the complexities arise more from an interactive than an additive effect, so that the provision of opportunities (mainly for women) to improve equity, as an intervention, may not be sufficient to address the interaction of gender with any of the other social factors. For instance, a woman who has TB but is unable to access health services in a context where TB is stigmatized, may find that the DOTS intervention that is provided daily to her home reduces

the impact of the condition but does little to improve the opportunities to overcome her other social circumstances or indeed to prevent re-infection at a later stage. This supports the argument for mainstreaming gender across all sectors of health and development, and highlights the advantage of comprehensive broad ranging programmes that address general poverty, basic standards of living, accessibility to education, and various principles espoused by the comprehensive primary health care strategy (Rifkin & Walt, 1986; Unger & Killingsworth, 1986; Walsh & Warren, 1980; Walsh & Warren, 1979; Werner & Sanders, 1997) compared with disease specific or even gender specific programmes.

The need to mainstream the gender perspective has intensified in several international organizations and within government departments since the 1995 Beijing conference. Mainstreaming refers broadly to the move from women-specific projects to the integration of gender concerns throughout all aspects of an organization or its programmes (Elson & Evers, 1998). However, the commitment has been patchy at best, and several organizations (including WHO) have largely continued to marginalize those who run the gender agenda from those responsible for other areas of health, with gender experts consulted only on a programme specific basis.

Finally, while the female bias in the gender literature has been critical in highlighting potential points of intervention to address equity, the general lack of information data related to men's experiences of gender and health constrains the debate and stifles opportunities for broader social interventions. The search for equity has therefore succeeded in mobilizing half the population, with little attention paid to the potential contributions that could be made by the other half of the population. Standing (1999) characterizes this as the "impact on women" versus "gender impact" distinction. Gender, by definition, is a comparative construct, and the roles and circumstances of one sex need to be discussed with reference to the other in order to understand and, where necessary, intervene in ways that are meaningful to both. This has been evident in a number of programmes that have involved community participation (Manderson, Mark & Woelz, 1996). An example is provided by a study that investigated the impact of inclusion of fathers in the decision to immunize children; there was a significant increase in the uptake and timely completion of the immunization schedule (Brugha et al., 1996)

Vlassoff and Moreno (2002) argue that an ideal way to ensure commitment to gender perspective in health policies, planning and intervention, is to start with better integration of, and equal opportunities for, women within the health services structure at all levels (Vlassoff & Moreno, 2002). There is also a need for gender issues to be integrated into training programmes for all health service providers, and for commitment to gender to be reflected in the allocation of resources. But in addition, a balance between advocacy, based on the requirement for social justice and equity, and the evidence needed to support programmes that are cost-effective, is required on the gender agenda to enable the planning and implementation of well informed interventions and, ultimately, improve gender equity and equality.

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