



REVIEW

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The socio-cultural context of health behaviour among Esan communities, Edo State, Nigeria*



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Abstract

This paper reports on health beliefs and their influence on treatment decisions and behaviour among the Esan people of mid-west Nigeria. The sources for the study are my own experience of growing up in Esan society, anthropological field work, and focus groups. The research revealed a transitional society where both traditional and modern medicine are employed and where the choice between them is determined by belief systems which are themselves in the process of change, as well as by distance and costs. The traditional health-belief system was one which placed most responsibility and blame upon women, and a system of social control over the adult female population. Changing health beliefs are less the result of the introduction of a new health philosophy than of the retreat, under the impact of Christianity, of traditional religion which embodied the older health philosophy.

Introduction

This paper examines how Esan people perceive sickness and the mechanisms of treatment. The emphasis is on the cultural beliefs associated with the sickness and the type of treatment chosen and used in treating the ailment.

The Esan people form a small linguistic and ethnic group, to which the author, an Esan woman and also an anthropologist, belongs. They number about half a million people and are found in Edo State, midwestern Nigeria, about 100 kilometres northeast of Benin City, between two larger and better known Nigerian peoples, the Benin Edo to the west and the Igbo to the east (Okojie 1960). They have no large towns, and have participated less fully in recent social change and economic development than most other southern Nigerian populations. Mortality levels are probably considerably above the average level for southern Nigeria where the 1990 Demographic and Health Survey found an infant mortality rate around 85 per thousand births, 16 per cent of births resulting in deaths by five years of age and life expectancy at birth probably over 55 years (Nigeria, Federal Office of Statistics, and IRD/Macro International Inc. 1992).

The data used in this paper were collected from four Esan communities, namely, Ekpoma, Egoro-Naoka, OkhuEsan and Ubiaja. The discussion is based on observation and measurement during anthropological fieldwork in 1988/89 and on subsequent focus-group sessions held with both men and women. The emphasis is on the people's perception of illness, mode of treatment used, preventative

*The research described here is part of the exploratory first stage of the Nigerian Health Transition Project, coordinated by I.O. Orubuloye and funded by the Rockefeller Foundation. The author is grateful for assistance received from Professor Orubuloye and also from Jack and Pat Caldwell. The research explored how sickness and its treatment was seen by one ethnic group which carried out by a member of that group with anthropological training. It is presented here as a contribution to the subsequent larger project and not as an attempt to place Esan views of disease and their aetiology in the larger framework of African medical anthropology.

measures and nutritional levels. The research aimed at examining how Esan perceptions of illness influence their behaviour and their treatment of illness in order to understand what interventions are necessary to improve health and reduce mortality.

The purpose of the work was to set the scene for later larger-scale investigations, surveys and health interventions by establishing how traditional people understood illness and its treatment and to what extent such an inheritance still affects the way they regard and use increasingly available modern medicine. A supplementary intention was to investigate whether specific interventions were needed to improve the position of women. Even though I was an anthropologist employed outside the area, field work back among the people from which I came was supported by a great deal of empathy which was enhanced by my working solely in the Esan language. My closeness to my informants may have its dangers, but I believe that it permitted me to see why rural people do not always seize every opportunity to employ modern medicine and why health services may have to make concessions to local viewpoints. In a sense this paper is a study of an indigenous anthropologist as well as an indigenous people.

Ethnography of the Esan people

The Esan people occupy four local government areas in Edo State, namely Esan West, Esan Central, Esan North East and Esan South East. Of the study communities Ekpoma and Ubiaja are the headquarters of two local governments, Esan West and Esan South East respectively, while Egoro-Naoka and OkhuEsan are two rural communities in these two local government areas respectively. The areas of study are not densely populated owing to high levels of migration to more urban areas such as Benin City, the capital of Edo State.

Most of these people follow either the traditional or Christian religions although there are a few Muslims in Ekpoma because of its proximity to Agbede where Islam is widespread (Omorodion 1991).

Some amenities, such as piped water, electricity and good roads, are inadequate or non-existent in these communities. For example, persistent shortages of pipe-borne water in the local government headquarters have led people to resort to using water from streams for domestic and personal use. The available drinking water in the communities is often not safe for drinking. The poor network of roads has also hindered the movement of goods between these communities and makes private transportation services, which are the only ones available, very expensive, and beyond the use of most residents. Where private transport services exist, they are often irregular which tends to make visits to health centres difficult as well as expensive. Except for two ambulances located in Ubiaja and Irukep Central Hospital (4 kilometres from Ekpoma), few vehicles are available to people in emergencies. These ambulances are often not available when emergencies occur as they are also used for commercial businesses such as the private conveyance of corpses outside and within the locality. Most people are illiterate and do not own radios or television. The situation is worst in the rural areas where there is no electricity and newspapers rarely penetrate.

Polygyny is widely practised. Moreover, many men who do not have a second or third wife maintain other women to provide additional relationships beyond their wives. This arrangement is often known to the wives at home. The existence of both co-wives and 'outside wives' gives rise to great envy and jealousy which are often held to result in women's inflicting harm and injury on their co-wives and co-wives' children (Bradbury 1957; Omorodion 1991).

Traditional practices exist to check such envy and jealousy. These involve the taking of oaths before shrines and taking those suspected of witchcraft to a particular stream called 'Amen Okha'. Such people are given water to drink at this stream while repeating certain incantations in the belief that a person who is a witch or wizard will fall down. A person declared to be a witch or wizard becomes an outcast. A woman will be sent out of her marital home into the open ground situated at the centre of the village and remain there under rain and sunshine as both families of orientation and procreation refuse

to take her back. Sometimes, she may return to one or other family after a long exposure, or begin a new life of her own with help only from adult children, if she has any.

Inheritance is strictly by primogeniture where only the first son inherits the father's property in the absence of a written will. He is expected, however, to use such property for the rearing and well-being of his younger brothers and sisters. In practice, this rarely happens because most sons turn such property to their personal use (Bradbury 1957; Okojie 1960 and 1989; Omorodion 1991).

Fieldwork findings

Types and causes of illnesses

Both my experience as a member of the community and my anthropological field work showed that Esan people commonly report that illness is caused by people or forces rather than disease. Illness is attributed to both natural and supernatural factors. In order to obtain an in-depth understanding of people's perception of illness we examined the reported illnesses suffered by children, adult males and adult females.

Children

The commonest illnesses identified amongst children were measles, headache, diarrhoea, vomiting, malaria, smallpox, chicken-pox, pneumonia, convulsions and tetanus. It is generally believed that measles, convulsions, tetanus and certain types of headache are caused by supernatural factors. People strongly believe that witchcraft is used by evil-doers in the community to cause such illnesses in children. This behaviour is most frequently attributed to jealousy. In past times and to a great extent even today, jealous co-wives were believed to attempt to create hardship and reduce each other's status by ensuring that the other's children should fall ill and even die. In fact, it was stressed a number of times that this was the reason that some women had had many deliveries but had no children. For example, a woman in one of the sessions in OkhuEsan recounted

You see me my daughter, I had many, many children, probably more than ten, but none attained the age of an adult. But my co-wives' children often survived with very few dying. I was the youngest wife and most liked by our husband. The other wives killed all my children and then turned around and called me a witch and said that I ate my children myself. My husband's persistent love kept me alive until he finally died. Today I have no-one, not even a child to care for me. See me, my appearance speaks for itself. All I am waiting for is death to join my husband beyond.

Until recently, this was the general feeling about child illness and death. It was either the mother herself or her co-wives and in-laws who must have killed her children, and in each case through witchcraft. This belief was so strongly entrenched that men reported that, to ensure the reduction or elimination of such occurrences they insisted that their wives take oaths on marriage before their ancestral shrines and other religious objects or cults that they would not kill each other's children or harm one another, that they would love their husband and not make medicines to kill him or make him love them rather than the others. Most of the communities still believe that such oath-taking has been effective in reducing child mortality, arising from witchcraft, to the barest minimum.

However, they added that in modern times oath-taking has decreased as people have increasingly turned to Christianity, which gives people a sense of protection from the power of witches and wizards.

According to one elder who is known as an expert in treating child illness

A woman had a very sick child that she brought to my house. I kept her and the child in a room in my house for observation and treatment. Do you know that every night the witch came beside the window of this room making all sorts of sounds. At times, it hit the window so hard you would think it would open. I fought relentlessly with it. The child's health deteriorated with every night the bird [witch] visited. Once the child was showing signs of recovery but the bird [witch] returned. It was beyond me, and the woman lost faith in me and took the child to The General Hospital in Ubiaja, 14 kilometres away. The child's condition remained unchanged and then worsened. The mother's money and property were exhausted. Three months later the woman returned to the village with the very ill child. In the company of other healers we reinforced our healing strength and destroyed the witchcraft. Someone close to the woman died after confessing and the child then became well.

We were told that there are also other 'evil-doers' apart from co-wives and in-laws, in the society who take satisfaction in seeing others suffer. People of this kind wander a lot in market places. Hence, the people argued that pregnant women, new-born babies and young children should not be taken to the market. Little children are left at home to play by themselves while mothers go to the market. Since they believe that during pregnancy the damage is most likely to be caused at an early stage, it is important that a pregnant woman goes as infrequently as possible to public places, especially the market. Even after giving birth the mother is not expected to go to the market for a further three to six months. The first visit to the market is expected to be marked by a ritual involving cowries, red power (camwood), the purchase of certain food items such as *ikpekele* (corn buns), and the giving of gifts and the receiving of prayer from the people she buys from. Much money should be spent. In addition, the mother is given new clothes by her husband and elaborately plaits or braids her hair. She also sprinkles white chalk over the market while other people in the market rub some of the chalk on themselves and pray for her and her child. She receives gifts in the form of food items from sellers in the market. This ritual is intended to ensure her happy and successful return to participation in the market. More importantly, co-wives are made to accompany and rejoice with her with the aim of ensuring that all wives are happy over the delivery of the baby.

With illnesses like diarrhoea, malaria, smallpox, chicken-pox and minor headaches, the causes are held to be natural. The people argued that in traditional times – meaning before the introduction of modern medicine and health education – such illnesses were caused by poor sanitation, lack of good water, and poor nutrition. For example, the women stated that in the traditional era children were fed on native bananas, boiled and mashed, and fed with the use of fingers. Children were also breastfed. But nursing mothers often ate food lacking nourishment, not well prepared or unsuitable for the child's stomach. Slimming food, melon soup and badly cooked vegetables were held to result in diarrhoea or vomiting in children because anything a breastfeeding woman ate was believed to go straight to the child through breastfeeding. Hence, the advice given to nursing mothers was to eat well-cooked vegetables, preferably turning the vegetables into a paste and adding this to soups, and to avoid beans (cow peas) entirely. These conditions were believed to be further worsened by the contaminated water used for drinking and bathing the child.

Now, they increasingly believe that additional natural causes of illnesses listed earlier are a poor environment characterized by overgrown weeds, poor water drainage resulting in stagnant waters which are breeding places for mosquitoes, sanitary conditions due to uncleaned lavatories, defaecation in places frequented by children, and the movement of pigs with mud all over their bodies. Officials claim that these illnesses are now under control because of various health programs, particularly the Expanded Program of Immunization (EPI) and oral rehydration therapy (ORT), as well as maintaining clean

environment and efforts to eliminate the breeding places of mosquitoes. Many women can now prepare ORT solution, and EPI nurses visit the communities on a regular basis so that most children are immunized at the proper time. Moreover, when the family can no longer manage such illnesses, the children are promptly rushed to the hospital. If such a child dies by chance, this death is seen as wished by God and taken in good faith. However, this new pattern of health behaviour is seldom the case except when the family is Christian and the parents are in a monogamous union.

Adult males

Adult males are believed not to fall ill easily. Common illnesses range from back and waist pains, 'sugar disease' (diabetes), haemorrhoids, blindness, and *utagba* (sudden swelling of the body, legs or knees). These illnesses were also attributed to both natural and, less commonly, supernatural factors. Illnesses such as back and waist pains are said to result from hard farm labour, constant bending, and when men start getting old, such pains begin. These pains were described as very severe but men often keep their pain to themselves. Haemorrhoids and diabetes, which most people described as sugar in the blood, are said to be caused from eating too much sweet food. They believe strongly that men suffering from such illnesses eat like women in that they take too much sugary food. This high intake of sugar is said to cause not only diabetes but also dysentery which leads to haemorrhoids. The people reiterated that diabetes and haemorrhoids are modern illnesses because in the traditional era, before the coming of white men, men's diets were not sweet or sugary food like rice, milk, bread, sugar, cocoa, tea, beans and sugar cane, but rather were basically sour or bitter. For example, bitter leaves used for making soup for men were never squeezed to avoid washing off its bitterness, but rather were used in their natural form.

Blindness and *utagba* are said to be caused by supernatural forces which are brought into play by failing to abide by custom or committing abomination. Examples of such offences range from adultery, having sex out of doors in the fields, rape, incest, failing to avoid mysteries guiding cultural beliefs or customs and claiming land which does not belong to them by tradition, swearing unjustly or taking oaths while guilty, and wishing and causing harm to other elders. Such illnesses were expected to persist because they were seen as a curse on the victim. It was believed that such illnesses could be prevented through ritual cleansing immediately following the period the offence was committed. The people believe that there is sufficient time for such rituals before the symptoms become visible which may take months, but more usually, years. Such supernatural punishments were inflicted by dead ancestral spirits on the victims because their offences could not be restrained by the spirits.

However, it is important to note that often these abomination-related illnesses were traced to actions not of the men but of their wives. For example, it is a strong belief among these Esan people that adultery or any abomination committed by a wife can rebound on the husband who may have had either sexual intercourse with her or eaten meals which she prepared. Hence an adulteress needs to be purified through certain rituals before she can perform her duties as a wife or she is quarantined or sent away to prevent such incurable illnesses from striking her husband.

Women are under strong suspicion when a man dies from illnesses held to be caused by supernatural factors. Only when a woman has proven beyond doubt her purity, uprightness and good life to the whole community can she be beyond suspicion. When the wife stands accused of causing the death of her husband, she is subjected to agonizing widowhood rites ranging from swearing or taking oaths to prove her innocence, to drinking water used in cleansing the dead man's corpse. Failure to fulfil such customary rites is interpreted as an admission of guilt of the crime which led to her husband's death. This means withdrawing her claims to the property of the man and, in very severe cases, the inflicting of bad omen or even sometimes death, on the woman.

Adult females

Illnesses among adult females are usually attributed to problems originating in pregnancy, childbirth, or its aftermath. Certain illnesses and conditions are seen as normal while other illnesses create great concern. Examples of the first group of illnesses are headaches and fever at the onset of pregnancy and normal labour pains. Such symptoms are given little attention and are expected to pass. However, there are situations where certain illnesses identified as complications arising during pregnancy and after delivery became the source of concern. Commonly identified complications are miscarriage (threatened or actual), haemorrhage, the retention of the placenta, and obstructed labour.

Miscarriage, referred to as *una* or *abhai*, is suspected when there is bleeding during pregnancy. If such bleeding is not arrested it may lead to the termination of the pregnancy. In most cases the life of the mother is not threatened. Haemorrhage, referred to as *unawede*, is excessive bleeding that can lead to death. The people likened such bleeding to a running tap: sanitary towels cannot be used to hold the blood flow which is so profuse that it could fill a bucket. The bleeding is such that the woman becomes weaker and weaker, and finally dies.

Death is preventable either through arresting the cause or through prompt treatment, usually still believed to be traditional treatment. Such bleeding arises at the onset of labour, whether premature labour or actual labour, immediately after delivery or at most three months after delivery, although the most common haemorrhage is the one immediately after delivery.

Retention of the placenta is also a major complication but one which seldom results in death. The informants said that specialized massaging of the uterus can induce the expulsion of any placenta, and thus this is rarely a matter for concern.

Obstructed labour, referred to as *uduogili*, is the second major cause of haemorrhage in women. The baby and afterbirth are believed to be in a ball-like form preventing natural delivery. The respondents reported that a woman in this condition continues to push to expel the baby for a very long period until she finally gets exhausted and dies.

The causes of such complications leading to death are attributed more to supernatural factors than natural ones. Commonly identified supernatural factors include having sex in the afternoon or in the fields, incest, adultery, practising witchcraft and taking a husband's property (such as money) without his knowledge or permission. Most of these supernatural factors can be brought promptly under control when the woman confesses her offence which is necessary before ritual can be successful; otherwise, no cure can be provided and death becomes inevitable. However, some respondents argued that certain complications may arise from natural factors. Illness of this type is suited to traditional treatment through the use of a powdery substance blown into the vagina and also taken orally.

It was observed from the discussions both with men and women that illnesses in adult women are mostly caused by offences against tradition or custom. In contrast, the illnesses of adult males and children are seldom self-inflicted but are often caused by the misdeeds of women. In essence, a woman is blamed for disasters to her child, her co-wives' children, and her husband; but she alone must bear the responsibility of her own state of health.

Types of treatment used

Two modes of treatment, modern and traditional medicines, are commonly used. Both treatments are used generally simultaneously to ensure prompt cures. However, only one type of treatment is sought and used in certain ailments because its curative power is well established.

Table 1 shows that people preferred certain types of treatment for certain types of sickness. For example, for illnesses such as convulsions, tetanus, pneumonia, and complications during pregnancy and after delivery, the preferred treatment is traditional medicine. It is believed that in these cases traditional medicines are more effective and prompt, and they are also much cheaper and easy to obtain.

Other illnesses such as vomiting and diarrhoea, measles, fever, smallpox and chicken-pox, are mostly treated by modern medicine. At times, modern treatment is preferred, in cases of obstructed labour and the retention of the placenta. It is important to note that most illnesses in children lead to the seeking of modern medicine or treatment. This has followed the success of the EPI and ORT programs which are contributing to the declining child mortality. Many of the women and men now agree with this statement made by a community leader:

In the past our children died frequently and in a short time after the onset of sickness. This arises because of the delay in seeking cure in hospitals or health centres. Also there were no EPI and ORT. With EPI most children no longer die of measles or tetanus. With ORT, children are saved from dehydrating until cure is sought in hospital if vomiting and diarrhoea continues.

Another woman said:

When children have fever, high temperature, and headache, we used to cover them up with thick clothes and put them by the fire. This practice led to child convulsions and finally death. Today, when a child has a high temperature, we bathe him with cold water, expose him and give him *Panadol*. Next the child is taken to the hospital for prompt attention. This practice has also reduced child mortality.

Table 1
Types of treatment preferred first for certain types of conditions (percentages of responses from all village i.e. women, N=500)

Condition	Treatment preferred	
	Traditional	Modern
Convulsions	85	15
Tetanus	75	25
Pneumonia	65	35`
Vomiting	11	89
Diarrhoea	10	90
Measles	14	86
Fever	5	95
Miscarriage	91*	65*
Haemorrhage	70*	50*
Obstructed labour	68*	46*

*Adds to more than 100 because many women believed in both types of treatment simultaneously

Nevertheless, this does not imply that traditional treatment has been abandoned. Rather, as Table 1 shows, traditional treatment is more often employed as a first step in treating children. For example, palm kernel oil with herbs are often given to children orally to cleanse either the stomach or the circulatory system. Such medication is less expensive than modern medicines.

Another observation was the high rate of self-medication involving the use of drugs purchased from a medical store, chemists or herbs or traditional medicines provided by a relation or friends. Self-medication is used mainly by adults for ailments such as colds, coughs, headaches, diarrhoea, vomiting and haemorrhage during and after delivery. Children are also treated for such ailments at home with drugs purchased in chemists or medical stores, and traditional medicines. Self-medication is common because most ailments in the initial stage are not perceived as serious or a source of concern, and only

when a cure is not forthcoming are children and adults rushed to the hospital. Another form of self-medication which was prevalent is the use of 'capsules' ranging from ampicillin, ampiclox and chloramphenicol for curative measures against ailments such as stomach upset, fever, sexually transmitted diseases (STDs) and skin diseases, although these treatments are sometimes followed on the recommendation of a medical practitioner. Once such ailments seem to be cured, people do not visit the hospital or inform the doctor of a recurrence on future visits but merely repeat the treatment. Particularly in the case of STDs, the patient cannot be certain that the ailment has been cured. This may cause future infertility which is a severe problem in this society where children are a source of wealth and status.

With adult male and female illnesses there was a higher reporting of the use of traditional treatment. Even among adults it was found that people often use traditional medicines first for illnesses which are life-threatening and modern medicines for non-life-threatening and simple ailments. However, many people expressed their desire to have both modern and orthodox treatment provided in the same place. Such provision, they argue, would allow both forms of treatment to complement each other and lead to quick and effective relief or cure. Simultaneous provision of modern and traditional treatment might significantly reduce the high rate of preventable death. Credibility was given to such suggestions from our examination of the mechanism of treatment.

Mechanism of treatment

Promptness in seeking treatment or cure influences mortality levels. It was found that people sought treatment or cure more promptly for a child than an adult. Costs are not a major factor when seeking the treatment of children but with adults are a significant factor. Both mother and father are greatly concerned by a child's illness, and treatment is generally given to children before payment is solicited. On the other hand, treatment is rarely sought promptly for adults because of lack of funds and the unwillingness of either spouse to bear the cost of treating the other. Thus, adult illnesses often reach a critical stage before treatment is sought.

Factors apart from costs that militate against prompt treatment are the great distance of health facilities or services from the patients' homes. People are also alienated by the attitudes and behaviour of medical practitioners to patients, and the shortages or non-availability of drugs and blood supplies. These factors create great obstacles against the more regular use of modern medical treatment.

People try to use more than one type of treatment to ensure that they complement one another. For example, a woman suffering from haemorrhage in a hospital is quickly placed on a drip and given an injection while at the same time a black powdery substance is blown into the vagina and repeatedly taken orally by the patient until bleeding ceases. Factors causing people to use both types of treatment were the desire to obtain quick recovery and the belief that each system embraced part of the truth and addressed part of the cause.

People also change the treatment from one type to another or even from one healer to another when continuing treatment is needed. For instance, in one case a child with an unidentified ailment first sought traditional treatment, then went to the hospital and was admitted, and finally left hospital and obtained treatment from another traditional healer.

It is important to note that people, irrespective of their age, do not hesitate to use modern treatment for child illnesses: such treatment is seen to provide swifter relief and cure than traditional treatment which is increasingly regarded as a trial and error form of treatment. However, adult illnesses are held to be preventable or curable to a great extent through strict adherence to customs and belief. Thus, traditional treatment is more often sought for treating adult illnesses than are modern cures.

Discussion

The Esan study demonstrates the absolute power that traditional health beliefs maintained until very recently and the strength that they still have.

Traditional health beliefs were inseparable from traditional explanations of life and overall patterns of behaviour. Women were usually blamed for illnesses that struck not only themselves but also their children, their husbands, their co-wives and their co-wives' children. In this way the health-belief system was also a system of social control in a patrilineal, patriarchal and even geroncratic system. Women knew that, if illnesses were to be avoided, they must be content with polygynous marriage and feel no envy or ill-will toward their co-wives and the co-wives' children. In addition they should have no sexual relations with anyone but their husbands. This system of control was rendered even more efficient by the necessity for a woman to confess her misdeeds in order to allow the necessary curative rituals to proceed. The traditional system also prescribed herbs for a range of simple illnesses which often afflicted children.

This is a system that modern medicine has by no means overthrown. The two systems are thought of by most people as different and complementary facets of the same basic health truth. The attack on traditional medicine has not come about solely from the introduction of an alternative and more effective treatment system. Traditional medicine was largely based on beliefs both in almost universal witchcraft, which explained much of what went wrong, and also in the existence of warnings and curative interventions from the ancestral spirits. The arrival this century of Christianity and, to a lesser extent, Islam, have begun an attack on the belief system which incorporated both witchcraft and the ancestral spirits. That attack is far from complete, but most Christians and Muslims now blame these forces for a much narrower range of illnesses than did their ancestors. This has opened the way not only to the use of modern treatment as an alternative but also for behavioural changes leading to greater personal responsibility for avoiding and treating sickness. Modern schooling has reinforced this message.

The failure of modern medicine to drive traditional beliefs from the field arises not only from the tenacity of traditional beliefs but also because the arrival of modern medicine is so incomplete. Curative facilities are distant and no transport is provided; doctors are often poor and usually arrogant, even if largely in self-defence. Since the implementation of the structural adjustment program, doctors prescribe medicines which few can afford, especially for adult treatment in a family situation where both men and women feel that there is much more justification for draining household resources to treat their children than to treat each other. There is considerable brinkmanship about who should bear costs.

The study provides strong confirmation for the approach advocated by UNICEF of trying to reach every village and household with the immunization program for children and with training and liquids for oral rehydration treatment. This is a clear lesson as to how the whole modern medical agenda should be implemented. There is a need for household health visitors in every village with a regular schedule for visiting every house, looking around to see who is sick, advising mothers with young children and pregnant women, perhaps taking simple medicines with them, and certainly attempting to organize visits to health centres.

The path has been prepared for the success of modern medicine not only by religious conversion and the introduction of modern education, but also by certain aspects of the traditional-belief system. Some forms of ill-health were taken to be natural and not the contrivances of persons using supernatural powers. The fact that diarrhoea was in this category paved the way for the success of ORT. Similarly, the belief that malaria was a natural phenomenon has made the introduction of prophylactics and drugs for curing fever much easier.

The traditional system can be reassuring, especially for incurable diseases. It is not particularly dangerous in the situation reported in this area where most people soon seek modern medical treatment as well, or even at the same time. This is increasingly the case when children are sick.

But dangers remain. Many people are still convinced that a range of adult disorders can be treated only by traditional medicine, and many adults probably still die without attempting to seek modern treatment. This is also a serious matter with regard to the problems of pregnancy, childbirth and subsequent maternal health where the traditional system still claims to be the sole effective approach. Thus, women continue to suffer and be at risk. Traditional beliefs probably still prevent many pregnant and nursing mothers from securing an adequately nutritious diet by forbidding them some of the most plentiful and nutritious food such as the local beans (cow peas). The belief that tetanus and convulsions can mainly be cured by traditional means may retard programs to vaccinate pregnant women against tetanus. Similar beliefs with regard to difficult breathing and pneumonia may slow the attack on acute respiratory infection in children.

Modern drugs are entering the villages much more rapidly than modern health treatment. The study showed the reliance on medical stores and pharmacies. This is partly self confidence in self-medication, but it also reflects the fact that the nearest store is usually closer than the nearest doctor or hospital, and that the total cost of treatment is higher in the latter. While self-medication may be dangerous, it may also be a major factor in the slow reduction of death rates. It may also be an important factor in controlling venereal disease, for the shops sell a great deal of antibiotics, although there is clearly also a danger of curing the symptoms rather than the disease.

Traditional theories of disease causation are dangerous in another sense. Because they often offer a complete explanation for causation that has nothing to do with hygiene or other aspects of behaviour, they give no reason for changes in these areas. Likewise, because they often recommend rituals that have no relation to how patients should be treated, they downplay the importance of health care.

Nevertheless, much of the population still believe in many aspects of traditional medicine without seeing any conflict between traditional and modern treatment. They are willing to try each successively. In these circumstances, there is a value in allowing both systems to be practised in the same institution.

I do not suggest that health will improve and mortality decline merely because of competition between alternative systems of health care. Behavioural changes are important. Household health visitors can probably achieve a great deal by teaching mothers about infant care even if they bring with them no medicine at all. Family change may also play a role. One of the most interesting findings of the study was that adult health care was facilitated when spouses did not begrudge each other the money for treatment, a situation that was found to exist only in marriages that were monogamous in both structure and spirit.

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Intra-household differentials in women's status: household function and focus as determinants of children's illness management and care in rural Mali*



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Abstract

In West Africa, health-seeking behaviour can be better understood by assessing how women differ from each other, rather than how they differ from men, in terms of their socioeconomic and political power within the domestic environment. Anthropological and demographic data were collected among rural Malian Fulani and Dogon populations who possess similar health beliefs and who live in the same ecological area. However, real differences between the two ethnic groups were reflected in variations in maternal status defined according to women's support and/or autonomy in their households. When a child becomes sick, status obligations result in limited degrees of co-operation between marital female relatives. By contrast, on a day-to-day basis such assistance is rarely forthcoming and women rely on their own unmarried daughters or on external kin networks for surrogate child care. It is concluded that variations in health behaviour and mortality outcomes within these populations reflect not simply 'ethnic' differences in beliefs or culture, but rather real differences in mothers' social positions within their family environments and in their access to household resources for children's treatment and care.

Background

Although much has been written about household variations in mortality and morbidity (DaVanzo 1984; Desai 1991) and on the household-community interface in structuring social relations (Guyer 1981; Harris 1981; Lloyd and Desai 1991), such research generally describes differences between the roles and responsibilities of men and women. Intra-household female status variations which distinguish how women differ from each other, rather than how they differ from men within their domestic circumstances have yet to be explored, together with their consequences for health-seeking behaviour and health outcomes. 'Within-' rather than 'between'-gender differences in social, economic and political household power are particularly important in Africa where the separation of spousal budgets and of male and female domestic roles has been widely documented (Abu 1983; Caldwell and Caldwell 1987). As the identification and early treatment of children's illnesses usually lie in the domain of women, such distinctions are important in understanding how children may be subject to increased risks, or be relatively advantaged, according to the social status of their mothers within their fathers' families.

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Evidence from rural Mali demonstrates that illness treatment strategies and the daily care of children depend very much upon the household context and support structure within which they take place. Demographic and anthropological data collected in these communities, who have yet to enter the health transition, indicate how women may be aided or constrained by their relationships with female members of their marital families, in pursuing effective treatment strategies, and in providing adequate day-to-day care for their children.

Defining 'the household'

Conceptualizing an adequate definition of 'household' has presented problems for both qualitative and quantitative social scientists, particularly in delineating its intersection with family and in dealing with kinship ties that extend beyond its boundaries (Wilk and Netting 1984). Demographers using survey or census data usually focus on household definitions centred on common provision of food, for example, from a common granary, or use of a common hearth or cooking pot; or they enumerate all members who look to the same person as their household head (UN 1980). Little information is available about the social relationships of those defined as belonging to the same household, nor about the external networks of individuals on whom they may rely, or, by contrast, whom they may support.

Anthropologists, on the other hand, prefer the term 'domestic domain' which relates not only to the preparation of food but also to the socialization of children and transfer of property, and to the maintenance and reproduction of household values and influence (Bender 1967; Goody 1976). Importantly, these encompass functional features of household organization and processes of future household development associated, for example, with households splitting up or enlarging.

Bruce and Lloyd (1992) describe the need for a new research focus that transcends the physical and temporal boundaries of the household, and stress that 'in the long run, family links, rather than living arrangements may be the more important determinants of women's and children's welfare and of the viability of households' (Bruce and Lloyd 1992:3). In a similar vein, Scrimshaw (1989) describes household boundaries as 'semi-permeable membranes' through which information and resources flow. The concept of household 'permeability' is central to this study, which shows how a mother's ability and motivation to exploit external household resources vary with her social relationships with members of her husband's family and with the health status of her children.

Household function and focus

Rather than assuming, as in standard neo-classical economic theory, that all household members have the common objective of pooling resources and maximizing collective benefits rather than personal gain (Becker 1976), we can better conceptualize variations in the means and motives of individuals by theories of bargaining or 'co-operative conflict' (Sen 1985, 1990). However, it is rarely recognized that both men and women may have different capacities for such transactions depending on their social relationships with other household members. In addition, individuals can bargain within their households using currencies, other than cash and income; which include children, social networking and household-based production, all of which determine women's position in their families and in the wider society (Bruce 1989). The evidence from rural Mali is that labour, cash and time are not simply interchangeable, but bargaining is mediated by the relative authority or autonomy ascribed to each household status position. Thus, decisions relating to children's health and care reflect a variety of negotiations, using a variety of currencies, rooted in the household's own political and social economy.

The household can therefore be viewed as a system, within which individuals have different roles of production and consumption, not just of socioeconomic resources but of information and knowledge for health. Within this framework, household function becomes an organizing factor. This does not refer simply to the control of domestic labour activities such as food cultivation, processing and

preparation, but rather reflects the focus of the internal female power relationships and social obligations around which these labour activities are based.

Wallman (1986) describes how within the household system, 'resource keepers' tend to be allocated, or to take over, the management of household material resources such as food or cash, and control non-material resources such as time, information and identity. Access to, and control over, these non-material resources have to do with household organization as well as structure and govern the relative autonomy and obligation of individual household members. In rural Mali the focus on female resource keepers and their influence, perpetuate variations in women's social status within their household environments and reflect the associated social, economic and political power they possess in relation to each other. Such status is a function of a woman's social relationship to the resource keeper who, in the survey communities, is usually the mother-in-law.

Thus an examination of household function rather than size, and household dynamics and focus rather than structure, provides a useful analytical framework for understanding how mothers gain and control material and non-material resources for health within their domestic environments. This theoretical base is used for the analysis of data from rural Mali to understand the causes and consequences for the care of children of intra-household variations in women's status.

Study site

The study site consisted of five villages in the Douentza *cercle*, a semi-arid region of rural Mali, known locally as the Seno-Mango (the great dune) where I lived from September 1989 to January 1991. The survey was carried out among Islamic Fulani and Dogon¹ populations using Fulfulde, the language of the Fulani.

For the purposes of this study, the Dogon are divided into the Humbebe and the Troni, two clans who differ linguistically but who have similar social and economic organization. The Fulani are divided into 'free' agro-pastoralist Fulbe and their dependants, the Rimaibe. The main pillar of the Fulbe economy is cattle-herding which takes men and women from their sedentary villages of the arid Seno-Mango into the lush pastures of the inner Niger River delta for six or more months of the year. Fulbe women sell or exchange milk each day and weave straw mats which they sell in the local market. Fulbe men cultivate millet only minimally, and the women not at all, as they consider it to be rather an inferior occupation. By contrast, both men and women in the Dogon and Rimaibe communities cultivate millet, a proportion of which the Rimaibe are still often obliged to give to their former Fulbe masters. Rimaibe women also weave mats, while the Humbebe and Troni women practice extensive market trading in cotton and local condiments.

A health dispensary, a pharmacy and maternity facilities are located in Douentza, the market town which is the administrative centre for the region of the same name. The nearest village in the sample is just seven kilometres from Douentza, whilst the furthest is at a distance of 26 kilometres. Four out of the five villages have an '*aide-soignante*', a health practitioner trained to deal with simple health problems. However, modern health services are rarely used, as children's illnesses in particular are often attributed to complex traditional taxonomies which can only be identified by traditional healers, and for which modern medical treatment is considered ineffective. None of the women in the sample

¹ Although classified as 'Dogon' by the early French ethnographic expeditions into the area, the Humbebe distinguish themselves from the Dogon of the Bandiagara plateau documented by Griaule (1948) and Palau-Marti (1957). The Humbebe are united by a common ancestral lineage with the clan name 'Ongoiba', and by their separate language known as Djamsai. Unlike the Dogon of the southern areas of the escarpment, the Humbebe have almost daily contact with the Fulani and most Humbebe men and women speak Fulfulde fluently.

had been to school; indeed formal education is perceived to conflict with Koranic schooling which is a greater priority for most parents.

Both the Fulani and the Dogon are patrilineal, preferring endogamous marriages so that young mothers' natal kin are usually close at hand. However, male and female children of the two ethnic groups are considered to 'belong' to their mother's extended marital family. If a woman's mother-in-law lives in the same household she is thus expected to consult her about major decisions affecting her children, including action to be taken during their illnesses. The mother-in-law is therefore the 'resource keeper' controlling information and cash for treatment and often governing what kind of diagnosis is given.² The ethos of a woman having married into a work relationship with her husband's household and into a power relationship with his mother, if she lives in the same household, is extremely strong among the Humbebe and Fulani alike.

Interestingly, and contrary to the original hypothesis around which the fieldwork was based, neither traditional illness taxonomies nor perceptions of the cause, nature and prevention of more naturalistic illnesses such as diarrhoea, fevers and respiratory infections varied significantly between the Fulani and Dogon communities in the sample. This is possibly because the Fulani had very few professional traditional healers within their own villages and sought outside advice from the many Dogon traditional practitioners. Their knowledge of causes and treatments, usually elicited from divination, was widely renowned and well-respected by the Fulani and Dogon alike. Thus differences in illness management presented below do not reflect different beliefs about appropriate action for specific types of illnesses associated with each ethnic group. They are rather connected with pathways of decision-making linked to characteristics of the consultation process. This relates to the form and function of the mothers' household environments and to their social positions within them, which differ substantially between the two ethnic groups and between the Fulani social classes. Mortality differentials therefore reflect not simply ethnic differences in beliefs or culture but rather, as will be shown below, real variations in mothers' family environments and their social obligation or autonomy within them.

Field methodology

Household censuses were taken to record the name, age, sex, marital status and occupation of each member of 180 households in the five villages selected for the initial demographic survey.³ Birth histories were taken from 334 ever-married women aged 15–49 in these households and additional information was collected about the delivery circumstances, vaccination status, breastfeeding, supplementation and weaning of the 'last birth' of each of these women. One Fulani village and one Dogon village were then selected as a subsample for intensive monthly morbidity follow-ups. These involved the collection of illness profiles for every illness event experienced by each child under five years of age from January to December 1990. Four hundred and eleven such profiles were collected when each child's mother was questioned about the consultative and treatment pathways followed from the initial identification of the illness. In addition each child under five in the two villages (N=145) was weighed and measured each season.

² Although women could never become professional traditional healers, post-menopausal women were considered knowledgeable diagnosticians and could recommend which healers would be effective for the illness in question. Importantly, some medicines such as the preventive medicines given daily to small children to prevent stomach aches, were often said to be effective only if administered by post-menopausal women.

³ During the survey, all people who ate out of the same 'cooking pot' and who all looked to the same household head were enumerated as belonging to the same household.

At the end of the year, structured minute-by-minute observations were carried out in the Fulani subsample village amongst 16 selected families who exhibited high and low prevalence of child morbidity measured by the number of observed episodes of diarrhoeal disease and their weight-for-height 'Z-Score' in September 1990. These observations noted characteristics of the child's day-to-day care environment together with specific verbal and non-verbal interactions between children and their care-givers over two separate six-hour periods for each child.

Towards the end of the study, a local measure of wealth was adopted for the Fulani village using a technique developed among pastoral communities (Grandin 1988). Key informants were asked to give a definition of 'wealth' and to rank their neighbours on the basis of perceived variations in their varying amounts of cattle, fields and children. Importantly, the method avoids asking for specific details of material possessions, such as numbers of animals, which it would have been considered inappropriate to discuss. Relative ranking with this technique created a consistent and accurate assessment of socioeconomic differentials using indigenous criteria.

Childhood mortality amongst the sample populations

Probabilities of dying during the neonatal period, in infancy and in childhood, based on all births during the ten years preceding the survey, were calculated using life-table methods, and are shown in Table 1. It should be re-emphasized that the Humbebe-Troni division is one of clan whilst the Fulbe-Rimaibe difference is one of social class. The lowest probabilities of dying are found amongst the Troni and the highest amongst the Fulbe.⁴ Amongst the Humbebe, over one-third of children are likely to die before age five, whilst amongst the Fulbe more than half can be expected to die before their fifth birthday. Using a Mantel-Haenzel odds ratio of the probability of dying by age five, differences between Fulbe and Rimaibe mortality were significant at the ten per cent level, and between both Fulani classes and both Dogon clans at the one per cent level. Probabilities of dying calculated for both the Humbebe and Troni combined were statistically different at the one per cent level from those calculated for the Fulbe and Rimaibe together.⁵ No significant mortality differences were found by sex or socioeconomic status.

Table 1
Douentza sample probabilities of dying between selected ages (in months)

Mortality per 1000 live births		Humbebe	Troni	ALL DOGON	Fulbe	Rimaibe	ALL FULANI
Neonatal	(1q0)	60	89	68	92	70	80
Infant	(12q0)	158	137	152	257	193	223
Child	(48q12)	257	83	209	415	319	361

⁴ In addition to the structure of their household which facilitates mothers' autonomy and ability to pursue treatment of children's illnesses, the significantly lower Troni mortality is possibly associated with the fact that for many years the village had a resident French-trained nurse who treated simple ailments and distributed free chloroquine to children and pregnant women during the rainy season.

⁵ These probabilities are slightly higher than those found within the Demographic and Health Survey of Mali (Traoré, Konaté and Stanton 1989), and compared with other national surveys (UNICEF 1989) and other surveys of the same region (Hill 1985). Compared with the southern Bambara groups who form the majority of the Malian population and the national samples, the Douentza communities have lower rates of vaccination, poorer health and educational infrastructures and were worse hit by the 1984-85 drought which decimated Fulbe cattle-herding economies in particular.

Under five (60q0)	375	209	330	566	450	504
Number of live births	300	114	414	215	184	399

The four groups exhibit fundamental differences both in their household size and also in their household structure. Differences in household morphology and internal dynamics between the two ethnic groups and between the Fulani social classes lead to variations in mothers' social power within their household environments. These internal status differentials account for differences in mothers' illness treatment strategies and care, and are ultimately reflected in variations in their children's health and nutritional outcomes. Thus characteristics of household structure and associated variation in household function, focus and maternal household status are the principal themes of the discussion.

Intra-household female status variations

Definitions of female household status

Although a growing number of studies seek to understand the importance of female social support, obligation and autonomy within the domestic environment in relation to the household production of health (Buvenic, Graeff and Leslie 1987; Jeffery, Jeffery and Lyon 1989; Doan and Bisharat 1990), women's status is often ill-defined and results in many terms or concepts having different connotations for different authors, making cross-cultural comparisons difficult and often meaningless (Mason 1988). Categories of 'status' used in this analysis are based on the nature of a woman's intra-household support or autonomy. However, it is also necessary to recognize the importance of extra-household resources, and the evolution of a woman's status over time as her marital and reproductive careers unfold and as her household advances through its own life-cycle.⁶

The following categories are used to differentiate between women in different social positions within their households:

Diagrammatical representations of women's intra-household social status and associated household types

Woman's Status	Household Type
1. Lone daughter-in-law O ↑ *O Woman is married to the son of the household head and lives in a small hierarchical family with her mother-in-law but with no other women of junior status. She is alone at the bottom of the female hierarchy and solely responsible for food preparation, water and fuel collection.	Small hierarchical
2. One of several daughters-in-law O ↑	Large hierarchical

⁶ Although it is recognized that wife rank has an important role in organizing labour and power between women of the same husband, the purpose of this study is to analyse cooperation and hierarchy as it affects the whole household. Thus, although rivalry and jealousy have been documented between women of different wife rank (Clignet 1970, Fainzang and Journet 1988) it is felt that the presence or absence of women who can work for them, or for whom they are all obliged to work, is of more immediate importance in relation to children's health outcomes.

*O ↔ O ↔ O

These women are also married to the son or sons of the household head, but have sisters-in-law in the same household who are obligated to the same mother-in-law. They can thus share the responsibility for household tasks under the supervision of the mother-in-law. Chores such as food preparation are carried out according to a strict rota.

3. Head wife with daughters-in-law

Small hierarchical

*O
↑
O

Wife of household head with woman or women of daughter-in-law status present in the small, but hierarchical household. These women are freed from household duties by the presence of daughters-in-law, but often have to provide the money for sauce condiments for each meal which can prove to be a financial burden. Any household tasks they carry out are done autonomously as they control their own time and labour and that of their son's wife or wives.

4. Alone

Nuclear

*O

Woman is sole woman of reproductive age in her household and therefore has no co-wives, sisters-in-law or daughters-in-law. She lives only with her husband and children in a nuclear unit.

5. **Sister-in-law****Lateral**

*O ↔ O ↔ O ↔ O

Woman is wife of the household head, or of his brother, and is with other women of equal status in the same household (not controlling for wife rank). There is no mother-in-law-daughter-in-law hierarchy as the household structure extends laterally rather than vertically. The wives of the different men in the household are thus related to each other only as sisters-in-law.

6. **Woman living in her natal family (*suudu baba*)****Various**

O (Mother)

*O (Daughter)

↑

O (Daughter-in-law)

These women live with their *suudu baba* either because they are divorced or sick or disabled and unable to work in their marital family. Performing household tasks for their mother is done out of respect rather than obligation unlike a daughter-in-law who, if in the same household, is *required* to carry out such duties.

7. **Female head****Female headed**

*O

Two women in the subsample were heads of households. One was widowed during the survey and the other was the leviratic 'fifth' wife of a man who lived in a nearby town and whom she rarely saw.

*Index woman and direction of her labour cooperation or obligation.

Note that only women in groups 1–5 are currently married).

Table 2 considers the status of each woman in the sample in her own intra-household hierarchy. This shows that amongst the four groups considered, women not only were part of households of different sizes, but occupied different positions within them, which endowed them with different degrees of autonomy, obligation and control. These differences result not just from life-cycle factors, but also from mortality experiences and reproductive performance; they also reflect household and community preferences for specific living arrangements which facilitate production activities and satisfy labour requirements.

Thus 36 per cent of the Fulbe women were the only females of reproductive age in their households, and lived in small nuclear units with their husbands and children. By contrast, 36 per cent of the Humbebe were in laterally extended households where work was divided between sisters-in-law but where there was no mother-in-law-daughter-in-law hierarchy. In addition, 21 per cent of the Humbebe occupied high-status positions in hierarchical households where they had daughters-in-law to work for them, and thus were relieved of the majority of household duties. Nearly half the Troni were living in large hierarchical households where they were sharing household duties with other women under the direction of a mother-in-law. Only about half the proportion of Troni women were lone daughters-in-law (and thus low-status *and* lone workers) compared with the other groups.

Table 2
Distribution of women of reproductive age according to their social position within their households (September 1989)

	Humbebe (N=106)	Troni (N=47)	Fulbe (N=87)	Rimaibe (N=94)	Mean age of woman
Mean household size	11.6	13.1	6.4	9.3	
	%	%	%	%	
Woman's social status:					
Lone daughter-in-law	12	6	15	13	25.3
One of several daughters-in-law	17	47	15	25	27.0
Head with daughters-in-law	21	6	5	16	36.9
Entirely alone	13	17	36	14	35.4
Sister-in-law	36	21	19	23	34.3
Daughter of head	2	2	9	9	28.0
Female head	—	—	1	—	42.0

Social position x ethnic group or social class (married women only):

$\chi^2=44.25$, d.f.=12, $p < 0.001$

Maternal household status and children's illness management ⁷

First informal discussion about the child's illness

Table 3 indicates that consulting someone informally about the child's illness appears to be associated with subsequently administering treatment, as three-quarters of those illness events where an opinion was sought or given were treated compared with just over half of illnesses during which no one was consulted. 'Consult' here denotes an informal discussion rather than advice seeking, and constitutes a verbal acknowledgement that the child is ill. It is not clear whether treatment was administered because the illness was perceived to be more serious and merited discussion with another individual, or whether the individual consulted suggested or supported treatment.

It is evident from Table 4 that a woman's household status has an influence on whom she consults about the child's illness or whether she even consults anyone at all. The table shows that for married women, a woman's place in the household hierarchy in relation to other women determines her ability to consult her husband. The data indicate that higher status, relatively autonomous women, such as those who live with their sisters-in-law in laterally extended non-hierarchical households, were more likely to consult their husbands. Similarly, women with daughters-in-law who are the organizational key to the function of a hierarchical household, and as such may be regarded more highly by the men as well as by the junior women, also consulted their husbands. Women who were the sole 'worker' (in this case women who were lone daughters-in-law or 'alone') tended to consult no one more than the other groups, whilst over one third of women living with their biological parents consulted their

⁷ Rather than simply carrying out a dichotomous analysis according to Humbebe and Fulani 'ethnic' characteristics which would mask the determinants of health-seeking behaviour at the household level, the analysis of the children's illness-management data describes variations within the whole study population according to the status categories described above. Columns may not add up to exactly 100 per cent because of rounding.

mothers. Women who were female heads of household were automatically forced into an extra-household consultation, or consulted no one at all. Those who were one of several daughters-in-law sought consultation with their mother-in-law rather than their husbands, although observation and monthly questioning revealed that the husbands of these low-status women are more likely to be absent on seasonal labour migration. However, as children's illness diagnoses lie within the knowledge domain of older women rather than young men, husbands' absences probably do not greatly influence consultative patterns in hierarchical households, as a woman would be expected to consult her mother-in-law even if her husband were present. The χ^2 test applied to those consulting their husband, someone else or no one by status group for married women only was statistically significant ($\chi^2=15.6$, d.f.=8, $p<0.05$).

Table 3
Child's illness treated by whether informal consultation took place

		Informal consultation took place	
		Yes (N=163) %	No (N=206) %
Illness treated:	Yes %	75	54
	No %	24	45

$\chi^2=16.46$, d.f.=1, $p < 0.001$

Illness treatment

Table 4 also shows that the proportions of children treated varied significantly with their mothers' social positions in their households.⁸ Women with peers, whether they were one of several daughters-in-law obligated to a mother-in-law, or whether they lived only with their sisters-in-law in laterally extended household structures, were more likely to treat their children. These women, although experiencing different degrees of autonomy and obligation, are in labour rotas where their household tasks are shared and where, in theory, their time can be more flexibly rearranged to seek treatment. In addition, women with peers, whether obligated to a mother-in-law or not, were more likely to have consulted someone about their child's illness. They therefore may have had more ideas about how to proceed with treatment, and indeed may even have been encouraged, or felt obliged, to do so.

Table 4
Informal consultation and child's illness treatment by mother's social position in household

Mother's social position in household						
Lone daughter-in-law (N=28) %	One of several D-laws (N=100) %	Head with D-laws (N=14) %	Alone (N=80) %	Sister-in-law (N=108) %	Maternal family (N=31) %	Female head (N=8) %

⁸ The majority of treatments administered consisted of traditional herbal remedies, and although some no doubt have considerable healing properties, their overall clinical efficacy is likely to be limited. However, treatment in this case is taken as a proxy for an acknowledgement of the illness and for a mother's attempt to control or alleviate symptoms.

Person informally consulted							
Husband	11	11	14	13	20	—	—
Mother-in-law	14	18	7	5	13	3	—
Other member of marital family	7	6	7	7	12	—	—
Mother	4	6	—	1	1	36	—
Neighbour	4	2	—	2	4	3	25
Old woman	—	2	14	2	6	—	25
No one	61	55	57	70	44	58	50
% Children subsequently treated							
	55	73	41	61	73	53	50

In contrast, only about half the children of lone daughters-in-law, female heads and women living in their natal families had their illnesses attended to. Compared with women in other status positions, these mothers not only lacked social and economic power in their households, but were extremely powerless in the external world and lacked authority and influence in the community. They were thus doubly constrained in being able to gain time or cash to treat their children. Interestingly, women who had daughters-in-law only treated 41 per cent of their children's illness events, possibly because the financial burden imposed on mothers-in-law by providing their daughters-in-law with condiments for food preparation, may preclude spending extra cash on treatment. Those mothers who were alone in nuclear families treated 61 per cent of their children's illnesses having usually discussed the illness with no one and therefore using intuitive rather than 'received' knowledge.

Choice of healer

Table 5 shows the type of healer first chosen according to the mother's status in her household. Higher-status women, particularly those with social support such as women living in laterally extended families with their sisters-in-law, were able to treat the child themselves, as did nearly three-quarters of those who live alone, female heads and heads with daughters-in-law. What these women have in common is autonomy and time to collect and prepare particular herbal remedies. By contrast, just over half of the daughters-in-law, either with or without peers, treated their children themselves. Such women lack knowledge about remedies or an ability to apply it, they lack the freedom to leave household tasks because of their junior status, and most importantly, they require the social sanctioning from their mother-in-law of any treatment that they may undertake.

Table 5
Choice of first healer by mother's social position in household

	Mother's social position in household						
	Lone daughter-in-law (N=16) %	One of several D-laws (N=68) %	Head with D-laws (N=7) %	Alone (N=50) %	Sister-in-law (N=80) %	Maternal family (N=17) %	Female head (N=4) %
Healer							
Husband	6	4	14	8	3	—	—
Child's mother	56	54	71	74	81	65	75
Mother-in-law	—	15	—	—	3	—	—
Other member of marital family	—	4	—	—	3	—	—
Mother	—	—	—	2	1	23	—
Traditional healer	19	9	14	4	6	6	25
Marabout	—	3	—	4	—	—	—
Old woman	13	3	—	—	—	6	—
Modern practitioner	6	7	—	8	3	—	—

Treatment by child's mother or treatment by others x status (married women only):

$\chi^2=15.21$, d.f.=4, $p < 0.005$

A surprisingly high proportion of children of lone daughters-in-law (19%) were treated by traditional healers and an additional 13 per cent visited old women with reported powers of healing, without trying a home remedy first. This is important for two reasons: first, lone daughters-in-law have very little time of their own or autonomy to pursue treatments using their own intuition. Thus, a visit to a healer, although more expensive and time-consuming, means that a diagnosis is made, and a cure already prepared. Secondly, and more importantly, the illness is publicly recognized as needing treatment. This is particularly important as the children of lone daughters-in-law, unlike those of daughters-in-law with peers, are the sole means by which their household can replicate itself in the future. Thus, responsibility for the illness and a child's potential death is diffused away from the mother who can claim to the household and to the community that she acted appropriately by seeking professional advice.

Payment for first treatment

Table 6 illustrates how the first treatment was paid for and shows that the greatest number of women choosing free treatments were female heads of household, women who were alone with no adult female support, or the heads with daughters-in-law who have to incur the expense that this high-status position brings. Lone daughters-in-law paid with money, as they lack the time to gain cash from supplementary economic activities or to collect free treatments, a knowledge of appropriate remedies and autonomy to wander freely into the bush to search for them. In addition, the fact that many were using healers meant that cash payment was usually obligatory.

For those who paid with cash, nearly three-quarters of women who lived with their sisters-in-law in laterally extended households paid with their own money, as did over half of lone daughters-in-law. More lone daughters-in-law received payment from their mothers-in-law than those who were one of several daughters-in-law. The latter appeared able to rely on the mother-in-law for consultation and treatment but turned to their husbands, the marital family or their own mothers for cash. More of the lone daughters-in-law received money from their mothers-in-law for treatment perhaps because, as

discussed, the child, whether male or female, constitutes the only member of the next generation of that household to date. Furthermore as described, the focus on children's influential agnatic kin becomes stronger when they are sick. A mother's marital relatives are expected to cover expenses when her child becomes sick as the child is said to belong to their family.

Table 6
Source of cash to pay for first treatment by mother's social position

	Mother's social position in household						
	Lone daughter-in-law (N=16) %	One of several D-laws (N=68) %	Head with D-laws (N=7) %	Alone (N=50) %	Sister-in-law (N=73) %	Maternal family (N=16) %	Female head (N=4) %
% using free treatments:	31	44	43	62	47	50	75
Of those paying with cash, cash provided by							
Child's mother	54	29	25	45	74	50	100
Husband	27	32	75	27	21	—	—
Mother-in-law	18	12	—	5	—	—	—
Other member of marital family	—	15	—	9	—	12	—
Woman's mother	—	12	—	14	5	37	—

Mother pays/other pays x status (married women only):

$\chi^2=15.03$, d.f.=4, $p < 0.005$

Thus, a child's illness which is perceived to threaten the common household good or equilibrium acts as a catalyst for the intensification of household focus, and female members of the marital family appear to offer each other limited advice and support when their children become sick. However, evidence from the observational data presented below shows that for children's day-to-day care, intra-household co-operation between female marital relatives is rarely forthcoming: a mother's own children and her natal kin constitute her main child-care resources.

Maternal household status and children's anthropometric outcomes

Intra-household female status variations also appear to have an impact on children's anthropometric outcomes. Weight-for-age is presented in Table 7 because it reflects the effects of recent nutritional insults in addition to episodes of illness. The table shows that children of women who live in laterally structured households with their sisters-in-law have better nutritional outcomes. Children of lone women in nuclear units also appear to do better perhaps because their mothers are not in competition with other women for household resources. By contrast, children of heads with daughters-in-law are also malnourished, which may reflect the lack of cash and time their mothers can devote to their care, owing to their responsibilities for running their households and paying for their daughters-in-law's expenses, as well as risks associated with their children's likely higher parity.

Table 7
Percentage of children whose weight for age is more than two standard deviations below the NCHS median by mothers' social position in household

Social position	Percentage	Total number of children
Lone daughter-in-law	69	13
Several daughters-in-law	47	34
Head + daughter-in-law	57	7
Alone	39	33
Sister-in-law	21	28
Maternal family	71	7
Female head	100	2

Over two-thirds of children of lone daughters-in-law are malnourished (more than two standard deviations below the NCHS median) compared with fewer than half of the children of daughters-in-law who have peers in the household. The most malnourished children are those of women who lived in their natal families and the two children of the female heads of household. These women not only lack status in their households through not being married, but also status in the community, where they have very little political or social power. The differences in the proportions of malnourished children by their mothers' household status (married women only) were statistically significant ($\chi^2=9.94$, d.f=4, $p<0.05$).

Children's day-to-day care

As described, 16 children were chosen for intensive observation based on their 'good' and 'bad' composite health scores using the number of episodes of diarrhoeal disease and weight-for-height Z-score in September 1990. Table 8 summarizes some basic household characteristics of the 16 families. As can be clearly seen, most 'healthiest' children were mainly of lone women. By contrast, the 'sickest' children were those of women of daughter-in-law status, although none in either group was a lone daughter-in-law. Importantly, although a greater number of mothers of the 'sickest' children had other women of reproductive age in the household, a greater number of the 'healthiest' children had unmarried sisters over eight years of age who proved to be invaluable in assisting their mothers both with household tasks and child care.

Interestingly, half of the eight households of the sickest children were in the 'richest' category according to the wealth ranking, but all the mothers of these children in these wealthy households were of daughter-in-law status. Similarly, the mothers of two of the healthiest children were lone women in the poorest households. It is possible therefore, that a mother's social position in her household and her access to household wealth rather than the overall level of wealth in the household, may be more important in determining the health and nutritional status of her child. Also noteworthy is the fact that most of the natal families of the mothers of the 'healthiest' children were present in the village. By contrast, most natal families of the mothers of the 'sickest' children lived elsewhere.

Table 8
Household characteristics of children in observational sample

Mother's age	Mother's natal kin in village?	Mother's proportion dead CEB	Number of siblings under five	Mother's status	Father polygynous?	Women aged 15–49 in household	Number of sisters 8+ years old	Wealth ranking
healthiest children								

breastfed								
35	No	0.25	2	Alone	No	0	2	Poorest
31	Yes	0.4	2	One of several daughters-in-law	Yes	3	1	Richest
24	Yes	0	2	Lives in natal family	No	0	1	Rich
41	No	0.73	1	Alone (but with widowed sister-in-law)	No	1	0	Poorest
weaned								
31	Yes	0.33	2	Alone	No	0	0	Rich
35	Yes	0.43	1	Sister-in-law	No	1	1	Poor
30	Yes	0.16	3	Alone (but with divorced sister-in-law)	No	1	1	Rich
60	Yes	—	1	Head with daughters-in-law	Yes	3	0	Richest
sickest children								
22	No	0	3	Alone	No	0	0	Poorest
28	No	0.2	2	One of several daughters-in-law	Yes	3	0	Richest
23	Yes	0.5	1	Head with daughters-in-law ^b	No	3	0	Rich
28	Yes	0.4	1	One of several daughters-in-law	No	3	0	Richest
weaned								
59	No	1.00	1	Female head	Yes ^c	0	0	Poor
25	No	0.4	2 ^a	One of several daughters-in-law	No	3	0	Richest
23	No	0	3	One of several daughters-in-law	No	1	0	Richest
36	Yes	0.57	1 ^a	Sister-in-law	No	1	2	Poor

^a+ one additional death of another child within previous six months.

^bWoman was divorced and residing in her natal family until September 1990, when she married the head of another household whose son's wife subsequently worked for her. Thus, where the child became sick and malnourished and where she was observed are two different households where she occupied two different status positions.

^cHusband and co-wives do not live in same village.

Intra-household social status and maternal time allocation

Table 9 shows the specific distribution of women's time allocation on household tasks, child care and commercial activity and also indicates the percentage of observation time women in each status category were spending within the physical limits of their marital families' compounds. Daughters-in-law, not surprisingly, carried out household chores for a greater proportion of time than women in any other status group and spent 82 per cent of the observation period within their marital families' compounds. Even though household tasks are, in theory, carried out on a rota basis, each woman was constantly involved in further household duties for her mother-in-law such as pounding millet, fetching water, and firewood or cleaning pots. Daughters-in-law spent over half their time in such activities

compared with women who lived with sisters-in-law in laterally structured households, who only spent 16 per cent of the observation time engaged in household duties. The latter, who lived with peers but unlike the daughters-in-law were in non-hierarchical households, spent only 56 per cent of their time actually in their husbands' households, and were more often to be found within their natal families or visiting friends and neighbours. Surprisingly, the heads with daughters-in-law were also carrying out a large amount of household work. This was, however, voluntary rather than obligatory, and most importantly consisted of labour over which they themselves had control. Table 9 also shows that women who lived with their sisters-in-law in laterally structured households were performing the fewest household tasks and the least child care but a much greater amount of personal commercial activity, trading condiments, kola nuts, batteries, sweets and medicines such as aspirin and chloroquine, within the village.

It seems that women who live in households with other women with similar claims to household resources, organize their time according to the presence or absence of a central resource keeper, the mother-in-law. This person controls the labour of women in hierarchical households and serves to focus their time and obligation more intensively within the physical confines of the household. Most importantly, the presence of a central resource keeper means that women who are obligated to her have a sanctioned channel to redirect to the higher echelons of the hierarchy financial and social responsibility during crises such as children's illnesses. Daughters-in-law therefore have less need for personal economic activity to provide them with cash in such emergencies, as they know that they can be helped by higher-status persons to whom they, and their husbands, are under an obligation. In addition, their labour obligations and intensive focus on the marital family, manifested by the large amount of time they spend within its boundaries, mean that they have little opportunity to pursue activities elsewhere for their individual gain.

However, women with peers in laterally structured households lack a mother-in-law to act as resource keeper, and yet live with other women who have a more-or-less equal claim on the household's resources. They therefore require economic independence as, unlike junior women in hierarchical arrangements, they do not have a socially sanctioned channel of access to household assets. Nor do they have an ability, by virtue of their social position and the structure of their household, to transfer responsibility and expenses to individuals at a higher level. Furthermore, the husbands of these women are themselves solely responsible for trying to support the extended family, unlike the husbands of the daughters-in-law, who are obligated to, but also supported by, their elderly fathers. Thus during crises, including children's illness, women who live with their sisters-in-law in laterally extended households can rely on their peers and husbands for advice and support but not for money: hence their high participation in commercial activity for their own gain. The illness profiles confirm that because of the combination of social support and autonomy associated with their status, they were able to treat their children much more frequently than other women. Table 6 shows that they paid for over half the therapies with their own cash and only infrequently received financial assistance from their husbands.

Table 9
Percentage of time spent in household tasks, child care and within the marital family compound by mother's social position in household

Number of women	One of several D-laws (N=5) %	Head with D-laws (N=2) %	Mother's social position in household			
			Alone (N=5) %	Sister-in-law (N=2) %	Maternal family (N=1) %	Female head (N=1) %

Time spent in household tasks	54	41	40	16	39	32
Time spent in child care	14	14	19	6	27	18
Time spent in commercial activity	1	—	3	24	13	—
Time spent in marital household compound	82	72	74	56	8	50

Time spent in household tasks: daughters-in-law vs. other married women. Wilcoxon ranked sum $p < 0.05$.
Time spent in household tasks: sisters-in-law vs. other married women. Wilcoxon ranked sum $p < 0.05$.
Time spent in commercial activity: sisters-in-law vs. other married women. Wilcoxon ranked sum $p < 0.05$.
Time spent in marital family compound: sisters-in-law vs. other married women. Wilcoxon ranked sum $p < 0.1$.

Status-related variation in the types of surrogate carers employed

Table 10 shows the characteristics of specific surrogate caretakers used by women in different status groups for their children during the observation periods. The table indicates that women who lived with their sisters-in-law in laterally extended households where there was no mother-in-law, exhibited very different patterns of care-giving from women living in vertically hierarchical households where they were obligated to their husband's mother. The data show that both these groups received very little help with child care from their marital female relatives within their households. The children of women who lived in lateral households with their sisters-in-law spent less than half their time even inside their fathers' households, and were cared for by their maternal relatives often in their mothers' natal families. By contrast, the children of daughters-in-law spent over 80 per cent of the time within the compound of their agnatic families but were cared for, not by their paternal grandmothers, and only briefly by their paternal aunts, but rather by their older sisters.⁹

Table 10

Maternal and surrogate care of children by mother's social position in household

Number of children	Mother's social position in household					
	One of several D-laws (N=5) %	Head with D-laws (N=2) %	Alone (N=5) %	Sister-in-law (N=2) %	Maternal family (N=1) %	Female head (N=1) %
Observed time child spent with						
Mother	61	65	63	24	66	68
Father	4	—	6	7	—	—
Brother	1	—	3	28	—	—
Sister	16	—	7	3	—	—

⁹ Obviously, the use of siblings as surrogate caretakers depends on whether siblings of the appropriate age reside in the household. Similarly the presence or absence of maternal natal kin determines their use as potential caretakers. For a description of each child's circumstances the reader is referred back to Table 8.

Paternal grandmother ^a	—	—	1	—	—	—
Paternal aunt ^a	2	—	4	—	—	—
Maternal grandmother/aunt	—	8	8	19	10	—
Neighbour	4	2	1	1	5	6
No one	11	24	6	19	16	26
Time spent in father's compound	83	82	70	35	—	86

^aMother's marital female relatives

Time spent being cared for by mothers:

Children of sisters-in-law vs. children of other married women: Wilcoxon ranked sum $p < 0.1$.

Time spent within father's compound:

Children of sisters-in-law vs. children of other married women: Wilcoxon ranked sum $p < 0.1$.

Children of daughters-in-law vs. children of other married women: Wilcoxon ranked sum $p < 0.1$.

Thus, an increasing intensification of household focus on the mother-in-law or resource keeper is inversely related to household permeability. Under these circumstances, individual activity is concentrated within the household confines, despite the fact that paradoxically, there is negligible interaction between marital female relatives within this limited range. Thus, for women such as daughters-in-law with peers, the structure of their immediate nuclear unit within the extended family, and particularly the presence of older female unmarried children, are their main resources for child care. Conversely, women in household environments where female labour and power relationships are less intensively focused, can move in and out of their household boundaries and exploit external household networks such as their natal kin more frequently on a daily basis.

Conclusion

'Ethnic' differences in mortality between the study populations do not reflect variations in beliefs about illness management and disease causation nor socioeconomic disparities, but rather result from real variations in women's social power within their domestic environments. Thus, lower Dogon mortality is a function of greater proportions of laterally structured households where women are free to pursue outside economic activity and yet have social support for household chores. Higher Fulani mortality reflects the more isolated nature of women's household circumstances, their lack of time and autonomy to become financially independent and their lack of social support within their domestic environments.

Most importantly, the study demonstrates that mothers have differing types and degrees of social and financial assistance at their disposal when their children become ill compared with those available for their daily care. Therefore, data which analyse only household determinants of children's illness management and ignore the nature of their daily care may be misleading, as mothers are entitled to different household resources, and indeed to resources from different households, depending on the perceived health status of their children.

Adherents to new models of household-economic behaviour and policy developers are increasingly asking 'who pays for the kids?' (Folbre 1992), and articulate that 'children's rights are implicit in their parents'—usually their mother's—marital status' (Bruce and Lloyd 1992:21). What the data from rural Mali show is that we should not just be asking who pays in terms of cash, but also who pays in terms of time? Examining 'who pays for the kids?' in monetary terms would indicate a degree of mutual support and cooperation between marital family members, particularly during children's illness. Examining who pays in terms of time, however, presents an entirely different picture. Although cash is received

from socially powerful individuals within the marital household, time is given by members of mothers' own nuclear units within their extended family, or from outside members such as their natal kin.

These data represent a mere 'snapshot' in the lives of particular women in certain households. The rights and responsibilities associated with specific status categories may change during a mother's reproductive years and with the social reproduction of her household: a woman may move from being a lone daughter-in-law to becoming a head with daughters-in-law within her reproductive life time. By contrast, she may remain in the same position her whole life, if her children form their own households on their marriage. Studies such as those concerned with explaining the clustering of child deaths (Das Gupta 1990) which assume a woman's rights and resources to be constant throughout her childbearing years fail to take into account that a mother's first and last birth may occur when she occupies a different status within her household. She thus may be subject to different obligations, and have access to different resources as she progresses through her reproductive career, because of the changing nature of her power and influence in her household environment.

Evidence from these communities indicates that women's social position within their family circumstances, in relation to each other, rather than in relation to men, is crucial in determining their access to household resources for child care, and in influencing their need and capacity for external independent economic activity. Thus while beliefs influence behaviour, the behaviours themselves are governed as much by access to, and control over, necessary resources, specifically information, time, labour and cash, as by appraisals of situational demands and notions of required or appropriate action. Examining aspects of household function and focus which govern these behaviours and the dissemination and control of information within the domestic environment among populations which have not yet begun mortality or fertility declines, may indicate how such reductions may be precipitated.

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Women's education, child welfare and child survival: a review of the evidence



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Abstract

This paper reviews recent evidence concerning the relative importance of women's education for child health, especially child survival in the Third World. Important regional patterns are uncovered, and particular attention is paid to discussion of the weaker associations observed in sub-Saharan Africa.

Introduction

This paper is concerned with the consequences of maternal education for the health of children, where health is interpreted in its broadest sense as complete physical, social, emotional, developmental and environmental well-being.

The importance of mothers' education for child survival through pathways other than enhanced socioeconomic status, was brought into focus by Caldwell's (1979) seminal paper on Nigeria. This paper argued that education of women played an important role in determining child survival even after control for a number of other factors, including such socioeconomic characteristics of the husband, as his educational level and occupation. Caldwell (1979) suggested several pathways whereby mother's education might enhance child survival. In increasing probable order of importance (according to Caldwell) these were: a shift from 'fatalistic' acceptance of health outcomes towards implementation of simple health knowledge; an increased capability to manipulate the modern world, including interaction with medical personnel; and a shift in the familial power structures, permitting the educated woman to exert greater control over health choices for her children.

During the 1980s our factual knowledge concerning the associations between maternal education and child survival at the micro-level expanded considerably as a result of the World Fertility Survey (WFS) program (for example, Hobcraft, McDonald and Rutstein 1984) and from a United Nations study which used both survey and census data (Mensch, Lentzner and Preston 1985). Both of these major studies showed that increased levels of mother's education were associated with improved chances of child survival in a wide range of developing countries: Hobcraft et al. (1984) covered 28 WFS surveys and Mensch et al. (1985) covered 15 countries; and there was some overlap in coverage. This association usually survived controls for a number of other socioeconomic variables, including the husband's education and occupation. The Hobcraft et al. (1984) study demonstrated that socioeconomic differentials in child survival widened with increasing age of the child and found the greatest consistency in fitted models for mortality between ages one and five, where there were strong suggestions that a model that included terms for both mother's and father's levels of education and the father's occupation had widespread applicability. Mensch et al. (1985) explored a wider range of covariates and found that on average about half of the gross effect of maternal education survived as a net effect after controls. They also found that the association of maternal education and child survival

was approximately the same in rural and urban areas, which was seen as consistent with Caldwell's hypothesized pathways, whereas the husband's educational level was associated with greater child-survival advantage in urban areas. Both studies suggested that the associations between mother's education and child survival were weaker in sub-Saharan Africa than in Asia or particularly Latin America, where socioeconomic differentials were generally larger. Hobcraft et al. (1984) also suggested that the husband's socioeconomic characteristics, especially education, were slightly more strongly associated with improved child survival in the sub-Saharan African countries. Both studies also suggested that there was no threshold level of maternal education that needed to be reached before advantages in child survival began to accrue; even a small amount of education was usually associated with improved chances of child survival, and the gains generally increased with increasing levels of education.¹ There is also overwhelming evidence that the strong and persistent associations of infant and child mortality with birth spacing are barely mediated by maternal education.

During the 1980s there were also a number of small-scale studies that tried to elucidate the pathways involved in lowering the mortality of children born to more educated mothers. Findings from these studies often appear contradictory, although it is possible that what we are beginning to accumulate is evidence that different pathways are important in different cultures.

Lindenbaum (1990) has stressed the apparent role of greater cleanliness among educated women in explaining differentials in child mortality in Bangladesh. Cleland (1990) reviews the very mixed international evidence on reported incidence of diarrhoeal episodes by levels of maternal education, including some further studies on Bangladesh; this review suggests that greater cleanliness, if it exists, often fails to be translated into lower frequency of diarrhoeal episodes.

A second pathway to receive considerable attention is the role of education in ensuring that the mother utilizes health services for her children. Again, Cleland (1990) concludes that

education may have a modest effect on health knowledge and beliefs, but a pronounced effect on the propensity to use modern medical facilities, and adopt modern health practices, because of a closer social identification with the modern world, greater confidence at handling bureaucracies or a more innovative attitude to life among women who have some experience of school (Cleland 1990:412).

A third pathway is that maternal education may be associated with greater emphasis on child quality, perhaps ensuring that fewer children are more likely to survive, have greater food and human capital investments and thus end up as higher quality citizens, being healthier, better educated, more affluent, and emotionally better developed. Evidence for this thesis is scant, although Levine et al. (1991), in a small study in Mexico, suggest that better educated mothers expect earlier intellectual and emotional development of their children. Moreover, Chavez, Martinez and Yaschine (1975) suggest that nutrition can play a critical role in making children more active, demanding and independent, thereby gaining more attention from the mother. However, there are also possible indications that educated mothers may become more effective at discriminating against little valued children. For example, Das Gupta (1990) found that the relative excess mortality of second and later daughters was greater for the children of the more educated mothers.

A final pathway to receive attention is perhaps best referred to as the empowerment of women through education. Cleland (1990) identifies three components to this empowerment, which he terms

¹ There were some exceptions where children of the uneducated appeared to have better survival chances than those born to women with one-to-three years of education; Hobcraft et al. (1984), suggested that this might result from data deficiencies.

instrumentality, social identification, and confidence. Instrumentality is the ability to manipulate and feel control over the outside world. Social identification is concerned with engagement with modern institutions and bureaucracies. Greater confidence permits the interaction with such officials and bureaucracies. Caldwell's original concerns with women's education altering power structures within the family should also be considered here. Most evidence for this pathway is indirect and can be summarized thus: educated women make greater use of health services for themselves and their children; hence they are empowered.

Despite a decade of attention to pathways, the evidence is still not clear about which pathways are important where, and even leaves room for doubt as to whether the strong associations of child survival and access to health care with levels of women's education are causal. For example, the study by DaVanzo and Habicht (1986) strongly suggests that little of the overall change in infant mortality in Malaysia from 1946 to 1975 could be attributed to changes in maternal education at the micro-level, even though a strong cross-sectional relationship was apparent at different points in time. Ewbank and Preston (1990) and Woods, Watterson and Woodward (1989) have both extended findings on links between child mortality and maternal education to around 1900 in the developed world and suggested that the weaker associations observed were due to the lack of access to facilities and modern medical knowledge which were simply unavailable at that time. However, studies which have tried to examine the links between maternal education and service accessibility in determining health outcomes in the Third World have had very mixed success in elaborating such links.

Life events of the mother with consequences for children

There are a number of associations with education of women that are not widely considered in the demographic literature on child survival (and child welfare, such as it exists).

Firstly, educated women tend to marry later and to have their first births later. If this delay moves the first birth beyond the teenage years, especially beyond age 18, the women themselves are more likely to survive the hazardous first birth and the first born child is also more likely to survive. Hobcraft (forthcoming) summarizes the excess risk for first born children to teenage mothers as being about 40 per cent, when averaged across 25 Demographic and Health Surveys.

Educated women generally experience lower rates of maternal mortality, both on a per birth basis and as a result of having fewer children. Loss of a mother can be potentially disastrous for her children's survival chances and for their future welfare, although elaborate fostering mechanisms exist in parts of sub-Saharan Africa. Regrettably, our information on the differentials in maternal mortality by educational level is scant, as is evidence on the consequences for the children. Part of the reason for such limited information is that retrospective surveys and population censuses, which are our main source of national-level information on survival, only include surviving women. Nevertheless, there is the possibility of exploiting census reports on children ever born and surviving to men, rather than women, cross-tabulated by responses on spousal survival to address this issue.

Graham (1991) gives estimated lifetime risks of maternal death. In a typical sub-Saharan African country the overall level of maternal mortality is about 650 per 100,000 live births. With a total fertility of about six births per woman, this translates into a lifetime risk of maternal mortality of about one in 20. If an educated woman experiences maternal mortality at about 300 per 100,000 live births and has an average of four children, her lifetime chance of death would be only one in 70. Put another way, 50,000 out of every million families where the mother was uneducated would be motherless; for educated mothers, some 14,000 families would be motherless. If we assume, for simplicity, that mothers who die average 3.5 and 2.5 children at the time of their deaths, there would be 175,000 motherless children in the million families with uneducated mothers and 35,000 motherless children in the million families with educated mothers. If maternal mortality were lowered to a still rather high and

unacceptable level of 100 per 100,000 live births, with each surviving mother averaging three births, the lifetime risk for the woman is reduced to about one in 330, and there might only be 6,000 maternal orphans in 3,000 motherless families among a million families. While these figures are illustrative, they do show that very large differences can arise in levels of orphanhood. For this illustration, risks of maternal death are assumed to be unvarying with age or parity, which leads to an understatement of probable true differentials; women are assumed to have 1.2 times as many pregnancies as births.

Since uneducated mothers tend to have larger families when they do survive and to begin childbearing earlier, their children are more likely to suffer the excess-mortality risks associated with childbearing too early or too late.

An element in determining the survival of the mother and the birth outcome is likely to be the extent to which the mother receives prenatal care, tetanus toxoid vaccination, and the quality of assistance at delivery. New evidence is beginning to accumulate fast on differentials in such care before and around the time of delivery from the Demographic and Health Surveys (DHS), although much analysis remains to be done. Stewart and Sommerfelt (1991) provide summary information on these variables for 25 DHS surveys, but their multivariate analysis only covers three countries, Bolivia, Egypt, and Kenya. Overall levels of prenatal care vary substantially from 25 per cent of births in Morocco to over 90 per cent in Zimbabwe, Botswana, Sri Lanka, Dominican Republic, and Trinidad and Tobago; for Bolivia, Egypt and Kenya these levels are 45, 53, and 77 per cent respectively. The percentages of deliveries attended by a trained person are also highly variable, from fewer than 33 per cent in Burundi, Morocco, Guatemala, and Mali up to 90 per cent or more in Dominican Republic and Trinidad, with the three study countries being at 42, 35, and 50 per cent respectively. Women had received tetanus toxoid during fewer than 20 per cent of their pregnancies in Egypt, Guatemala, Peru, and Mali; and in more than three-quarters of their pregnancies in Kenya, Botswana, Zimbabwe, Sri Lanka, and Dominican Republic; in Bolivia, Egypt, and Kenya the percentages were 20, 12, and 89 respectively.

Stewart and Sommerfelt (1991) show large differences according to the woman's level of education for prenatal care in Bolivia and Egypt, but much smaller ones in Kenya. After control for several other variables, urban-rural residence, a possessions index, husband's education, parity, age at delivery, multiplicity of births, and prior family-planning use, the woman's own educational level emerged as the most powerful predictor of prenatal care for Bolivia and Egypt, and weakly significant for Kenya, where only urban/rural residence proved a significant predictor. The association of prenatal care with the woman's education was more powerful in urban areas than in rural areas for both Bolivia and Egypt. A more elaborate comparative analysis by Bicego and Boerma (1991) found huge, but immensely variable, differentials in the extent of failure to receive prenatal care by level of education. After controls for an index of economic status and a range of biodemographic variables, the risk of receiving no prenatal care was from 55 to 1,300 per cent higher among uneducated women than those with some education. Since prenatal care did little to account for mortality differentials, it is by no means clear what to make of these vast differences in access.

In all three countries studied by Stewart and Sommerfelt (1991), educated women were much more likely to be attended by a trained person at delivery. Once again, these associations remained powerful after control for the same set of other factors, being strongest in Bolivia. For both Bolivia and Egypt, the net association with the woman's level of education was the largest source of difference, whereas urban-rural differences were again marginally stronger in Kenya. Once again, the association with the woman's education was more powerful in urban areas for Bolivia and Egypt.

Differentials in tetanus-toxoid immunization by level of woman's education were small for both Egypt and Kenya, but quite substantial for Bolivia. No multivariate analysis was pursued by Stewart

and Sommerfelt (1991) on this outcome. However, Bicego and Boerma (1991) showed remarkable differences between urban and rural strata in the relationship between female education and non-use of tetanus toxoid during pregnancy. The educational advantage seems much greater in rural areas than in towns. Bicego and Boerma speculate that immunization is (correctly) perceived as unnecessary by the educated urban elite, but that female education provides the knowledge and the means to gain access to such health interventions in rural areas.

Maternal education and child survival: new evidence

Much fresh evidence on associations between maternal education and child survival is appearing from the analysis of data from the Demographic and Health Surveys. Results from some substantial comparative studies are summarized here.

Multivariate analysis

Hobcraft (forthcoming) discusses results from several multivariate analyses for 25 DHS surveys, which incorporate mother's education as one of the covariates of child mortality, taken here as survival to age two. The general conclusions concerning the associations between maternal education and survival to age two do not differ substantially among the various models considered. The gross effects of mother's education are altered very little by controls for the timing and spacing of births, which is the major concern of Hobcraft's study. This serves to confirm earlier conclusions from WFS data. The greatest attenuation

Table 1

Average odds ratios for continental groups; socioeconomic model

Gross	Mother's education (yrs)			Father's education (yrs)			Manual	Father's occupation	
	1-3	4-6	7+	1-3	4-6	7+		Sale/ Serv.	Profess Cleric.
Americas (9)	0.75	0.52	0.31	0.88	0.75	0.52	0.84	0.71	0.53
North Africa (3)	0.79	0.66	0.34	0.85	0.81	0.47	0.87	0.80	0.60
SS. Africa (10)	0.92	0.77	0.56	0.95	0.80	0.65	0.84	0.79	0.61
Asia (3)	0.98	0.66	0.41	1.14	0.78	0.49	0.77	0.91	0.51
Overall (25)	0.85	0.65	0.42	0.94	0.78	0.57	0.83	0.78	0.56
Net (including control of region)									
Americas	0.79	0.60	0.38	0.90	0.91	0.85	1.09	0.92	0.85
North Africa	0.88	0.83	0.49	0.95	0.91	0.71	0.87	0.88	0.86
SS. Africa	0.99	0.83	0.68	0.94	0.82	0.77	0.94	0.90	0.80
Asia	1.02	0.72	0.54	1.14	0.86	0.72	0.97	0.92	0.86
Overall	0.90	0.73	0.52	0.95	0.86	0.78	0.99	0.91	0.84
Ratio (Net/Gross)									
Americas	1.05	1.15	1.26	1.02	1.20	1.62	1.30	1.29	1.61
North Africa	1.11	1.27	1.43	1.12	1.13	1.52	1.00	1.10	1.43
SS. Africa	1.08	1.08	1.21	0.99	1.03	1.19	1.11	1.13	1.32
Asia	1.04	1.09	1.33	1.00	1.10	1.46	1.25	1.02	1.70
Overall	1.06	1.11	1.22	1.01	1.10	1.38	1.19	1.17	1.48

Number of countries									
Statistical significance									
One per cent	2	8	14	0	2	6	1	0	1
Five per cent	5	10	19	2	4	7	2	4	5
		(of 25)			(of 24)			(of 21)	
Values of odds ratios									
< 1.0	20	23	25	16	20	23	13	19	19
< 0.6	0	6	18	1	1	2	0	0	2
		(of 25)			(of 24)			(of 21)	
Countries included:									
Americas:	Bolivia, Brazil, Colombia, Dominican Republic, Ecuador, Guatemala,							Mexico, Peru,	
Trinidad and Tobago.									
North Africa:	Egypt, Morocco, Tunisia.								
Sub-Saharan Africa:	Botswana, Burundi, Ghana, Kenya, Liberia, Mali, Senegal, Togo,							Uganda,	
Zimbabwe.									
Asia:	Indonesia, Sri Lanka, Thailand.								

Source: Hobcraft (forthcoming)

of the gross effects occurs for his 'socioeconomic' model, which incorporates mother's education, father's education, father's occupation, and region of residence as the covariates of survival to age two. Information on women's occupation or work status is not easily used in these comparative analyses (see Hobcraft et al. 1984), because the information available is often extremely limited, some women do not work, and definitions of women's work status apparently differ in unpredictable ways across WFS and probably DHS surveys. The results from the 'socioeconomic' model are considered briefly here.

Table 1 shows average odds ratios for groups of countries resulting from fitting logistic models to predict the chance of survival to age two for each country in turn. The first panel shows the average gross odds ratios, that is without control for the other socioeconomic variables. In gross terms, the overall average odds of dying before age two for a child born to a mother with seven or more years of education are only 42.5 per cent compared with the children of uneducated mothers. The extreme contrasts for the other socioeconomic factors are smaller, with the odds ratio being 56.6 per cent for the children of fathers with seven or more years of education compared with those whose fathers are uneducated, and 56.3 per cent for the contrast between children of professional and clerical worker fathers and those whose fathers are in agriculture and fishing. Thus, there is apparently greater differentiation by maternal education than by the other factors.

Examining the overall average values for the net odds ratios, shows that all are attenuated somewhat by the control for the other factors shown and for region within country. However, the attenuation is mild for mother's education, with the most advantaged group of children having odds of death which average only half of those for the most disadvantaged group on this dimension. The attenuation is much greater for the father's education and his occupation, with the odds of death for the most advantaged group only being about 80 per cent of that for the least advantaged. These findings strongly suggest that maternal education exerts the most powerful influence on child survival among the few socioeconomic variables considered here.

This conclusion is confirmed by a more detailed examination of the results for individual countries, which is summarized in Table 1. The parameters associated with the effects of maternal education are far more likely to be statistically significant, with 19 reaching a five per cent level and 14 of these being significant at the one per cent level for the contrast between the most and least educated group. Five of the six countries for which this contrast is not significant are in sub-Saharan Africa: Botswana, Ghana, Mali, Uganda, and Zimbabwe; the other exception is Trinidad and Tobago, which

has the smallest sample size. Moreover, the odds ratios for the children whose mothers have had only four to six years of education reach statistical significance more frequently than do those associated with any of the father's characteristics. Similar conclusions can be drawn from the magnitude of the odds ratios associated with the variables considered. In the majority of countries the odds ratios associated with parents having higher socioeconomic status are below one, but this occurs more frequently for all categories of mother's education. Even more importantly, very few odds ratios are below 0.6 for the father's characteristics, only one or two in each category, suggesting chance occurrences; yet fully 18 of the 25 countries have net odds ratios below this level for the contrast between the children with the most and least educated mothers. The net odds ratios for this contrast are always below 0.5 in the countries of the Americas; and always below 0.6 in the few North African and Asian countries included here.

Weak effects in sub-Saharan Africa

However, only three of the sub-Saharan African countries have odds ratios for the extreme maternal education contrast which are below 0.6 (Burundi, Senegal, and Togo); the remaining seven include Kenya and Liberia at just over 0.6, Mali, Zimbabwe, Botswana, and Uganda at around 0.75 to 0.8, and Ghana at 0.95. Earlier studies (e.g. Hobcraft et al. 1984; Mensch, et al. 1985) had indicated that the association of child survival with maternal education was weaker in sub-Saharan African countries than elsewhere, but the findings here are more powerful than hitherto. We can only speculate as to why this substantial difference arises.

The apparently weaker effect of maternal education on child survival does not arise simply because of lower penetration of education in African countries, since several of the countries considered here have quite advanced educational systems. Over a third of births in Botswana, Ghana, Kenya, and Zimbabwe occur to mothers with seven or more years of education during the period of two to fifteen years preceding the DHS surveys used in the analysis. Only Sri Lanka and Trinidad and Tobago exceed these proportions who are relatively highly educated. Of course, several of the sub-Saharan African countries included in the analysis have very low levels of education: fewer than seven per cent of births occurred to women with seven or more years of education in Burundi, Mali, Senegal, and Togo. But this is also the case for Morocco and Guatemala. So the low differentiation in child survival by maternal education in sub-Saharan Africa cannot be ascribed to fundamental structural differences.

Caldwell (1990) draws attention to the much greater autonomy of women in sub-Saharan Africa than in many Asian and Muslim societies. He might thus go on to argue that the effects of maternal education for child survival are weaker in sub-Saharan Africa because the key empowerment aspects within the family are less relevant. But this ignores the even greater differentiation in Latin America, where women also have considerable autonomy.

Several of the sub-Saharan African countries considered here have significant levels of child fostering or of labour migration. Perhaps these aspects of child-care practice, including the level of surrogate care, interact with mother's education in a way that means that a few years of education leads to higher risks of child death than for the children of uneducated mothers, for example by disrupting traditional practices.

Perhaps health infrastructures are weaker in sub-Saharan Africa, thereby inhibiting the ability of more educated women to take advantage of their human capital in the health environment. But once again this argument can hardly be applied throughout the diverse range of sub-Saharan African societies considered here. Botswana, Kenya, and Zimbabwe have fairly low levels of child mortality by Third World standards, with fewer than 100 children per thousand dying by age five (see Hobcraft 1991); these countries have achieved mortality levels which are comparable to those achieved in the other continental groupings considered here. Undoubtedly, many of the sub-Saharan countries considered do

have very high levels of child mortality; among the 25 DHS countries considered, the only ones with estimated levels of mortality before age five of above 150 per thousand for the 15 years preceding the surveys come from this region: Mali (295), Liberia (232), Senegal (223), Burundi (192), Uganda (184), Togo (160), and Ghana (153). But Burundi, Senegal, and Togo are the only three countries of the region which do exhibit low odds ratios of death (<0.6) for the children of the most educated group of mothers compared with those born to uneducated mothers; and Liberia is only just above this level.

Ghana and Uganda in particular experienced periods of unusually extreme hardship during the fifteen or so years covered by this analysis. Perhaps the very weak association of child mortality with mother's educational level in these two countries is in part a reflection of these experiences? The next section looks at recent evidence on differentials in health-service utilization and nutritional status: perhaps sub-Saharan African countries achieve a greater homogeneity of provision of whatever health services they have, possibly associated with outreach programs of immunization overcoming the traditional advantage associated with having an educated mother?

One further possibility which must be mentioned is the issue of data quality. The weak associations with levels of maternal education do not simply occur for the poorest and least educated sub-Saharan African societies. Is there any reason to suppose that reporting of child mortality is worse in Botswana and Zimbabwe, relatively advanced societies in this context, than in Senegal or Togo? This also seems an implausible explanation.

Thus, despite a clearly weaker association between levels of maternal education and child survival in sub-Saharan Africa, we have only been able to speculate as to the reasons for this. A number of plausible explanations have been raised here, but none found convincing. This issue will be a focus of further research.

Further multivariate analysis

We now turn to a brief examination of the results of the comparative analysis by Bicego and Boerma (1991), which covers experience from up to 17 DHS surveys. This study fitted logistic-regression models to neonatal mortality and hazards models to mortality from ages one to 24 months. Only births during the five to six years preceding the surveys were included in the analyses, mainly because they go on to examine health-service utilization information which was only covered for recent births. The main focus of the analysis was upon maternal education and child survival. Countries were divided into two groups: those with sufficient numbers of births occurring to women with secondary or higher levels of education (Bolivia, Colombia, Dominican Republic, Guatemala, Egypt, Thailand, Sri Lanka, Ghana, Kenya, Uganda, and Zimbabwe), where three education groups were maintained, no education, primary, and secondary; and those with lower levels of education (Morocco, Tunisia, Burundi, Mali, Senegal, and Togo), where only the contrast between mothers with no education and those with some was maintained. The analyses consisted of the estimation of a series of models, which progressively introduced 'blocks' of control variables. Only the coefficients for maternal education are presented. The first model simply includes maternal education as an explanatory variable, giving the 'gross' effects. The second model controls further for whether the household has piped water, whether it has some kind of latrine, and for an index of household economic status, derived from information on possession of a radio or television, of motorized transport, and a non-dirt floor in the dwelling unit. The third model introduced controls for birth order, preceding birth-interval length, and age of the mother at the birth; 'bio-demographic' or 'family formation' controls. Their fourth model includes indicators as to whether or not the mother received prenatal care and tetanus toxoid during the relevant pregnancy. A final model introduces an interaction between the maternal education effect and rural-urban residence in order to assess whether the relationship is different.

Bicego and Boerma (1991) confirm once again that neonatal mortality is generally less sensitive to maternal education than mortality in the next 23 months of life. But they also note that Bolivia, Colombia, Mali, and Burundi provide exceptions to this generalization. In contrast to Mensch et al. (1985) they find a stronger relationship of maternal education with child survival in towns than in rural areas. Whether this contrast in findings is related to Bicego and Boerma (1991) not controlling for paternal education or to their only interacting maternal education with urban-rural residence remains open to question. Mensch et al. (1985) found no difference between urban and rural areas in the relationship of child mortality to maternal education, but did find stronger effects for father's education in urban areas; they also fitted separate models to the rural and urban strata, thereby interacting all variables with urban-rural residence. Bicego and Boerma (1991) see education as being more important in towns partly because of the greater complexity of bureaucracy and social structure and partly since urban dwellers may more easily escape traditional family power structures, enabling them to make more effective use of educational advantage. Somewhat curiously, they see their finding as indicating that education is not important for overcoming problems of physical access to services, since the advantage is not greater in low-access rural areas; but a certain density of service provision may be essential for any access and this may occur more easily in towns.

The gross effects of maternal education on child survival were reduced by 30 to 50 per cent by controls for the economic index and prior use of health services. This finding suggests that a sizeable fraction of the gross effect of maternal education on child survival is operating to capture more general socioeconomic advantage, although more than half of the effect is not attributable to these indicators.

Controls for family-formation patterns generally increased slightly the advantages of higher maternal education for child survival, although there were exceptions. Only Kenya showed a large increase in the education effects, suggesting that the less educated have the most favourable patterns of family formation there. In general, though, the association of these family-formation variables with maternal education proves weak, as in many other studies.

Addition of the health-service use indicators reduced the net maternal education effect in most countries, but only substantially so in Zimbabwe, Bolivia, and Dominican Republic (and, perhaps, Morocco). Of course, this prior health-service utilization is at least partly attributable to the mother's education, so that the indirect effect of maternal education through these indicator variables should still be properly accounted as part of the total effect of maternal education on child survival. What is being captured here is thus one of the pathways through which higher education leads to better child survival.

The health and well-being of children

The DHS has also provided us with a considerable body of new information on differentials in health status of children. Information is collected on use of prenatal care, tetanus-toxoid immunization during pregnancy, and type of care at time of delivery for all births during a five-to-six year period preceding the surveys. For surviving children only, further information is collected concerning height and weight, extent of immunization, and childhood morbidity and treatment patterns. Once again, this rich mine of information is only partly used to date.

Growth faltering

Bicego and Boerma (1991) continue their comparative analysis referred to in the previous section to provide useful information on maternal education and growth faltering for children aged 3-23 months at the time of the surveys. Low height for age ('stunting') is widely regarded as indicative of adaptation to routine and chronic malnutrition, but not a key indicator of being at risk of death. Thus, the study of stunting is likely to provide important indicators of the likely longer-term health of children into adulthood and perhaps indicate probable future small stature with potential higher risk of low birth-

weight babies and consequent higher risks of child mortality. Bicego and Boerma (1991) find that stunting in early life is strongly related to maternal education, but not as strongly as mortality risks between one and 24 months. Control for the index of economic status reduces the excess risks for the children of the less-educated mothers by about 50 per cent, suggesting that economic status is important in determining long-term nutrition. However, even after controlling for economic status, children of women with no education are at least twice as likely to be stunted in Colombia, Dominican Republic, and Thailand as children of secondary-educated women. It would be interesting to have these analyses further controlled for the socioeconomic characteristics of the father, for example education and occupation.

Low weight for age is usually more closely associated with likely future mortality, reflecting short-term nutritional crises to a greater extent than stunting. Bicego and Boerma (1991) find that the gross relationship of being underweight is of the same order of magnitude as that for mortality between one and 24 months. But control for the index of economic status reduces these effects more substantially (by close to 60 per cent on average), such that the net effects of maternal education on low weight for age are a little weaker than the net effects on stunting.

Control for prior use of health services only accounts for about ten per cent of the excess risk of being underweight and about 20 per cent of the effect for stunting. These findings suggest that the greater propensity to use health services among the educated mothers, whether as a result of education *per se* or other related factors, does not play a critical role in determining or reducing growth faltering, although perhaps playing a small part.

Immunization

We now turn to some of the information on differentials in immunization of children (see Boerma et al. 1990). The DHS results serve to reiterate and confirm the huge changes under way in the coverage of immunization. Among children aged 12-23 months at the time of the DHS surveys about 80 per cent were reported to be fully immunized (BCG, three DPT, three or more polio, and measles) in Botswana, Zimbabwe, and Tunisia; around two-thirds in Kenya and Sri Lanka; and over half in Egypt, Morocco, Brazil, and Colombia. Fewer than 20 per cent of such children were fully immunized in Mali, Liberia, Senegal, Bolivia, and Guatemala; about a third in Ghana, Uganda, Thailand, and Peru; and 44 per cent in Burundi. Among children born to mothers with at least secondary schooling, over 90 per cent of those aged 12 to 35 months at the time of the DHS surveys had ever been vaccinated in 20 of the 23 countries considered by Boerma et al. (1990). The only exceptions were Uganda and Liberia, both at 88 per cent, and Mali. But children of women who were uneducated were far less likely to have ever been immunized, although levels still exceeded 90 per cent in nine countries. Fewer than three-quarters of such children had ever been immunized in Ghana, Liberia, Mali, Senegal, Uganda, Thailand, and Bolivia. The difference in immunization coverage between children of the uneducated and those of the educated was below ten percentage points in ten of the 23 countries, and only exceeded 20 percentage points in Ghana, Liberia, Mali, Senegal, Uganda, Thailand, and Bolivia. Increased coverage of immunization of children can only narrow these differentials.

Information on specific immunizations in Boerma et al. (1990) is restricted to children aged 12-35 months with a health card. Fractions of the population covered by health cards vary enormously and there are often large differentials in such coverage by the mother's level of education. In general, the extent of coverage by health cards increases with level of mother's education and often quite substantially. For example, the extent of coverage increases by at least 25 percentage points from children of uneducated mothers to those of secondary-educated mothers in Ghana, Senegal, Thailand, and Dominican Republic. But coverage decreases with increasing education of mother in Botswana and Zimbabwe, and drops away for children born to mothers with secondary schooling in several other

countries. This makes it extremely hazardous to interpret differentials in immunization levels among those with a health card.

As a general rule, over 90 per cent of children with a health card have received their first DPT immunization. This coverage level only drops below 90 per cent in Liberia (62%) and Egypt (86%) for children born to mothers who had primary education; and for children of uneducated mothers in Liberia (68%), Senegal (83%), Egypt (76%), Bolivia (82%), and Brazil (88%). Differentials are thus generally small, with the few exceptions noted here. But coverage among this group with health cards for the third DPT vaccination is much more variable. Even for children born to women with secondary or higher education, fewer than 80 per cent received DPT3 in Burundi, Liberia, Senegal, Bolivia and Guatemala. Among children of uneducated women with health cards 80 per cent or more received DPT3 in Botswana, Kenya, Zimbabwe, Tunisia, Sri Lanka, and Thailand. Differentials in coverage by level of maternal education were thus generally small for these countries. However these differences spanned over 30 percentage points in Ghana, Senegal, Uganda and Brazil; and also exceeded 20 percentage points in Liberia, Egypt, Morocco, Bolivia, Colombia, and Peru.

Measles immunization for children with a health card reached about 90 per cent of those with uneducated mothers in Botswana, Zimbabwe, and Tunisia, but was below 80 per cent in the 17 other countries covered by Boerma et al. (1990). Education differentials in extent of measles vaccination were usually in the 10-to-20 percentage points range; but were lower in Botswana, Burundi, Zimbabwe, Tunisia and reversed in Thailand and Guatemala; and slightly above 20 percentage points in Ghana, Kenya, and Egypt.

In many countries, immunization levels have increased very rapidly over recent years. As these reach saturation levels socioeconomic and other differentials in coverage inevitably become small. It remains an open but intriguing question how far the very high and even coverage by levels of maternal education in Botswana and Zimbabwe play a role in producing the low mortality differentials. The outreach nature of mobile vaccination teams undoubtedly serves to reduce the access advantages normally associated with socioeconomic advantage, including maternal education. Perhaps we are beginning to see the results of a new 'radical egalitarian' form of health provision in parts of Africa which is achieving smaller differentiation by socioeconomic status than in a classic case like Sri Lanka (Caldwell 1986); and perhaps this equality of treatment is being achieved medically, despite the lack of the same political will for equality. Or perhaps this is just reflective of major and rapid development. Answering these questions further is beyond the scope of the current paper.

Morbidity and treatment

Differentials in the prevalence of diarrhoea during the two weeks preceding DHS surveys for children aged six-23 months are given by Boerma, Sommerfelt and Rutstein (1991). The differentials in reported incidence of diarrhoea show unexpected features and are often somewhat counter-intuitive. The varied pattern of these differentials no doubt reflects a combination of differing propensities to report, the salience of diarrhoeal episodes for the mother, and real differentials in incidence. In five out of 23 countries studied the prevalence of diarrhoea was considerably higher (at least 20%) among children of uneducated women than among those born to mothers with primary schooling; but prevalence was also ten or more per cent lower for four countries. In 14 out of the 23 countries children of primary school mothers had a prevalence of diarrhoea which was higher by more than 20 per cent than for children of mothers with secondary schooling; in only one country was the difference more than ten per cent in the opposite direction. These differentials by education of the mother, especially the contrast associated with secondary schooling, were among the largest and most consistent of a wider range that were examined, including possession of a radio, piped drinking water, and toilet facility. The greater strength of association of reported incidence of diarrhoea with maternal education than with

these other variables is strongly suggestive that Cleland's (1990) dismissal of Lindenbaum's (1990) hypothesis was both unfounded and premature, since he was using the same DHS evidence.

There are massive variations in the extent of knowledge concerning oral rehydration salt (ORS) packets among mothers of differing educational levels, although some countries provide notable exceptions. In Botswana, Zimbabwe, and Egypt over 90 per cent of all mothers had heard of ORS packets; not surprisingly educational differentials are small in these countries. At the other extreme, fewer than half of the mothers had heard of ORS packets in Burundi, Mali, Togo, and Uganda. In Peru, only 25 per cent of uneducated mothers had heard of ORS, contrasting with 89 per cent of those with secondary schooling: a difference of 64 percentage points. The range was about 50 percentage points in Uganda, Mali and Guatemala, and also over 40 points in Burundi, Ghana, and Bolivia. Thus, differentials in knowledge of ORS by mother's education are among the most dramatic that we have found.

The fraction of diarrhoeal episodes to children aged 1-59 months in the two weeks preceding the DHS surveys which were treated with ORS packets was nevertheless fairly low for all levels of education of the mother. About 40 to 50 per cent of diarrhoeal episodes for children of mothers with secondary schooling were so treated in Botswana, Ghana, Togo, Thailand, Colombia, Dominican Republic and Trinidad and Tobago. Elsewhere, the levels of ORS treatment among secondary schooled mothers were lower still, being below 15 per cent in Liberia, Uganda, Brazil, Mexico and Peru. Educational differences were small in Botswana, where just over 40 per cent of children of all educational groups received ORS treatment. Differentials were absolutely large (over 20 percentage points) in Togo and Dominican Republic and relatively large in a number of other countries.

Information on prevalence of fever in the four weeks preceding the DHS surveys was collected only for ten sub-Saharan African countries and Colombia (Boerma et al. 1991). The differentials in reported prevalence of fever by mother's education are typically small. Overall prevalence levels are low in Botswana, Burundi, and Zimbabwe, being below ten per cent. Elsewhere the reported prevalence of fever is much higher, over 30 per cent, and in Liberia over 50 per cent; the figure for Senegal is also high, at 61 per cent, but reflects a question on incidence of malaria during the previous cold season. The low reported prevalence of fever in Burundi increases with increasing education of the mother. Moderate to significant gradients in the expected direction emerge for Senegal, Togo, and Uganda.

More educated mothers are generally more likely to take children with a fever to a medical facility; some 90 per cent do so in Botswana, where there is little differentiation. Differential use of medical facilities for feverish children is greatest in Ghana (33 percentage points) and in Togo and Colombia (both at 21 percentage points). With the exception of Botswana, a quarter to a half of uneducated mothers took a feverish child to a medical facility, contrasted with half to three-quarters of mothers with secondary schooling.

By and large there is strikingly little variation by levels of mother's education in the prevalence of a cough or rapid or difficult breathing in the four weeks preceding the DHS surveys, although overall reported prevalence levels vary dramatically among societies. Prevalence of a cough etc. in the four-week reference period is reported for over 40 per cent of children in Liberia, Zimbabwe, Egypt, Bolivia and Ecuador; and for fewer than ten per cent of children in Mali and Togo. Prevalence increases with increasing maternal education in Egypt.

Resort to medical facilities for treatment of coughs etc. is high in Botswana (82%) and Kenya (66%) and low in Burundi (36%), Togo (33%) and Bolivia (22%); elsewhere the range is 40-55 per cent. Educational differentials in access to medical treatment for coughs are small in Botswana, Kenya,

and Zimbabwe, being less than 12 percentage points. But differentials are large, over 20 percentage points, in Ghana, Egypt, Bolivia, and Colombia and nearly 40 percentage points in Togo.

Conclusion

With the striking exceptions of Botswana and Zimbabwe (for which some information is missing), there is fairly clear evidence of differentiation according to the level of the mother's education in the prevalence, but more especially in the treatment of childhood diseases. Educated mothers seem somewhat more successful at reducing the prevalence of diarrhoeal diseases, but their children seem equally at risk of fevers and coughs. Educated mothers are strikingly better informed about ORS packets and generally more likely to make use of these for diarrhoeal episodes. Educated mothers are also generally more likely to use medical facilities for treatment of diarrhoeal episodes, fevers, and coughs. We are not in a position to assess how far these differentials translate into better chances of survival for the children, since this information is only obtained for surviving children. Equally we can at the moment only speculate as to how far these differences, especially in treatment, translate into the improved nutritional status of children of educated women.

Similarly, more educated women are more likely to have initiated immunization and even more likely to have ensured that their children are fully vaccinated. Again it is impossible to assess from DHS data how far these differences translate into a mortality advantage, since this information is only collected for surviving children, although DHS II extends coverage. More educated women are also more likely to have received prenatal care, to have been immunized with tetanus toxoid during pregnancy, and to have their deliveries attended by trained personnel. Evidence suggests that some of the survival advantage accruing to the children of more-educated mothers is mediated through better prenatal care and tetanus-toxoid vaccination.

More-educated women also marry and enter motherhood later and have fewer children. As a consequence of their greater likelihood of using health services, of avoiding high-risk pregnancies and of experiencing fewer pregnancies, they are considerably less likely to die in childbirth and thereby orphan their children with deleterious consequences.

More-educated women also have fewer stunted children, who will be disadvantaged in later life through their adaptation to low-nutritional inputs, for example through producing lower-birthweight children of their own.

The evidence of improved survival chances of children with increasing education of the mother has been shown to be very strong across time and culture, although there are some exceptions which ought to be the focus of greater scrutiny. We have discussed, but failed to resolve, the apparently weaker association in several sub-Saharan African countries. The literature which tries to disentangle the pathways through which survival and health advantage accrues to children born to more educated mothers remains inconclusive.

As has been stressed throughout this paper, we can still not be sure that the associations of all of these key factors in child health with maternal education are causal. Associations are often attenuated by control for a limited range of other factors. Control for key unmeasured factors might reduce these associations with mother's education to negligible levels. However we must beware of accepting such findings without careful thought, because the additional factors may simply be capturing the pathways through which maternal education operates to produce differing health outcomes.

I have largely neglected issues of the role of maternal education in broader child development and welfare, mainly because my knowledge of a literature on such topics is scant. However Levine et al. (1991) illustrate some of these broader concerns for a small study in Mexico as does the assessment by Myers (1992). My neglect of child welfare and development issues is not because they are taken to be unimportant. On the contrary, this arena of positive health concerns for children in the developing

world should become the next major focus of demographers' attention, following the gradual spread into broader health concerns as evidenced by the recent DHS surveys and a widespread literature on small-scale and anthropological studies not given adequate attention here.

Evidence from the developed world strongly suggests important developmental advantages for children of more educated mothers: the move towards 'quality' children and away from emphasis on basic survival. Educational differentials in survival certainly persist in the developed world (Valkonen 1987) and a massive literature assesses disadvantages and relative welfare of children in relation to mother's education among other explanatory variables (see, for just one example, Robins and Dickinson 1985).

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Maternal education, female labour force participation and child mortality: evidence from the Indian census*



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Abstract

The objective of this paper is to examine how child mortality changes with different levels of maternal education and to quantify the impact of maternal education and female labour force participation. Child mortality gradients, according to years of education, are rather steep at the primary education level for both male and female children. In post-primary stages of education incremental gains in mortality reduction are almost non-existent. Child mortality is inversely related to both maternal education and female labour force participation but disaggregated analysis showed that female labour force participation has no impact on child mortality among females with fewer than seven years of education. The relative impact of maternal education on child mortality is three times stronger than that of female labour force participation. Excess female child mortality prevailing in certain parts of India also has an inverse relationship with the length of mothers' education, and female labour force participation. Female labour force participation has a stronger influence on excess female child mortality than on absolute child mortality. The evidence in the paper lends support to Bardhan's hypothesis on excess female child mortality.

Introduction

This paper seeks to document the association between the length of mother's education and child mortality $q(5)$ as revealed in the Indian census data. The paper focuses mainly on how the strength of the inverse relationship between child mortality rates and mother's education varies with the duration of that education (henceforth referred to as the mortality gradient) in different states of India. It also examines the impact on child mortality of female labour force participation at different levels of education. The paper also examines the related question of excess female child mortality and the levels associated with different levels of maternal education and the female labour force participation at those levels thereby testing the validity of Bardhan's hypothesis on the relationship between the excess female child mortality rate and female labour force participation rate (Bardhan 1988).

I first review the existing evidence on the relationship between maternal education and child mortality. Next I present data on child mortality for different states of India and analyse the interstate differences in the level of mortality and relative mortality risks at different stages of maternal education. Finally, I examine the different impacts of the length of mother's education and female labour force participation and discuss the issue of excess female mortality.

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Female education, labour force participation and child mortality

Overwhelming micro- and macro-level evidence suggests a negative association between maternal education and child mortality (see Cochrane, Leslie and O'Hara 1980; Cleland and van Ginneken 1988; Cleland 1990). It may be useful to recapitulate the major routes of causation identified by the earlier studies before attempting to review the possible influence of female labour force participation on child mortality. The surveys indicate that the way in which maternal education influences child mortality is fairly complex and has three different facets. First, the observed relationship between maternal education and child mortality could partly be due to certain independent factors associated with education, such as different fertility behaviour and higher economic and social status, which reduce mortality risk. Secondly, education itself can have an independent influence on child mortality by promoting better child-care practices at home and more intensive use of preventive and curative health care. Finally, certain extraneous factors may either enhance or suppress the overall strength of the relationship between child health and maternal education. What is observed is an amalgam of these three routes of causation.

Part of the observed association between maternal education and child mortality may be due to certain independent factors connected with educated mothers. Different fertility behaviour and better socioeconomic status are often cited as important associated factors. The fertility behaviour of educated mothers minimizes the child mortality risk associated with birth as they tend to have children when they are neither too young nor too old; they also may be better at spacing their births. All these factors are known to reduce the child mortality risk. Similarly, with higher education, women are likely to have higher incomes and better social status either through their direct participation in the labour market or through the higher probability of being married to wealthier men. Studies using World Fertility Survey data clearly show that education has a strong favourable effect on child mortality independent of the influence of different fertility behaviour and better socioeconomic status (Hobcraft, McDonald and Rutstein 1984; Cleland and van Ginneken 1988).

Mother's education affects child survival in two main ways: through better child-care practices and higher standards of hygiene at home, and more rational and greater use of preventive and curative medical services (Mosley and Chen 1984; Cleland and van Ginneken 1988). The first way is known as 'the household production of health' in the health-economics literature (Grossman 1972). It is hypothesized that the effectiveness with which basic child-health-promoting inputs, such as personal hygiene, prenatal and postnatal care, and feeding practices are combined, improves with the level of education of the mother. It is also argued that education gives greater independence to the mother which will help her take child-health-promoting decisions without any hindrance (Caldwell 1986). The second important pathway of influence is through the superior health-seeking behaviour of educated mothers. There is considerable empirical evidence, from the less developed countries in all parts of the world, that the propensity to use preventive and curative health services for self and children is high among educated mothers. Educated mothers are also found to have superior knowledge of diseases and they seek timely treatment more often (see Cleland and van Ginneken 1988). However, some studies deny superior health-care knowledge on the part of educated mothers, particularly among those with lower levels of education (Caldwell, Reddy and Caldwell 1983; Lindenbaum, Chakraborty and Elias 1985). To sum up, the available evidence indicates a strong and independent association between mother's education and child health, but the exact mechanisms through which it operates are not yet clear.

A number of external factors influence the strength of association between maternal education and child mortality. The overall strength of the association is greater among children in the age group three to seven years than among infants (Cleland and van Ginneken 1988), because biological factors rather

than child-care practices, including breastfeeding, play an important role in determining mortality among younger children. As they grow, the influence on health of environmental factors and child-care practices becomes important. Further, the influence on mortality differentials of the improved availability of basic public health facilities such as clean drinking water, good primary health facilities and sanitary disposal of human and animal wastes is found to be indeterminate (Cleland and van Ginneken 1988). In some societies, notably Costa Rica, China and Sri Lanka, improved access to better public health facilities has reduced the differences in child mortality rates between well educated and poorly educated mothers; but in many developing countries the mortality differentials due to maternal education do not change appreciably even after some improvement in public-health facilities have become more available. Thus, the supportive role of public-health infrastructure in strengthening the influence of maternal education on child health is not clear.

The relationship between female labour force participation and child mortality is even more complex. On the one hand, labour force participation can have an adverse impact on child health as the child will not get full attention from its mother and may even forgo the benefits of breastfeeding. This will probably happen in those families where because of poverty the mother must participate in the labour market soon after delivery. On the other hand, the mother's work force participation will enhance the family income which will in turn have a positive impact on child nutrition and health. Thus, the eventual outcome of female labour force participation on child mortality depends on the relative influence of these two routes of causation.

The empirical evidence on this issue also reflects this conflict. Many of the international studies cited in Dwyer and Bruce (1988), suggest an inverse relationship between child health and female labour force participation. Some studies suggest that, after controlling for family income, children are better fed and looked after in households where women work. In such households, a larger proportion of the family's earnings are expended on child care and related activities. A study by Kumar¹ (1977) in Kerala indicated a positive association between female earnings and child nutrition, but a similar association between paternal income and child nutrition was not found. Another study of poor households in Kerala and Tamil Nadu categorically states that

eliminating female work, even if it means some improvement in male employment, would have a very negative effect, not only on the females themselves, but also on the families they support (Mencher 1988:119).

On the contrary, some studies indicate a direct relationship between child mortality and labour force participation (Hobcraft et al. 1984; Basu and Basu 1991). For instance, a recent Indian study reported an adverse impact on child mortality of the mother's participation in the labour force (Basu and Basu 1991). The authors trace this to the inability of working mothers to give adequate care to infants and to breastfeed them properly.

Mortality gradient

As noted in the preceding section, the mortality level changes with the length of maternal education. How it changes is essentially an empirical question. A theoretical answer is difficult to find as the gradient is an outcome of the interaction between the length of mothers' education and a complex set of socioeconomic factors. This section presents empirical evidence on how child mortality $q(5)$ has changed with mothers' education in different states of India, and how the relative risk of mortality and mortality gradient have changed.

¹ As cited in Dwyer and Bruce (1988)

The study uses child mortality estimates based on the 1981 census data (India 1988). Other sources of information have serious drawbacks. India's civil registration system suffers from abysmally low coverage. Fairly accurate annual estimates of births and deaths at the state level are obtained through the Sample Registration System, but the sample size on which these estimates are based does not permit any further disaggregation of data. The Census of India gives disaggregated estimates of child mortality (India 1988) and the female labour force participation rate² (India 1987a) in different states according to five different levels of mother's education. The data on child mortality have been derived using the 'indirect estimation method' suggested by Brass, which is known to yield fairly accurate estimates (India 1988:1). Under this method, the child mortality estimates have been made using the 1981 census information on 'children ever born' and 'children surviving' cross-classified by the age of the mother. The mortality estimates for four age groups, q(1), q(2), q(3) and q(5), by five different levels of mother's education are available. The educational levels are: illiterates, literates and up to middle school (0-7 years of education); middle school and up to matriculation (7-10 years); matriculates and up to graduation (10-15 years); and graduates and above (15-17 years). The midpoints of the duration of education of the last four classes indicated above, namely 3.5 years, 8.5 years, 12.5 years and 16 years respectively, have been taken as the average length of education. Broadly speaking, the first two categories of education impart basic skills and in the latter two categories specific job-related skills are acquired.

The average level of child mortality, the absolute level of mortality among children of illiterate mothers, and the relative mortality risk (relative to the child mortality risk of illiterate mothers) among children of educated mothers of varying lengths of education are given in Table 1. The information is presented by state and sex of the child. The relative mortality risk in Table 1 refers to the risk of mortality among children of educated mothers relative to the child mortality of illiterate mothers. Important inferences may be drawn from this information. First, rates of child mortality vary widely between states. For example, the average female child mortality varied from 76 per thousand in Kerala to as high as 208 per thousand in Uttar Pradesh. Secondly, the interstate variation in the mortality of male children is lower than that of female children. This is clearly indicated by the smaller coefficient of variation. Larger interstate differences in female child mortality were caused mainly by excess female child mortality in all major states of the northern region of the country. Thirdly, child mortality among illiterate mothers was fairly high even in the low-mortality states. For instance, the absolute difference in female child mortality of illiterate mothers in Kerala and Bihar was about ten per thousand, but the difference in the overall mortality was 46 per thousand. Fourthly, dispersion of relative child mortality rates among mothers with one to seven years and seven to ten years of education is very similar. Roughly, more than two-thirds of states fall within a band of eight to 12 per cent of either side of the mean mortality of each stage of education. Educated mothers with fewer than ten years of education form anywhere between 85 and 95 per cent of the literate female population in different states. This means, that interstate variation in mortality differences is influenced in an important way also by the manner in which a given state's population is distributed across different stages of education; it is usually felt that the differences arise mainly through interstate differences in mortality rates across different educational classes.

² The census gives the number of women main workers by age groups for five different educational classes, the same educational classes for which child mortality data are available. The study considered only those in the age groups of 15 years and above who were main workers. The main worker is defined as 'a person whose main activity was participation in any economically productive work by his physical or mental activities and who had worked for 183 days or more' (India 1987a:5). The female labour force participation rates have been calculated from these data.

The major finding of the analysis, however, is the appreciable decline in the average mortality risk associated with increase in the level of maternal education. The children of mothers with one to seven years of education faced a relative risk of about two-thirds of the child mortality risk of illiterate mothers. The relative child mortality risk then drops to one third of that of illiterate mothers with about ten to 15 years of education and to one-fifth with higher education of duration exceeding 15 years. This pattern is roughly the same for both male and female children. Although the interstate variation in relative risks is not high, because of considerable variation in absolute levels of mortality, the quantum of reduction in mortality for additional years of education may vary substantially across states.

To examine this issue and also to see how mortality gradients change across different stages of education, the decline in child mortality for an additional year of maternal education was computed for each level of education (Table 2). This was done by dividing the difference between the child mortality of an educational class and the class preceding it by the difference in the average duration of education of the respective classes. For example, the difference in the male child mortality rate of mothers with an average education of 3.5 and 8.5 years duration is 38 in Andhra Pradesh. This means that movement from an average education of 3.5 years to 8.5 years (five years of additional education) results in a marginal decline in mortality by 7.60 (38/5) per additional year of education (see Table 2). This is evidently a rough method but can serve as a first approximation.

Table 2
Decline in the child mortality rate for an additional year of maternal education

	Decline ^a – male child Years of mothers' education				Decline ^a – female child Years of mothers' education			
	1–7	7–10	10–15	>15	1–7	7–10	10–15	>15
Madhya Pradesh	23.14	9.00	4.75	4.00	25.71	10.60	5.75	6.29
Uttar Pradesh	19.43	5.60	6.50	4.86	23.43	9.20	6.25	6.57
Rajasthan	19.14	6.20	4.75	6.00	22.86	8.60	6.25	2.29
Maharashtra	15.71	7.60	7.75	5.71	17.14	8.00	8.25	4.00
Himachal Pradesh	15.43	4.60	2.75	–	14.29	5.40	5.00	–
Karnataka	14.29	6.20	7.00	7.43	16.57	6.20	6.50	6.86
Jammu & Kashmir	14.29	3.60	3.50	2.86	14.57	3.00	4.75	4.29
Gujarat	14.00	5.00	4.50	4.86	18.29	1.80	9.25	5.14
Andhra Pradesh	13.71	7.60	4.75	5.14	15.14	7.00	4.50	4.29
Tamil Nadu	11.71	6.00	6.75	6.57	13.71	6.40	5.75	6.57
West Bengal	11.71	8.60	5.25	2.57	12.86	9.40	3.75	3.14
Kerala	11.71	4.80	5.75	–	10.86	5.60	4.25	–
Meghalaya	11.43	8.40	8.00	–	12.57	7.80	8.00	–
Nagaland	11.14	5.40	2.00	–	12.00	5.40	-0.75	–
Orissa	11.14	12.40	9.50	6.00	10.86	12.20	8.50	6.29
Bihar	10.86	4.60	4.50	6.00	11.14	6.20	5.25	5.14
Haryana	10.57	5.60	3.75	7.14	19.43	5.00	5.75	5.43
Tripura	10.57	9.80	6.25	–	9.71	10.20	7.25	–
Punjab	8.57	4.80	4.25	4.29	10.00	6.60	5.25	2.29
All India	16.20	6.80	5.80	4.90	20.00	7.80	5.50	4.50
Coefficient of variation	0.26	0.33	0.34	0.27	0.30	0.36	0.37	0.31

Notes: ^aIn child mortality rate per 1,000.

^bStatistically significant at five per cent level or better.

Source: Based on Table 1.

The mortality gradient estimates show that at the all-India level, male child mortality declines by 16.2 per thousand for every year of additional education in the one-to-seven years education class, which corresponds approximately to the primary education phase. But the decline in male child mortality per year of additional education falls steeply to about six per thousand and stays at that level during all the remaining post-primary educational stages. Although there are a few exceptions, this pattern typifies the situation of male child mortality in most of the states. In the case of female child mortality too, there is a steep fall in the mortality rate by 20 for every additional year of education in the primary education stage at the all-India level. Then the reduction in the mortality rate falls steeply to 7.8 per additional year of education in the seven-to-ten years of education range. Thereafter it gradually declines to 4.5 per additional year of education for higher education exceeding 15 years duration. Thus, unlike the case of male children, the rate reduction in female child mortality mildly declines with additional years of education. This indicates gains in terms of reduced female child mortality as the duration of maternal education increases. The above findings show the crucial role primary education plays in the reduction of child mortality. As the unit costs of primary education are lower than the subsequent stages of education, the results indicate that primary education could be highly cost-effective in reducing child mortality.

Table 3
Mortality gradients derived from weighted least-squares regressions

Variable/Equation	1	2
1. Dependent variable: male child mortality		
Length of education	-0.13** (-7.09)	-0.14** (-7.66)
Labour force participation rate	—	-2.08* (-2.30)
Use of state dummies	yes	yes
—2		
R	0.38	0.42
F-statistic	3.88**	4.17**
Diagnostics (F-statistics)		
functional form	0.68 ^a	0.04 ^a
heteroscedasticity	2.85 ^b	2.63 ^b
2. Dependent variable: female child mortality		
Length of education	-0.13** (-7.15)	-0.14** (-7.69)
Labour force participation rate	—	-2.84 ^b (-2.25)
Use of state dummies	yes	yes
—2		
R	0.38	0.42
F-statistic	3.89**	4.17**
Diagnostics (F-statistics)		
functional form	0.45 ^c	0.22 ^c
heteroscedasticity	3.41 ^d	3.30 ^d

Notes: **Significant at 99 per cent level of confidence.

*Significant at 95 per cent level of confidence.

^aFunctional form is appropriate at 95 per cent level of confidence or better. F-statistic is based on Ramsey's RESET test.

^bErrors are homoscedastic at 95 per cent level of confidence or better. The test is based on the regression of squared reminders on squared fitted values.

Obviously, the results are approximations of the relationship between mortality and the length of education as the entire reduction in mortality cannot be attributed to education alone. Besides female labour force participation, one can identify a large number of state-specific factors, such as infrastructure, level of income, poverty; and factors specific to certain stages of education such as social class, level of family income, which will have an independent influence on child mortality rate. Many of these variables are either difficult to measure or unmeasured.

To estimate the mortality gradient more accurately, the following equation has been used:

$$M = a_0 + a_i + b_1E + b_2L + u$$

where M denotes child mortality rate by sex of the child; a_0 is a general intercept; a_i are state dummies; E is the length of education; L is female labour force participation rate at different lengths of education; b_1 and b_2 are regression coefficients; and u is the random error. Dummies were included only when found, indicated by variable addition-deletion tests. Since the data are available only by groups, the equations have been estimated using weighted least-regression squares using the actual number of

women in each educational class in the respective states (India 1987b) as weights.³ The model was estimated under alternative functional forms by taking a different transformation of the variables, and an exponential form was selected (as also suggested by the rough estimates of mortality gradients). Results of the regression equations along with diagnostics are presented in Table 3. The table shows results of the best equations separately for male and female children.

As noted above, the exponential form passes the functional-form test and also has homoscedastic residuals. These models were estimated using weighted least squares. Results show that both the length of mother's education and the female labour force participation rate have a statistically significant inverse relationship with child mortality. This is true for both male and female children. The explanatory power of this equation was approximately 42 per cent for both female and male children. The estimates of β coefficients, which indicate the relative influence of education and the female labour force participation on mortality rates (Table 4), suggest that the impact of education is approximately three times stronger than that of the female labour force participation rate, for both sexes.

Table 4
Relative influence of maternal education and female labour force participation on child mortality

	Length of education	b value of Labour force participation rate
1. Female child mortality equation (with state dummies)	-0.84	-0.27
2. Male child mortality equation (with state dummies)	-0.84	-0.27
3. Excess female child mortality (with state dummies)	-0.74	-0.32

Note: β values are obtained as follows:

$$\beta = \frac{\beta_x S_x}{S_y}$$

Where β_x is regression slope coefficient of independent variable 'X'; S_x is standard deviation of variable 'X'; and S_y is standard deviation of the dependent variable y. Thus β values normalize the regression coefficients for the differences in their magnitudes and put them on a relative scale for the purpose of direct comparison.

These results apparently contradict Basu and Basu's (1991) findings but rather seem to confirm the findings of the studies suggesting a favourable impact of female labour force participation on child mortality. But this is not entirely true. The difference between Basu and Basu's conclusions and mine could be due to the fact that their study is based on aggregate data, whereas, the present study controls for the level of education by considering participation rates at different levels of female education. Disaggregated analysis of the data showed that there was no statistically significant relationship between the female labour force participation rate and child mortality among illiterate females and those with fewer than seven years of education (Table 5). This is in line with Basu and Basu's findings and

³ Unweighted regression on grouped data will have zero mean and variance σ^2/n_g ; where n_g is the size of the 'g'th group. This violates the equal variance assumption of OLS if group sizes are different. Multiplication of both sides of the equation by $\sqrt{n}$ will meet the requirements of classical regression but is not a good substitute to using ungrouped data. The information loss in grouped data is directly proportional to within-group variation (Greene 1990: 290-291).

their arguments. It may be noted here that job-related skills are obtained mainly after the first seven years of general education. Thus the factors implicit in Basu and Basu's argument seem to play a significant role mainly in households with low levels of female education, which are generally also poor households. Yet the overall relationship between child mortality and female labour participation was inverse and statistically significant.

Table 5

Impact of female labour force participation rates on child mortality, disaggregated analysis, based on weighted least-squares regression

Variable/Equation	Illiterates and up to seven years of education	Above seven years of education
1. Dependent variable: male child mortality		
Labour force participation rate	-0.35 (-0.40)	-5.31** (-6.14)
Constant	6.37	4.98
-2		
R	0.00	0.43
F-statistic	0.16	37.78**
Diagnostics (F-statistics)		
functional form	4.47	0.10 ^a
heteroscedasticity	3.33	0.09 ^b
2. Dependent variable: female child mortality		
Labour force participation rate	-0.59 (-0.65)	-5.66** (-6.61)
Constant	6.43	4.98
-2		
R	0.01	0.47
F-statistic	0.43	43.76**
Diagnostics (F-statistics)		
functional form	3.49	0.22 ^a
heteroscedasticity	2.65	0.16 ^b

Notes: **Significant at 99 per cent level of confidence.

^aFunctional form is appropriate at 95 per cent level of confidence or better. F-statistic is based on Ramsey's RESET test.

^bErrors are homoscedastic at 95 per cent level of confidence or better. The test is based on the regression of squared reminders on squared fitted values.

Excess female child mortality

India recorded an excess female child mortality of ten per thousand in the 1981 census (Table 6). The excess female child mortality was even higher for illiterate mothers at 13 per thousand. But it disappeared among mothers with one to seven years of education. Among mothers with higher levels of education, female children had progressively and proportionately lower levels of mortality than male children at the all-India level. Excess female child mortality, which is rather unusual, exists in some of the states in the northern region of the country. Biological factors endow female children with better abilities to survive than male children and, therefore, male children usually have a higher level of mortality than female children. This is true even in many parts of India (Table 6). However, in some regions the problem of excess female child mortality is acute. For instance, the excess female child

mortality of 34 per thousand in Uttar Pradesh is almost half of the overall female child mortality of 74 in Kerala. Even in a state like Haryana, which has higher *per capita* income, the excess female child mortality is almost one-third of the overall female child mortality in Kerala.

Table 6
Excess female child mortality rates^a

States	Overall	Years of mothers' education				
		0	1-7	7-10	10-15	>15
Uttar Pradesh	34	37	23	5	6	0
Haryana	28	33	2	5	-3	3
Bihar	22	11	10	2	-1	2
Rajasthan	20	22	9	-3	-9	4
Punjab	14	17	12	3	-1	6
Gujarat	10	24	9	25	6	5
Madhya Pradesh	8	9	0	-8	-12	-20
Jammu and Kashmir	3	3	2	5	0	-5
Maharashtra	-2	0	-5	-7	-9	-3
Tamil Nadu	-3	0	-7	-9	-5	-5
Karnataka	-3	-1	-9	-9	-7	-5
Tripura	-4	-8	-5	-7	-11	—
Orissa	-5	-5	-4	-3	1	0
Himachal Pradesh	-6	-7	-3	-7	-16	—
West Bengal	-7	3	-1	-5	1	-1
Nagaland	-8	-7	-10	-10	1	—
Andhra Pradesh	-8	-7	-12	-9	-8	-5
Kerala	-9	-10	-7	-11	-5	—
Meghalaya	-10	-8	-12	-9	-9	—
All India	10	13	0	-5	-4	-3

Note: ^aExcess of female child (q_f) mortality over male child mortality (q_m) per 1,000. Positive numbers indicate excess female child mortality.

Source: India (1988).

Besides female education, three important factors are identified to explain excess female mortality (Bardhan 1988; Basu 1989; Das Gupta 1990). They are, first, cultural preference for male children⁴; secondly, low social status of women; and thirdly, low female labour requirements in areas where rice is not grown. Among these three, the last hypothesis, propounded by Bardhan (1988), is intuitively the most appealing. The underlying factor in the hypothesis is the low economic value of women and hence female children in areas where the labour force participation rates of women are low. It appears that the other two factors (low social status and cultural preference) responsible for excess female child mortality stem partly from the low economic value of women. This is not to say that there are no other factors; but women's economic value will have a significant bearing on the other two factors. In view of the importance of Bardhan's hypothesis, the paper makes an attempt to test it.

Table 7
Excess female child mortality rates, regression results

Variable/Equation	1	2	3
Dependent variable:			
Relative excess female child mortality – CMR_f/CMR_m			
Weighted least squares (log linear)			
Labour force participation rate	-0.31*	-0.46**	-0.45**
	(-2.12)	(-3.52)	(-4.08)
Length of education	–	-0.22**	-0.33**
		(-4.95)	(-11.14)
Use of state dummies	none	none	yes
Constant	0.04	0.05	–
–2			
R	0.04	0.24	0.70
F-statistic	4.53*	15.17**	11.34**
Diagnostics: F-statistics			
functional form ^c	0.09 ^a	0.09 ^a	0.00 ^a
heteroscedasticity ^d	7.07	0.28 ^b	0.08 ^b

Notes: **Significant at 99 per cent level of confidence.

*Significant at 95 per cent level of confidence.

^cFunctional form is appropriate at 95 per cent level of confidence or better. F-statistic is based on Ramsey's RESET test.

^dErrors are homoscedastic at 95 per cent level of confidence or better. The test is based on the regression of squared residuals on squared fitted values.

The model employed to test Bardhan's hypothesis is similar to the one described in the previous section. In the place of absolute child mortality, the ratio of female child mortality to male child mortality, henceforth referred to as relative excess female child mortality is taken as the dependent variable. The independent variables are the length of mother's education and the female labour force participation at different lengths of female education. State dummies to capture the impact of excluded variables are included in one of the equations. In this model an inverse and statistically significant

⁴ A variety of reasons are behind male preference. Important among these are a dowry, a strong cultural desire to have continuity of family lineage (in most regions only male children can inherit the family title), and the belief that those with no male children will have to go to hell after death. It should be noted that in Meghalaya and Kerala, where a matriarchal system exists, female children have the lowest mortality in relation to male children (Table 6).

relationship between relative excess female child mortality and the female labour force participation rate would lend support to Bardhan's hypothesis. The model was estimated using weighted least-squares regression with the same weights as used earlier (see footnote 3). Unlike the case of absolute child mortality equations where the exponential form passed the functional form test, the log-linear form was found to be the most appropriate functional form for this application.

The results of the best equations presented in Table 7 show that female labour force participation alone has a statistically significant inverse relationship with relative excess female child mortality; but the equation had a heteroscedasticity problem. The inclusion of the length of mothers' education as an additional variable improved the explanatory power of the equation considerably and also helped to overcome heteroscedasticity. Both length of education and female labour force participation were inversely related with relative excess female child mortality, and statistically significant. As expected, inclusion of state dummies improved the explanatory power, and did not appreciably change the magnitude of the coefficient for length of education and female labour force participation.

The β coefficients presented in Table 4 show that the relative impact of female labour force participation on excess female mortality is slightly less than half of that of the influence of education. Thus, even though Bardhan's hypothesis is supported by the census data, maternal education seems to have a stronger influence in explaining relative excess female child mortality than the female labour force participation rate. But as between excess female child mortality and absolute child mortality, female labour force participation has a stronger influence in explaining excess female mortality than in explaining the absolute level of male and female child mortality.

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Table 1
Child mortality risk for mothers with different levels of education, by sex of child and state of residence

States	Av. male child mort. rate ^a	Mortality of male child					A v. fe m al e ch il d m or t. ra te a	Mortality of female child				
		Rate ^a for illit. mothers	Relative risk ^b by years of maternal education					Rate ^a for illit. mothers	Relative risk ^b			
			1–7	7–10	10–15	>15			1–7	7–10	10–15	>15
Madhya Pradesh	193	208	61.1	39.4	30.3	23.6	201	217	58.5	34.1	23.5	13.4
Orissa	181	193	79.8	47.7	28.0	17.1	176	188	79.8	47.3	29.3	17.6
Uttar Pradesh	174	183	62.8	47.5	33.3	24.0	208	220	62.7	41.8	30.5	20.0
Rajasthan	166	175	61.7	44.0	33.1	21.1	186	197	59.4	37.6	24.9	20.8
Tripura	150	169	78.1	49.1	34.3	–	146	161	78.9	47.2	29.2	–
Meghalaya	147	166	75.9	50.6	31.3	–	137	158	72.2	47.5	27.2	–
Maharashtra	146	172	68.0	45.9	27.9	16.3	144	172	65.1	41.9	22.7	14.5
Karnataka	143	160	68.8	49.4	31.9	15.6	140	159	63.5	44.0	27.7	12.6
Andhra Pradesh	143	156	69.2	44.9	32.7	21.2	135	149	64.4	40.9	28.9	18.8
Himachal Pradesh	142	156	65.4	50.6	43.6	–	136	149	66.4	48.3	34.9	–
Tamil Nadu	134	153	73.2	53.6	35.9	20.9	131	153	68.6	47.7	32.7	17.6
West Bengal	132	138	70.3	39.1	23.9	17.4	125	141	68.1	34.8	24.1	16.3
Bihar	131	133	71.4	54.1	40.6	24.8	153	144	72.9	51.4	36.8	24.3
Haryana	125	133	72.2	51.1	39.8	21.1	153	166	59.0	44.0	30.1	18.7
Gujarat	119	140	65.0	47.1	34.3	22.1	129	164	61.0	55.5	32.9	22.0
Jammu & Kashmir	114	120	58.3	43.3	31.7	23.3	117	123	58.5	46.3	30.9	18.7

Punjab	104	115	73.9	53.0	38.3	25.2	118	132	73.5	48.5	32.6	26.5
Nagaland	104	122	68.0	45.9	39.3	–	96	115	63.5	40.0	42.6	–
Kerala	85	123	66.7	47.2	28.5	–	76	113	66.4	41.6	26.5	–
All India	147	164	65.2	44.5	30.5	20.1	157	177	60.5	38.4	28.0	16.9
Coefficient of variation	0.19	0.17	0.08	0.09	0.15	0.15	0.23	0.19	0.10	0.12	0.16	0.20

Notes: ^aChild mortality rate per 1,000.

^bRelative risk per cent.

Source: India (1988).

AIDS knowledge, condom beliefs and sexual behaviour among male sex workers and male tourist clients in Bali, Indonesia*



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Abstract

The objective of this paper is to describe the AIDS knowledge and risk behaviours of male sex workers who serve predominantly male clients in Bali, Indonesia, to discuss implications for the spread of the disease, and to discuss appropriate interventions for these groups. Data are drawn from a qualitative study of the workers and clients consisting of interviews with many open-ended questions. The results of the study are viewed in terms of the AIDS Risk Reduction Model (ARRM). The data indicate that there is a very active community of male sex workers and male clients in Bali that is at risk of AIDS infection. Multiple sexual partners, unprotected anal intercourse, and frequent experience with STDs put both workers and clients at risk. Workers had limited knowledge of AIDS and STDs, although clients were mainly well informed. Both groups were characterized by frequent mobility. High levels of alcohol use by clients were reported before and during sexual encounters and may be a factor in increasing risky sexual behaviours. Interventions for these groups should include improving knowledge of workers, improving STD treatment for both clients and workers, skills training for sex workers, and increasing availability of good quality condoms and lubricants.

Introduction and background

Transmission of HIV through sexual contact has been the most frequent means of the spread of the disease. Because of the link between multiple partners and increased risk of AIDS established in the homosexual population in the US, there is much concern about the role that commercial sex workers may play in the spread of HIV infection.

Although the literature on female commercial sex workers has become fairly large, there are not many published reports on male workers who serve male clients. They include studies conducted in the United States (Fowler 1989; Pleak and Meyer-Bahlberg 1990; Estep, Waldorf and Marotta 1991; Waldorf and Lauderback 1991), in Europe (Tirelli et al. 1988; van de Hoek et al. 1988; Robinson,

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Davies and Beveridge 1989; Morgan Thomas 1990) and in Thailand (Muangman et al. 1988; Sittitrai 1988, Sittitrai et al. 1989).*

The two most comprehensive studies were conducted in the United States. In a study of fifty 14 to 27-year-old male prostitutes in New York City, Pleak and Meyer-Bahlberg (1990) found that male prostitutes had considerable knowledge about AIDS and this knowledge was related to their behaviour. They often avoided anal intercourse and frequently used condoms if they did engage in anal intercourse, particularly with clients. High rates of condom use (85%) were found for anal intercourse, although many encounters involved only other sexual activities. Workers were safest in sex with male customers, less safe with other male partners, and least safe with female partners.

Studies of male sex workers have also been conducted in San Francisco. Data from a first study (Estep et al. 1991) showed that among hustlers, men who recruit clients face to face (N=180), and call-men, more educated men who operate from a book of clients, masseurs, models, and escorts (N=180), general knowledge of AIDS, specific information regarding safe sex and AIDS, and number of customers serviced were significantly related to the level of safe or unsafe sexual behaviours (Estep et al. 1991). A larger study that focused on condom use has recently been completed. Five hundred and fifty callmen and hustlers were interviewed during 1991 (Waldorf and Lauderback 1991). Condom use was high for workers in this study: nearly three quarters of the workers had used condoms in the last week. Hustlers reported considerably less frequent condom use for anal intercourse than call-men and condom use was less frequent for both groups with intimates than with customers. Condoms were also much more likely to be used for anal sex than for oral sex.

The remaining studies most relevant to Indonesia come from Thailand. A study was conducted in 1988 of male sex workers in three areas of Thailand: Bangkok, Hat Yai, and Chiang Mai (Muangman et al. 1988). In these areas, workers meet clients through gay bars, bath houses, and public locations. Most workers were in their twenties and the mean incomes were low for the urban areas. Most workers had some formal schooling with the lowest levels in Hat Yai. The educational levels were higher than comparable samples of female sex workers. About two thirds of each urban group could identify behaviours that spread AIDS, although knowledge was lowest in Hat Yai. Unfortunately, less than half of each of the three groups thought that AIDS could be spread by an asymptomatic carrier. The number of partners per week was highest in Hat Yai (seven), with four per week in Bangkok and three in Chiang Mai. Less than 50 per cent engage in anal intercourse in Chiang Mai compared to 72 per cent of the Bangkok sample and 86 per cent of the Hat Yai sample. About 10 per cent of Bangkok workers reported that they never use condoms as against 30 per cent of Chiang Mai workers, and 82 per cent of Hat Yai workers. Intravenous drug use was negligible among male sex workers in this study.

A second study (Sittitrai 1988) consisting of three focus group discussions in male bars in Bangkok, found workers' knowledge to be accurate about sexual transmission, but found a number of misconceptions about casual transmission. The male workers in these groups also had higher educational levels than female workers in the same areas. One important finding from the discussions was that the workers often found themselves to be pressured by both customers and establishment

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owners to engage in unsafe sexual practices. Most male workers reported that they engaged in anal intercourse without protection. The low incidence of condom usage was a result of negative prior experiences with condoms including breakage, small size, customer refusal, or discomfort. Inappropriate lubricants including body lotion, oil, and saliva were also used.

A third study (Sittitrai et al. 1989) was conducted with 141 male bar workers from five bars in Bangkok. As with the other studies, these men had a large number of sexual contacts and more than half engaged in insertive and receptive anal sex without condoms. In the two-week period before the interview, all workers had sex with male clients, 23 per cent with female clients, 13 per cent with non-client males, and 50 per cent with non-client females. Thus, the sexual activities of these young men put them at risk for HIV infection and the potential for spread of the disease was high because they have sex with both male and female clients and non-clients.

Study context

At the end of 1992, the currently documented number of AIDS cases and HIV-infected persons in Indonesia was remarkably low: 80 cases were documented. The Indonesian Ministry of Health has conducted serotesting with particular emphasis on high-risk groups including female commercial sex workers, transvestites and gay men and only a few HIV-positive individuals have been identified. Most of the individuals diagnosed with AIDS or who have tested positive were gay men, although a small number of prostitutes of both sexes have been identified as seropositive. However, given the estimated large numbers of sex workers in Indonesia and their suspected high rates of sexually transmitted diseases (STDs), there is a great potential for the spread of HIV infection.

Bali, one of 27 provinces of Indonesia, is an island with a population of nearly three million people. The recent 'explosion' in tourism with its attendant construction and service industries, coupled with outside investment in garment, craft and fisheries production has brought a level of economic development and opportunity that serves as a magnet to both the rural and urban poor of neighbouring provinces such as East Java (population 52 million). Thus, considerable circular migration to and from Bali occurs, consisting of both business people and tourists from Indonesia and beyond, as well as the poor searching for employment.

The commercial sex industry exists throughout Indonesia and can be found throughout the island of Bali. In Bali, however, it is concentrated in the provincial capital city of Denpasar and the nearby tourist centres of Kuta, Sanur and Nusa Dua. Both Sanur and Nusa Dua tend to cater to the more affluent tourists staying in relatively expensive hotels. Kuta is the largest tourist centre and it attracts a wide variety of tourists who stay in accommodation ranging from cheap 'homestays' to five-star hotels.

Commercial sex is illegal throughout Indonesia and the law is periodically enforced in Bali by means of token arrests and deportations of female sex workers to their homes in East Java. Male sex workers have generally not been subjected to such arrests. Although the number of female commercial sex workers in Bali is estimated to be over 1,000 the total number of male sex workers in Bali is estimated at one to two hundred.

A transvestite group known traditionally as *wadem*, but more recently as *waria*, are visible and officially recognized in Indonesian cities. The *waria* tend to work as entertainers, hairdressers and sex workers. However, apart from this group, homosexuality is generally not accepted in Indonesia and persons who reveal that they are homosexual are subjected to discrimination. They tend to be ridiculed in films and in the media, and in general only successful persons in the arts and entertainment industry are open about their sexual orientation.

The objective of this paper is to use data from a qualitative study to describe the AIDS knowledge and risk behaviours of male sex workers who serve predominantly male clients in Bali, Indonesia, to discuss implications for the spread of the disease, and to discuss appropriate interventions for these

groups. The results of the study will be viewed through the framework of the AIDS Risk Reduction Model (ARRM).

This study focuses on the population in Kuta which is estimated to include about 50 male prostitutes who serve both Indonesians and foreign clients. Several methods are used to meet customers: approaching potential customers in particular areas along the beach, soliciting partners on the street, going to residences, and meeting in bars, nightclubs and discotheques. Sexual relations may take place along the beach in the bushes or small shacks made from palm fronds, in the clients' hotel rooms, or in the rooms of cheap hotels rented specifically for the purpose. Liaisons are often brief, but many become extended with the client providing room and board, clothes, jewellery, presents, and travel rather than direct payment to the worker. In general, this commercial sex is not organized by outside parties and prostitutes do not have to share their proceeds with a pimp.

The AIDS Risk Reduction Model (ARRM)

The ARRM is a three-stage model that characterizes people's efforts to change sexual behaviours related to HIV transmission (Catania, Kegeles and Coates 1990). The model aims to understand why people fail to advance over the change process, in order to gear intervention programs to a specific stage of the change process. The first stage of the model involves labelling behaviours as high risk for contracting HIV and implies knowledge of the disease and belief that the individual is at risk of the disease. The second stage is a decision-making stage: individuals must evaluate the costs and benefits of changing their behaviour and whether they are capable of carrying out that change (self-efficacy). The third stage is the enactment stage. This stage often includes information-seeking behaviour and requires communication skills with sexual partners. The model is used here to identify the stage of behaviour change of sex workers and clients in order to discuss appropriate interventions for both groups.

Methodology

Subjects

From May to July, 1991, a convenience sample of 20 male commercial sex workers (CSWs) and 19 of their tourist clients were recruited at places where CSWs work including beaches, street areas, bars, or discotheques. Friendship networks of CSWs were also used to recruit sex workers into the sample. Clients were recruited for the study either by meeting them at CSWs' work sites or at bars or discotheques where CSWs recruit clients.

Survey instruments

The interview consisted mainly of open-ended questions and assessed: (1) knowledge of AIDS, sexually transmitted diseases, and condoms, (2) socioeconomic and demographic characteristics and migration history, (3) sexual experience, including experience as a sex worker and experience with intimates and other unpaid partners, (4) attitudes and beliefs about condoms, and (5) other health practices. This open-ended free-response format has been recommended to identify beliefs and social norms most likely to influence behaviour (Ajzen and Fishbein 1980) and to identify constructs most likely to influence behaviour (Higgins and King 1981; Bargh 1984). Responses were recorded on interview schedules in the presence of the respondents. Separate questionnaires with similar content were used for the workers and clients.

Interviewing procedure

The interviewing staff consisted of two Balinese males and one American male. The Balinese interviewers were university graduates in anthropology who had spent time with the male sex-worker

community. They conducted all of the interviews with CSWs in the Indonesian language. The American interviewer was a gay male who had been living in the study area for two years. He conducted the tourist client interviews in English. Two tourist clients completed self-administered forms. Interviewer training included knowledge of AIDS and STDs, techniques for conducting and obtaining interviews, detailed study of the questionnaire, and supervised field practise in conducting interviews. Interviews were held at locations throughout the resort area including homes, beach areas, hotels, and restaurants. Locations were chosen to insure privacy during the interview. Respondents were willing to answer the sensitive questions in the interview and no significant problems were reported by the interviewers.

Male sex workers

Demographic characteristics:

The age of the male sex workers interviewed ranged between 18 and 30 years with a mean age of 22.7 years (Table 1). None had ever been married. All had attended school with the majority having attended at least some high school and an additional 20 per cent having at least some university or academy-level education. The workers were likely to come from middle-class economic backgrounds. A few had fathers who were farmers or small traders, but 60 per cent had fathers who were either civil servants or in business. About 30 per cent of the workers were not originally from Bali and most had arrived within the last two years. As in Thailand, both the level of education and parents' socioeconomic status were considerably higher than those of female sex workers in Bali (Wirawan, Ford and Fajans 1992).

The best measure of ethnicity in the study is religion. The ethnic Balinese are Hindu, and only one worker reported Hindu religion. Those of Muslim religion (70%) are mainly Javanese, while those who report Christian religion may be from many parts of Indonesia.

The workers were characterized by considerable mobility within Indonesia as well as outside the country. In the previous two years, half had resided in Jakarta, 30 per cent in Surabaya, the capital city of East Java, 20 per cent in West Java and 20 per cent in Central Java. In addition, individuals had also lived in Singapore, Malaysia, Switzerland, and the Netherlands. Most report visits to their home village for holidays (85%).

Table 1

Demographic and socioeconomic characteristics of male sex workers, Bali, Indonesia, 1991 (N=20)

Age:	Range	18–30	Living arrangements:		
	Mean	22.7		Alone	2
	18–21	6		Other sex worker	8
	22–24	7		Non-gay friends	7
	25–30	7		Gay friends	2
Religion:			First time in Bali:	Other	1
	Islam	14		Before 1987	6
	Christian	5		1988–1989	6
Ever married:	Hindu	1		1990–1991	7
		0	Residence last two years:		
				Jakarta	10
Education:	Jr. high school	1		Surabaya	6
	High school	15			
	University/academy	4			

Father's occupation:		West Java	4
		Central Java	3
Farmer	3	Batam	2
Trader	5	Malaysia	2
Civil servant/business	11	Europe	2
		Only Bali	7

In Bali, 40 per cent reported living with other male sex workers, while 45 per cent reported living with other friends. Workers reported spending much of their free time with friends who were also CSWs. Nine respondents reported having other regular employment in addition to sex work. Of these, nearly half worked as hairdressers in beauty salons. Eighty-five per cent reported that they would like an alternative occupation such as work in the tourist business, modelling, or anything as long as it is a 'good' type of work.

AIDS knowledge

During the interview, workers were asked a series of open-ended questions about AIDS. All of the workers had heard about AIDS and the major sources of information were other gay men (85%), television (75%), newspapers and magazines (55%) and tourists (40%). When asked who can get AIDS, the most common responses were gay men (85%), prostitutes (60%) and gigolos, male sex workers serving female clients, (50%). Other answers were that one can get AIDS by having sexual intercourse with tourists and with frequent partners. Only 15 per cent specifically mentioned anal sex. Eighty per cent reported that it was possible to tell by looking if a person had AIDS, indicating that they do not recognize asymptomatic infection. Reports of symptoms of AIDS infections were often inaccurate. The majority of sex workers (55%) felt that they were at risk of getting AIDS. The most common reason given for risk was 'frequent sex with tourists' (73%). For those who did not consider themselves at risk, the most common reasons were that they use condoms (75%) or that their body was healthy (50%). Seventy-five per cent reported that they had done something to avoid getting AIDS, and the most frequent responses were that they use condoms (60%) and that they select 'clean' clients (40%).

Sexually transmitted diseases

Sex workers were asked a similar series of open-ended questions concerning their knowledge of and perceived risk of other sexually transmitted diseases (STDs). All respondents reported knowing of at least one STD with 90 per cent mentioning syphilis, 90 per cent AIDS, and only 35 per cent mentioning gonorrhoea. Most reported either other gay persons (80%) or newspapers and magazines (80%) as their sources of information concerning STDs while 35 per cent reported tourists and 25 per cent mentioned television as sources of information. Although most sex workers had heard of one or more STDs, their knowledge of the specific symptoms associated with these diseases and the mechanisms of transmission were often inaccurate.

Nearly all (95%) considered gay men to be at risk of getting an STD, while 70 per cent reported sex workers, 40 per cent gigolos; 30 per cent mentioned tourists, and 15 per cent reported clients of sex workers to be at risk of getting an STD. A wide variety of responses were mentioned when asked how those at risk can get an STD. Thirty per cent reported frequent sexual partners to place one at risk, 20 per cent mentioned not taking care of oneself, 15 per cent not selecting partners, and 15 per cent having sex with tourists. Anal intercourse (15%) or oral sex (15%) were also mentioned as placing one at risk of an STD. The majority of respondents (95%) considered themselves to be at risk of catching an STD, with 50 per cent reporting their having numerous or frequent partners as the reason, while 13 per cent reported having sex with tourists as placing them at risk. These sex workers considered both tourists

(95%) and other Indonesians (85%) as people likely to have STDs while 55 per cent specifically mentioned gay sex workers as people who suffer from STDs. A variety of alternative approaches to prevention of STD were reported. Forty-five per cent of the respondents stated that they had used a condom to prevent transmission while 35 per cent mentioned careful selection of partners, ten per cent took antibiotics after sex, ten per cent avoid anal sex and ten per cent reported trying to avoid tourist clients. One half of the respondents reported that they had ever had an STD. Of these 90 per cent reported having an STD two or more times. Sixty per cent reported self treatment with various drugs while 40 per cent had visited a doctor for treatment at least once. Informal conversations with workers revealed a reluctance among some to visit health-care providers because of the stigma of their homosexual activity.

Condom beliefs and general condom use

A series of open-ended questions were asked to elicit condom beliefs from workers. In response to questions about the 'good things' about condoms, the workers replied that they were safe and they prevent diseases (60%), they are clean (30%) and they prevent pregnancy (30%). 'Bad things' about condoms were that they decrease pleasure. They also said that men with frequent partners should use condoms (56%). Seventy per cent said that all or some of their gay friends like condoms and the main reason that they like them is to prevent illness. Ninety per cent thought that condoms prevent AIDS and all knew of sources for condoms in Bali.

Ninety-five per cent of the workers had used a condom in the last month with the main reason for use being to prevent illness. Seventy per cent keep them at their residence and sources for condoms include the *apotik* (drug store or chemist 43%), clients (29%), and gay friends (13%). Almost all workers had discussed condoms with clients and many claim to ask clients to use condoms. Twenty-four per cent reported that they ask all clients to use condoms, 24 per cent ask those who they do not know or who look suspicious, 35 per cent ask all foreign clients, and 18 per cent ask foreign clients that they do not know. Seventy-two per cent have had clients who refuse to use condoms.

General sexual history

Most of the workers first had sex with a man when they were in their teens: 35 per cent at age 14 or less, 40 per cent at age 15-16, and 25 per cent at 16 or more. Forty-five per cent of the workers were paid for their first sex with a man. Fifty-nine per cent have had sex with a woman. Respondents had worked for an average of 3.1 years with a range of two months to nine years. Thirty per cent of respondents had worked as CSWs only in Bali, 60 per cent had worked in Jakarta or Surabaya and ten per cent had worked in Batam or Malaysia. The workers generally return to their home village for holidays (85%), and some (35%) are usually sexually active on these visits. Many of those men interviewed identify themselves as gay, although some are primarily heterosexual in orientation.

Most workers work seven days each week and most have one client per day with a reported average of 5.9 clients each week. The median earnings per week was US\$75 and the range was from US\$23 to US\$125. Hotel or retail workers in the Kuta area would probably receive a salary averaging \$50 or less per week. In addition to cash, most workers also receive nonmonetary payments such as food or clothing. Workers report having clients who include Japanese men (100%), Caucasian men (85%), and Indonesian tourists (90%), as well as Indonesian businessmen (80%), university students (45%), civil servants (30%), and schoolboys (20%). Nearly all (95%) report being with clients both for a short time and all night but 72 per cent report that they are with most clients for a short time.

Table 2 shows the frequency of sexual acts requested by clients and the percentage of workers who agreed to perform each of these acts. Anal intercourse, both insertive and receptive, was the most common act requested and almost all workers would agree to perform these acts. Masturbation of the

client and the client masturbating the sex worker was the next most frequent practice and all workers would agree to this practice. Oral intercourse followed, with almost all workers agreeing to perform. Rimming, tongue to anus, the last practice asked about, was less common.

Table 2

Distribution of male sex workers according to frequency of clients' requests for various sexual acts, and number of sex workers agreeing to perform acts, Bali, Indonesia, 1991 (N=20)

Sexual act	None	Sex workers by clients' requests			Number agreeing
		Fewer than half	Half	More than half	
Client sucks sex worker's penis	0	8	7	5	19
Sex worker sucks client's penis	1	10	5	4	19
Client's penis in sex worker's anus	0	4	5	11	17
Sex worker's penis in client's anus	0	3	5	12	20
Client licks sex worker's anus	3	17	0	0	16
Sex worker licks client's anus	9	11	0	0	6
Sex worker masturbates client	0	3	7	10	20
Client masturbates sex worker	0	4	9	7	20

Sexual experience in the last week

Workers were asked detailed questions about their sexual experience in the last week. They had an average of 5.2 clients in the last week, with 4.1 of these new clients and 0.8 repeat clients. Two workers reported new female clients in the last week. Forty-three per cent of the workers had an intimate male non-paying partner and 32 per cent had a casual non-paying partner. Sixty per cent of workers had an Indonesian client from Bali, 60 per cent had an Indonesian client from outside Bali, and 90 per cent had a tourist client from outside Indonesia.

Table 3

Sex workers' experience with oral and anal intercourse in the last week, Bali, Indonesia, 1991 (N=20)

Sexual act	Number of times with client			With other partner one or more times
	One or more times	Range	Median	
Partner inserts penis in sex worker's:				
anus with condom	16	0-5	1	6
anus without condom	14	0-6	2	7
mouth with condom	1	—	—	1
mouth without condom	13	0-7	2	7
Sex worker inserts penis in partner's:				
anus with condom	15	0-6	1	5
anus without condom	14	0-5	2	7
mouth with condom	0	—	—	1
mouth without condom	14	0-6	3	9

Table 3 shows the frequency of experience with oral and anal intercourse in the last week for sex workers. Most workers had experienced both insertive and receptive anal intercourse and many episodes took place without condoms. Oral intercourse was also a common practice and there was almost no condom use for oral intercourse.

Male tourist clients of sex workers

Demographic characteristics

Male sex workers report that their clients include both Indonesians and foreign clients. This study includes only foreign clients who may be either tourists or residents engaged in a variety of business activities. These clients reported permanent residence in a number of countries with 42 per cent residing in Europe, 21 per cent in Australia and others from the United States, Japan, and other countries (Table 4). Their age ranged from 23 to 53 with a mean age of 34.8 years. One-third of respondents had been previously married to a woman, but none was currently married. One third had a current male life partner. Respondents tended to be highly educated 70 per cent having attended college or university, and an additional 16 per cent having received a postgraduate degree. As a group they tended to be frequent travellers, with almost 80 per cent having previously visited Bali. For many respondents, these visits were longer than the average tourist stay with almost half having been in Bali seven or more weeks. This latter group consisted primarily of people engaged in business activities who made multiple visits. Most respondents were travelling alone. Many men had visited other countries in the region in the previous two years, including Thailand (58%) and other Asian countries. Their occupations included sales and business, designers and artists, teachers, and other professional and non-professional occupations.

Table 4

Demographic and socioeconomic characteristics of male tourist clients of male sex workers

Age:	Range	23–53	Travel status:	
	Less than 30	4	Alone	16
	30–39	7	With friend	3
	40+	8		
Permanent residence:			Education:	
	Europe	10	High school	2
	Australia	4	College/university	13
	United States	3	Postgraduate	3
	Other	2		
Number of visits to Bali:			Countries visited in last two years	
	1 visit	4	Thailand	8
	2–3 visits	7	Singapore	9
	4+ visits	8	Australia	3
			Other Asia	3
			Hong Kong	1
Length of time in Bali:			Relationship status:	
	0–2 weeks	4	Have had a male life partner	17
	3–4 weeks	3	Have a male life partner now	6
	5–6 weeks	3	Previously married to a woman	6
	7+ weeks	6		

AIDS knowledge

The clients were also asked a series of open-ended questions about AIDS. The most important sources of information for clients were gay media, friends and other media including newspaper and television. They reported that AIDS could be transmitted by blood (58%), needles (53%), sex (48%), anal sex (48%), and transfusions (37%). The majority of clients said that it was either unlikely or very unlikely (63%) that they would get AIDS. The modal reason for the low risk was careful or safe sex (45% of all clients). For those who thought that it was likely, 33 per cent gave 'risky sex' as the reason for their higher risk. Almost all of the clients (95%) reported taking actions to avoid getting AIDS and these included careful, safe sex (50%), use of condoms (50%), and having decreased the number of partners (39%).

Sexually transmitted diseases

Clients were asked similar questions concerning their knowledge and perceived risks of contracting other STDs. Relatively high levels of knowledge of STDs were observed with 90 per cent of respondents mentioning syphilis and gonorrhoea, and an additional 80 per cent adding herpes genitalis.

Most frequently mentioned symptoms of STDs included dysuria (53%), discharge (47%), sores on the penis (37%) and swelling of the genitals (32%). Respondents thought it likely that male sex workers in Bali suffered from STDs with 53 per cent mentioning AIDS, 37 per cent gonorrhoea, 26 per cent herpes and 26 per cent reporting syphilis as likely illnesses of sex workers in Bali. One third stated that it was difficult to know if a sex worker had one of these diseases, while the remainder felt they could tell by looking for sores on the penis (42%), discharge (32%), or observing if the sex worker had pain on urination. Nearly half (44%) of the clients reported having ever had an STD themselves with 21 per cent reporting having seen a doctor for an STD in the last six months.

Condom beliefs and general condom use

Clients were asked a shorter, slightly different set of questions about condom beliefs. They reported that people use condoms to prevent infection (80%), for AIDS prevention (26%), and to prevent pregnancy (74%). The only common reason that people like condoms was for AIDS prevention and people do not like them because they cause an interruption (53%), they decrease sensation (37%), they are a lot of trouble to use (32%), and they have an unpleasant smell or taste (26%). More than half of the men did not know of a source of condoms in Bali and 84 per cent said they had never obtained one there.

Clients were asked about their current condom use in general. Twenty-five per cent reported that they do not use condoms with any partners including CSWs, lovers and casual partners. Another 35 per cent reported that they always use condoms with lovers or intimate partners, 53 per cent always use condoms with casual partners, and 56 per cent always use condoms with CSWs. Sexual practices may differ for different types of partners.

Clients were also asked about their recent condom use. Twenty-five per cent used a condom at their last sexual encounter with a sex worker and 35 per cent at last sexual encounter with a partner who was not a sex worker. Nearly 85 per cent have asked a sex worker to use a condom and 44 per cent have been asked by a sex worker to use a condom. Forty-one per cent carry condoms with them. Eighty-one per cent use a lubricant with condoms and 19 per cent use lubricated condoms.

General sexual history

Clients' age at first sexual relations with a man ranged from eight to 31 years with 21 per cent aged less than 14. Eighty-four per cent had had intercourse with a woman. Most had first paid for sex in their late 20s and early 30s. When asked what they enjoy when they are with sex workers, 25 per cent

said that they liked to talk with them, 81 per cent said they enjoyed the sexual activities, and 44 per cent said that they enjoyed their companionship. Clients had paid sex workers a mean of 6.9 times in the last month, with a range from one to 23. They had paid an average of 6.4 different sex workers, with a range from one to 23. Most reported that they were usually with a prostitute for a short time (68%) but 50 per cent reported at least one all-night encounter. Some clients also reported being with a prostitute for several days (19%) or long term (6%). The average payment was about US\$5 and 58 per cent of clients gave a non-monetary payment such as food or clothing.

Sexual experience in the last week

The clients reported paying a mean of 1.7 sex workers (range 1-4 partners) a mean 1.9 times (range 1-5 times) in the last week. Eighty per cent of their partners were Indonesian and 17 per cent were other tourists (including one female tourist). Table 5 summarizes the sexual practices reported in the last week by tourist clients. Masturbation was the most common practice, with oral intercourse the second most common. There was a smaller amount of anal intercourse reported both with and without condoms. Rimming (tongue to anus) was also reported with both sex workers and with other partners.

Table 5

Sexual acts experienced at least once in the last week by male tourist clients of male sex worker (N=19)

Sexual act	Number with sex worker	Number with other partner
Masturbation	6	11
Penis in partner's mouth, no condom	8	13
Penis in partner's mouth, condom	1	1
Partner's penis in mouth, no condom	7	11
Partner's penis in mouth, condom	1	1
Penis in partner's anus, no condom	3	2
Penis in partner's anus, condom	2	5
Partner's penis in anus, no condom	0	3
Partner's penis in anus, condom	1	3
Tongue in partner's anus	3	7
Partner's tongue in anus	3	7
Fisting	0	0

It should be noted that CSWs report more recent experience with anal intercourse than clients report. These differences may be due to several factors. First, both are small samples that do not consist of matched partners. The clients who were interviewed comprised few or none of the interviewed sex workers' clients. Secondly, the clients may not proportionally represent all nationalities of tourist clients. Underrepresentation of nationalities for whom anal intercourse is a more common practice could cause a low estimate of its prevalence. Thirdly, Indonesian clients were not interviewed and experiences with Indonesians are included in the CSWs' reports. Underreporting by the clients could also have been a factor, although this is unlikely since they reported higher levels of anal sex with unpaid partners.

Alcohol and drug use

Heavy use of alcohol by clients was reported by both sex workers and by clients. Ninety per cent of the sex workers report that they have clients who are drunk and 85 per cent of these workers use

alcohol themselves before or during sexual encounters. Eighty-three per cent of the clients report that they become intoxicated in Bali. Forty-four per cent report giving alcohol or drugs to sex workers.

In contrast to this, use of other drugs may be much less common in Bali. Only 16 per cent of clients reported having used other drugs in Bali. None of the sex workers reported intravenous drug use themselves and only five per cent of clients reported ever using intravenous drugs. However, their past histories imply more risk of HIV infection: 48 per cent of clients have had sex with someone who was an intravenous drug user (24%) or probably was an intravenous drug user (24%).

Summary and discussion

Several limitations of this study must be kept in mind. The data come from small, convenience samples and thus, generalizations to Bali and to other areas of Indonesia are limited. Only English-speaking tourist clients were interviewed, although sex workers report their clients to include local Indonesians and Indonesian tourists, and tourists from other Asian countries. Because of difficulty of recruitment, both prostitute and client data may undercount long-term relationships. Short-term visitors are probably underrepresented in the client sample and higher-priced sex workers may also be underrepresented. It should also be noted that the data are self reports on sensitive topics that are not easily verified.

The data indicate that there is a very active community of male sex workers and male clients in Bali that is at risk of transmission of AIDS infection. Male sex workers have limited knowledge of AIDS and STDs. Knowledge of transmission of these diseases is weak and they are unaware of asymptomatic transmission. Multiple sexual partners and frequent anal intercourse put the prostitutes at risk. Condom use is low and prostitutes possess ambivalent attitudes about their use; they frequently experience STDs and self-treatment with antibiotics is common as they report stigmatization by health-care providers. These men are characterized by considerable mobility and many are sexually active on frequent travel and home visits to other parts of Indonesia.

In terms of the ARRM model, many workers were at stage one, the labelling stage. The prostitutes had inaccurate information about AIDS and other STDs and proposed ineffective strategies such as choosing 'clean' partners for risk reduction. As discussed below, interventions with these men should begin with messages that focus on which behaviours lead to HIV and STD prevention to influence labelling of high-risk behaviours as problematic. As more sex workers progress to stages two and three of the ARRM model, the commitment and enactment stages, interventions should include skills development in condom negotiation and use. Interventions among sex workers could take advantage of social networks existing in the community. Education about these diseases and the development of skills to negotiate condom use and safer sexual practices could be organized through these networks.

The non-Indonesian tourist clients, in contrast, have considerable knowledge of AIDS and STDs. However, multiple sexual partners, including both sex workers and other tourists and ambivalent attitudes toward condom use, resulting in irregular use, put the clients and their sexual partners at risk of infection. Many were unaware of sources of condoms in Bali and condoms are not readily available at places where sexual encounters take place. High levels of alcohol use were reported before and during sexual encounters and may be a factor in increasing risky sexual behaviours. The clients have histories of STD infection and many report travel to countries with higher seroprevalence such as Thailand.

In terms of the ARRM model, the clients have in general moved beyond stage one, the labelling stage, into commitment and enactment stages. Obstacles to moving toward the enactment stages in this group may include negative beliefs about condoms as well as the unavailability of good-quality condoms in Bali. An additional obstacle may be that many of their Indonesian partners do not generally feel susceptible to HIV infection.

Health-care services that provide appropriate STD diagnosis and treatment without disapproval also need to be developed for workers in the area. Similarly, services for clients are also lacking. It should be noted that both groups have sufficient income to pay for services, so that once established, the services could become self supporting. In addition, increasing availability of good quality condoms and water-soluble based lubricants for both sex workers and clients should enhance disease prevention. These should be readily available at the sites where sex workers and clients meet, as well as in places of lodging for tourists and other places where sexual encounters take place.

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Forum: On the limited utility of KAP-style survey data in the practical epidemiology of AIDS



This issue of Forum presents a debate on Herbert L. Smith's, 'On the limited utility of KAP-style survey data in the practical epidemiology of AIDS, with reference to the AIDS epidemic in Chile', *Health Transition Review* 3,1,1993. His response to issues raised in this debate will appear in *Health Transition Review* 4,1,1994.

How do we secure adequate data on sexual networks and the probability of HIV transmission?

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Smith's (1993) paper is very welcome in that it stimulates a much needed debate on raising research standards in the study of sexual networks and the transmission of HIV/AIDS. Nevertheless, his paper is difficult to grapple with in that he has several targets, including perhaps population-based epidemiology itself. At least one would derive that impression from his insistence that the focus should be on the person truly at risk, defined as the one whose partner is seropositive, in contrast to advocating estimates of what fraction of persons are likely to become infected if their partners practise a certain sexual lifestyle. In contrast, we are told that what should be employed is 'practical epidemiology', which seems little more than traditional (and praiseworthy) public health and medical practice devoted to patients, those they might infect, and other who might be infected by those from whom they received the disease.

This comment will focus on three issues: the possibility of undertaking better population-based epidemiology in order to understand the epidemic; the extent to which the approach advocated by Smith can be said to lead to an understanding of the epidemic; and the public-health value of population-based research.

(1) The criticism of many KAP-style HIV/AIDS studies is justified but Smith does not make it clear whether he is attacking poor-quality research or maintaining that population-based inquiries in this area will never secure adequate data or will secure the wrong data.

Attacking the national AIDS surveys funded by WHO's Global Programme in AIDS (GPA) at this stage is setting up a strawman to fight. These first surveys were carried out rather quickly, often by national statistical offices or health departments, with for instance, little of the intense experimentation and supervision that laid the foundations for the World Fertility Surveys (WFS) and on matters more sensitive and without the decades of prior study that fertility enjoyed, and hence had no chance of success. The Togo data on men's numbers of extramarital sexual partners were implausible in a society where men are believed not to be able to go for long without sex and where long post-partum female

sexual abstinence and spousal residential separation was traditionally practised (Kumekpor 1975), and were not compatible with the findings of more intense studies in the same region (Caldwell 1993). The findings of the Lesotho survey were greeted, when first released, with scepticism by local medical practitioners and social scientists who were present at the meeting.

But intense person-to-person discussions, with some similarities to the 44 interviews in Chile that Smith found satisfactory, have almost certainly succeeded in securing reasonably accurate estimates of the numbers of different sexual partners of respondents in the Ekiti District of Nigeria (Orubuloye, Caldwell and Caldwell 1991) and elsewhere in Nigeria and Ghana (Caldwell 1993). As the respondents were mostly health persons, the substitution of nurses for social scientists would probably have jeopardized the work. Going one step further, a study in Ondo Town, Nigeria, probably achieved a reasonably accurate description of men's sexual partners (Orubuloye, Caldwell and Caldwell 1993). West Africa is one of the least difficult parts of the world to secure such information, but the GPA is also now funding successful small-scale projects in other parts of sub-Saharan Africa.

These data are needed for epidemiological modelling of the epidemic, but they are not sufficient in themselves. To model the sexual networks it is necessary to be able to identify partners' partners, at least to know their number and preferably some of their characteristics. Even the Ondo Town study failed to elicit high quality information of this type from the male respondents, not because of resistance but because most did not know with any certainty about the sexual activities of their partners. One could seek out the respondents' partners and treat them in turn as respondents (noting carefully how many cite the original respondents as being among their partners). This process could be repeated several times, but once would probably suffice for model-building provided that there was an accurate identification of the number of partners (perhaps adjusted by some factor derived from whether the first respondent was mentioned or not) and of whether the respondent belonged to a group with a high risk of AIDS: in Africa, commercial-sex workers, long-distance truck drivers, those suffering from other sexually-transmitted diseases (STDs), or those living in areas with a high proportion of HIV-infected persons. This would reveal the dangerous links in the chains and perhaps the extent to which networks overlap or have common links. The real problems are ethical (Caldwell, Orubuloye and Caldwell forthcoming 1994). Even in fairly permissive societies, there are real problems in locating a person – perhaps married or perhaps single and living with their parents – and proceeding to interview them on the basis that they have been named as a sexual contact by someone else (or alternatively giving misleading information about how they were selected). Furthermore, where a high proportion are commercial-sex workers, then there are difficulties because it will probably prove to be impossible for them to identify many of their partners by names and addresses.

(2) Smith (1993) advocates the use by HIV/AIDS research of 'traditional methods of control of sexually-transmitted diseases, such as contact tracing and partner notification, with their focus on actual social and sexual networks ...' (page 13). Are these really traditional and continuing methods in Chile and elsewhere? Should one, or can one, turn up at the door of every named sexual contact and demand to know their contacts? Does one also enforce an HIV test and then proceed to find the next wave of partners only for those persons seropositive? If the chain of infection is close to being fortuitous – as is implied by Smith's comment that the chance of infection is only one per thousand sexual acts (true only for normal heterosexual activity and even then when other STDs are not present and when the reference is to the man's chance of being infected) – then we may not get a very good picture of sexual networks or of the level of sexual activity in the society. Furthermore, the trail may become cold every time it reaches a commercial-sex worker – probably a frequent occurrence – who does not know the names and addresses of most of her or his clients. But how well does contact tracing work? In Australia it works well in the case of diseases with no implications of socially-unacceptable behaviour and with a short

latency period before manifest signs are visible, as was historically the case with smallpox. But the usual approach to STDs now is to suggest to the infected person that he or she tell all their partners or send them to the health personnel involved to be told. Some African programs report that such advice brings them into contact with any partners of infected persons in only about five per cent of cases, and doubtless contact with all partners is much below this level. Smith states that, 'most infected patients interviewed claimed to be in favour of notifying partners, but generally preferred to notify their stable partners themselves; notwithstanding the fact they had heretofore failed to do so' (page 11). In many cases this is probably a politeness response. In many cases, too, this form of tracing is more likely to reveal the possible future path of infection than the past one. We are told that 'many had information on casual partners that would presumably facilitate their contact by health officials' (page 11). The fact that neither the researchers nor the health officials have employed this method is probably testimony to both a reluctance to carry out such tracing (where interviewing would present difficulties of an utterly different order than the clinic-based interviewing of persons who had voluntarily submitted themselves for HIV testing), and a belief that the information supplied would allow only a fraction of each network to be identified. This approach's greatest value has been underscored by Smith. It allows the identification of high-risk geographical areas where people indulge in risky behaviour rather than the geographical areas where they live, and it provides a more certain identification of the afflicted person's characteristics and sexual preferences than forms often cursorily filled in by health staff (an aim of all good research interviewing). It has generally been concluded that the long latency period of HIV/AIDS, with its implication that the seropositive person may have been infected years before by some now forgotten partner precludes contact tracing for this disease. The only successful attempts reported in the United States were in two states previously unaffected where the infecting contact was more easily identified. There is also another problem. When carrying out contact tracing for STDs, US contact tracers arrived with the message that they had reason to believe that the persons contacted might have been infected and that a test and treatment could be arranged. The emphasis was all on concern for the person's health and then finding other people who could be helped. This is very different from contacting someone to announce that they might have a fatal and untreatable disease.

(3) Population-based survey *cum* anthropological research is needed to build models of the epidemic, to allow public-health personnel to gauge the potential danger, and to provide data for informational services and the media which may help to bring about behavioural changes. What is important here is sexual behaviour: numbers of partners over time, types of partner (how many in the high-risk groups), type of sexuality (basically heterosexuality, homosexuality or bisexuality), extent to which condoms or other forms of safe sex are used, STD status and history, and intravenous drug use. In order to model sexual networks, we also need to map them out to at least second-order partners; to know how many sexual partners a person has and how many partners each partner has. Some research on higher order partners would be social scientifically illuminating but the modellers need no more.

The fact that some surveys attempt to get their information by 'mirror samples' and others focus in on alcohol and viewing pornographic films are also strawmen – examples of bad research do not disprove the need for good research in the same area (although the level of alcohol consumption is in many societies a good indicator of the likelihood of men practising unsafe sex with unsafe partners). Certainly, any good research should go further and relate the level of sexual networking to the level of HIV/AIDS in the area, and our exploring of sexual networks probably should try to take into account – if respondents are truthful – where they 'hang out', especially when they are likely to indulge in high-risk sexual behaviour.

Only good data on sexual networking can show how fast an AIDS epidemic is likely to move through a population and whether it is likely to expand or contract, and, short of the mass use of an

effective vaccine, they are likely to prove the best weapon for containing the epidemic. In large areas of sub-Saharan Africa only good information on the extent of sexual networking, and on the frequency with which high-risk individuals are found in those networks, will provide governments with enough convincing information and the media with sufficiently newsworthy inputs, to disturb the population to the point where behaviour changes – where men have fewer partners and take fewer risks, where women regard the situation as so serious that they pressure their husbands and sons in this direction, and where, if they fail to change their husband's behaviour, they insist on safe sex within the relationship or break it up.

Surveys, surveillance, and the measurement of risk: a response to Herbert Smith

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In his recent paper Smith challenges the utility of surveys on knowledge, attitudes, and practices related to HIV transmission (Smith 1993). Smith has made two fundamental errors in his perception of the motivation for carrying out KAP surveys. First, he assumes that such surveys are meant to document the modes of transmission occurring in the surveyed population. Secondly, he assumes that epidemiologists use surveys as research tools to draw causal conclusions about risk factors and disease. Neither of these two assumptions is true.

Public-health surveillance is defined as the ongoing, systematic collection, analysis and interpretation of data on specific health events for use in the planning, implementation and evaluation of public-health programs (Thacker 1988). This concept has been broadened in recent years to watching over indicators of risk, as well as actual disease incidence (*Morbidity and Mortality Weekly Report* 1992). The continuity of the process is as important as the validity of the measures. Surveillance systems do not seek to identify individuals at risk, to provide aetiological data on the chain of causation, or precisely to measure disease dynamics. For instance, the surveillance of most infectious diseases captures information on only about ten to 30 per cent of the actual cases that occur. These are not selected by any formal sampling technique. The data are not representative, but a considerable body of data shows that the results of surveillance still provide good information about such important aspects of disease dynamics as age distribution, geographic distribution, and temporal trends (Langmuir 1963).

Smith's assumption about validity is curious to the epidemiologist and the health educator. He points out that 'The one-shot survey process is not well suited to obtaining valid measures of intimate behaviour' (Smith 1993:5). One cannot challenge this statement, but I am not aware that the proponents of KAP surveys have laid such a claim. KAP surveys may not be strictly valid, but when they are repeated with similar survey instruments and similar samples over time, they measure the changes in the population's knowledge and perceptions about HIV risk factors. If these trends are not in the desirable direction, then the political and technical leaders of HIV control programs must modify their messages. In the absence of such data, program managers are flying without instruments.

Surveillance is classically done not by 'investigators' but by governmental officials with responsibility for disease-control programs. They take their information about causal relationships from

the general research literature. They then decide what indices are practical to monitor over time. These indices are then placed under surveillance. Indices are selected more for the relative ease and low cost of measuring them than for their causal proximity to the disease under consideration.

Thus, for example, public-health officials follow tax revenues from tobacco sales because the data are readily accessible, whereas individuals' actual consumption of cigarettes is more difficult to measure. Actual determination of the population subgroups that are actively smoking might be still more difficult (Pierce et al. 1989; Lopez 1992). Monitoring changes in tax revenues in no way implies that tax revenues are the cause of lung cancer or coronary disease. Placing the population's knowledge, attitudes and practices related to HIV transmission under surveillance does not imply that the specific behaviours being monitored are either necessary or sufficient for transmission.

Smith's assumption that KAP surveys are meant to document the modes of transmission occurring in the surveyed population at the time of the survey, or accurately describe the epidemiology of the infection, shows a misunderstanding of the role of surveillance in epidemiology. Epidemiologists do not use KAP-style surveys to make inferences about the current prevalence of HIV infection, or to predict the future course of an epidemic, as Smith states. The World Health Organization advocates KAP surveys to help design the content of health-education programs in developing nations. If a high proportion of the population does not know what condoms are, then the health education message needs to explain them. If a high proportion recognizes what they are, but doesn't believe in their effectiveness, a different health education message is necessary. The main utility of KAP surveys is to guide these decisions about the content of HIV control efforts. Good KAP surveys thus play a central role in the planning and evaluation of health-education programs.

Epidemiologists do not expect KAP surveys, or indeed any cross-sectional survey, to have great use in understanding the epidemiology of HIV infection in a given population. This is because, as Smith eloquently points out, surveys are limited by sampling design techniques, and are not well adapted to ferreting out the actual behavioural practices that predispose to, let alone cause, any individual infection. Once transmission patterns in a given population have been identified, however, KAP surveys of the general population help monitor the prevalence of such practices in the general population. The exact prevalence estimate may be inaccurate, but increase or decreases in knowledge will be detected if similar instruments and similar sampling strategies are used. These changes can guide the evolution and content of health education measures.

Smith alleges that 'Most KAP-style operational constructions of risk behaviours posit an epidemiology of AIDS based on weak or irrelevant correlations' (Smith 1993:9). I believe that the public-health workers who manage HIV prevention programs and carry out KAP surveys do not posit any such relationship. KAP surveys are performed to help estimate the direction of changes in knowledge, attitudes, and behaviour over time. Whether or not these behaviours directly lead to HIV infection is not of paramount importance for use of the survey results. Smith, quoting Anderson and May, points out that, '[t]he most important factors in survey work are assessment of changes through time and at different spatial locations' (Anderson and May 1988:517 cited in Smith 1993:9). Note that there is no direct assumption of the importance of any particular behaviour in the causal chain.

Smith erroneously assumes that epidemiologists use surveys as research tools to draw causal conclusions about risk factors and disease. KAP surveys are not aetiologic research tools. They are valuable parts of a program of surveillance of behavioural practices in the general population. Perhaps Smith's fundamental problem lies with the concept of surveillance itself. Carefully conducted research studies, which can document the temporal course of events, are vital to define the importance of individual risk factors. Once these studies are done, surveillance of the prevalence of such behavioural practices becomes useful. Most epidemiologists insist upon well-performed cohort studies or case-

control studies to provide the causal link between a behavioural risk factor and a disease or condition (Rothman 1986:10-16). Fortunately such studies abound in the HIV literature, and show strong evidence of the now well-known behaviours that facilitate HIV transmission. KAP surveys did not become a major part of the HIV control agenda until after the major transmission modes for the virus were well documented in a large number of concordant cohort and case-control studies.

Smith is concerned about the 'failure of the investigators to think hard about the relationships between the behaviours they are measuring and the disease phenomenon they are studying' (Smith 1993:5-6). He confuses aetiological research with surveillance, and confuses the concept of risk with the concept of cause. Once he has done so, it is easy for him to criticize KAP surveys, since they certainly do not identify causes of transmission of HIV. Smith is concerned that measuring KAP in the general population does not identify the risk behaviours of people who are actually transmitting HIV. He points out that the HIV status of a sexual partner is much more important than the number of partners in determining risk. There is no practical or ethical way that any government can determine the HIV status of all members of its population, and then target educational messages to them alone. As long as educational messages are to be addressed to the whole population, then the whole population's general knowledge, attitudes, and practices should be monitored to provide guidance for and evaluation of the effort. Special efforts to target individuals such as in counselling sessions at an HIV clinic, may be tailored to the individual's needs. These efforts certainly should be guided by more sophisticated information than that gathered by a KAP survey.

International health, and particularly work on the health transition, attracts workers from a wide variety of fields. These workers may have distorted views of each others' disciplines and methods. Researchers and disease-control program managers may also have problems understanding each other. I believe that Smith has misinterpreted the methods of epidemiology, and the motivations of HIV prevention programs. *Health Transition Review* has rendered an important service by opening this debate to a wide audience of scholars and public-health activists.

Data collection strategies in the study of behaviours: limited use of simple solutions to a complex problem

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Several issues are of interest in considering the utility of various behavioural data collection methods in relation to HIV/AIDS. These can be formulated as follows:

- What behavioural research is useful for designing immediate interventions *targeted* at specific situations and/or to mobilize existing capacities to implement interventions?
- What behavioural research is useful for planning *wide-scale* public-health programs?
- What behavioural research and data are useful in making inferences on the current size and future course of the HIV epidemic?

- What behavioural research is useful in monitoring and evaluating progress and achievements either by small-scale interventions or large-scale programs
- In addition, what insights can be gained on the validity and reliability of various behavioural research methods and what are their implications for use in the pursuit of different objectives?

Smith touches upon some of these questions with what appears to be a random logic and attempts to provide some answers, but mixes up the issues. Smith's starting point relates to the first question. He focuses on situations where the epidemic is at an early stage and where, everyone would agree, the onus is to design and to implement interventions to slow the spread of HIV. The conclusion (p.13) that 'unfocused inquiry into diffuse behaviours in undifferentiated populations is not a productive line of research ... to design ... intervention' is fairly obvious in relation to such an objective, especially with the use of three disqualifying adjectives.

The discussion, however, is blurred on several accounts by the confusion of generic data-collection methods, namely the KABP surveys can be and have been used in different populations (not necessarily 'undifferentiated'). However, the choice of a method or a combination of methods depends on objectives; quantitative surveys usually complement qualitative studies without these being mutually exclusive.

A sense of history

In the early 1980s, in response to the Hepatitis B and AIDS epidemics, there was an upsurge of research on sexuality. However, the bulk of this work was devoted to populations such as homosexual men perceived to be at 'high risk' for contracting or transmitting infections. Missing from this research agenda were studies of the sexual behaviour of populations thought not to play a major role in HIV transmission. In response to that concern, and with the increasing evidence that heterosexual transmission of HIV was growing rapidly, the Global Programme on AIDS of WHO launched in 1988 the KABP and Partner Relations Surveys (WHO/GPA 1988) with the overall purpose of providing basic descriptive information about the knowledge, attitudes and the sexual behaviour of the general population as it relates to the risk of HIV/AIDS both within and across societies and cultures. More specific objectives of these surveys can be classified under three headings: a) to establish baselines for successive monitoring of reported behavioural changes and effectiveness of general information campaign in improving knowledge about transmission and prevention and in encouraging more tolerant attitudes towards those already infected; b) to assess ways in which the risks related to HIV infection are understood and perceived and assist in the design of general public prevention strategies; and c) to provide information which would be of value for advocacy to policy makers beyond the health sector, such as educational authorities.

These small-size surveys, generally around two to three thousands adult respondents, were *not* designed to obtain data on the frequency of, for example, homosexual behaviour or covert behaviours in the population at large; this would have required much larger sample sizes or a different method. Nor was it ever intended to use KABP data to predict the future course of the epidemic. As Smith appropriately points out, deterministic prediction of the future course of the AIDS epidemic would require not only estimates of the incidence and prevalence of specific types of risk behaviours in specific groups and estimation of their sizes but also more information about sexual networks and group mixing. As a parallel step in GPA research agenda, other survey instruments were developed, targeted at specific high-risk situations, such as homosexual and bisexual behaviour, prostitutes and clients and injecting drug users (WHO/GPA 1989-91). It was recognized that by their very nature

survey instruments are limited in their ability to conceptualize or situate research findings. Even the most carefully designed surveys offer only limited insights into the complex range of social and cultural meanings that may be associated with particular behaviours. In turning to the central goal of translating research findings into effective interventions, questions related to context and meaning are often centrally important.

In recognition of these limitations inherent to surveys, protocols for the qualitative study of both sexual culture and the culture of health, illness and disease were developed in 1990 (WHO/GPA 1990) and such work continues in the areas of evaluation and sociobehavioural determinants of HIV transmission.

Running behind the epidemic

Smith argues for a study of 'risk groups' derived from an indepth inquiry of people with AIDS/HIV, but his attempts to describe the characteristics and behaviours of persons with HIV/AIDS remain vague. Studies of homosexual men, injecting drug users and women prostitutes have shown that if the virus is present in some communities and the behaviours that transmit infection are sufficiently common and intense, HIV can become epidemic within specific populations and further spread into the 'wider general' population. For example, estimation of HIV seroprevalence among injecting drug users seeking treatment in Bangkok increased from zero per cent in 1985–86 to 16 per cent in 1988 and to 40–60 per cent in 1992 (WHO/GPA 1991 and WHO/GPA 1993). In Trinidad and Tobago, among persons with AIDS attributable to sexual transmission, the proportion linked to heterosexual contact increased from zero per cent in 1983–84 to 47 per cent in 1987 (WHO/GPA 1991).

Soon after the beginning of the AIDS epidemic, increasing concern was expressed about the accuracy and representativeness of the number of reported AIDS cases. AIDS patients having contracted HIV infection through stigmatized behaviours are likely to avoid notification. Moreover, the reported number of AIDS cases is only representative of infections contracted several years before and therefore merely reflects a picture of the past. In such a situation, 'snowball' investigations based on reported AIDS cases, mandatory HIV testing and contact tracing, as suggested by Smith (p.10), further increase the false impression that HIV is confined to particular groups of people, at a time when the epidemic may have spread to other populations. Some large urban areas of Brazil, for example, experienced epidemics that first affected homosexual and bisexual men, then emerged among injecting drug users and the female partners of these groups, and finally spread among non-injecting heterosexuals. Haiti, Honduras, Mexico and Thailand provide other examples of epidemiological patterns where the spread is rapid in urban areas, far beyond the first groups identified by 'case-reporting'. To rely on identified AIDS cases clearly bears the danger of looking backwards rather than addressing the current and, possibly, the future situation.

Biomedical risk and behaviour

Smith reserves some of his strongest criticisms of large surveys for their poor measurement of the risk of HIV infection. It is obviously true that sexual intercourse, of whatever nature and scale, carries no risk to an individual if all partners are free from infection. However, the purpose of surveys is not to assess the risk of HIV infection for individuals but to measure current or potential future risk at an aggregate level. There is abundant epidemiological evidence that, once the epidemic has spread beyond special groups in the ways outlined above, the rate of change of sexual partners and use of condoms are powerful indirect markers of HIV-infection rates. KABP-type surveys attempt to measure these and other similar aspects of behaviour. Such information is valuable for the design of public information campaigns directed towards different segments of the population and for the monitoring of subsequent change.

The relationship between diet, exercise and heart disease may be a helpful analogy. The statistical links are well established, but there is evidence that genetic factors are also critically important determinants of risk for an individual. In the future, it may be possible to identify individuals who are not at risk of heart disease, regardless of their dietary and other behaviours. In the meantime, it is entirely proper for public-health campaigns to advocate a balanced diet and exercise for all. Investigations of these behaviours among the general population play a valuable role in guiding and evaluating such campaigns.. Similarly, with sexual behaviour and HIV infection, it is entirely proper for public-information programs to attempt to reduce general-risk factors, even though the risk of infection to individuals with the same sexual behaviour will depend on a host of other factors and thus will vary greatly. An important priority in sexual-behaviour research is to assess the quality of data and to develop better measuring techniques, as has already been somewhat achieved for surveys of food intake and diet.

HIV prevention relies on non-discriminatory approaches

The importance of the ethical and public-health issues linked with the disclosure of identity of individuals infected with HIV is easily forgotten even if lip service is paid to such issues. The systematic survey of HIV-testing sites as proposed in Smith's paper (p.12) is based on records of all HIV-positive persons at the Public Health Institute in Santiago from a large network of hospitals, STD clinics etc. and also a penitentiary 'where testing is consequent on suspected homosexuality'. Documenting the spread of the epidemic over time and in different populations is easily achieved by using the unlinked anonymous testing method to estimate the HIV seroprevalence among 'sentinel' population groups that are selected for their accessibility over time (usually those who attend health services) and their potential vulnerability. For surveillance purposes, at an early stage of the epidemic it is therefore 'practical' to test blood from 'high-risk populations' attending various clinics, but those detected (anonymously!) as HIV infected represent only a small proportion of the total number of HIV infections and any strategy relying on their identification would be of very limited use. For effective prevention strategies to be implemented, those most at risk need to be accessed and not driven underground.

Indeed Smith's proposals on control measures are rather confusing. 'Traditional methods of control of STD, such as contact tracing and partner notification (p.13)' as advocated may only be of some value for curable diseases. The history of syphilis is illustrative of such a misguided approach. Before penicillin was available, the failure of syphilis control is attributable, at least partly, to the finger-pointing approach. Case finding and other militaristic approaches may succeed in disease control if there is a treatment for that disease. While there is certainly a role for voluntary testing and counselling for 'a reasonable intervention program to be targeted at these *individuals* (with AIDS who remain sexually active) and their partners' (p.13), this role is likely to be marginal in checking the general spread of HIV. Because there is a lifelong potential for transmission and because HIV is sexually transmitted and nevertheless a possibility of protection from infection, the main challenge for prevention at *population* level is to act *before* the HIV test becomes positive and not after.

Brief comments

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I would want to add only a footnote to Smith's excellent article. From my own experience as a consultant to the World Health Organization, Global Programme on AIDS, I think that a lot more could be said about why KAP-style surveys are used. WHO staff have recognized that such surveys tell only part of the story. Cara'l et al. (1991:S65) have written that 'By themselves, the survey data [i.e. WHO's KAP surveys], removed as they are from their social and cultural context, cannot furnish satisfactory explanations of patterns of sexual behaviour.' This, they continue, can only be supplied by mainly anthropological data which do not yet exist.

The problem is that WHO relies on such unsatisfactory data and frankly does not use what else there is. To explain this Alice in Wonderland situation we need, I think, to ask a number of searching questions about the sociology of those who prepare the KAP surveys. WHO is always poor mouthing, saying they could do more with more money. But this is only part of the story. In bodies like WHO, where there is still much suspicion of anthropology and similar soft qualitative disciplines, the method of data collection chosen, the data collected and their interpretation are determined to a large extent by the dominant medical quantitative subcultures.

The way forward may require a radically different approach in the handling of data. After all, our colleagues in the historical and legal disciplines, long ago devised rigorous methodologies to evaluate very dubious materials (Pitt 1972, 1982). In this way the researcher becomes rather like a judge in a court of law weighing up all the evidence from whatever source. Hopefully this might avoid some of the blunders that are likely from the KAP crowd until such time that we have the richer ethnography.

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Book Reviews



The Ethics and Politics of Human Experimentation. By Paul M. McNeill. Cambridge: Cambridge University Press, 1993. xiv + 315pp. Hardcover A\$49.95

McNeill has appropriate, but unusual, qualifications for writing on this subject. He is a graduate in law and psychology, with a PhD. in the history and philosophy of science, but teaches community and public health in the University of New South Wales, Sydney. His is a radical approach, on the side of people and subjects, without being overbearingly moralistic or ideological.

He confines himself largely to medical research and to human experimentation, so this review is not forced into the much more controversial area of the interrelations between ethical review committees and social science research. His central argument is that both researchers and their institutions have a vested interest in research going ahead. Furthermore, they are represented on ethics committees, and, even when they are not, they have the status and power to influence because of their knowledge and expertise.

McNeill's thesis is that the only way of protecting the subjects of experimentation is to have them represented on committees, perhaps by such bodies as consumer health groups or civil rights bodies. Even representatives of this type should not draw predominantly on their own beliefs or ideologies, but should attempt to contact the population pool from which the subjects will be drawn in order to explain to them the issues and to canvass their reactions. The theory is clear. The practice will undoubtedly be extremely difficult without weighting the argument and the evidence too far one way or the other. Indeed, the very argument will either have to be drawn from the influential scientists with their vested interests or will be a reaction – and perhaps a suspicious or unfair one – against those views.

Perhaps the weakest part of the book is Chapter 1 with its record of wartime atrocities and postwar atomic and nuclear experimentation. These are events on quite a different scale and essentially in the real political field in contrast to the sense in which McNeill employs political to mean the interests of institutions and programs. The issues he deals with in the rest of the book are on a smaller scale and hence are more subtle and more difficult.

I used the book for guidance on an important issue of medical ethics that will inevitably come to the fore, and found it of little help. Soon, the first experimental HIV/AIDS vaccines will become available. It will be possible to test them only on human beings. There is a tremendous need for safe vaccines to come into mass use in places like Uganda, where parts of the south-west and the capital, Kampala, exhibit levels of adult infection approaching 40 per cent of the population. No satisfactory vaccine may come into use unless the first vaccines can be tested, and until they are tested millions may be condemned to death in East and southern Africa. Yet, who will guarantee that the first experimental vaccines will not infect some of the recipients with HIV or will give complete protection from sexually-transmitted HIV? The researchers intend to cover themselves morally against the latter eventuality by warning all the subjects to take no sexual risks. But, if the advice is given so forcibly that everyone heeds it, the protective value of the vaccine will never be tested. A successful test presumably rests on the assumption that some people will not heed the advice, perhaps because it was not sufficiently convincing. The moral dilemma does not end here. The subjects in an HIV-vaccine test will almost

certainly be volunteers, yet, in Uganda and other parts of sub-Saharan Africa, some of these subjects will have volunteered precisely because they intend to continue a high-risk life-style if science can offer any hope that they will have some protection. They will take any warnings to arise out of the researchers' desire to protect themselves emotionally, ethically and legally – as indeed will be the case – and accordingly will discount it. The easy solution is to keep postponing the tests, but this will almost certainly result in far more deaths than it saves. These are issues with which McNeill will probably find himself deeply involved, and I look forward to his writings on the subject.

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Pregnancy, Birthing and Family Planning in Kenya: Changing Patterns of Behaviour. A Health Survey Utilization Study in Kisii District. By Alanagh Raikes. Copenhagen: Centre for Development Research. CDR Research Report No. 15, 1990. 1–192 pp. Paperback. DKK64,00 (postage and bank charges included).

A considerable amount of research has been conducted during the past 25 years on maternal and child health (MCH) and family planning (FP) in developing countries. Important gaps in information continue to exist, however. There is, for instance, less knowledge of various aspects of MCH than of FP programs. There are fewer studies specifically focusing on what is happening at the local level (villages, districts) than at the national level. And there are also fewer in-depth studies aiming at acquiring a picture of the overall situation than studies solely relying on quantitative data using cross-sectional sample surveys. The relevance of Raikes's study is, therefore, its promise to fill us in on some of the abovementioned gaps in knowledge.

The study specifically deals with the use of antenatal, maternity and family-planning services in the Kisii District in Kenya, with equal emphasis on all three services. Another feature of the study is the use of different methods of data collection. In addition to information derived from a cross-sectional survey conducted among 723 mothers in 1985–1986, in-depth interviews were held with mothers in 20 households; personnel of 31 health centres were interviewed and nine traditional birth attendants were visited. So what have we learned from this study or, more importantly, what can policy-makers in Kisii, in other districts of Kenya, in Nairobi and in international agencies learn from this study?

Two of the findings are that 90 per cent of mothers visit antenatal services at least once during pregnancy and that 41 per cent of all deliveries take place in hospitals or health centres. Various reasons are discussed for why some women do not make antenatal visits and why some decide to deliver at home. These reasons are classified as predisposing, enabling and health-service factors. Existing beliefs and practices relating to pregnancy and childbirth are extensively discussed as a group of predisposing factors. Age of the mother, parity and socioeconomic status are examples of enabling factors. Among the health service factors mentioned are the characteristics of hospitals and clinics and the views of hospital and clinic staff on the operation and problems of antenatal and maternity services.

A similar approach is used with respect to family planning (FP) and the use of FP services. Noteworthy in the category of predisposing factors is the description and discussion of the role of traditional customs and methods of spacing births, in particular breastfeeding, abstinence from sexual relations and polygamy. The impact of demographic and socioeconomic characteristics on FP

acceptance is described in a section dealing with enabling factors. Especially relevant in the category of health service factors is the analysis of features of government-operated FP clinics compared with those of a private organization.

A major conclusion with respect to maternity services is that the existing services are very inadequate in terms of both facilities and staffing. They would be much more intensively used if there were more of them and if they were of better quality. With respect to the use of FP services it is concluded that FP is not a top priority for women in Kisii. Mention is made again of the contrast in services provided by the government (integrated with MCH) and a private organization (not integrated with MCH). This leads to the conclusion that there certainly is an important role to be played by non-governmental agencies and that '...for a while integrated MCH/FP [may] not [be] the most viable way to expand the [FP] service' (p. 139).

The study by Raikes is complementary to the existing studies undertaken so far. It is important that equal attention is paid to MCH and FP, because it happens too often that studies that claim to deal with both MCH and FP, in practice give much more attention to FP. Another noteworthy feature of the study is the use of a variety of sources of information. Especially useful is the description of beliefs and behaviour relating to pregnancy, childbirth and family planning as well as the results of in-depth interviews with staff of clinics, health centres and hospitals. It is to some extent disappointing that less than maximum use was made of the opportunities which were available. The study deals with a number of topics relevant for MCH and FP, but the analysis is not always thorough enough and the evidence in favour of several conclusions too sparse and not convincing enough. For instance, the results of the cross-sectional survey are somewhat meagre. More topics could and should have been included, for instance, on perceptions of women and mothers on 'high risk' pregnancies needing delivery in hospital and on their views on the quality of services provided by hospitals and clinics. It is also a pity that the study did not make optimal use of already existing information dealing with Kisii District as well as of results of epidemiological and other studies on MCH and FP which have already been conducted in Kenya and other East African countries. In spite of these limitations the report by Raikes is a welcome addition to the already existing literature.

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AIDS: The Making of a Chronic Disease. By Elizabeth Fee and Daniel M. Fox, eds. Berkeley: University of California Press, 1992. vi+430 pp. Cloth US\$45.00, paperback US\$15.00.

Almost from its very beginnings, AIDS has demanded attention from historians. In 1988, medical historians and policy makers were treated to the publication of *AIDS: The Burdens of History*, edited by Elizabeth Fee, from the School of Public Health at Johns Hopkins University, and Daniel M. Fox, who is now President of the Milbank Memorial Fund and Professor of Social Sciences in Medicine at the State University of New York, Stony Brook. The volume set a new standard for contemporary history, with a collection of essays that were as theoretically bold as they were immediately relevant. Now, the same two editors have gathered another set of treatments of AIDS. Like their earlier effort, this new volume will reward scholars and students who come to it from a wide range of approaches. The contributions to this new volume reflect a set of major changes in the definitions of AIDS, most notably a shift from conceptualizing AIDS as an acute infectious disease towards seeing AIDS as a chronic disease.

These essays demand understanding on multiple levels. The collection is an exploration of the different ways that the natural sciences on the one hand, and the humanities and the social sciences on the other hand, give various degrees of insight into the phenomenon that we now think of as AIDS. And what is AIDS? Perhaps the book's central theme is the contingent nature of that definition. Part of its strength is that at the end (or even not far from the beginning) the reader has been disabused of the naive notion that 'AIDS' or related terms have any meaning outside of a specific social, economic, and historical context. At another level, these essays try, more or less effectively, to articulate the relevance of history to contemporary health policy. At yet another level, these essays say a great deal about the phenomenon that is killing people around the world. Relativism will go only so far. Physicians, public health providers and policy makers must finally decide to act, no matter how aware they are of the arbitrary nature of the definitions that they decide to use. However, given the rapidly changing nature of the empirical evidence, this is a book that will be most valuable for its conceptual insights.

Some of the sixteen contributions have been published previously, although many of them have been somewhat revised for this volume. The editors' cogent introduction emphasizes how the ways historians think about a given issue are different from the ways that scholars in the other social sciences think; and it emphasizes the relevance of an historical approach for understanding health policy. Throughout the book, written by members of the 'Greater Historical Profession' (p. 12), historical themes are very much in evidence.

The first section of the book considers efforts to represent the virus that is defined as causing AIDS. Stephen S. Morse looks with a virologist's eye at the evolutionary nature of the HIV virus, stresses the inseparable nature of pathogens and their hosts, and speculates about other viruses that may follow. Gerald M. Oppenheimer examines how groups of people, such as those working at the Centers for Disease Control in the United States, and ways of thinking, such as an epidemiological approach, tended to define the disease in certain ways and not in others. In the second section of the book there is a great deal about how legal and public policy matters helped create the response to AIDS. Harvey M. Sapolsky and Stephen L. Boswell give a fascinating account of how the two major groups that provide blood and plasma reacted, differently, to changing ideas about the infection. David J. Rothman and Harold Edgar compare the different ways that drugs for cancer and drugs for AIDS have been evaluated. Because AIDS was initially defined as an acute infection, the FDA chose to insist on randomized, placebo-controlled trials. Had AIDS been treated as a chronic cellular illness instead, drug trials might have more resembled those typically used to test cancer treatments. There, randomized, placebo-controlled trials are not considered ideal, either in principle or in fact.

A third section of the book examines the response of affected populations, such as the gay community and intravenous drug users. It includes a powerful set of photographs of women with AIDS by Ann Meredith, together with comments by the women about their lives. The book's fourth and final section includes excellent international perspectives on the disease. Two essays examine the response of communities in the United Kingdom and Japan, illustrating the difference made by different cultural contexts. Randall M. Packard and Paul Epstein compare AIDS research in Africa with research in Africa on venereal disease and tuberculosis. They point out that a fixation on African sexuality shaped Western attitudes towards AIDS. They also claim that needle use and malnutrition have not received adequate attention from AIDS researchers. Finally, Paula A. Treicher deconstructs both 'eyewitness' and statistical accounts of AIDS as carried out from the developing world.

Taken as a whole, this volume presents a complex, multifaceted analysis of what we now call 'AIDS'. It will be useful for those who study the disease, as well as for those who teach medicine, history, and policy.

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Constructing Questions for Interviews and Questionnaires: Theory and Practice in Social Science. By William Foddy. Melbourne: Cambridge University Press. xii+228. Hardcover A\$75.00.

Foddy has concentrated on the task of understanding the nature of verbal data, with the ultimate aim of increasing the validity of the questions used in social research. Although Foddy describes his text as a practical book, a number of the early chapters are devoted to defining the issues and to providing a theoretical framework within which to consider the methodological assumptions underlying the use of verbal data.

Foddy describes a model in which the respondent is an active participant in the communication process, rather than a passive agent, as has been the case with much previous survey research. Subsequent chapters deal with the factors affecting responses to questions and the subjects ability to respond. Issues addressed include contextual influences and the limitations of memory.

The final chapters of the book concentrate more on 'how to do it' and it is to these chapters that most readers will first turn. For example, Foddy's more practical chapters discuss the use of filters, reducing question threat, the use of open versus closed questions, the measurement of attitudes and how to check that questions work as intended.

This book does not deal with issues such as sample selection, questionnaire layout, or how to conduct interviews or analyse data. It deals with the more fundamental problem of how to formulate questions. Anyone who has attempted this task knows how difficult it can be. Foddy's book is excellent. It should be read by everyone involved in social science survey research.

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Paths to Asian Medical Knowledge. By Charles Leslie and Allan Young, eds. Berkeley: University of California Press, 1992. ix + 296pp. Cloth US\$40.00, paperback US\$15.00.

Paths to Asian Medical Knowledge is the result of a conference entitled 'Permanence and Change in Asian Medical Systems' held in 1985 and funded by Wenner-Gren. It provides a sequel to the first volume on Asian medical systems published in 1976 under the editorship of Charles Leslie, which came out of the 1971 conference. While the former volume emphasized 'the history and ethnology of Islamic, Indian, and Chinese humoralism' (1992:7), the essays in this volume, as the title indicates, concern 'the sources and modalities of medical knowledge' (1992:14).

The volume comprises twelve substantive chapters divided according to geographic or cultural area into three main sections: Chinese and other East Asian traditions, with five chapters; Ayurveda and other traditions of South Asia, also with five chapters, and the Islamic-Humoral Traditions, consisting of two chapters. The collection is preceded by a general introduction by Charles Leslie and Allan

Young (pp. 1–18), and there are also short but useful introductions to each of the three sections. The general introduction surveys the major theoretical issues in the literature on Asian medicine and in this context also provides a useful overview of the major published sources on Asian medicine from the 1970s to the present.

The offerings in the first section, 'Chinese Medicine, Cosmopolitan Medicine, and Other Traditions in East Asia' are diverse. Kuriyama, in 'Between Mind and Eye: Japanese Anatomy in the Eighteenth Century' provides a careful study of eighteenth century Japanese responses to Dutch anatomical engravings, drawing on ideas about the nature of visual perception. Farquhar's study, 'Time and Text: Approaching Chinese Medical Practice through Analysis of a Published Case', importantly gives us access to 'the temporal and practical forms of medical life' (p.63) through an account of the nature and uses of published cases in Chinese medicine. A contribution to the understanding of the foundations of current Chinese practices of traditional medicine in Taiwan is provided by Seaman who compares folk categories of thought in medicine, agriculture, and geomancy. Unschuld's 'Epistemological Issues and Changing Legitimation: Traditional Chinese Medicine in the Twentieth Century' provides an interesting and important discussion of the essentially Western ideological sources for the legitimacy and dynamism of traditional Chinese medicine over the last 80 to 90 years, while comparing it to developments in Western medicine. Finally, Lock, in 'The Fragile Japanese Family: Narratives about Individualism and the Postmodern State' presents a wide-ranging account of the 'remaking of a cultural identity in postwar Japan' (p.99) as it affects the nuclear family and particularly the mother in the family. She shows how points of tension in contemporary society have become subject to medicalization and makes use of this to provide a provocative critique of the concept of medicalization as well as other forms of explanation which may be used to legitimate a particular political or moral order.

Section 2 of the volume cover Ayurveda and other traditions of South Asia and is also diverse in terms of the topics which are addressed. Trawick's valuable essay 'Death and Nurturance in Indian Systems of Healing' takes up four different systems of healing in India, analysing them as both systems of thought and practice as they are manifest in contemporary Tamil Nadu. She shows how symbolic interrelationships between these differing systems act to generate an overall pattern or set of healing traditions which may actually contribute to the process of healing. Obeyesekere's 'Science, Experimentation, and Clinical Practice in Ayurveda' deals with the scientific character of Ayurveda through the observation of and interviews with specific practitioners, for 'there are no professional scientists of Ayurveda, that is, those whose main role is the generation of scientific knowledge through research'. Rather, 'their science emerges out of their medical practice' (Obeyesekere, p.162). The confrontation between Ayurveda and biomedicine in the context of the historical development of Ayurveda as a professional system of thought and practice is the subject of Leslie's interesting study, 'Interpretations of Illness: Syncretism in Modern Ayurveda'. Leslie shows how and why Ayurvedic scholars cling to the concepts underlying Ayurveda as well as work to reconcile it with biomedical knowledge. Zimmermann's 'Gentle Purge: The Flower Power of Ayurveda', details how both in South Asia and in the export of Ayurvedic therapies to the West, the 'modern emphasis on gentle elements in Ayurveda changes the tradition significantly' (p.210). These alterations to classical doctrine are used 'to reveal the significance of catharsis—both purification and purgation—in historic Ayurveda' (p.210). Lastly, syncretic forms of explanation and understanding used by the Tuluva peoples in Karnataka State when they are faced with a new, tick-borne epidemic disease is the subject of Nichter's contribution, 'Of Ticks, Kings, Spirits, and the Promise of Vaccines'. These are examined in reference to the ecological, political and sociocultural context in the region.

The remaining two chapters in the volume make up a section entitled 'Islamic Humoral Traditions'. The first, by Good and Good, 'The Comparative Study of Greco-Islamic Medicine: The Integration of Medical Knowledge into Local Symbolic Contexts', provides an important template for the comparative consideration of the humoral traditions of the Islamic world. It commences with the problem of how the humoral medical tradition grounded in classical cosmology can be 'suited to map the life world of extraordinarily diverse Muslim societies' (p.258), and outlines a number of means through which humoral medicine may become symbolically integrated in diverse cultures, as well as the implications of this integration at both biological and sociocultural levels. Lastly, Laderman's chapter, 'A Welcoming Soil: Islamic Humoralism on the Malay Peninsula', provides a study of the integration of Islamic humoral ideas among the cultures of the Malay peninsula by comparing humoral medicine to accounts of indigenous systems of thought drawn from ethnographic sources on aboriginal peoples.

The book provides a useful source for the exploration of key epistemological issues in the study of thought and practice with Asian medical systems and in comparative medicine generally. It also offers the reader a range of interesting substantive accounts of and perspectives on Ayurvedic, Chinese, and Islamic traditions drawn from various regions and historical periods.

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