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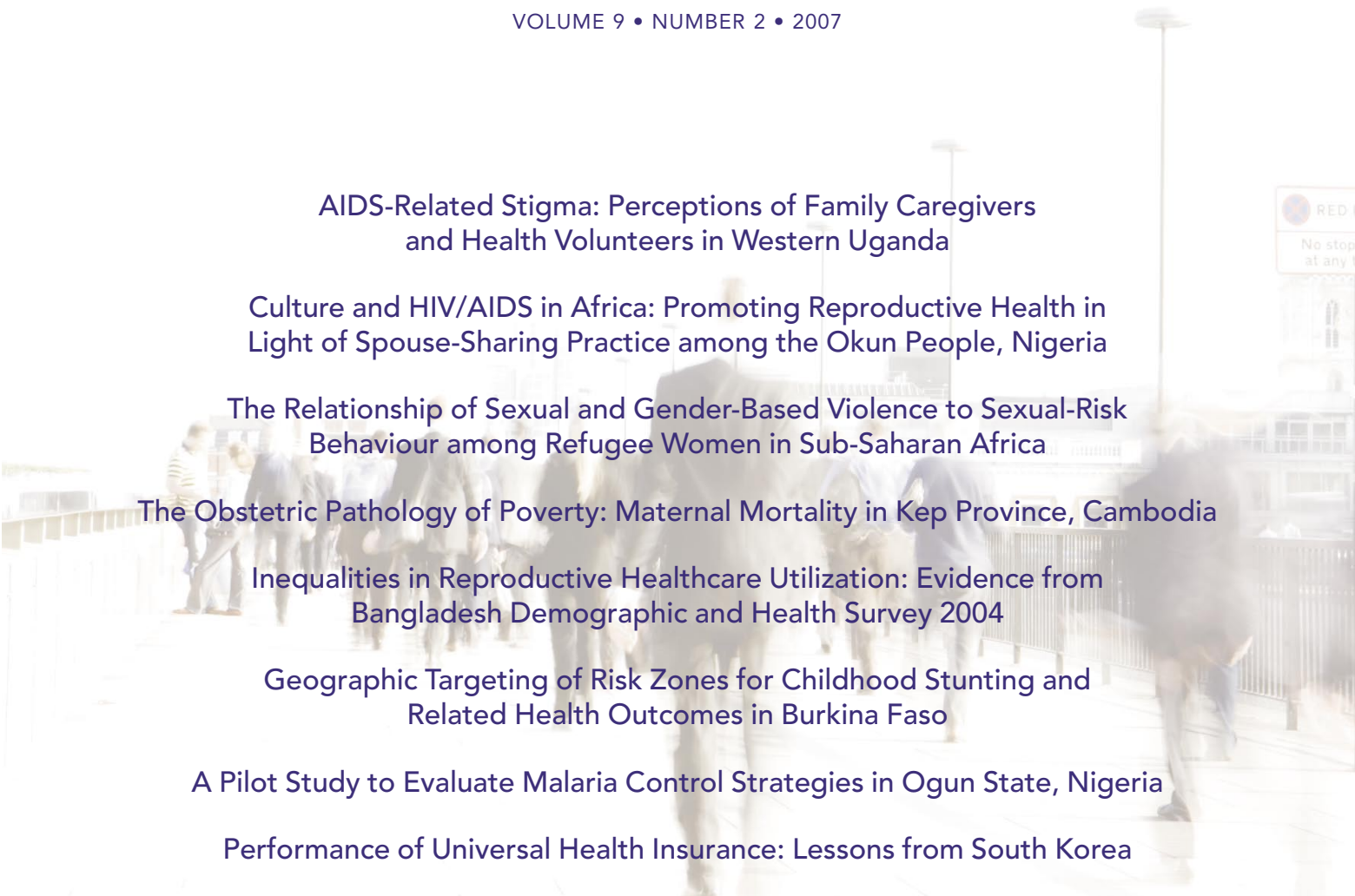

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IN THIS ISSUE

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From the Editor-in-Chief

This issue of *World Health and Population* features both geographic as well as subject matter diversity, from South Korea to sub-Saharan Africa, and health insurance to interventions designed to alter traditional cultural practices. There are some unifying themes, however, with three papers relating to HIV/AIDS, two examining issues around reproductive health, two concerned with primary health care, and two examining healthcare issues in middle income countries which increasingly resemble those of countries in North America and Western Europe.

In "AIDS-related stigma: Perceptions of family caregivers and health volunteers in Western Uganda" Walter Kipp et al. address a dimension of the AIDS epidemic outside the usual prevention-treatment focus by seeking information on the impact of stigma on already overburdened home-based AIDS caregiving. The good news is that respondents in this qualitative study reported a lessening of AIDS-related stigma, and showed an encouraging enthusiasm for discussing the issues, perhaps an indicator in itself of lessening social stigma of such a widespread disease.

Osagbemi et al. offer an extension to primary prevention efforts for HIV/AIDS through an intervention to change a traditional cultural practice. In "Culture and HIV/AIDS in Africa: Promoting reproductive health in light of spouse-sharing practice among the Okun people" the authors report on testing an intervention with a pre-post control group design. The intervention resulted in increased knowledge of transmission patterns for the disease, and higher "intention to discontinue spouse-sharing" in the intervention communities. Whether this approach can actually decrease spouse sharing (with the goal of decreasing HIV transmission), remains for follow-up research.

The third article that touches on the HIV/AIDS epidemic in sub-Saharan Africa does so through the very difficult subject of sexual violence in refugee populations. In "The relationship of sexual and gender-based violence (SGBV) to sexual-risk behaviour among refugee women in sub-Saharan Africa," Johannes John-Langba reports on interviews with 402 refugee women from 16 different countries in a camp in Botswana. A remarkable 75% of the women interviewed reported being victims of SGBV. Not surprisingly, a number of negative health impacts were noted. More importantly, however, an increase in sexual risk behaviors (putting the women at higher risk of HIV/AIDS) was causally associated with previous SGBV.

Reproductive health care issues are address by Amitha Kalaichandran and David Zakus in "The obstetric pathology of poverty: Maternal mortality in Kep Province, Cambodia" and by Halder et al. in "Inequalities in reproductive healthcare utilization: Evidence from the 2004 Bangladesh Demographic and Health Survey." Kalaichandran and Zakus link underreporting of maternal mortality with the Millennium Development Goals, identifying through verbal autopsies maternal mortality rates potentially two times higher other in-country estimates in Cambodia. The interesting turn-of-phrase "obstetric pathology of poverty" (attributed to Abdel-Aleem in 1993) gets to the point that, even in resource constrained countries, it is the very poorest that continue to suffer the greatest disadvantage in reproductive outcomes. The article by Halder et al., based upon the

Bangladesh Demographic and Health Survey, points out that along the continuum of antenatal, delivery, and postnatal services, postnatal services are typically the most neglected, and that reproductive health care needs to be both physically and financially accessible, as well as appropriately targeted for the population being served.

The two articles focusing on primary care do so from very different angles. The first, "Geographic targeting of risk zones for childhood stunting and related health outcomes in Burkina Faso" by Florence Margai points out that appropriate targeting of services in highly resourced constrained countries is a complex challenge. Margai uses sophisticated geo-mapping techniques to identify at-risk populations for childhood stunting, but concludes that "broader, more integrative approaches are needed" both to identify the at risk populations as well as the appropriate multifaceted intervention. The second article relating to primary care, "A pilot study to evaluate malaria control strategies in Ogun State, Nigeria" by Adeneye et al., is a descriptive study of awareness of treatment initiatives and policy changes related to malaria control. Linked with efforts around the 2010 Roll Back Malaria targets, the cross-sectional household and clinic surveys reported by Adeneye et al. conclude that better use of multiple modes of communication are necessary, as well as a better understanding of how the target population receives, processes, and acts upon information related to malaria control.

Finally, there are two articles in this issue of *WHP* which move to problems of middle income countries and issues perhaps more familiar to health policymakers in OECD countries. "Performance of universal health insurance: Lessons from South Korea" by Sangho Moon and Jaeun Shin briefly describes the remarkable 12 year transition to universal health insurance in that country (from 1977 to 1989), and benchmarks the progress of South Korea across the dimensions of access, cost, and outcomes since that time. It is certainly a remarkable accomplishment. The last article, "Living Arrangements and the Role of Caregivers among the Elderly in Latin America," by Antonio Trujillo, Thomas Mroz, and Gustavo Angeles, analyses a cross-sectional, population-representative data set ("SABE"), similar to the Health and Retirement Survey in the U.S. The authors take a labor economics approach in examining the role of caregivers for the elderly in four Latin American countries, the exchange of services for care giving (e.g., childcare) in these settings, and possible conflicts arising from the increasing participation of women in the workforce. Since the proportion of elderly in the population is increasing more rapidly in Latin America than other areas of the world, significant policy challenges must also be faced in the future.

We hope that you find these articles of interest and value, and will additionally explore the other offering online at www.worldhealthandpopulation.com. The editors and publishers of *WHP* are always interested in any comments or suggestions you might have on the articles or journal. Please feel free to write or e-mail us.

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AIDS-Related Stigma: Perceptions of Family Caregivers and Health Volunteers in Western Uganda

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Abstract

This article reports the findings from a qualitative research study carried out in four areas in western Uganda. Opinions about AIDS-related stigma were elucidated from four focus group discussions with health volunteers of a home-based care program for HIV/AIDS and from 16 in-depth interviews with family caregivers of AIDS patients. While the health volunteers emphasized that AIDS-related stigma is still very strong, the family caregivers said that positive changes have occurred and discrimination against AIDS patients and their family members has eased. The difference in the perception of AIDS-related stigma between health volunteers and family caregivers needs further confirmation through additional studies specifically designed to answer this question. It should also be investigated whether the healthcare system itself contributes to AIDS-related stigma in this environment.

Introduction

Investigating the burden of caregivers for HIV/AIDS patients is especially relevant for sub-Saharan Africa, where the majority of persons with HIV/AIDS live. Here most patients suffering from clinical AIDS remain at home and receive either some care through home-based care programs or no formal healthcare services at all. This situation is reported by many authors, who stress the importance of family caregiving, especially in poor rural settings of sub-Saharan Africa where formal healthcare services such as home-based care are virtually absent (Robson 2000; Ntozi 1997; Chela et al. 1989; Reijer 1999). AIDS patients and their family caregivers in sub-Saharan Africa live in communities where much stigma surrounding HIV infection exists (Kalondo 1996; Anderson 1994).

Stigma often leads to social isolation and loneliness, not only for AIDS patients, but also for their family caregivers and other family members (Casaux and Reboredo 1998). This suggests that the AIDS-related stigma goes beyond the individual AIDS patient in that it affects all members of the household. Powell and others have shown in their North American study that most of the personal suffering by caregivers of AIDS patients was associated with AIDS-related stigma (Powell-Cope and Brown 1992). Information about how AIDS-related stigma adds to the high family-caregiver burden is not easily available from developing countries.

Stigma against persons with a certain medical condition has been widely described. The first examinations of disease-related stigma go back to the work in psychiatric hospitals in the 1950s (Goffman 1961). Goffman also first described "courtesy stigma," a stigma acquired as a result of being related to a person with stigma. Much of the stigma-related research was done in settings where mental disease and/or disabilities played a role (Angermeyer et al 2003). It is mostly within this context that courtesy stigma was described in families having a child with mental retardation (Green 2003). These studies emphasized individual factors of mental patients or disabled children. More recently, other work on stigma has emphasized less the individual factors and more the structural inequalities in the society in which stigma is embedded (Parker and Aggleton 2003).

The complexity of AIDS-related stigma has been described by Castro in Haiti, who pointed out how difficult it is to define (Castro and Farmer 2005). Castro has also emphasized the importance of examining the broader underlying societal factors causing AIDS-related stigma rather than the individual characteristics of AIDS patients and their family members. Reidpath stipulated that stigma associated with HIV/AIDS is not a singular entity, but is layered with other stigmas, such as those associated with the routes of transmission (e.g., sex work, injection of drugs) and personal characteristics such as race, religion, ethnicity and gender (Reidpath and Chan 2005). Songwathana observed from Thailand that limited attention has been paid to how AIDS-related stigma affects the processes and experiences of diagnosis, treatment, prevention and care for AIDS patients (Songwathana and Manderson 2001). As moral issues around sexuality are exposed, when somebody becomes visibly sick with AIDS it is easy to understand why other people react to AIDS in a judgmental way. It has been speculated that other obvious factors possibly contributing to AIDS stigma relate to the features of HIV/AIDS that people generally find very frightening (e.g., fear of contagion, early death in adults and transmission from mother to child). If this is true it would correspond with Reidpath's conceptual framework.

The difficulty of quantitatively measuring AIDS-related stigma in sub-Saharan Africa has been highlighted by Kalichman in South Africa, who stated that AIDS-stigma-related quantitative scales are not available or validated for Africa (Kalichman et al. 2005). This motivated Kalichman and colleagues to test an instrument in South Africa that was derived from a tool validated in developed countries. As AIDS-related stigma is regarded as one of the major barriers to developing effective preventive and care programs (Reidpath and Chan 2005), it is important to examine and follow trends in AIDS stigma. It is also important to determine how AIDS-related stigma evolves, how it changes during a successful HIV/AIDS control program (which has taken place in Uganda and in the study area) and how specific interventions can be developed to mitigate it.

This pilot study on AIDS-related stigma was part of a bigger study that sought to assess family-caregiver issues on a broad scale, measuring them in quantitative and qualitative terms. Our working

definition of AIDS-related stigma included issues surrounding discrimination and ostracism. Similar words exist in the local language Rutooro, and the concept of stigma is well known and understood in the local culture.

In western Uganda, care for rural AIDS patients is almost exclusively provided by family members in the home, since hospital access is very limited and costly. For example, in Kabarole district, one of the districts included in this study, 90% of the population lives in rural and/or remote areas. HIV prevalence is estimated at 14% in the study area, and some 6000–8000 AIDS patients require treatment with antiretroviral drugs (ARVs). The rural study area is typical for sub-Saharan Africa, with a high burden of infectious disease including malaria and tuberculosis. None of the homes visited during this study had running water or electricity, and most were poorly built. None of the care recipients in our study were being treated with ARVs. Health volunteers, who are selected by the communities, are part of the Primary Health Care program in Uganda.

Health volunteers are involved in several district health programs, for example, family planning, HIV/AIDS care, tuberculosis control (direct observed therapy, DOTS) and control of parasitic diseases. The volunteers we interviewed were part of the home-based care program for AIDS patients. The volunteers provided mainly homemaking services such as helping with cooking, buying food and child care, but they also provided basic patient care and HIV counselling for family members (after training in basic counselling skills). They visited a home based on the patient's need, usually 2–3 times per week. The average duration of one visit was around one hour. Volunteers were not paid salaries but received non-cash incentives from the Kabarole District Health Department.

Methodology

This study was designed as a qualitative study, as no validated tools were available to quantitatively measure the level of AIDS-related stigma. Sixteen family caregivers, whose care recipients were clients of the home-based care program, were included in the study. They were purposefully selected from a random sample of 120 caregivers, using a systematic sampling from all active client households of the home-based care program living in four sub-counties in Kabarole and Kamwenge districts. Only family caregivers with care experiences of one year or longer were selected from the list for the year 2003. We started at the beginning of the list, consecutively selecting those who qualified. Family caregivers were contacted by the research team and enrolled in the study if they voluntarily agreed. Of the 16 caregivers recruited, 12 were female and 4 were male.

In addition to the caregiver interviews, we conducted four focus group discussions (FGDs) with 18 health volunteers of the home-based care program for AIDS patients. Health volunteers were purposefully selected from the same four sub-counties where the caregivers were living. They were contacted by the research team after they expressed their willingness to participate. When they agreed to participate, they were enrolled in the study. Of the 18 health volunteers, nine were males and nine were females.

The topics of the in-depth interviews and the FGDs were designed to address issues identified through information from the literature, from local health workers, and from our own experience. For example, caregivers were asked questions about caregiving tasks, housing conditions, financial costs, relationships with the care recipient and other family members, relationships with service providers and issues surrounding AIDS stigma. Health volunteers were asked more general questions about AIDS-related stigma in the community, general attitude of families (public) toward AIDS patients, openness and demand for HIV testing services, and other issues around the care they provide in the homes of their patients. Discussion about AIDS-related stigma was covered in the later part of the interviews/FGDs in order to acquaint the interviewee/group with the interviewer while using less sensitive issues.

All in-depth interviews and FGDs were tape recorded after participants gave consent for recording. Tapes were transcribed word by word in the local language Rutooro. Transcripts in Rutooro were translated into English by an experienced language teacher and reviewed by a second interpreter. Qualitative analytical techniques included content analysis (theming, coding, catego-

rizing, abstracting). Abstracting was done by transforming data from individual instances to create general categories that were derived from the data.

One male and one female interviewer/facilitator with experience in qualitative techniques were trained to properly use the instruments of the study and received refresher training in qualitative interview techniques. Female participants in the in-depth interviews were interviewed by a female interviewer and male participants were interviewed by a male interviewer.

The study was approved by the Health Research Ethics Board (Panel B) at the University of Alberta, the Uganda National Council for Science and Technology, Kampala, and the District Directors for Health Services of the districts involved. Individual consent from all study participants was obtained with a signed consent form after an information letter was read to them. Interviews and FGDs were conducted at locations chosen by the participants in order to protect their confidentiality.

Results

Descriptive statistics for the family caregiver are shown in Table 1:

Table 1. Characteristics of family caregivers (n=16)*

Characteristic	Number of Caregivers
Age (Years)	
Below 40	5
41–50	4
Over 50	7
Sex	
Male	4
Female	12
Marital status	
Married	10
Divorced	1
Widowed	1
Single	4
Duration of caregiving	
Less than 2 years	4
2–5 years	6
More than 5 years	6
Relationship with care recipient	
Parent	3
Sibling	8
Spouse	3
Grand parent	2

*No percentages given due to the small sample.

Health volunteers were between 20 and 30 years of age. All have served as health volunteers for a period of one year or longer.

The following two major themes emerged from the interviews and discussions: 1) AIDS stigma still persists in Uganda, and 2) there is some hope as positive changes have occurred; for example, AIDS-related stigma has declined.

Sub-themes extracted from the transcripts follow.

Families' Fears about HIV/AIDS

Some health volunteers said that family members are worried about their involvement in caring for AIDS patients, not only for fear they will be infected with HIV, but also because of discrimination. Health volunteers also noted that they usually educate families about the prevention and spread of HIV/AIDS to allay any fears clients/caregivers may have. Health volunteers gave the following comments:

"…During home visits we find some patients have no care takers because of stigma, and they are alone. In such a situation the burden of cleaning the patient falls on us. We clean and even feed the patient."

"You have to assure them that this is like any other disease so, they have to be patient and understanding."

"Most of the family members are scared, as I told you, about stigma. The only thing we do is healthy education. We tell them that it is not AIDS; it's just like any other infection. It is just for reassurance that those people are trying to go over it. We explain how the infection is transmitted and how we avoid it."

Most health volunteers reported that stigma is still prevalent among many households and in the community, and this makes disclosure of the HIV/AIDS diagnosis very difficult. They said that stigma affects their work, as they also fear to discuss the diagnosis with the care recipients. To illustrate the problem of stigma, health volunteers reported that many pregnant women did not access services to reduce mother-to-child transmission of HIV because they feared their husbands:

"…There are times when we find a pregnant woman who does not want her husband to know that she is infected. If you tell her to go to the hospital and get drugs so her child can survive, she will not accept, however much you try to counsel her."

While all health volunteers thought that the AIDS-related stigma is still very strong, most family caregivers except two said that AIDS-related stigma has declined. These two family caregivers indicated their doubt as follows:

"…The truth is that a relative might not assist, but a friend or neighbour may be more helpful. Although the patients during the period of extreme weakness usually demand a lot of support and care, relatives will only come in after they have died."

"In fact the father gave assistance in terms of school fees, then after senior six she joined Institute of Commerce. There she got the disease and her father abandoned her, and she had to come to her uncle and I decided to start taking care of her, and when I meet the father he doesn't even greet me. We became enemies. But the problem is attributed by the disease."

Confidentiality of Diagnoses Is Emphasized

Health volunteers strongly emphasized the importance of maintaining confidentiality regarding HIV/AIDS diagnoses in order to make it possible for clients to keep their diagnosis private. The volunteers also said they cannot discuss the care recipients' HIV status with them unless they declare it on their own. In this regard, the volunteers seemed to overemphasize confidentiality issues in comparison with other prevalent infectious diseases, e.g., malaria, tuberculosis and even other STDs, where confidentiality was not seen as an issue. In addition to overemphasizing confidentiality, the volunteers also had an incorrect understanding of confidentiality, as they thought besides not talking to others about one's HIV diagnosis, it would also include not talking to an AIDS patient about his

diagnosis, as shown in the following comment:

"When he comes for counselling, we tell him that since he is sick he should not go for women as he might contact AIDS. He then asks you, you think I have slim (AIDS)? We do not tell him the truth because if he knows he will go ahead spreading it. We tell him that if he goes with other women he will die within a short time. He himself will tell us that he is suffering from slim. Then we tell him not to spread it."

Risk of Suicide Is a Reality

Results of discussions also indicated that due to stigma, health volunteers reported to be afraid of counselling patients about their HIV positive status for fear that they might commit suicide, as shown in the following comments of volunteers:

"… A patient may come to us for counselling worried and dejected. Although we can see the signs of AIDS we fear that if we tell him that he has HIV/AIDS he might commit suicide or he might say, these people have no AIDS drugs so why should I go back."

"We cannot directly tell the patients that they have AIDS, so we only advise them on reducing on their sexual contacts because it will weaken them further. We fear that if we mention that they have AIDS they will commit suicide."

A More Positive Attitude toward AIDS Patients

Responses from family caregivers indicated that in general the attitude toward AIDS patients by relatives and friends has changed from highly stigmatizing to more understanding and sympathetic. A number of family caregivers said that relatives and friends now continue visiting the patient, although they do not provide a lot of support since they are also very poor themselves. In a few situations, caregivers said they are not close to their relatives, but the neighbours show love and care by coming to visit and sometimes pray with the patients and express their concern, as shown in the following comments:

"There is nothing like avoiding her, in fact the friends try to visit her and give her comfort, except the relatives don't mind about her."

"They have no problem. In the past they would laugh at the patients, but these days at least every family has, even in any way or the other, faced the same problem."

"Anyway there is no problem with them at all be in the bars or somewhere else. Sometimes friends assist me with money or drinks."

"They have not changed much and they are not mistreating us in any way, but we visit them and they visit us as well. Even relatives have kept coming to see us."

Family caregivers associated this change in reaction and attitude with the spread of the epidemic, since almost every family has now been affected by HIV/AIDS, and it is no longer new within their communities.

"Even if most of us have not gone for HIV testing, let us assume that the disease is for everybody because at least every family has been affected, and, currently at least, it is no longer talked about too much, compared to the past, as in 1988 and 1994. Nothing happens because people take it to be very normal compared to the past when people used to fear a lot."

Overall, most family caregivers said that positive changes toward HIV/AIDS have occurred in this part of Uganda and that AIDS-related stigma is declining. However, there was not a single spontaneous comment from a health volunteer in this regard.

Discussion

Our study tried to elucidate information about AIDS-related stigma in western Uganda from a small group of family caregivers of AIDS patients and health volunteers involved in AIDS care in the home. Almost all participants (both volunteers and family caregivers) were generally very open about HIV/AIDS in the interview and focus group setting. This openness to discuss HIV/AIDS-related issues with others is a precondition for more effective prevention and care programs. Furthermore, more effective prevention and care programs are now available in Uganda in the form of free antiretroviral therapy and related services for AIDS patients, and these may in turn decrease stigma due to HIV/AIDS.

This was a qualitative pilot study with a small sample size and limited categories of participants. A larger, more representative quantitative study should be undertaken, including a greater variety of health professionals, more AIDS patients and their family members, and the general population. Although free antiretroviral therapy was not available during the time of our study, it is now widely available. Therefore it is realistic to assume that the HIV/AIDS stigma has declined on a wider scale since this study was conducted, because of the enormous benefits AIDS patients on antiretroviral therapy and their family members have experienced. The probable decline in stigma needs to be measured in a larger study area with solid methodology, and documented in detail. This would generate important new information on additional benefits of antiretroviral therapy that reach far beyond the health of individual AIDS patients.

It was also important to note that most participants expressed great interest in the discussion and said that they had never been asked about AIDS-related stigma; nor did they recall a similar study being conducted in their community. The open attitude toward AIDS may in itself be a small sign that in the group we interviewed, the stigma is now less of an issue than it once was.

It was interesting to find that most responses saying that AIDS-related stigma has declined came from the family caregivers, while none of the health volunteers expressed this opinion. We would have expected it to be exactly the opposite – that family caregivers would have stronger and more negative feelings than health volunteers about the stigma because they are the ones who directly experience it. We feel that responses of family caregivers, indicating they felt less stigmatization in the community, were very credible. It is not completely clear to us why the difference in responses in these two groups exists. One possible explanation could be a "staff" issue: the health volunteers identified themselves as more a part of the formal healthcare system than as representatives or advocates of their clients and the community. This "staff attitude" of health volunteers is also shown in their responses to some questions, which indicated that the volunteers themselves seem to treat AIDS patients as a "different" group of patients. We have seen circumstances where formally trained healthcare workers, who are usually the volunteers' role models, have considered AIDS patients a "different" group of patients. Healthcare systems in many countries have treated AIDS patients differently from other patients in many respects, for example, by establishing special AIDS clinics and treatment centers, requiring special counselling skills in staff doing HIV testing, and demanding extensive and lengthy training and certification programs for staff distributing the new ARVs. There is also evidence from the literature that the healthcare system induces AIDS-related stigma (Kelly et al. 1987).

The difference in responses between health volunteers and caregivers raises the question of whether the health volunteers are sensitive to the changes occurring in homes affected by HIV/AIDS (e.g., that family caregivers experience and express a decline in AIDS-related stigma), or whether they represent the more conservative part of the healthcare system that still considers AIDS patients "different" and thus inadvertently may not help to reduce the stigma involved. The question of if and how AIDS patients are stigmatized by healthcare workers and the healthcare system should be

investigated in more detail in developed and developing countries alike. If stigma is mostly a health-care system problem, then it should be addressed by appropriate health system changes. For example, if found to be a staff attitude problem, then additional staff training and enforcement of ethical principles would be required. However, in either case this component of the AIDS-related stigma problem could be effectively and directly dealt with by the healthcare system itself. Introducing measures required to effectively solve these system and staff problems lies within the mandate and control of those who could really make a difference.

Limitations of the Study

1) Participants (especially the caregivers) were self-selected and using home-based-care services. This may have overestimated the reported decline in AIDS-related stigma, as caregivers who are not aware or not using services may be less informed and less enlightened about HIV/AIDS. 2) The small sample does not allow us to draw definite conclusions about trends in AIDS-related stigma. This would require a much larger and more representative study. 3) The discrepancy in responses between health volunteers and family caregivers on AIDS-related stigma could have been, at least in part, due to different data-collection modes, for example, in-depth interviews versus focus group discussions.

Summary

Family caregivers reported that they felt there is now less AIDS-related stigma than in the past; this is important to note, bearing in mind that the opinion comes from a very small, self-selected group. We did not find any published information on trends of AIDS-related stigma in Africa. This is somewhat surprising, as the literature clearly states that AIDS-related stigma is a crucial hindrance to improved HIV/AIDS control. It would be very important to investigate in detail how trends in AIDS-related stigmatization can be best measured and continuously monitored and why changes in the trend occur (Varas-Diaz et al. 2005). This could be done using some of the new tools available since we conducted our study. This knowledge would be crucial to improve the effectiveness of ongoing HIV/AIDS prevention and care programs. Since stigma research in HIV/AIDS has been carried out mostly in developed countries, more knowledge and understanding of this stigma is needed from the cultural context of developing countries in order to be more successful in HIV/AIDS prevention and care.

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Culture and HIV/AIDS in Africa: Promoting Reproductive Health in Light of Spouse-Sharing Practice among the Okun People, Nigeria

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Abstract

The Okun tribe, numbering about a million persons, accepts sexual relations between men and wives of their male kin. We identified and used features of spouse sharing that affect reproductive health to develop an interactive, community-based intervention. The intervention promoted discussion of spouse sharing as a risk factor in HIV/AIDS transmission, knowledge of AIDS/sexually transmitted diseases (STDs), perception of risk and alternative behaviors to avoid contracting HIV/AIDS. The intervention effects were evaluated using data collected in baseline and follow-up surveys in May 1999 and June 2000 among 1018 sexually active respondents in two sets of Okun communities – one with and the other without intervention. The intervention significantly increased knowledge of HIV/AIDS, perception of risk of contracting the disease and the intention to discontinue spouse sharing in the intervention communities. Those who perceived themselves at risk of contracting HIV/AIDS were more

likely to express intention to discontinue spouse sharing (odds ratio 2.87) than those who did not. It was recommended that future community-based interventions to address traditional practices that could transmit HIV/AIDS should address the aspects of the practice that could transmit the disease and actively involve the people to make impact.

Background

The Okun tribe, numbering about a million persons in the North-Central zone of Nigeria, accepts sexual relations between men and wives of their male kin in a practice called *ale/alase*.[1] The practice promotes sexual partnering and typifies sex with relatives by marriage in many communities in sub-Saharan Africa. In Nigeria, for instance, various studies of Yoruba culture in the South-West region have confirmed widespread extramarital sex in the form of spouse sharing (Ward 1937; Fadipe 1970; Caldwell, et al., 1991; Orubuloye et al. 1991; Orubuloye et al 1992; Messersmith 1994; Adegbola and Babalola 1999). See Kashamura (1973) for similar studies in other parts of Africa and Kakar (1990) in India. Some of these authors have concluded that the spread of HIV may be facilitated by sexual networking involving sex with relatives by marriage among men and women in the general population.

The intractable problem of HIV/AIDS in sub-Saharan Africa has created the need to understand sexual behavior and the practices that spread the infection as well as to experiment with programs that will halt its spread. Studies have documented sexual behaviors and traditional practices such as early marriage, "sugar daddy" syndrome, polygamy, extramarital sex and widow inheritance among others that contribute to the spread of HIV infection in different parts of the continent (Dominique and Calves 1997, UNESCO 1999, Longfield et al. 2004, Bankole et al. 2004). The continued existence of these practices in the community is probably responsible for the slow progress being recorded in the fight against this dreaded disease in many parts of sub-Saharan Africa, a slowness that is increasingly becoming of serious concern to all.

Although the literature is replete with information on behaviours and practices that contribute to the spread of HIV, few focused interventions to address these practices have been conducted. Organized primary prevention education programs have addressed general information about HIV/AIDS with the hope that those acculturated in other ways will be able to apply the knowledge and change their behaviour to avoid contracting the disease. Unfortunately, the most affected people are members of small ethnic groups in media-poor rural areas who have been neglected in major health promotion campaigns, or at best have been treated as part of larger ethic groups in their countries. What these groups probably need are specially packaged, community-based, participatory and interactive interventions that they can identify with and that respect their culture and beliefs.

Again, it is argued that the literature on HIV/AIDS prevention activities in sub-Saharan Africa is replete with case studies of best practices that are not based on research and that evaluations are too few and often poorly designed, or are too inconclusive to yield reliable guidance about program impact on which further interventions can be based (Grunseit and Kippax 1993, Kirby 1995, Hughes and McCauley 1998). The inadequacy of research findings concerning effectiveness of intervention and the growing problem of HIV/AIDS attributable to traditional practices combine to pose challenges to researchers, program managers and other stakeholders. This report documents the impact of a program designed to promote knowledge of HIV/AIDS, heighten people's perception of risk of the disease and discourage the practice of spouse sharing (sexual partnering) among the Okun people in the middle belt region of Nigeria.

Description of Program/Intervention

Previous studies conducted among the sexually active Okun people with support from the World Health Organization revealed that the practice of spouse sharing was high (63%), knowledge of sexually transmitted infections and HIV/AIDS was poor, and the people were still at the stage of denial of HIV/AIDS in their community (Osagbemi et al. 1995; Osagbemi and Adepetu 2001; Osagbemi and Jegede 2001). An intervention was planned to create awareness about HIV/AIDS,

promote self-protective practices and discourage the practice of spouse sharing among the Okun people. In several meetings with community members, it was decided that an Open Day with poster distribution, drama and peer education strategies would be adopted to convey the intervention messages, and their impact would be evaluated before considering other strategies.

Two sets of posters were distributed during the Open Day ceremony, each carrying short factual messages on HIV/AIDS and spouse sharing, with pictorial illustrations. The first displayed the message that HIV/AIDS is real, kills and has no cure. The second carried the message that HIV/AIDS could be contracted by having *ale/alase* or keeping multiple sex partners, using unsterilized needles and razor blades, and through contact with infected blood. It advised people to say "no" to spouse sharing and multiple sexual partnering. The Open Day, designed to entertain and educate in each settlement, attracted attention and drew participation from the local populace, including chiefs, traditional leaders and opinion leaders. It heightened HIV/AIDS awareness and provided the context for launching other intervention strategies – drama, peer education and posters. A detailed description of the planning, development and implementation of the different aspects of the program has been provided elsewhere (Osagbemi and Jegede 2001).

The drama presentation mirrored the practice of spouse sharing in the communities and provided the context for addressing many aspects of the practice that are considered capable of spreading HIV infection and/or are inimical to reproductive health. The play consisted of five parts, all designed to sensitize people on the risks of spouse sharing and the need to adopt self-protective behaviours in light of HIV/AIDS. Condom use was presented as a feasible option for prevention. Wrong treatment-seeking behaviours in the community were highlighted in specific scenes, and correct alternatives presented. At the end of each drama session, spectators were usually advised to visit the peer health educators (PHE), introduced before the drama, for more information.

The objective of the peer health education was to make the impact of the intervention more sustainable by repeating the intervention messages and discussing them among peers/groups in the communities after the program team may have departed. Peer educators (PEs) were credible volunteers from religious groups, age grades, schools and cooperative unions in the communities. Most importantly, those selected demonstrated strong interest and commitment to the program during training. At the end of training, each PE received an outline of the major findings of the previous studies in English and the interpretation in the local language, a primer on sexually transmitted diseases (STDs) and HIV/AIDS, a packet of condoms and 50 posters. Peer educators were given a modest task of counselling at least one person per day during the intervention period.

In the intervention communities, approximately 1700 posters in the local language were successfully distributed and four drama performances were staged between May 1999 and April 2000. The 80 trained PHEs (20 each in Ejuku and Ijowa and 40 in Isanlu) reported that they had educated 1840 persons within the period of the intervention. Intervention activities were conducted simultaneously, and the aim for activities was to complement and reinforce each other and facilitate community-wide discussion of the intervention messages. Over 95% of respondents reported exposure to at least one intervention activity, and about 87% reported exposure to two or more activities.

This study draws ideas from the step-to-behaviour-change framework, which synthesizes theories of communication and behaviour change into a practical model to guide reproductive health communication programs. The framework in turn derived its ideas from earlier works such as the health-belief-model, social-learning theory and the theory of reasoned action (Bandura 1977; Proschaska et al. 1997; Fishbein and Ajzen 1975). The step-to-behaviour framework describes five stages through which people pass as they change their behaviour: knowledge, approval, intention, practice and advocacy (Piotrow 1997; Kim et al. 2001). Effective communication campaigns determine the stage that their audience is at and focus their energy accordingly. At the time of this survey, HIV/AIDS information was just beginning to spread uniformly among the Okun and many people could not relate their behaviour to the new disease. The Okun study focused on the three earliest stages, when people learn key information about the disease and acquire skills for prevention, discuss campaign messages and express an intention for a new behaviour.

Methodology

The study used a quasi-experimental design involving two sets of Okun communities,[2] one with and the other without intervention. The intervention settlements comprised Isanlu – a local government headquarters, and two rural settlements – Ejuku and Ijowa. The non-intervention communities comprised Mopa – a local government headquarters, and two more rural villages – Effo and Ponyan. In 1996, the estimated populations of the studied settlements were: Isanlu – 14,446, Ejuku – 5644, Ijowa – 8216, Mopa – 10,405, Effo – 5790 and Ponyan – 7371 (National Population Commission Field Office, Isanlu).

Baseline and follow-up survey data were collected from 1018[3] sexually active Okun men aged 16 to 60 years and ever-married women aged 12 to 49 years in May 1999 and June 2000. The survey consisted of two parts: a knowledge, attitude, behaviour and practice (KABP) survey with the 1018 respondents, and a focus group discussion (FGD) among 86 informants (results of the FGD has been reported elsewhere; see Osagbemi and Jegede 2001).

In the program and control settlements, eligible respondents were reached through a random selection of census enumeration areas [EAs], followed by a random selection of households in the selected EAs. The questionnaire was administered in face-to-face interviews, and as much as possible, respondents and interviewers were matched together by sex. The surveys were conducted as approved by the University of Jos Institutional Review Board and the World Health Organization's Ethical Review Committee for research involving human subjects. Detailed sampling procedures have been described elsewhere (Osagbemi and Adepetu 2001; Osagbemi and Jegede 2001).

The questionnaire was divided into seven sections. Section 1 sought information on respondents' demographic and socio-economic characteristics including marriage and fertility history. Section 2 collected information on sexual practices in the locality and on the respondents' participation in the practice of spouse sharing, as well as whether respondents had any intention of stopping the practice. Section 3 examined respondents' awareness and experience of STDs, and Section 4 examined respondents' awareness and knowledge of HIV/AIDS and their sources of information. Sections 5 and 6 examined respondents' knowledge and practice of protective behaviour including the use of condom. Finally, Section 7 measured exposure to the intervention program and was included only in the post-intervention survey questionnaire.

It was not possible to measure directly all aspects of the steps-to-behaviour-change model using the questionnaire among the Okun; however, the people's intention measured by our study assumed the antecedents. In theories of human behaviour, intention has long been viewed as important because it synthesizes the influence of an individual's background and attitudes and mediates between those characteristics and actual behaviour (Azjen and Fishbein 1969).

Expression of intention to stop spouse sharing was measured with a "yes" or "no" based on the response to the survey question asking whether a respondent intends to discontinue the practice of spouse sharing in the next six months. Knowledge score[4] was calculated for individual respondents from the 14 questions on the survey questionnaire on facts and misconceptions about HIV/AIDS. Psychometric analyses were performed on the items used to measure knowledge of HIV/AIDS among the Okun to ensure that they were reliable. The split-half reliability analysis shows that the correlation among the 14 items, the Spearman-Brown correlation coefficient and the Guttmann split-half correlation coefficients were 0.6243, 0.7135 and 0.7418, respectively. Not-too-high and not-too-low correlation coefficients of this nature are good indicators of items reliability (Nunnally, 1978). Those who scored 0–5 were categorized as low, 6–10 as medium and 11 and above as high. Perception of risk was also measured with a "yes" or "no" response to the question of whether a respondent considered herself or himself to be personally at risk of contracting HIV infection.

Data were collected from the same respondents before and after the intervention. This is an extremely powerful design that gives us exact estimates of behaviour change, because we track the same person over one year and this allows us meaningful comparisons between the intervention and control groups. The background and socio-demographic characteristics of respondents and exposure to the intervention were recoded into dichotomous variables (see Table 2). A generalized

logistic regression model for dichotomous variables was fitted into the dataset to estimate the odds ratios of a respondent's expressing an intention to stop the practice of spouse sharing from exposure to our program, knowledge of HIV/AIDS and perception of risk of contracting HIV infection, while controlling for the background characteristics of the respondents and the interaction between exposure to the program and background characteristics.

Results

Table 1 contains information on background characteristics of the participants in the program. The same respondents in the intervention communities (n = 588) and non-intervention communities (n = 430) completed a post-intervention survey questionnaire identical in content to the pre-test questionnaire.

Table 1. Percentage distribution of respondents by selected characteristics for the overall sample and for the intervention and non-intervention communities

Characteristics	Variables		Community		
			All	Intervention	Non-intervention
			***N* = 1018**	***n* = 588**	***n* = 430**
			2000	2000	2000
Sex	Male		50.1	49.3	51.2
	Female		49.9	50.7	48.8
Locality	LG headquarters		52.6	56.5	47.2
	Rural villages		47.4	43.5	52.8
Age	≤35 years		56.6	55.1	56.9
	≥36 years		43.4	44.9	43.1
Educational status	No formal schooling		35.0	34.8	43.0
	Some formal schooling		65.0	65.2	57.0
Media exposure	Radio	Yes	87.1	86.2	86.2
		No	12.9	13.8	13.8
Occupation	Non farming activities		34.1	34.3	33.9
	Farming		48.4	47.9	47.9
Type of family	Polygamy		46.1	46.5	46.0
	Monogamy		53.9	53.5	54.0

The number of men and women was approximately equal; slightly over half reside in semi-urban areas and are less than 35 years old. About one third have no formal education, but the majority of participants listen to the radio at least once a week. Only one third were engaged in non-farming activities, and almost half had a polygamous family background. Respondents were similar in a number of demographic and socio-economic characteristics, except that the intervention group was more likely to reside in the urban area (local government headquarters) and was more educated.

Bivariate Analysis

The intervention and control groups were compared along a number of intermediate outcomes – knowledge of HIV/AIDS, perception of risk and expression of intention to discontinue the practice of spouse sharing directly. These intermediate outcomes were believed to be positively influenced by the program after one year among the Okun people. Table 2 reveals that knowledge of HIV/AIDS increased between June 1999 and May 2000 in the general population but was more dramatic in communities where we conducted our study than in non-intervention communities. The intervention group scored higher and the differences were large and significant on all 14 items designed to test the knowledge of transmission and prevention of HIV/AIDS. The knowledge that women or men can contract and spread HIV increased significantly in both intervention and non-intervention settlements.

Table 2. Percentage distribution of respondents who answered correctly to the facts and fallacies about HIV/AIDS, according to survey year

S/No	Facts and Fallacies about STDs Including HIV/AIDS	Intervention Communities		Non-intervention Communities	
		1999	2000	1999	2000
	n	**591**	**588**	**438**	**430**
1	The practice of *ale/alase* can facilitate the spread of HIV/AIDS in the community.	34.0 (201)	78.6 (462)***	35.4 (155)	41.4 (178)
2	HIV/AIDS can be transmitted through sexual intercourse.	72.1 (426)	99.0 (582)***	70.1 (307)	74.9 (322)
3	Only men/women get AIDS.	53.0 (313)	88.9 (523)***	64.4 (282)	75.1 (323)***
4	Only sex workers transmit HIV.	58.0 (343)	89.6 (527)***	62.6 (274)	67.0 (288)
5	Person can get HIV without looking sick.	33.0 (195)	74.0 (435)***	32.2 (141)	31.2 (134)
6	A person can get AIDS by shaking hand with the person who has AIDS.	55.0 (325)	80.8 (475)***	59.6 (261)	64.9 (279)
7	A person can avoid AIDS by using condom.	49.1 (290)	75.3 (443)***	55.9 (244)	58.1 (250)
8	Getting AIDS is a matter of bad luck.	56.0 (331)	83.5 (491)***	62.8 (275)	65.8 (283)
9	There is no cure yet for AIDS.	71.1 (420)	98.6 (580)***	73.3 (321)	80.7 (347)
10	A person can avoid HIV/AIDS by having only one sex partner and no *ale* or *alase*.	47.0 (278)	84.0 (493)***	67.6 (296)	72.6 (312)
11	Mosquito can spread the AIDS virus.	51.9 (307)	70.2 (413)***	56.6 (248)	62.6 (269)
12	Babies can get HIV from their mothers.	31.0 (183)	70.2 (413)***	44.7 (196)	46.3 (199)
13	Traditional medicine can cure AIDS.	46.0 (272)	80.3 (472)***	66.4 (291)	70.5 (303)
14	You cannot contract HIV/AIDS from an infected person by sharing the same utensils.	46.0 (272)	60.9 (358)***	48.2 (211)	51.6 (223)

***Significant at $p \leq .001$.

Table 3 shows that more people were probably aware of the risk of HIV/AIDS in the community in 2000 than in 1999. About half of the population considered themselves at risk of contracting HIV/AIDS in 1999 and two thirds in 2000 in the intervention group, compared with slightly less

than half in 1999 and slightly more than half in 2000 in the control group. The increase in the intervention group was large and significant between 1999 and 2000 ($X^2 = 97.5$, $p \leq .001$).

Table 3. Perception of being at risk of contracting STDs including HIV/AIDS within the past six months, by survey year

Response	All***		Intervention Communities***		Non-intervention Communities	
	1999	2000	1999	2000	1999	2000
Yes	50.6 (521)	71.9 (732)	52.3 (309)	79.7 (469)	48.4 (212)	54.2 (233)
No	49.4 (508)	29.1 (286)	47.7 (282)	21.3 (119)	51.6 (226)	46.8 (197)
Total	100 (1029)	100 (1018)	100 (591)	100 (588)	100 (438)	100 (430)

***Significant at $p \leq .001$.

According to Table 4, less than 5% of sampled respondents who practised spouse sharing in 1999 expressed intentions to stop, compared with about 36% in this category of respondents in 2000. This percentage increase was higher among respondents in intervention communities (53.2%) than in non-intervention communities (11.9%).

Table 4. Percentage distribution of respondents by whether or not they expressed intention to stop spouse sharing for the overall sample and for the intervention and non-intervention communities

Expressed an Intention in Next 12 Months to Stop Spouse Sharing	All***		Intervention Communities***		Non-intervention Communities**	
	1999	2000	1999	2000	1999	2000
Expressed	4.91 (33)	36.44 (207)	4.9 (20)	53.2 (159)	4.90 (13)	11.9(32)
Not expressed	95.09 (639)	63.56 (361)	95.1(385)	46.8 (108)	95.1(254)	88.1(237)
Total	100 (672)	100 (568)	100 (405)	100 (299)	100 (267)	100 (269)

**Significant at $p \leq .05$, ***Significant at $p \leq .001$.

Multivariate Analysis

Table 5 contains the results of the logistic regression on the likelihood of expressing an intention to stop the *ale* or *alase* practice of spouse sharing. The analysis was conducted in stages. Model 1 examines differences in exposure to the intervention for the likelihood of expressing an intention to stop the practice of spouse sharing. The effects of the respondents' knowledge of HIV/AIDS and perception of risk were adjusted for in Model 2. Measures of traditional attributes such as type of family setting (polygamy or monogamy), occupation, and urban and rural residence were adjusted for in Model 3. Model 4 incorporates socio-economic and demographic indicators such as income, educational status, radio exposure, sex and age to see if these variables mediate the effects of exposure to the intervention on reporting of intentions to stop spouse sharing. We assumed that if the exposure–intention relationship is still significant, the evidence could be reasonably assumed to infer the effect of our program.

Table 5. Odds ratio from logistic regression models measuring the effects of exposure to intervention on the likelihood of expressing intention to stop participation in spouse sharing among the Okun, 2000

Name of Variable	Categories	Model 1	Model 2	Model 3	Model 4
Exposure to the intervention	Exposed	14.9***	3.25***	3.40***	2.82**
	Not exposed	1.00	1.00	1.00	1.00
Knowledge of HIV/AIDS	High		2.94***	2.89**	2.57*
	Medium		1.00	1.00	1.00
	Low		0.99	0.99	0.66
Perception of risk	Yes		3.11***	3.06**	2.87**
	No		1.00	1.00	1.00
Type of family	Monogamy			1.29	1.37
	Polygamy			1.00	1.00
Occupation	Farming			0.59*	0.61*
	Non-farm			1.00	1.00
Residence	Urban			1.36	1.31
	Rural			1.00	1.00
Income category	High				1.57
	Low				1.00
Educational status	Some schooling				1.55
	No formal schooling				1.00
Radio exposure	Yes				1.41
	No				1.00
Sex	Male				1.20
	Female				1.00
Age group	≤35 years				0.74
Constant		2.24	2.58	2.48	2.81
2-log likelihood		458.53	421.79	414.66	410.05

*Significant at $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

In Model 1, the odds ratio of reporting an intention to stop the practice of ale or alase is 14.9 among those exposed to the intervention, in contrast to those not exposed. In Model 2, the addition of knowledge of HIV/AIDS and the perception of risk of contracting the disease ameliorated dramatically the relationship between exposure and intention to discontinue spouse sharing.

This confirms the hypothesis that exposure will increase knowledge of HIV/AIDS and heightens the perception of risk leading to expression of intention to stop spouse sharing among the Okun.

This relationship between exposure, acting through knowledge, perception of risk of contracting HIV and expression of intention to stop spouse sharing among the Okun was slightly weakened with the addition of socio-cultural variables in Model 3. The addition of education, media exposure and demographic attributes like age and sex variables in Model 4 did not ameliorate the relationship between exposure, acting through knowledge of HIV/AIDS, perception of risk of contracting HIV/AIDS and expressing an intention to stop spouse sharing

Discussion

This paper describes the impact of a community-based HIV/AIDS awareness program to discourage the practice of spouse sharing among the Okun people. It was implemented in three intervention and three control settlements in the middle belt region of Nigeria. Quantitative data from the respondents were used to examine the correlates of expressing an intention to stop the practice of spouse sharing. Two rounds of surveys involved the same respondents, one before and the other immediately after the intervention, which allows direct comparison of the data. Intervention activities took place at intervals, enabling participants to reflect on the knowledge gained. Some of the activities were repeated in the community to reinforce earlier information and promote knowledge retention.

We did not control for the conditions or reasons generally given for the practice of spouse sharing, such as polygamy, widowhood, early marriage, infertility and impotence. The quantitative survey did not directly capture this data in a manner amenable to analysis. These conditions may have implications for individuals' and couples' vulnerability to the practice of spouse sharing and the ability to discontinue involvement, particularly for women (Osagbemi and Adepetu 2001). Analysis that includes these conditions will shed more light on the interplay between these socio-economic conditions, vulnerability to spouse sharing, HIV/AIDS and the probability of eradicating the practice in the society.

The intervention and control groups were compared along a number of intermediate outcomes – knowledge of HIV/AIDS, perception of risk and expression of intention to discontinue spouse sharing directly. These intermediate outcomes were positively influenced by the program after one year. Knowledge of HIV/AIDS increased significantly in the communities where we conducted our studies compared with other communities. The intervention group scored higher and the differences were large and significant on all 14 items testing knowledge of transmission and prevention of HIV/AIDS between 1999 and 2000. In the non-intervention communities, only the knowledge that HIV/AIDS is not a disease of a particular sex (male or female) increased significantly. In both communities the notion held before the intervention that HIV/AIDS is a disease contracted from women is generally changing, and this a good development for prevention of the disease in the community.

People in the intervention communities were more aware or probably more convinced in 2000 than in 1999 that the practice of spouse sharing (*ale/alase*) can facilitate the spread of HIV/AIDS in the community. The highest percentage point difference of 44.6% recorded on this particular issue in the intervention communities undoubtedly stems from the improve knowledge of HIV recorded among this group. It indicates that the Okun people are beginning to relate their behaviour to the disease. This is further confirmed by the findings that whereas in 1999 about half of the population considered themselves at risk for contracting HIV/AIDS, in 2000 two thirds of the intervention group considered themselves at risk. Only slightly more than half of the control group saw themselves at risk in 2000.

The increase in knowledge about HIV transmission and the perception of risk of contracting the disease have combined to create an intention to discontinue spouse sharing. Less than 5% of the sampled respondents who practised spouse sharing in 1999 expressed intentions to stop, compared with about 36% in 2000. This percentage increase was higher among respondents in intervention communities (53.2%) than in non-intervention communities (11.9%). The intervention messages

stating that HIV/AIDS – *Jodimole* – is real in Okun land, is sexually transmitted, and *ale* or *alase* can facilitate its spread, probably heightened the individual's sense of vulnerability and perception of risk in the community.

When respondents' background characteristics were controlled for in a multivariate analysis shown in Table 5, the intervention increased knowledge of HIV/AIDS and heightened the perception of risk, leading to expressions of intention to stop spouse sharing. among the Okun. The relationship between exposure to the intervention, knowledge of HIV/AIDS, perception of risk of contracting HIV and expression of intentions to stop the practice of spouse sharing was slightly weakened with the addition of socio-cultural variables in Model 3. Farmers were significantly less likely to express intentions to discontinue spouse sharing. Farming symbolizes the traditional occupation of the people and is an indicator of a probable adherence to tradition in the society. This finding is important given the central role farmers play in the economy of these rural communities. Special attention must focus on taking the message of HIV to farmers so that they can change their behaviour and improve their sexual and reproductive health.

The modest success recorded by our program is probably due to the colourful Open Day ceremony, the play and the peer health education program meant to complement each other and organized with active participation of the people. Over 80% of respondents reported exposure to the three major activities, probably because of the publicity given to the program, which used the local traditional channel of information dissemination (Osagbemi and Jegede 2001). Although the effects of each program on outcome variables were not isolated, studies in other parts of Africa confirm the advantage of combining several means of communication. Different audiences, with varied backgrounds, respond to different appeals (Kane et al. 1998; Jato et al. 1999; Kim et al. 2001).

HIV/AIDS in sub-Saharan Africa has not spread in a social or cultural vacuum (Caldwell et al. 1989, Bankole et al. 2004). Thus, tackling cultural practices that could spread HIV/AIDS among populations, particularly in small tribal groups in several parts of Africa, will probably benefit from a community-based, culturally sensitive, multi-channel program of information dissemination specifically focused on the problem itself, with the people as active partners. The whole intervention and its messages probably addressed an aspect of HIV transmission (multiple sexual partnering) that found meaning in the culture of the Okun people in the form of spouse sharing and that the people could easily identify with.

The future impact of the intervention on the discontinuation of spouse sharing among the general population will probably depend on those who expressed an intention to discontinue the practice now. In theories of human behaviour, intention has long been viewed as important because it synthesizes the influence of an individual's background and attitudes and mediates between those characteristics and actual behaviour (Ajzen and Fishbein 1969). The urge to stop the practice is probably rising in all the Okun communities, probably in response to the growing awareness of the threat of HIV/AIDS, which is receiving nationwide publicity. The government is mounting radio and television propaganda to further inform people about the reality of the disease in the country. While some of these messages on HIV/AIDS may not directly address the issue of spouse sharing and the socio-cultural peculiarity of the Okun people, some are no doubt informative.

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Notes

1. *Alase* in the Okun language literally means a cook. Food exchange between lovers is an important feature of the practice. The name *alase* probably derived from the fact that a man who maintains an affair with a kin's wife, in addition to sex, enjoys the privilege of meals specially prepared by his lover. As part of the practice, the man provides the woman with food items twice or three times a week, usually from his farm. Presently, those who are not farmers may occasionally give money in return for a permanent ration every evening from their lovers. Men refer to their partners as *alase* while women refer to theirs as *ale*.

2. The 1995 study (Osagbemi et al 1995) showed a high rate of involvement in spouse sharing in seven settlements (three local government headquarters and four rural villages). Four of these settlements were selected and randomly assigned to the intervention and non-intervention settlements for the 1999 study.

3. To calculate sample size, the assumption was made that if the Okun people's knowledge of HIV/AIDS was tested in the community, they would know about 50% of basic facts about HIV/AIDS transmission, symptoms and prevention. Theoretically, the intervention is expected to improve knowledge by 20% to 25% to detect a difference of 22% following the intervention (with an alpha of 0.05%, power of 80% and attrition rate of 10%); 360 eligible respondents each would be required to participate in the two sets of communities – the intervention and non-intervention.

4. Knowledge score was calculated for individuals based on the 14 test items presented in Table 2. Psychometric analyses were performed on the 14 items to ensure that they were reliable (Nunnally 1978). The ability of a test item to obtain similar results from the same individuals under similar circumstances can be measured with a test, re-test comparison of scores or by measuring split-half consistencies in scores. The split-half reliability analysis shows that the correlation among the 14 items, the Spearman-Brown correlation coefficient and the Guttman split-half correlation coefficients were 0.4221, 0.562 and 0.5734, respectively. According to Palumbo (1969), not-too-high and not-too-low correlation coefficients of this nature are a good indicator of item reliability. Thereafter, individual scores were recoded. Those who scored 0–5 were categorized as low, 6–10 as medium, and 11 and above as high.

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The Relationship of Sexual and Gender-Based Violence to Sexual-Risk Behaviour among Refugee Women in Sub-Saharan Africa

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Abstract

This study utilized the reformulated theory of learned helplessness to investigate the relationships of sexual and gender-based violence (SGBV), learned helplessness, depression and sexual-risk behaviours among refugee women in a camp setting in Botswana. Simultaneous multiple regression analysis showed that past SGBV predicts current sexual-risk behaviour ($F = 2.018$; $p < .011$). Although the hypothesized mediating roles of learned helplessness and depression on the relationship between past SGBV and current sexual-risk behaviour were not supported, 55% of participants experienced learned helplessness and 90% were depressed.

Introduction

Sexual and gender-based violence (SGBV) has been reported to occur during all phases of the refugee experience: prior to flight, during flight, while in the country of first asylum and during repatriation and reintegration. The perpetrators are reportedly fellow refugees, members of other clans, religious or ethnic groups, military personnel, relief workers, members of the host population and family members (United Nationals High Commissioner for Refugees [UNHCR 1999]). "SGBV encompasses a wide variety of abuses that include rape, sexual threats, exploitation, humiliation, assaults, molestation, domestic violence, incest, involuntary prostitution (sexual bartering), torture, insertion of objects into genital openings, and attempted rape" (UNHCR 1999: 36).

Like other regions of the world, women in sub-Saharan Africa are not only vulnerable to SGBV during conflict, but also during the periods of social disruption and disintegration in the aftermath of war, especially when they are fleeing the conflict and residing in camps for refugees or internally displaced persons (Human Rights Watch [HRW] 2000). For instance, a 1994 survey of 205 Liberian women and children aged 15–70 years found 49% had experienced at least one incident of physical and/or sexual abuse by soldiers during the Liberian civil war (Koss and Kilpatrick 2001). In Sierra Leone, a household survey of women revealed that 9% experienced war-related sexual assault and an additional 9% had been sexually assaulted outside a war situation (Coker and Richter 1998).

The injuries that refugee women sustain from SGBV persist long after the crime. The social, psychological and health consequences of SGBV have been widely noted among refugees in sub-Saharan Africa. Refugee victims of SGBV in the region have reported ongoing sexual and reproductive health problems, psychological and social problems. Survivors of SGBV in refugee situations have been observed to experience depression, guilt, terror, shame and loss of self-esteem. In refugee camp settings in Africa, SGBV victims are often rejected by spouses and families, ostracized and subjected to further exploitation and/or punishment (UNHCR 1999). These physical, psychological and social consequences of SGBV only add to the pain of uprooting and forced migration.

The violence that usually produces refugees has complex and multiple direct and indirect effects on health and disease. Sexual violence and exploitation are a shockingly frequent experience for refugee women before or during flight and even in refugee camps. In sub-Saharan Africa, like most refugees in other regions of the world, sexual exploitation and/or violence by border officials, fellow refugees and members of the host community are unfortunately part of the experience of forced migration (Kalipeni and Oppong 1998).

The population of African refugees in this study are women residing at the Dukwi camp in Botswana who, owing to external aggression, occupation, foreign domination or events seriously disturbing public order in various parts or the whole of their countries of origin, were compelled to leave their place of habitual residence and are now seeking refuge in Botswana. The refugees at the Dukwi camp are predominantly from Angola, Namibia and Somalia. The refugee women who participated in this study are from Angola, Burundi, Democratic Republic of Congo, Namibia, Rwanda, Sudan, Somalia, Uganda and Zimbabwe. All these countries have had histories of conflict and/or war in the last decade or so.

Although some reports are available, the nature and extent of SGBV and its relationship to sexual-risk behaviour has not been systematically documented in refugee situations in sub-Saharan Africa. This study investigated the relationships of SGBV, learned helplessness, depression and sexual-risk behaviours among refugee women in a camp setting in Botswana. Guided by the reformulated theory of learned helplessness (Abrahamson et al. 1978), the potential mediating roles of depression and learned helplessness were also explored. The specific research questions addressed were: (1) What is the magnitude of SGBV in refugee camp settings in sub-Saharan Africa? (2) What is the relationship between SGBV and sexual-risk behaviours in refugee situations, and how does depression affect this relationship? (3) How does learned helplessness explain the relationship between SGBV and sexual-risk behaviours in refugee situations? (4) Does learned helplessness (as a result of SGBV) increase the likelihood of engaging in sexual-risk behaviours by refugee women? (5) Is depression an outcome of learned helplessness by refugees?

Theoretical framework

This study utilized the reformulated theory of learned helplessness (Abrahamson et al. 1978), an extension of the theory of learned helplessness (Seligman 1975), to investigate the relationship of SGBV and sexual-risk behaviours among refugee women in Botswana. The reformulated theory of learned helplessness posits that causal attributions for unpleasant and perceivably uncontrollable events have three dimensions: global versus specific (globality), stable versus unstable (stability) and internal versus external (Abrahamson et al. 1978). A global causal attribution occurs when the individual presumes that the cause of negative events is consistent across multiple situations, whereas

a specific causal attribution occurs when the individual presumes that the cause is unique to only one situation. A stable causal attribution occurs when the individual presumes that the cause is consistent across time, whereas an unstable causal attribution occurs when the individual presumes that the cause is specific to one point in time (Abrahamson et al. 1980).

Although the reformulated theory of learned helplessness has not been scientifically tested among refugee populations with histories of SGBV, it has had widespread applications in the social, behavioural and health sciences in understanding human behaviour in a variety of situations. For example, learned helplessness has been shown to be a potential outcome of involuntary exposure to risk components such as forced sex and attendant sexually transmitted diseases (STD) (Eisenstein and Carlson 1997; Seligman 1975). When applied to risk taking in general, learned helplessness has been shown to typically develop when attempts to avoid harm (e.g., potential exposure to STD through sexual risk taking) do not yield diminished risks and where the victim cannot avoid exposure. Thus, through experience, the victim learns that trying to avoid risk is futile (Hogben et al. 2001).

The motivational, cognitive, emotional and behavioural deficits that lead to depression have also been identified in humans experiencing learned helplessness. Depressed individuals have been shown to have negative, pessimistic beliefs about the efficacy of their actions and the likelihood of obtaining future rewards (Southwood 1986). Depression has also been shown to be a typical collateral outcome of learned helplessness (Klein and Seligman 1976). Higher rates of depression and a putative increase in depression have also been attributed to forced sex or physical violence (Hogben et al. 2001). Victims of forced sex in general are typically more depressed than non-victims (Fishbach and Herbert 1997). According to Isaac and Schneider (1992), depression is also related to perceived loss of control and may influence sexual-risk behaviours among women who would normally avoid such behaviours and may predict STDs.

Methods

Study Site

The research setting was the Dukwi Refugee Camp in Botswana that is located along the main highway that links the north and south of the country, about 560 km from Gaborone (capital city of Botswana). The camp covers an area of approximately 20 square kilometers and is inhabited by refugees from 16 countries, predominantly from Southern Africa, the Great Lakes region and the Horn of Africa. During the time of the study, the camp was occupied by about 3000 refugees, of which about 65% were women and 35% men. The refugees live in houses, tents and huts that are assigned on a first-come, first-served basis.

Research Design

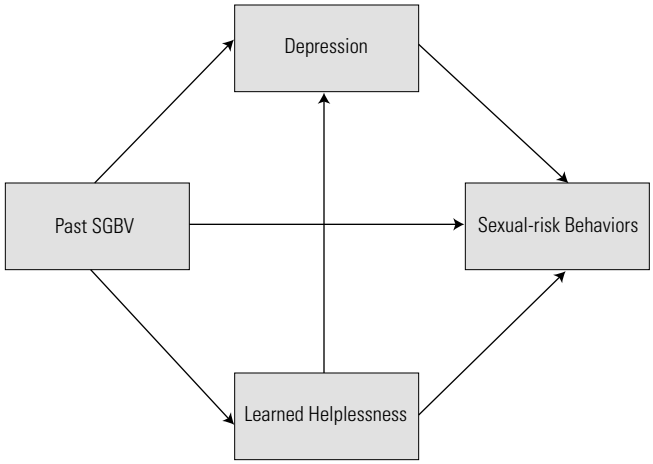
A cross-sectional research design was used to test the main hypotheses in the study. A survey questionnaire that was informed by the relevant theoretical and empirical literature served as the data collection instrument. Trained female research assistants interviewed participants at their preferred locations in one of the four widely spoken languages (Mbukushu, Lozi, Swahili and English) in the camp. Participation in the interviews was voluntary, and all information obtained was made confidential. After completion of the interview participants were given a package containing bathing soap, educational materials on safe sex practices/HIV/AIDS and information on referrals for physical and mental health services available to refugees in Botswana. Those refugees who declined to participate in the research were also offered the package.

This research was reviewed and approved by the Office of the President of Botswana and the Chief of Party of the UNHCR office in Botswana. In addition, approval was also obtained from the Institutional Review Board of the University of Pittsburgh, after an exempt review for human subjects' protection. Every effort was made to ensure protection, anonymity and confidentiality to minimize any potential adverse consequences to participants.

Hypotheses

Based on the reformulated theory of learned helplessness, I hypothesized that among refugee women in sub-Saharan Africa: (1) A history of past SGBV (uncontrollable event) predicts engagement in sexual-risk behaviours, (2) learned helplessness predicts depression and sexual-risk behaviours, and (3) depression and learned helplessness mediate the relationship between past SGBV and sexual-risk behaviours. The hypothesized relationship between the central study variables is shown in Figure 1.

Figure 1. Hypothesized model of SGBV, depression, learned helplessness and sexual-risk behaviour



Variables

Sexual and Gender-Based Violence (Independent Variable)

This was defined as any type of abuse that includes rape, sexual threats, exploitation, humiliation, assaults, molestation, domestic violence, incest, involuntary prostitution (sexual bartering), torture, insertion of objects into genital openings and attempted rape (UNHCR 1999). A history of SGBV was assessed.

Learned Helplessness (Independent Variable)

This was characterized as the failure to take harm-avoidant responses even when such responses led to reduced exposure to harm and/or risk of harm as measured by the Learned Helplessness Scale (Quinless and McDermott 1988). This variable was also hypothesized as mediating the relationship between past SGBV and current sexual-risk behaviour.

Depression (Independent Variable)

This encompasses the depressed mood symptomatology. It comprised the symptoms of depression in the last week as measured by the Hopkins Symptoms Check List-25 (Mollica et al. 1987). This variable was also hypothesized as mediating the relationship between past SGBV and current sexual-risk behaviour.

Sexual-Risk Behaviour (Dependent Variable)

This is considered a constellation of behaviours involving inconsistent or no condom use during vaginal, oral and anal intercourse with primary and non-primary male partners (Jones 2001). It also

included having sex with partners who are perceived by the participant to be having sexual intercourse with other women and/or men, taking drugs and/or using alcohol (Aral and Wasserheit 1995).

Measures

Sexual and Gender-based Violence (SGBV) Scale

The SGBV measure in this study was adapted from the Gold Standard SGBV Questionnaire (GSSQ) of the Reproductive Health of Refugees Consortium. The GSSQ is a 188-item measure that assesses SGBV in refugee and/or conflict settings by estimating the prevalence of sexual and physical violence during several periods defined by historical markers such as prior to the war, during war, during occupation and while internally displaced. It has been pilot tested cross-nationally in Rwanda (Africa), Kosovo (Europe) and East Timor (Asia), but its psychometric properties are yet to be determined (Ward et al. 2003). For the purposes of this research, only three sections of the GSSQ were used to create a scale that assessed SGBV during the occupation and/or conflict, during flight/displacement and post-conflict (host country) on 6-point Likert scale format. The reliability coefficient of the SGBV scale in this study's sample was .97 (Cronbach's alpha). Composite SGBV scores were computed by categorizing the items into physical violence (PV); intimidation and control (IC) and sexual violence (SV). Physical violence was defined as "pulled hair, slapped/twisted arm, hit with fist or something else, pushed down/kicked, choked." Intimidation and control was defined as "forbidden to see friends or family, kept away from medical care, and refusal to give money for food, insulted or swore at you, threatened to hurt you, threatened with weapon." Sexual violence was defined as "partner using threats of physical harm or using force to obtain sex, or forcing the woman to have sex with other people" (Ward et al. 2003). Exploratory factor analysis of the SGBV items was used to assess construct validity and to detect structure (classify) in the relationships between the variables. The established SGBV categories were confirmed using principal components factor analysis with a varimax rotation. The principal components factors analysis confirmed three factors that manifested the underlying dimensions of the original categories of physical violence, intimidation and control, and sexual violence, and these were used in subsequent analyses.

Learned Helplessness Scale (LHS)

The LHS is a 20-item scale that measures the degree of learned helplessness with each item rated on a 4-point Likert scale. Participants were asked whether they "strongly agree" (1), "agree" (2), "disagree" (3), or "strongly disagree" (4) to a list of statements related to the dimensions of the reformulated theory of learned helplessness, i.e., globality, stability and internality. Total possible scores ranged from 20 to 80, and the higher the LHS score, the higher the individual's level of learned helplessness (Quinless and McDermott 1988). A composite learned helplessness (LH) score was computed by calculating the average of the individual scores. The composite LH score was used to categorize participants into low and high groups of learned helplessness based on the median split (Wilson et al. 1992); this was done for descriptive purposes only. Those participants who scored above the median (55.3%; n = 211) were classified as the high-learned-helplessness group and those who scored below the median (44.7%; n = 187) were the low group. Internal consistency for the LHS in this study was .80 (Cronbach's Alpha).

Hopkins Symptoms Check List (HSCL-25)

This is a symptom inventory that measures symptoms of anxiety and depression. It consists of two scales with a total of 25 items that assess anxiety and depression symptoms. Only the depression scale with 15 items (HSCL-15) was used in this study to compute depression scores for the participants. They were asked to respond to a list of statements by indicating whether they had felt that way in the last week. Response options ranged from "not at all" (1) to "extremely" (4). The depression score from the HSCL-15 has been consistently shown to be highly correlated with major

depression in several populations and was used in this study because of its sensitivity and specificity as a screening instrument with refugee populations. In contrast to other known depression scales, the HSCL-15 has been extensively used to identify distress in refugee populations (Mollica et al. 2001). The sensitivity and specificity for the presence of depression (using a cut-off score of 1.75 from the 15 depression items) in a study of newly admitted patients into a mental health facility were .88 and .73, respectively (Mollica et al. 1987). The HSCL-15 has also been widely translated and used in several studies among diverse groups (Cardozo et al. 2000), has been validated against clinical diagnosis (Smith-Fawzi et al. 1997) and has been shown to have high internal consistency in studies of Russian-, Arabic-, Farsi-, English-, Bosnian- and Croatian-speaking patients (Mollica et al. 2001). In this study a cut-off score of 1.75 was used to classify participants into depressed and non-depressed groups. Those participants with depression scores of 1.75 and higher (90%; $n = 363$) were classified as depressed, and those with scores lower than 1.75 (10%; $n = 35$) were non-depressed. The reliability of the HSCL-15 in this study's sample was .76 (Cronbach's Alpha).

Sexual-Risk Behaviour (SRB) Scale

The SRB scale in this study was adapted from the Women's Relative Sexual Risk Scale (WRSRS). The WRSRS is a 31-item instrument that assesses women's unprotected intercourse with male partners who engaged in sexual-risk behaviours during the previous three months' recall period (Downey et al. 1995). It consists of two dimensions that assess sexual-risk behaviours. The first dimension assesses the numeric frequency of the participant's engagement in unprotected vaginal, oral and anal sex during the last three months with a male partner. The other dimension taps the participant's perceived likelihood that her male partner engaged in sex with other women, sex with men or used drugs and/or alcohol during the same time period (Jones 2001). All items were in the context of a primary or a non-primary partner and were based on the previous three months. A composite SRB score was computed that was the sum of the weighted frequencies of unprotected vaginal, oral and anal intercourse and the perceived partner behaviour score for both primary and non-primary partners combined. A higher SRB score translates to a higher level of sexual-risk behaviour. The internal consistency of the SRB scale in this study was .77 (Cronbach's alpha).

Statistical Analysis

The central study variables in this study were: past SGBV (categorized as past physical violence, past intimidation and control, and past sexual violence); learned helplessness; depression and sexual-risk behaviour. The composite scores of each of the SGBV categories are based on logarithm transformations of the average scores for the total items in the category. The Kolmogorov-Smirnov and Shapiro-Wilk tests of normality confirmed the normality of the log-transformed variables. The computed composite scores of the other central study variables also satisfied the assumptions of normality, linearity, homoscedasticity and homogeneity of variance (Table 1). Bivariate analyses were performed to examine the relationships between the variables. Pearson product-moment correlations and one-sample t-tests were used to test for associations. Simultaneous multiple regression analyses were performed to test the central study variables, and a fully recursive path analysis was also performed to test the mediating roles of learned helplessness and depression in the hypothesized model.

Results

Descriptive Findings

A total of 402 refugee women residing at the Dukwi camp in Botswana were interviewed. They ranged in age from 21 to 63 years, with a mean age of 29.2 years ($SD = 7.20$). Participants in the study originated from nine African countries: Angola, Burundi, Democratic Republic of Congo, Namibia, Rwanda, Somalia, Sudan, Uganda and Zimbabwe. About half were from Namibia (49.3%) and another 28.6% from Angola.

Overall, about 75% of participants reported having experienced SGBV either in their home country, during flight/transit or while in Botswana. More than half of the participants (56%) experienced SGBV in their home country during the conflict, while about 39% reported SGBV during flight. About 37% reported having experienced SGBV while in Botswana (host country).

The median split of the composite LH score was used to categorize participants into low and high groups of learned helplessness. More than half (55%) of participants scored above the median and were classified as the high-learned-helplessness group and those who scored below the median (45%) were classified as exhibiting low learned helplessness.

Using a cut-off score of 1.75 (Mollica et al. 1987) to classify participants into depressed and non-depressed groups, about 90% of participants scored 1.75 and higher on the HSCL-15 scale and were classified as depressed, and only 10% scored lower than 1.75 to be classified as non-depressed.

Table 1. Descriptive statistics of the central study variables

Variable	*N*	Range	Mean	SD
Past physical violence	401	1.73	-.23	.40
Past intimidation and control	401	1.92	-.23	.41
Past sexual violence	401	1.92	-.13	.35
Learned helplessness	398	2.21	2.84	.44
Depression	398	2.67	2.42	.52
Sexual-risk behaviour	398	10.91	.00	1.30

In terms of sexual partnerships in the last three months, about two thirds (68%) of participants reported having only a primary partner(s), and about 15% said they had only a non-primary partner(s). Two percent had both primary and non-primary partners, and 14% claimed they had no sexual partner(s) in the last three months. About 76% said their primary partner was their husband, and 22% claimed their main boyfriend was their primary partner. More than half (59%) of participants with a non-primary partner reported their non-primary partner was someone they had seen occasionally in the last three months, while the remaining 41% said their non-primary partner was someone whom they saw for only one night.

Inferential Findings

Simultaneous multiple regression analyses were used to test the relationships between the variables, and a fully recursive path analysis of the hypothesized model was also performed. Results from a path analysis of the hypothesized model using simultaneous linear regression techniques with the Statistical Package for Social Sciences (SPSS) version 13.0 follow.

Past SGBV and Sexual-Risk Behaviours among Refugee Women

To test this relationship, simultaneous multiple regression analysis was performed with sexual-risk behaviour as the dependent variable and past physical violence, past intimidation and control, and past sexual violence as the independent variables at the .05 level of significance. There was an overall statistically significant effect ($F = 2.018$; $p < .011$) on sexual-risk behaviour. The three predictor variables together explained 15% of the variance in sexual-risk behaviour. However, when the standardized regression coefficients of the individual independent variables are examined, only past sexual violence was found to contribute significantly to the prediction of sexual-risk behaviour ($\beta = .461$; $p < .024$), as shown on Table 2.

Table 2. Coefficients of the simultaneous multiple regression of past SGBV to sexual-risk behaviour

Independent Variable	β	*t*	*p*
Past physical violence	-.033	-.173	-.863
Past intimidation and control	.005	.025	.980
Past sexual violence	.461	2.267	.024*
R^2 = .015; F = 2.018, p < .011			

Dependent variable: Sexual-risk behaviour; *p < .05.

Learned Helplessness and Sexual-Risk Behaviours among Refugee Women

Simultaneous multiple regression analysis was used to test whether learned helplessness predicts sexual risk among refugee women. It showed that the effect of learned helplessness on sexual-risk behaviour was not statistically significant (β = .005; p < .91), and therefore learned helplessness does not predict sexual-risk behaviour among refugee women (Table 3).

Learned Helplessness and Depression among Refugee Women

Simultaneous multiple regression analysis was also employed to test whether learned helplessness predicts depression among refugee women. The effect of learned helplessness on depression was statistically significant (β = .360; p < .001), suggesting that learned helplessness predicts depression among refugee women (Table 4).

Table 3. Coefficients of regression of learned helplessness with sexual-risk behaviour

Independent Variable	β	*t*	*p*
(Constant)	--	-082	.935
Learned helplessness	.005	.102	.919
R^2 = .001; F = .010			

Dependent variable: Sexual-risk behaviour

Table 4. Coefficients of regression of learned helplessness with depression

Independent Variable	β	*t*	*p*
(Constant)	--	7.470	.000
Learned helplessness	.360	7.676	.000**
R^2 = .130; F = 58.918			

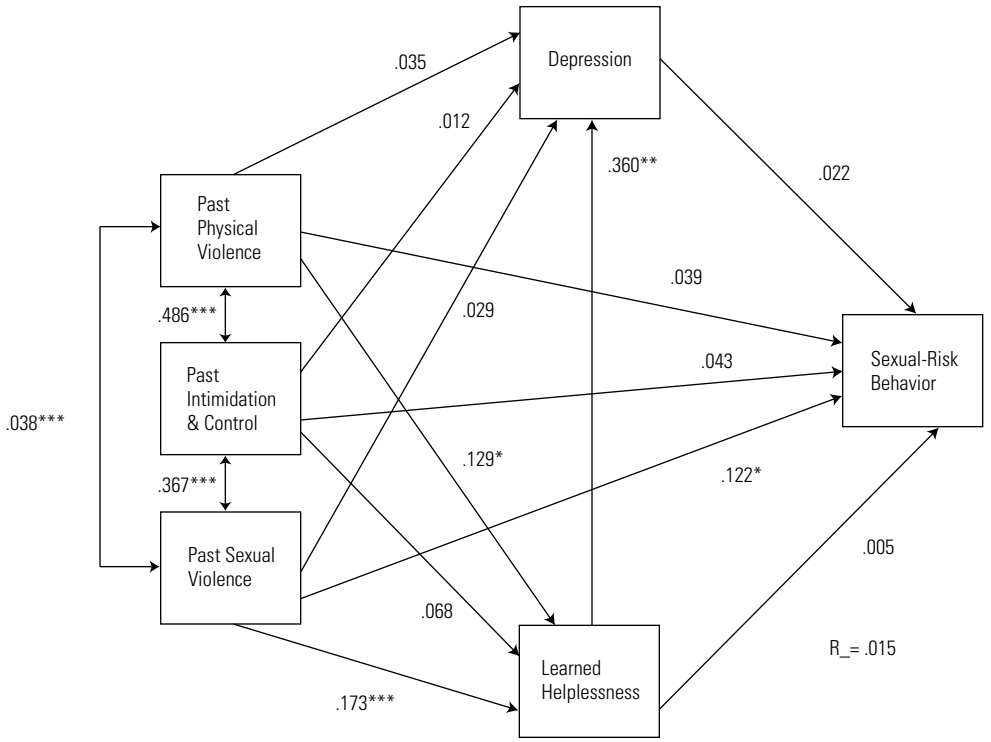
Dependent variable: Depression; ** p < .001.

Mediating Roles of Depression and Learned Helplessness

A fully recursive path analysis of the hypothesized model was performed to determine the paths and effects of the predicted relationships and mediating roles. Only four paths were significant: the past physical violence to learned helplessness path, the past sexual violence to sexual-risk behaviour path, the learned helplessness to depression path and the past sexual violence to learned helplessness path. Although past sexual violence was found to have a significant effect on both sexual-risk behaviour (β = .122; R^2 = .015; p < .010) and learned helplessness (β = .173; R^2 = .030; p < .001), the path between learned helplessness to sexual-risk behaviour was not significant (β = .005; R^2 = .001; p < .919), demonstrating that learned helplessness does not mediate the relationship of past sexual violence and sexual-risk behaviour. Although learned helplessness was found to have a significant

effect on depression (β = .360; R^2 = .130; p < .001), the path between depression and sexual risk-behaviour was not significant (β = .022; R^2 = .001; p < .668). Therefore, since depression had no significant effect on sexual-risk behaviour, it was also not a mediator of the relationship between sexual violence and sexual-risk behaviour. A path diagram of the fully recursive hypothesized model is shown on Figure 2.

Figure 2. Path-analytic model: influence of past physical violence, past intimidation and control, past sexual violence, learned helplessness and depression on sexual-risk behaviour



*p < .05; **p < .01; ***p < .001.

Discussion

This study found that about 75% (n = 303) of participants had experienced some form of SGBV either in their home country, during flight/transit or in the host country. The refugee women in this study were more likely to experience SGBV in their home countries (during conflict) than during flight or in the host country. These findings show that refugee women in sub-Saharan Africa are not only vulnerable to sexual violence during conflict, but also during the periods of social disruption and disintegration that follow war, when they are fleeing the conflict and residing in camps for refugees.

The most common perpetrators of SGBV were soldiers, Civil Defense Forces, paramilitary, and family members or relatives of the victims. Soldiers were the main perpetrators in the home country and during flight, whereas the police and/or interrogators were the main perpetrators of SGBV once the refugee had entered Botswana. These findings suggest that refugee women in the region may lack the protection and recourse that international human rights law affords them.

The current study found that more than half of the participants (55%) experienced learned helplessness and about 90% were depressed. This finding is congruent with prior research on

battered and abused women (Walker 2000) that shows women's experiences of uncontrollable violence produce learned helplessness over time and eventually depression. Repeated experiences of violence have also been shown to diminish the victim's motivation to respond appropriately (Abrahamson et al. 1980). In this study, learned helplessness was also found to be moderately and significantly correlated with depression. This finding is consistent with the LH model of depression that suggests depression is a typical collateral outcome of learned helplessness (Klein et al. 1976; Klein and Seligman 1976).

The finding that past SGBV predicts current sexual-risk behaviour suggests that refugee women in sub-Saharan Africa with histories of SGBV are more likely to engage in sexual-risk behaviours than their counterparts without such histories. This finding is consistent with prior research that has examined the correlates of sexual-risk behaviours among vulnerable populations (Hogben et al. 2001; Susser et al. 1998; Tubman et al. 2001).

Past physical violence was also found to be positively and significantly correlated with learned helplessness but not correlated with depression. However, learned helplessness was moderately and significantly correlated with depression. This finding supports the learned helplessness–depression model, as first proposed by Klein and Seligman (1976).

The hypothesized relationship between learned helplessness and depression with sexual-risk behaviour was not significant. This suggests that both learned helplessness and depression (as potential outcomes of past SGBV) do not predict current sexual-risk behaviour among refugee women in sub-Saharan Africa. Thus, the hypothesized mediating roles of learned helplessness and depression in the relationship between past SGBV and current sexual-risk behaviour were not supported in this study. Learned helplessness was found to have a significant effect on depression among refugee women, although the path between depression and sexual-risk behaviour was not significant, suggesting that learned helplessness is a likely mediator of the relationships between both past sexual violence and past physical violence to depression, which could be the subject of further research.

Limitations

The cross-sectional nature of this study limits causal inferential interpretations of the findings, due to the limitations in establishing temporal order. Longitudinal studies will be needed to provide stronger evidence of associations. This study is also limited by the self-report measures that are subject to the influences of social desirability, response bias, or inaccurate recall. The sensitive nature of some of the questions may also be particularly prone to under-reporting. Like similar studies of SGBV with vulnerable populations, refugee participants in this study may have deliberately under-reported their SGBV experiences out of fear of stigmatization and retribution, especially when the interviewers were themselves female refugees residing at the camp. The learned helplessness and women's relative sexual-risk scales are limited by the fact that they had not been validated with refugee populations prior to this study. In addition, potential errors in the translation of the scales from English into three different African languages may likely affect the psychometric properties of the individual measures.

Conclusion

The patterns of vulnerability to SGBV evident in this study suggest specific prevention approaches for governments and other refugee assistance agencies in sub-Saharan Africa that include public acknowledgment and discussion of the problem of SGBV in refugee situations on the continent. The findings in this study could be utilized in various initiatives geared toward national consensus building in preventing SGBV in refugee programs in Africa. Initiatives aimed at building national consensus on preventing sexual abuse and exploitation in refugee situations have been shown to be very successful in moving forward the agenda on preventing sexual exploitation and abuse in refugee camps, as in the Kenya refugee program, for example. A national consensus building initiative could bring together participating agencies to agree, review and adopt fundamental protocols, in addition to providing an important opportunity for decision makers and key stakeholders in refugee situa-

tions to agree to a Code of Conduct and discuss their views on how to mainstream policies and programs on sexual exploitation in refugee settings.

The findings of this study could also provide program managers and humanitarian workers in refugee situations with some of the indicators of the psycho-social needs of refugee women in camp settings in Africa. It may equip them with knowledge about and indicators of some of the risk and protective factors of SGBV (including the psycho-social impact). This may be useful in the design and implementation of behavioural surveillance systems and behavioural change interventions that target risky sexual behaviours in refugee settings. These findings could also be utilized in ways that could raise awareness of the problem of SGBV and its associated mental health implications among policy makers and humanitarian aid workers alike. It could be utilized by refugee agencies as the basis to mainstream the prevention of SGBV within their programs, in addition to providing them with the knowledge and tools to raise awareness of the problem of SGBV in refugee situations.

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The Obstetric Pathology of Poverty: Maternal Mortality in Kep Province, Cambodia

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Abstract

Purpose: To conduct a baseline assessment study of maternal mortality in the province of Kep, Cambodia.

Methods: We evaluated maternal mortality in Kep using a structured questionnaire. The questionnaire was administered to women who were deemed the best respondents, and it included a verbal autopsy portion. The best respondent answered questions regarding a recent maternal death in the area, and the cause of death was identified.

Findings: Five maternal deaths were recorded in this study. Since 523 births were documented in the district for the last year, the maternal mortality rate for the province is 956/100,000. The cause of death for one woman was unknown. The other women most likely suffered from infection, eclampsia, postpartum hemorrhage and antepartum hemorrhage. The maternal mortality ratio may be an underestimate, given the stigma associated with reporting maternal deaths, especially when associated with traditional delivery practices.

Introduction

The Millennium Development Goals (MDGs), the rubric upon which international public health governs itself, includes a goal that specifically calls for reducing the maternal mortality ratio by three-quarters between 1990 and 2015. The MDGs present an opportune time to re-think how maternal health is evaluated and improved (Freedman et al. 2005). The "obstetric pathology of poverty," a

term used by Abdel-Aleem (1993), refers to the double trend of poor maternal health and increased risk of maternal death in developing countries when compared with that of females from more developed countries (Abdel-Aleem 1993). Over 530,000 women die each year from complications related to or exacerbated by pregnancy (WHO 2005). This is roughly equal to the number of lives lost if a jumbo jet crashed every four hours (Seim AR 2005). Further, about 90% of these deaths take place in developing countries (Kasonde 2000).

Cambodia is one of the poorest nations in the world, with a reported maternal mortality ratio of between 437/100,000 (Demographic and Health Survey [DHS] 2000) and 450/100,000 (WHO 2005). Maternal, neonatal and child health (MNCH) is a salient feature of primary healthcare and is currently one of the three main priorities stated in the National Primary Health Plan of the Cambodian Ministry of Health (MoH 2003). Patient registration for MNCH services at Cambodian healthcare centers has been studied extensively (RACHA 2000). However, a baseline assessment of maternal mortality and morbidity had yet to be conducted in Krong Kep province.

Krong Kep ("Kep") is a small province in the southwest of Cambodia. The 2003 population of Kep was estimated at 35,434 (MoH 2004). The objective of the study was to conduct a preliminary assessment of possible risk factors for maternal mortality in Kep, calculate a maternal mortality ratio for the area and evaluate how this figure compares with the nationally reported figure. In doing so, this study serves as a point from which studies could be conducted to further investigate the issue and suggest policy changes.

Methods

Defining a 'Maternal Death' – Inclusion Criteria

Maternal death was defined as the "death of a woman during pregnancy or 42 days after pregnancy, irrespective of the duration or site of pregnancy, from any causes that are related to or aggravated by pregnancy or its management, but not from accidental or incidental causes" (WHO 1992). The deceased woman must have resided in Krong Kep, with her death occurring between June 1, 2004 and June 1, 2005 in the referral hospital, health centers, villages or elsewhere in the Krong Kep municipality.

Data Collection

We obtained official facts and figures for maternal mortality through interviews with personnel from the maternal health department at the MoH Operational District (OD) office for Kep. We were told that there were zero maternal deaths from June 1, 2004 to June 1, 2005, and 523 births.

After obtaining the official figures, we visited each village and asked pregnant or new mothers, passers-by, traditional birth attendants and village elders if they were aware of a maternal death in the area or in another village in Kep from June 2004 to June 2005. We asked 300 pregnant women and new mothers, as well as 13 traditional birth attendants, 9 village elders, and approximately 16 passers-by from June 13, 2005 to August 2, 2005.

If respondents told us they were aware of a maternal death, we asked if they could provide the name and location of a "best respondent" (BR) to consult about the death. The questionnaire was then administered to the best respondent. The verbal autopsy portion of the questionnaire allowed us to confirm that the inclusion criteria were met and to identify the cause of death as described by the BR. Using the official reported number of births for Kep and the number of maternal deaths identified, we estimated the maternal mortality ratio for Kep.

Maternal Mortality Questionnaire/Verbal Autopsy

The questionnaire administered to the BR consisted of six sections: demographics, pregnancy history, information about last pregnancy, pre-pregnancy planning, verbal autopsy and additional comments. To meet the timeline and scope of this study, the verbal autopsy section was adapted from a questionnaire used for a study in Bangladesh by the Centre for Health and Population Research

(2005). The principal investigator validated the survey; the Centre for International Health (CIH) Program Manager and the OD Director approved it. The interpreter read the questionnaire to clarify any vague concepts and confirm that the concepts could be translated into Khmer. The survey was then pilot tested in Phnom Leav village.

The BR was identified by being most knowledgeable of the circumstances surrounding the death and was generally the sister of the deceased. As the official statistics (which reflect reporting by the birth attendant) for the Kep region imply underreporting of maternal deaths, it is not surprising that the birth attendant may not have been a BR for the death.

The first part of the questionnaire included descriptive and demographic questions about the deceased woman. Her age, number of children, educational level, income, occupation and age at first pregnancy were determined. Educational levels were divided according to the following categories: no education (illiterate), 1–3 years (partially illiterate), 4–6 years (literate, some primary education), 7–12 years (literate, some secondary education) and >12 years (postsecondary education). The questionnaire asked if the woman had a health record at the local health centre or referral hospital. The number of antenatal and postnatal visits (including administration of tetanus-toxoid vaccinations) during the woman's last pregnancy were sought. Her knowledge and practice of birth spacing, the number of stillbirths, miscarriages and abortions, gravidity and parity were determined. Lifestyle questions asked whether the woman used cigarettes, betel nuts and alcohol during pregnancy. The BR was asked who delivered the woman's last child (if she died after birth) or where she planned to go for her delivery (if she died during gestation). Questions were also asked about the baby, whether it was delivered alive, and for how long it lived after the mother died.

The second part of the questionnaire included a verbal autopsy component. This included questions regarding the gestational time or postpartum time at the mother's death and where she died. Healthcare-seeking behaviour of the deceased during pregnancy and her pregnancy history were recorded. Details about hemorrhaging were noted, as were the number of abortions and the approximate time of death. The remainder of the verbal autopsy report was separated into three sections that were consulted depending on whether the woman died before labour, during labour or after delivery.

Data Recording and Analysis

As this was a preliminary study of maternal mortality, descriptive statistics were used. Data from interviews were recorded directly on individual copies of the questionnaire. After returning from the field each day, we recorded responses on Microsoft Excel spreadsheets. Data analysis was also completed using Microsoft Excel.

Ethical Considerations

Upon our arrival in Cambodia, the proposal and questionnaire were reviewed by the Cambodian Ministry of Health. The study provided each interview subject with a letter of informed consent discussing the objectives of the study. BRs were reassured that no names would be used in the final report. As compensation for participating, the BRs received a toothbrush and toothpaste after completing the survey. Lastly, maternal health outreach and information sessions were given in the five most populous villages after data collection for the municipality was complete.

Results

A total of five maternal deaths were recorded for Kep. Three of the BRs were sisters of the deceased, one was the husband and another was a close friend. The mean age of the deceased women was 34 years. The oldest was 41, while the youngest was 26.

The mean number of children per woman was five. Four of the deceased women were grand multiparous, as they had delivered more than five children. This is higher than the national fertility rate of 4.2 (DHS 2000). Three of the women were multigravidia, with five or more pregnancies.

Each of the women came from a different village. One was from Kep Ville, which is only 1 km

from a health post, and one came from Damnakchangeur, which is 4 km from a health post. The others lived either 2 km or 3 km from a health post. Three of the women did not have a health record at a health centre or referral hospital, and two had made only one visit.

All of the BRs claimed that the deceased women did not earn enough money to support themselves and their family. This indicates that all were quite poor. The women had various levels of education. Only three were literate; one had no education, while the other had completed some primary school.

Most of the BRs were unaware of the number of antenatal care (ANC) visits made by the deceased woman during her pregnancy (see Table 1). Two women were reported to have received ANC at least once. Only one woman sought postnatal care (PNC) (see Table 1). Two women died during pregnancy or soon after delivery, and were thus unable to seek PNC.

Table 1. ANC and PNC visits by the deceased women

Number of Antenatal Visits	# Subjects
Don't know	3
1 visit	2
Total	5
Number of Postnatal Visits	
Not applicable	2
None	2
1–2 visits	1
Total	5

Most of the women had never had an abortion. Only one woman was known to have had an abortion during her lifetime, while another respondent was unsure if the deceased had had an abortion (see Table 2).

Table 2. Incidence of abortion

Had One Abortion	Don't Know	Never Had an Abortion
1	1	3

One mother died after about four months of gestation, while four died after delivering the child. One died after 24 hours, another after seven days, and the last 40 days after giving birth (Figure 1).

Among those women who died after delivery, half were attended by a traditional birth attendant (TBA). One of the TBAs was confirmed to have had some training (see Figure 2). One deceased woman was attended by a midwife and the other by a doctor. Three of the babies were delivered alive. One woman had miscarried during the gestational period, while the other had a stillbirth. Of the babies delivered alive, one died at one month of age, and two were alive at the time of the study.

Figure 1. Time of death

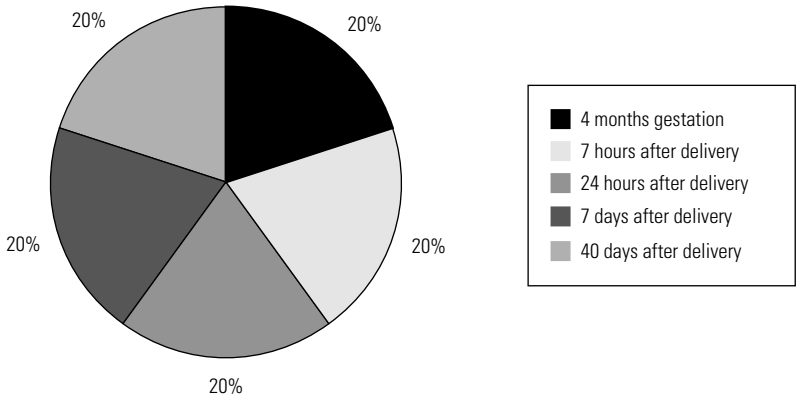
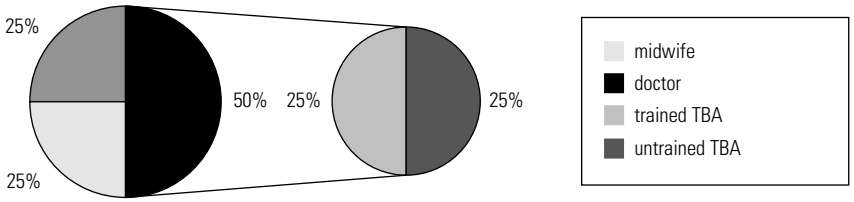
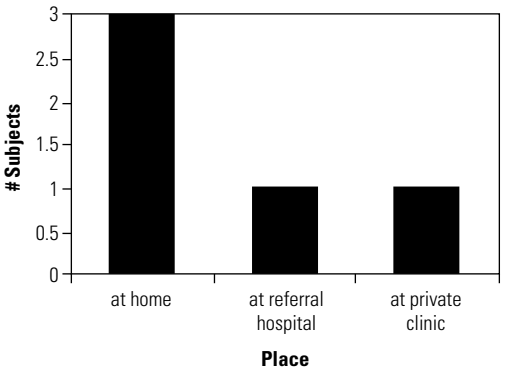


Figure 2. Delivery personnel



Three of the women died at home, while the others died at the referral hospital or private clinic, as seen in Figure 3. When asked why the women were not transferred to the hospital, BRs gave lack of money and time as two reasons (see Table 3). One BR claimed that the subject was transferred home, since nothing could be done at the hospital. The husband attended the deaths of four women; relatives attended two. One death was also attended by the children, and another by a midwife.

Figure 3. Place of death

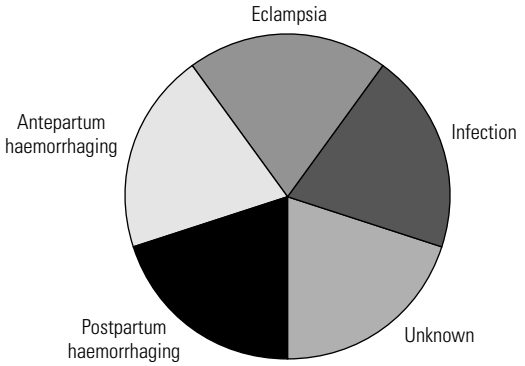


After analyzing the symptoms and data from the verbal autopsy portion of the questionnaire, we deemed that each woman had died from a different obstetrical cause. The likely causes of the five maternal deaths are seen in Figure 4.

Table 3. Reasons for death at home, n = 3

If she died at home, why wasn't she taken to hospital?	# Subjects
No money	1
Not enough time	1
Taken from hospital to die at home	1
Total	3

Figure 4. Probable causes of death



Maternal Mortality Ratio for Krong Kep
Given the following figures, the Maternal Mortality Ratio (MMR) can be calculated:
# of live births within the last year: 523
# of maternal deaths from June 2004 to June 2005: 5
MMR = (5/523)(100,000)
= 956.0
The MMR for Krong Kep is therefore **956/100,000.**

Discussion

The purpose of the present study was to provide a descriptive assessment of the picture of maternal mortality in Krong Kep, Cambodia, through the use of a novel method of ascertaining maternal deaths. Since this is a preliminary assessment of the issue in Kep, further study is needed to solidify evidence to affect policy change. Due to the small sample size and descriptive nature of the study, the results serve primarily to assess the issue in Kep, though it is likely that the findings from this study might be relevant to other areas of Cambodia.

Though Demographic Surveillance Site (DSS) data and the sisterhood method are often used to measure maternal mortality, they have various drawbacks (Shahidullah 1995). Moreover, verbal autopsies vary in quality (Chandramohan 1994). The method we used may be an appropriate way to assess maternal mortality on a small scale, such as at the village level. It is a variation on the "community inquiry" approach used by Kumar and colleagues (1989). It assumes that communities are in a constant dialogue about various vital events in the area, and it may be quite accurate in rural areas, especially tight-knit communities such as Kep. The advantage to the approach used here is that a large number of pregnant women or new mothers were consulted from various villages in Kep. We also acknowledged that pregnant women may have the most knowledge about recent maternal deaths, as they likely have access to anecdotal information that may pertain to their own welfare. The

approach described here may also borrow from principles of the sisterhood method, which assumes that sisters (or close female friends for that matter) would be more likely to know about the death of another female, particularly if it happened during pregnancy or after delivery. Indeed, the best respondent in this study tended to be the sister or close female friend in most cases.

A total of five deaths were reported. This is clearly a departure from the official number of zero deaths given by the Operational District office. This may often be the case, as was shown in a Jamaican study, where careful analysis indicated a maternal mortality ratio twice that of the official figures (Walker et al. 1986). Cambodia has a very weak vital registration system, especially in rural areas, and this may lead to underreporting of both births and deaths. Much of this underreporting may be by the birth attendant, perhaps due to the stigma and feared repercussions associated with reporting such deaths.

Two of the deceased women may be considered high risk, as they were over the age of 35 when they gave birth. This is often cited as the age at which special precautions should be taken during delivery, due to the higher risk of complications, particularly related to anemia, hemorrhage and eclampsia. The fact that most of the women were multiparous is not surprising, as this also tends to add to the risk of obstetric complications. Other research has also commented on the link between age, parity and maternal mortality (Walker et al. 1986). Further study is required to examine the link between these risk factors and maternal mortality in Kep.

The "three delays" for maternal care are (a) delay the decision to seek care, (b) delay of arrival at health facility and (c) delay the provision of care (Thaddeus and Maine 1994). These delays are largely influenced by poverty and distance from a health post. This study found that poverty may be a risk factor for maternal death, as most of the deceased women lived relatively far from a health post. This was also found in a recent study in Afghanistan, where socioeconomic status and the inability to pay for care before, during and after delivery were linked to maternal mortality (Bartlett et al. 2000). However, the relationship between socioeconomic status and ability to seek care is not a simple one (Thaddeus and Maine 1994). Further, due to the small sample size and descriptive nature of our study, firm conclusions about the effect of distance and poverty on maternal mortality cannot be made.

Our study found that more women sought antenatal care than postnatal care, supporting the idea that postnatal care is often neglected (Lijestrand 2000). However, ANC use was still low, similar to another study in Cambodia (Zafar 2003). It is likely that the decision to seek ANC and PNC is affected by some of the aforementioned barriers to healthcare. That only two women were known to have received ANC at least twice may indicate the salience of such care to help prevent obstetric complications. Indeed, improvements in maternal care may be more important determining factors of maternal health than higher standards of living (Loudon 2000). Yet it is crucial that the role of ANC and PNC be evaluated on a larger scale in Kep to determine if there is an association with maternal mortality.

It is likely that the number of abortions was underreported in this study due to stigma associated with the practice. Further, the woman in our study reported to have had an abortion may have opted for a clandestine procedure. One study found that unsafe abortion accounts for at least 13% of maternal mortality (Khan et al. 2006). Further, abortion deaths are generally biased downwards and misclassified as hemorrhage or sepsis (Khan et al. 2006). Safe abortion practices require changes at policy level and abortion training (Berer 2000). This is not a new idea, and it was asserted most notably at the International Conference on Population and Development in Cairo in 1994.

It is not surprising that a TBA attended half of the women who died after delivery. Though one TBA may have been described as trained, it is difficult to assess the quality and amount of training given. The use of skilled personnel is a contentious issue within the field of maternal health. It has been pointed out that most health personnel in developing countries tend to work in urban areas (Mavalankar and Rosenfield 2005), and this contributes to the lack of skilled personnel in rural areas. This lack has been linked to the risk of maternal death in Cambodia (Chatterjee 2005). It is important to note that two women were indeed attended by skilled personnel, but still suffered the

same fate as the women who delivered at home. This may indicate the importance of various other factors in preventing maternal death, such as antenatal and postnatal care.

The causes of maternal death were identified after the verbal autopsy interview with the BR. Convulsions were described in one case, which, along with other symptoms, led us to speculate that the woman may have died from eclampsia. Hemorrhaging was linked to "severe" bleeding either before or after delivery. Infection was given as one cause of death. One case was unknown. This corresponds to the finding that severe bleeding is responsible for 25% of maternal deaths, infection (or sepsis) accounts for 15% and eclampsia for 12% (Goodburn and Campbell 2001). The finding that two women most likely suffered hemorrhage supports the evidence proposed by Khan and colleagues (2006) that hemorrhage and anemia are important causes of maternal death. Further studies in Kep should aim to include a larger sample size to validate our findings regarding causes of maternal death.

Using the methods described in this study, the MMR value for Krong Kep was calculated to be 956 deaths for every 100,000 live births, which is almost double the national figures, and higher than the absolute number of maternal deaths given by the OD office for Kep. Underreporting, as mentioned earlier, may have been an issue, and it is quite possible that other maternal deaths occurred within the specified time frame and were not reported to the researcher. This is especially true for deaths that may have occurred very early in pregnancy. The underestimate may be exacerbated by the tendency to underreport deaths in Cambodia (Chan 1999). Taboos surrounding the topic of death in communities may be one reason why no maternal deaths were reported to the OD office. It is hoped that villagers will be encouraged to report such deaths to increase the level of awareness of maternal health at the district and national level. Further, the number of live births in a given year (as obtained by the OD office) may be an underestimate, given that many births occur at home and may not be registered. This further leads us to hypothesize that our MMR figure is an underestimate.

The MMR is difficult to measure, especially in areas with weak vital registration (Berhane et al. 2000). The WHO has emphasized that all values of MMR be viewed with a degree of uncertainty (WHO 2005). This may be due to several factors, including the methods used to obtain MMR. The household method, sisterhood method, Reproductive Age Mortality Survey (RAMOS) and statistical modelling each yield different MMR figures and have their own strengths and weaknesses.

A few limitations were identified in this study. First, translation barriers may have led to some inaccuracies during data collection. However, every effort was made to field test the questionnaire and explain the concepts to the interpreter prior to implementation. When confusion arose during the interview, concepts were explained further. Second, certain cultural taboos are associated with death, and this may have affected the responses of the BR. Often, pregnant women are discouraged from speaking about the topic for the fear of bringing harm to their own baby (Geisbrecht 2004). Third, some TBAs may have refused to report a death for fear of being blamed. This occurred in one instance, as a TBA denied knowledge of a death even after it was found that she assisted a delivery that ended in the mother's death shortly thereafter. Fear of blame also contributes to underreporting deaths to the OD office. Fourth, the causes of maternal mortality as identified by our study were not triangulated with other methods for determining cause of death. Last, a larger sample size, obtained through a prospective study, may allow these results to be generalized, and allow for a deeper analysis of risk factors for maternal mortality in Kep. These points serve as appropriate points for future study regarding maternal health in Krong Kep.

Conclusion

The "obstetric pathology of poverty" has been described as an ever-increasing problem in poor nations of the developing world. This issue is nowhere more evident than in Cambodia. In the Western Pacific Region, 40% of maternal deaths occur in only six countries, which account for 10% of the population (Ruyan 1999). Cambodia is included in this list, and it is thus not surprising that a high maternal mortality ratio was found in Kep. Today, a woman's risk of dying from pregnancy-

related causes in the poorest nations is higher than a century ago in the richest nations (Graham 2002). It is crucial that new strategies be adopted with the aim of increasing access to healthcare for expectant mothers. Though encouraging institutional delivery remains as one pillar to decrease maternal mortality, this study implies that skilled delivery may not be sufficient by itself, and that ANC and PNC should be encouraged to identify and treat high-risk women. Other studies (Chan 1999; Koblinsky et al. 1999) recommend emergency obstetric be available care as well. However, due to the small sample size and descriptive nature of this study, solid recommendations cannot be made. Indeed, maternal mortality is one of the gravest human rights violations; preventing and reporting the thousands of unnecessary maternal deaths that occur each year in developing countries should become a priority.

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Inequalities in Reproductive Healthcare Utilization: Evidence from Bangladesh Demographic and Health Survey 2004

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Abstract

Utilization of reproductive healthcare services such as antenatal care (ANC), delivery place facilities and postnatal care (PNC) is essential and a basic need for mothers around the globe. However, in Bangladesh inequalities in many forms affect the use of these facilities. These inequalities include socio-economic status, age, education, household size, existence of living children, occupation and household location. Using the database from the Bangladesh Demographic and Health Survey (BDHS) 2004, this study investigated the inequalities and implications of receiving facility-based maternity care such as ANC, delivery place and PNC in Bangladesh. Based on our findings, it is assumed that with the current inequalities in wealth and education, less attention to mothers with bigger family size and to mothers those existing children, lack of facilities and awareness, in rural areas, increased use of reproductive healthcare is unlikely without a change in wealth inequalities and attention to more equity in the health sector. Bivariate and multivariate analyses were done for the study, including tests of significance. Overall, findings revealed significant socio-economic inequalities in the use of reproductive healthcare services. Use of services was much lower among the poor than the rich. These socio-economic inequalities may be reduced by expanding outreach health programs and bringing services closer to the disadvantaged (poor people). The study concluded that many of these inequalities are social constructs that can be reduced by prioritizing the needs of the poor and disadvantaged and adopting appropriate policy change options.

Introduction

Maternal mortality in Bangladesh is often depicted as among the highest in the world (Streatfield and Al-Sabir 2003). Although health in most countries has significantly improved over the past few decades, substantial inequalities in health outcomes among nations, socio-economic groups and individuals have remained (Leon and Walt 2001). Improving the health of the poor and reducing health inequalities have become the central goals of many development programs (Wagstaff 2002). Four dimensions in health – equal access to available care for equal need, equal utilization for equal need, equal quality of care for equal need and equity in outcome – are emphasized to promote health equity (Krasnik, 1996). Several studies have revealed that poverty and ill health are intertwined (Wagstaff 2002), and poverty and marginalization are the underlying causes of inequalities in health (Evans et al. 2001). The poor and women are expected to suffer a greater burden of ill health than the rest of the population, particularly during pregnancy and childbirth (Hadi and Gani 2005). The need to expand reproductive health services in developing countries is now recognized more than ever. Of more than 500,000 maternal deaths that occur every year, a quarter to a third are the result of complications of pregnancy (WHO, 2000). More than 99% of maternal deaths occur in developing countries. A woman living in Africa has a 200 times greater risk of dying from complications related to pregnancy than a woman living in an industrialized country (WHO, 2000).

Although the poor face the worst reproductive health outcomes, poverty is not an insurmountable barrier to health if appropriate investment in health is made. There are many discriminatory policies in place in most developing countries (Hadi and Gani 2005), and the distribution of public health services is unequal in many developing countries (Makinen et al. 2000).

Bangladesh is a poor country with nearly half (48%) of the population living on the wrong side of the poverty line (Hadi and Gani 2005). Although the healthcare network has expanded in rural areas of Bangladesh and the country has experienced significant health development over the past two decades, the overall situation of poor women has changed very little. The problems of the healthcare system are deeply rooted in the society, and their transformation requires major structural changes. Several attempts have been made to understand the equity issues in Bangladesh, but questions on many issues have remained unanswered (Bhuiya et al. 2001; Chowdhury and Bhuiya 1999). Reproductive health status has consistently been reported as varying widely and has never been uniform across the country (Mitra et al. 1997). This study attempted to improve our understanding about socio-economic inequality in the use of reproductive health services in Bangladesh by analysis of the BDHS 2004 database. Three domains of reproductive health services – antenatal care, safe delivery place and postnatal care – were considered in the study.

Methods

The BDHS 2004 is the fourth survey of this type conducted in Bangladesh. Fieldwork commenced on January 1, 2004 and was completed on May 25, 2004. The 2004 BDHS survey was conducted under the authority of the National Institute for Population Research and Training (NIPORT) of the Ministry of Health and Family Welfare of the Government. of Bangladesh. The survey was implemented by Mitra and Associates, a Bangladeshi research firm located in Dhaka. ORC Macro of Calverton, Maryland, provided technical assistance to the project as part of its international demographic and health surveys (DHS) program, and financial assistance was provided by the U.S. Agency for International Development (USAID)/Bangladesh.

The 2004 BDHS sample is a stratified, multistage cluster sample consisting of 361 primary sampling units, 122 in the urban area and 239 in the rural area.

Details of the methodology have been described elsewhere (BDHS 2004). After receiving permission, we took the BDHS 2004 data set from the Internet (www.measuredhs.com). The data file consists of 11,440 eligible women from 10,500 households. It includes information on background characteristics (age, education, religion, etc.); socio-economic status; reproductive history; family planning methods; antenatal, delivery and postnatal care; breastfeeding and weaning practices; vacci-

nation and health of children under the age of five; marriage; fertility preferences; causes of death of children under age five, etc. These households (10,500) had consistent data for assets, housing conditions, and water and sanitation variables, sufficient to create a household socio-economic status index.

The data were analyzed using SPSS (version 11.5) software. Household wealth status was measured by applying principal component analysis (PCA), which involves breaking down assets (e.g., radio, bicycle) or household service access (e.g., water, electricity) into categorical or interval variables in a manner similar to the approach proposed by Filmer and Pritchett (1998, 2000) and used by others (e.g., Wagstaff and Watanbe 1999). Cross-tabulations and multivariate analysis were used to expose associations between the dependent and independent variables. Lastly, trend tests (chi square) were used to determine the significance of any gradient in inequalities.

The variable of interest in the study is the wealth quintile, which is a proxy for socio-economic status. Five wealth quintiles were defined: 1st (poorest), 2nd, 3rd, 4th and 5th (richest). First, we examined the bivariate association between the independent variables and dependent variable. We also examined three-dimensional associations between the dependent variable and household characteristics by wealth quintiles. We then developed statistical models to examine the net association between the dependent variable and wealth quintiles in the presence of the effect of other independent variables. We used a logistic regression model for the associations.

The basic approach to model building was to include the wealth index in each model and to include, sequentially, age, education, household size, number of children, partner's occupation, residence location and discussion with partner regarding family planning (FP). This approach allows for an assessment of the extent to which wealth differences in ANC utilization, use of delivery places and PNC utilization are associated with other factors.

Variable Definitions

Dependent Variables

Utilization of antenatal care (ANC): A woman was defined as having used ANC if she used those services one or more times during pregnancy. She was defined as a non-ANC user if she had no ANC visits.

Use of delivery place: A woman was defined as having used a delivery place if, for her pregnancy delivery, she went to any of the following: Government hospital, Government health centre, any maternal and child welfare centre, private hospital/clinic or NGO hospital/clinic. She was defined as not having used a delivery place if she delivered at her own home or another's home.

Utilization of postnatal care (PNC): A woman was defined as having used PNC if, after the birth of her baby, a health professional had checked her health within 42 days of delivery. She was defined as a non-PNC user if she had had no PNC visits within 42 days of delivery.

Independent variables

The independent variables used for this study are wealth index (socio-economic status), age, education, household size, number of living children, partner's occupation, residence location and discussion about methods of family planning (FP) with her partner.

The wealth index was prepared based on household assets (electricity, radio, bicycle, motor cycle, television, wardrobe, table, chair/bench, watch or clock, cot or bed, sewing machine, owns any homestead, owns any land, hygienic latrine, floor-wall-roof material) and household service access (e.g., water, electricity, cooking fuel). Later, this wealth index was used as a proxy for socio-economic status and constituted the independent variable wealth index.

Table 1. Reproductive healthcare utilization: ANC, delivery place and PNC by socio-economic and other household characteristics (weighted)

Indicators	Reproductive healthcare utilization (Percent of mothers)		
	ANC (n=5416)	Delivery place (n=5416)	PNC** (n=4838)
Wealth quintiles (Socioeconomic status)	p=0.000	p=0.000	p=0.000
1st (poorest)	33.7	2.2	13.0
2nd	45.9	3.5	16.8
3rd	58.4	6.2	16.5
4th	66.5	12.7	24.3
5th (richest)	84.1	33.7	30.1
Age	p=0.000	p=0.036	p=0.572
<20 years	59.3	10.8	20.3
20-34 years	56.9	11.3	18.3
35-49 years	42.7	6.4	19.6
Women's Education	p=0.000	p=0.000	p=0.000
No education	37.5	2.8	13.0
Primary	54.9	7.4	18.8
Secondary and higher	77.3	22.6	27.1
Household size	p=0.006	p=0.047	p=0.603
2-3	62.7	13.1	21.3
4+	54.0	10.8	16.7
Number of living children	p=0.000	p=0.000	p=0.007
No children	82.7	31.5	20.9
1 child	53.5	8.9	22.4
2 & above	51.9	7.3	17.0
Partner's occupation	p=0.000	p=0.000	p=0.000
Farmer	47.8	5.5	16.9
Agri & non-agri labourer	53.9	6.9	18.7
Semi-skilled labourer	66.1	16.9	21.5
Small businessman	58.3	12.7	19.4
Well-paid occupation*	77.0	32.1	29.6
Residence location	p=0.000	p=0.000	p=0.202
Urban	74.8	25.2	20.4
Rural	50.9	6.9	18.5
Discussed FP with partner	p=0.000	p=0.000	p=0.000
Never	51.1	8.7	16.9
Once or twice	58.5	12.2	20.5
More often	73.2	15.9	22.6

Note: * Well-paid occupation: Land owner, professional worker, big businessman.
** 578 (11%) women out of 5416 had delivered baby at a facility centre, were assumed to have received PNC and hence are not included in the PNC analysis.

Results

I. ANC for the Pregnant Mothers

Bivariate Associations

In the bivariate analysis, socio-economic status was strongly associated with utilization of ANC (Table 1). Besides this, the data revealed that more young (<20 years) pregnant women made ANC visits to healthcare providers (59%) than their counterparts aged 35–49 years (43%). ANC visits

were high among educated mothers (77%) compared with mothers with no education (38%). Also, ANC visits were highest among pregnant women without children, compared with those who already had children. Like wealth quintiles, ANC was higher among mothers with partners in a well-paid occupation. Table 1 also shows a significant difference between rural and urban households (51% versus 75%, respectively). Finally, women who discussed family planning (FP) with their partners most often used ANC more than their counterparts who seldom or never discussed it at all. Overall, ANC utilization revealed significant relationships with all variables, including socioeconomic status, age of mother, maternal education, household size, number of living children, partner's occupation, residence location and discussion of FP with partners.

Association of ANC with Wealth Quintile and Household Characteristics

Table 2 presents ANC utilization by household characteristics and wealth quintile. On average, 56% of all women used ANC. The proportion of women using ANC increased with increasing wealth; more than twice as many women in the highest quintile used ANC (84%) compared to women in the lowest quintile (34%).

In all quintiles, the difference in ANC use between poorest (73%) and richest (89%) is less among women with no living children than with any other characteristic. Furthermore, women with no living children made the greatest use of ANC, with an average of 83%.

In terms of education, ANC use is significantly higher among educated women compared to those with less or no education. All the differences among quintiles are statistically significant. In addition, use of ANC shows an increasing trend from the poorest to the richest quintile in each category of educational achievement.

In terms of specific variables – age, partner's occupation and household size – while there is room for debate about variations within the quintiles, but for all variables - age, education, household size, number of living children, partner's occupation, residence location and discussion of FP with partners- the differences of variation between quintiles are statistically highly significance.

Results of Logistic Regression

The models for ANC utilization are presented in Table 3. Model-I shows unadjusted odds ratios, that is, this model showed that mothers in the richest quintile were 10 times more likely to have used ANC compared to the poorest quintile (reference category). Though mothers in all quintiles were significantly more likely to have used ANC compared with women in the poorest quintile, the difference between 4th and 5th quintiles is just notable, that is, the magnitude of the difference is striking. Model-II shows that after controlling for age, mothers in the richest quintile were again 10 times more likely to have used ANC compared with the poorest quintile (reference category), that is, adjustment of age does not bring any significant changes over the odds ratios. Considering maternal age, ANC utilization varied significantly between age groups: older mothers were less likely to use ANC than younger (<20 years) mothers.

Model-III showed that education contributes significantly to ANC utilization. Including education in the model caused age group to become insignificant and lowered the impact of the wealth index. Hence, education is likely one of the most important factors influencing ANC utilization. The influence of household size, number of living children, partner's occupation, residence location and discussion of FP with partner were also significant. However, apart from the variables such as education and number of living children, other variables did not substantially change the logistic models.

II. Use of Delivery Facilities by the Pregnant Women

Bivariate Associations

On average, a small proportion (11%) of women used delivery facilities; the remaining (89%) women gave birth either at their own home or at another's home. The bivariate analysis in Table 1 shows that the highest percentage (34%) of women going to a facility for their delivery were in

Table 2. Reproductive health care utilization: ANC by wealth quintiles and by household characteristics

Indicators	Quintiles (figures are in percentage)					Average
	1st (Poorest)	2nd	3rd	4th	5th (Richest)	(Chi-square trend)
	n=1298	n=1123	n=1054	n=998	n=943	n=5416
ANC utilization	33.7	45.9	58.4	66.5	84.1	55.9 (p=0.000)
Age specific ANC						
<20 years	36.02	55.16	61.57	72.02	88.39	59.35 (p=0.000)
20-34 years	33.98	44.78	59.10	67.52	84.84	56.90 (p=0.000)
35-49 years	28.75	37.04	47.57	47.06	70.89	42.88 (p=0.000)
Education specific ANC						
No education	28.83	36.36	46.29	46.19	63.33	37.54 (p=0.000)
Primary	39.89	51.36	58.84	61.93	71.43	54.97 (p=0.000)
Secondary and higher	51.43	56.89	70.47	78.30	91.65	77.27 (p=0.000)
Household size specific ANC						
2-3	40.64	62.25	73.48	70.27	86.02	62.64 (p=0.000)
4+	31.79	48.39	57.69	71.76	85.06	53.85 (p=0.000)
Number of living children specific ANC						
No children	72.73	65.52	78.00	68.12	88.55	82.67 (p=0.000)
1 child	31.80	47.83	52.53	72.25	84.72	53.46 (p=0.000)
2 & above	30.70	44.10	59.77	67.70	76.00	51.90 (p=0.000)
Partner's occupation specific ANC						
Farmer	32.34	39.03	58.30	56.44	65.00	47.92 (p=0.000)
Agri & non-agri labourer	37.30	52.76	58.44	72.90	80.56	53.92 (p=0.000)
Semi-skilled labourer	34.51	47.52	59.78	75.31	86.43	66.24 (p=0.000)
Small businessman	31.65	41.24	60.78	61.95	85.71	58.34 (p=0.000)
Well-paid occupation	50.00	39.13	55.56	75.82	90.09	77.31 (p=0.000)
Residence location specific ANC						
Urban	40.18	58.97	66.44	71.82	88.01	74.80 (p=0.000)
Rural	33.05	44.39	57.16	65.44	78.19	50.92 (p=0.000)
Discussed FP with partner specific ANC						
Never	29.84	43.86	55.74	65.20	80.22	51.09 (p=0.000)
Once or twice	37.55	47.18	58.10	65.66	84.65	58.50 (p=0.000)
More often	49.33	55.07	75.53	78.95	93.22	73.15 (p=0.000)

Well-paid occupation: Land owner, professional worker and big businessman.

Table 3. Logistic regression

Indicators	Model-1 Un-adj. OR	Model-I1 Adj. OR	Model-III Adj. OR	Model-IV Adj. OR	Model-V Adj. OR	Model-VI Adj. OR	Model-VII Adj. OR	Model-VIII Adj. OR
Wealth index								
1st (poorest)[a]								
2nd	1.671***	1.663***	1.416***	1.435***	1.410***	1.461	1.453***	1.456***
3rd	2.774***	2.738***	2.093***	2.141***	2.061***	2.125	2.097***	2.081***
4th	3.922***	3.886***	2.541***	2.653***	2.484***	2.522	2.460***	2.472***
5th (richest)	10.401***	10.457***	5.887***	6.089***	4.664***	4.584	4.147***	4.076***
Age								
<20 years[a]								
20-34 years		.809**	1.002	1.059	1.054	1.055	1.056	1.066
35-49 years		.494***	.752*	.816	.810	.814	.815	.825
Education								
No education[a]								
Primary			1.637***	1.626***	1.666***	1.700	1.701***	1.675***
Second. & above			3.163***	3.089***	3.281***	3.272	3.326***	3.262***
Household size								
2-3[a]								
4+				.737**	.759*	.759*	.769*	.775*
Living children								
No children[a]								
1 child					.461***	.484***	.643**	.650*
2 & above					.456***	.477***	.639**	.640**
Partner's Occupation								
Farmer								
Labourer						1.531***	1.500***	1.517***
Semi-skilled labourer						1.463***	1.402**	1.407**
Small businessman						1.241*	1.191	1.196
Well-paid occupation						1.531**	1.488**	1.463**
Residence location								
Urban[a]								
Rural							.684***	.693***
Discussed FP with partner								
Never[a]								
Once or twice								1.105
More often								1.966***

*** p<0.001, ** p<0.01, * p<0.05, [a] Reference Category
Well-paid occupation: Land owner, professional worker, and big businessman.

the richest quintile, whereas the figure was only 2% for the poorest. Similarly, the highest proportion of mothers who delivered at a facility were (23%) educated; the smallest percentage had no education (3%). Women without children formed the greatest percentage using delivery facilities at 32%, compared to mothers with one or more children at 9% or less. For the other characteristics, mothers whose partner had a well-paying occupation, mothers living in an urban environment and mothers who discussed FP with their partners more often had the highest rates of delivery facility use. Moreover, all these differences were statistically significant. On the other hand, maternal age and household size did not show strong significant differences in use of delivery facilities.

Overall, utilization of delivery facilities showed significant relationships with all variables (socioeconomic status, maternal education, number of living children, partner's occupation, residence location and discussion of FP with partners) except maternal age and household size.

Association of Using Delivery Facilities by Wealth Quintiles and Household Characteristics

Table 4 presents use of delivery place facilities by household characteristics and wealth quintile. The richest–poorest ratio of using delivery place facilities is over 15. Throughout all breaking characteristics, the inequalities trend among quintiles in use of delivery facilities has constantly been observed as very wide.

Table 1 showed that age and household size were not significant factors in use of delivery place facilities for mothers. In terms of wealth inequalities, Table 4 shows, irrespective of age, education, household size, number of living children, partner's occupation, residence location and discussing FP with partner, differences in wealth are statistically significant across all characteristics. Use of delivery place facilities increases with wealth status.

Table 4. Reproductive health care utilization: Using of delivery place facilities by wealth quintiles and by household characteristics

Indicators	Quintiles (figures are in percentage)					Average
	1st (Poorest)	2nd	3rd	4th	5th (Richest)	(Chi-square trend)
	n=1298	n=1123	n=1054	n=998	n=943	N=5416
Used delivery place	2.2	3.5	6.2	12.7	33.7	10.7 (p=0.000)
Age specific using of delivery place						
>20 years	5.69	3.59	8.80	15.48	31.25	10.75 (p=0.000)
20-34 years	1.73	3.52	5.84	13.02	34.44	11.26 (p=0.000)
35-49 years	0.00	2.96	2.91	5.88	30.38	6.41 (p=0.000)
Education specific using of delivery place	0.84	1.21	4.29	6.09	13.33	2.80 (p=0.000)
No education	4.78	4.96	6.08	8.76	18.52	7.50 (p=0.000)
Primary	4.76	5.78	8.48	18.30	42.05	22.51 (p=0.000)
Secondary and higher						
Household size specific using of delivery place						
2-3	5.35	3.97	10.61	21.62	40.86	13.19 (p=0.000)
4+	1.66	4.61	7.69	12.21	39.61	10.75 (p=0.000)
Living children specific using of delivery place						
No children	9.09	3.45	6.00	11.59	43.37	31.47 (p=0.000)
1 child	1.77	4.74	4.15	13.29	30.56	8.69 (p=0.000)
2 & above	2.25	4.51	6.77	10.51	20.00	7.29 (p=0.000)
Partner's occupation specific						
Farmer	1.49	4.09	4.26	7.92	18.75	5.57 (p=0.000)
Agri & non-agri labourer	1.85	1.51	7.14	13.55	24.07	6.84 (p=0.000)
Semi-skilled labourer	1.77	5.67	9.50	18.41	32.95	16.77 (p=0.000)
Small businessman	2.53	5.08	6.90	10.73	34.56	12.74 (p=0.000)
Well-paid occupation		3.04	4.17	18.68	49.14	32.18 (p=0.000)
Residence location specific						
Urban	3.57	5.13	10.27	11.05	41.80	25.11 (p=0.000)
Rural	2.11	3.28	5.51	13.11	21.54	6.89 (p=0.000)
Discussed FP with partner specific						
Never	1.70	3.76	6.67	12.24	29.27	8.69 (p=0.000)
Once or twice	2.84	2.93	5.48	14.04	35.53	12.27 (p=0.000)
More often	4.00	4.35	7.45	9.21	40.68	15.74 (p=0.000)

Well-paid occupation: Land owner, professional worker and big businessman.

Results of Logistic Regression

Table 5 presents results of the models for using delivery place facilities. Throughout all models, odds ratios do not differ significantly between the poorest and the 2nd quintile.

Table 5. Logistic regression

Indicators	Model-1	Model-I1	Model-III	Model-IV	Model-V	Model-VI	Model-VII	Model-VIII
	Un-adj. OR	Adj. OR	Adj. OR	Adj. OR	Adj. OR	Adj. OR	Adj. OR	Adj. OR
Wealth Index								
1st (poorest)[a]								
2nd	1.600	1.586	1.231	1.254	1.223	1.200	1.181	1.183
3rd	2.947***	2.894***	1.919**	2.014**	1.900**	1.646*	1.607*	1.605*
4th	6.514***	6.428***	3.597***	3.959***	3.658***	3.089***	2.940***	2.941***
5th (richest)	22.639***	22.679***	10.935***	11.897***	8.856***	6.297***	5.245***	5.226***
Age								
<20 years[a]								
20-34 years		.812	.966	.982	.978	.912	.918	.921
35-49 years		.511***	.819	.888	.855	.751	.752	.753
Education								
No education[a]								
Primary			2.001***	1.980***	2.082***	1.974***	1.989***	1.980***
Second. & above			4.168***	4.062***	4.482***	3.764***	3.882***	3.869***
Household size								
2-3[a]								
4+				.806	.831	.805	.826	.829
Living children								
No children[a]								
1 child					.519***	.515***	.736	.737
2 & above					.429***	.409***	.595**	.595**
Partner's occupation								
Farmer[a]								
Labourer						1.206	1.148	1.156
Semi-skilled labourer						1.781**	1.613**	1.617**
Small businessman						1.658**	1.501*	1.504*
Well paid						2.766***	2.528***	2.527***
Residence location								
Urban[a]								
Rural							.556***	.557***
Discussed FP with partner								
Never[a]								
Once or twice								1.008
More often								1.103

*** p<0.001, ** p<0.01, * p<0.05, [a] Reference Category
Well-paid occupation: Land owner, professional worker and big businessman.

Unadjusted odds ratios in model-I revealed that mothers in the richest quintile were 23 times more likely to have used delivery place facilities compared to the poorest quintile (reference category). Also striking is the difference in values of odds ratios between the 4th and 5th (richest) quintiles. Model-II shows that after controlling for age, mothers in the richest quintile were again 23 times

more likely to have used delivery place facilities compared to the poorest quintile: adjustment of age does not significantly change the odds ratios. However, adjustment of education brought the odds ratios from 23 times to 11 times compared with the poorest quintile. Including education in the model caused age to become insignificant and lowered the impact of the wealth index. Hence, education is likely one of the most important factors influencing mothers' use of delivery place facilities. Similarly, number of living children, partner's occupation and residence location are other significantly factors because adjustment of these variables in the model lowered the impact of the wealth index (Table 5). Overall, inclusion of age, household size and discussion of FP with partner did not substantially change the logistic models.

Table 6. Reproductive health care utilization: PNC by wealth quintiles and by household characteristics

Indicators	Quintiles (figures are in percentage)					Average
	1st (Poorest)	2nd	3rd	4th	5th (Richest)	(Chi-square trend)
	n=1270	n=1085	n=988	n=870	n=625	n=4838
PNC utilization	13.0	16.8	16.5	24.3	30.1	18.8 (p=0.000)
Age specific PNC utilization						
>20 years	16.58	14.49	21.83	29.58	24.68	20.27 (p=0.000)
20-34 years	11.42	17.75	14.74	22.19	31.91	18.32 (p=0.000)
35-49 years	17.50	15.15	18.18	31.25	21.82	19.58 (p=0.000)
Education specific PNC utilization						
No education	10.84	14.34	9.85	20.65	20.19	12.98 (p=0.000)
Primary	15.93	19.53	15.88	19.47	27.92	18.75 (p=0.000)
Secondary and higher	20.00	16.98	24.28	30.03	34.06	27.05 (p=0.000)
Household size specific PNC utilization	17.05	20.69	22.88	27.12	26.79	21.30 (p=0.000)
2-3	12.84	17.39	12.50	29.82	19.35	16.74 (p=0.000)
4+						
Living children specific PNC utilization						
No children	15.00	10.71	17.39	18.03	25.53	21.28 (p=0.000)
1 child	15.83	20.42	15.87	32.67	43.43	22.36 (p=0.000)
2 & above	10.09	13.82	21.77	16.96	34.17	16.97 (p=0.000)
Partner's occupation specific PNC utilization						
Farmer	12.63	16.60	13.78	22.99	22.73	16.79 (p=0.000)
Agri & non-agri labourer	14.56	15.31	19.58	27.61	29.27	18.68 (p=0.000)
Semi-skilled labourer	12.61	16.54	18.52	25.77	28.90	21.47 (p=0.000)
Small businessman	12.34	19.05	13.43	24.04	29.37	19.21 (p=0.000)
Well-paid occupation	16.67	15.00	23.19	26.67	38.98	29.59 (p=0.000)
Residence location specific PNC utilization						
Urban	12.04	12.61	16.15	20.50%	27.58%	20.48 (p=0.000)
Rural	13.09	17.25	16.67	25.25%	33.22%	18.51 (p=0.000)
Discussed FP with partner specific PNC						
Never	11.97	16.13	13.27	24.02	27.97	16.96 (p=0.000)
Once or twice	14.38	16.71	19.40	24.20	32.99	20.58 (p=0.000)
More often	15.28	23.08	22.99	26.09	27.14	22.87 (p=0.000)

Well-paid occupation: Land owner, professional worker, and big businessman

III. PNC for the Mothers

Since 1998, 5416 (47%) of the 11,440 eligible women had given birth. Although many had more than one birth in this period, this analysis was limited to the most recent birth. Nevertheless, 578 (11%) women out of 5416 who had delivered their baby at a facility centre were assumed to have received PNC and hence these are not included in this PNC analysis.

Bivariate Associations

Bivariate analysis in Table 1 revealed that socio-economic status was strongly associated with utilization of PNC. In addition, education, number of living child, partner's occupation and discussion of FP with partner are other significant factors that influenced women's PNC utilization. PNC use is highest among the women in the richest quintile; age, household size and residence location did not make a significant difference in PNC use.

Comparing all background characteristics, women with partners in well-paid occupations showed the highest rate of PNC use (30%), followed by women with the highest education (27%) and women who discussed FP with their partner more often (23%).

Association of PNC with Wealth Quintile and by Household Characteristics

Utilization of PNC by household characteristics and wealth quintile is presented in Table 6. On average, 19% (909 out of 4838) of women used PNC. The proportion increased with increasing wealth: more than twice as many women in the richest quintile used PNC (30%) compared with women in the poorest quintile (13%).

Overall, Table 6 shows that irrespective of age, education, household size, number of living children, partner's occupation, residence location and discussing FP with partner, differences in wealth across all specific characteristics are statistically significant. Use of delivery place facilities increases with wealth status.

Results of Logistic Regression

The logistic models for PNC utilization are presented in Table 7. Model-I shows unadjusted odds ratios: this model revealed that mothers in the richest quintile were three times more likely to have used PNC than those in the poorest quintile (reference category). Unadjusted odds ratios in model-I also showed that ratios differ significantly between the poorest quintile (reference category) and 2nd and 3rd quintiles ($p<0.05$) and with other quintiles (4th and richest; $p<0.001$).

Though adjusting the model for age did not bring any significant change (model-II), adjusting for education reduced the differences between the poorest and 2nd and 3rd quintiles to insignificance and lowered the impact of the wealth index (model-III). Moreover, the odds ratios of education differed significantly compared to no education. Hence, other than wealth, education is likely one of the most important influences on PNC utilization.

In general, other than wealth and education, the logistic models in Table 7 revealed that partner's well-paid occupation and no living children influenced women's use of PNC positively.

Discussion and Conclusions

ANC Utilization

Older, poor, and less educated women are less likely to seek ANC (Thomas et al. 1997). Tables 1, 2 and 3 show a consistently wide variation in ANC across wealth quintiles. In Bangladesh, poorer mothers generally use ANC less than their richer counterparts. The general perception is that the wealthy are able to use ANC more than the poor (Hadi and Gani, 2005). Findings were similar for partner's occupation: women whose partner was well paid used ANC more than women whose partner was not.

In terms of age, the study revealed that young pregnant women (<20 years) had the highest use of ANC (59%); women aged 35 to 49 used it least (43%, Table 1). A study by Hadi and Gani (2005)

had similar findings: use by women aged 30 years or less was 40.8%, versus 28.9% for women over thirty. One possible reason for this could be that younger women know less about complications of pregnancy. Moreover, most women under 20 are first-time mothers and fearful about pregnancy complications. Irrespective of wealth, they tend to visit healthcare providers for ANC more than any other age group. However, the overall rate is far below expectations. Results were similar for women with no living children: their ANC utilization was higher than that of women with children.

The ANC analysis (Tables 1, 2 and 3) established that education is another positive factor for ANC use: educated mothers utilized ANC more than uneducated mothers. A study by Ahmed and colleagues (2003) also found that educated mothers were much more aware regarding ANC.

As per planning and management of the health sector in Bangladesh, though the rural health program comparatively seems to be more systematic (only by structure) than urban areas (Source:

Table 7. Logistic regression

Indicators	Model-1	Model-I1	Model-III	Model-IV	Model-V	Model-VI	Model-VII	Model-VIII
	Un-adj. OR	Adj. OR	Adj. OR	Adj. OR	Adj. OR	Adj. OR	Adj. OR	Adj. OR
Wealth Index								
1st (poorest)[a]								
2nd	1.351*	1.342*	1.197	1.198	1.199	1.222	1.225	1.223
3rd	1.326*	1.321*	1.084	1.089	1.098	1.106	1.112	1.107
4th	2.149***	2.160***	1.626***	1.649***	1.696***	1.696***	1.718***	1.723***
5th (richest)	2.887***	2.923***	2.056***	2.080***	2.201***	2.121***	2.206***	2.188***
Age								
<20 years[a]								
20-34 years		.841	.957	.986	.977	.973	.971	.982
35-49 years		.978	1.291	1.338	1.319	1.313	1.312	1.340
Education								
No education[a]								
Primary			1.455***	1.452***	1.447***	1.457***	1.457***	1.445***
Second. & above			2.057***	2.034***	2.011***	1.977***	1.965***	1.935***
Household size								
2-3[a]								
4+				.772	.773	.771	.767	.771
Living children								
No children[a]								
1 child					1.541**	1.541**	1.378	1.401
2 & above					1.057	1.048	.934	.951
Partner's Occupation								
Farmer								
Labourer (agri, non-ag)						1.254	1.265	1.299*
Semi-skilled labourer						1.165	1.187	1.204
Small businessman						1.118	1.137	1.149
Well-paid occupation						1.440*	1.453*	1.447*
Residence location								
Urban[a]								
Rural							1.167	1.176
Discussed FP with partner								
Never								
Once or twice								1.173
More often								1.253

*** p<0.001, ** p<0.01 * p<0.05, [a] Reference Category
Well-paid occupation: Land owner, professional worker, & big businessman

Health and Family Planning Management Structure in Bangladesh, 2005), this study found that women in urban areas had higher ANC utilization than those in rural areas (Tables 1, 2 and 3). A possible explanation is that there are more facilities and service providers in urban than in rural areas. Moreover, urban mothers have more interaction with knowledgeable mothers and consequently may have a higher degree of awareness. Finally, discussing family planning with their partner also contributed to ANC use.

Use of Delivery Place Facilities

Although place of delivery is an important factor for delivery outcome and health of the mother and the newborn, Barkat and Majid (2003) found that 96% of deliveries take place at home in Bangladesh. Another study (Reproductive Health in Rural Bangladesh Volume 2) revealed that over 90% of all deliveries were at home with untrained attendants, often in unsafe and unhygienic conditions. The findings in Tables 1, 4 and 5 show that most deliveries took place at the marital or another home, while only a small proportion (10.7%) occurred in health facilities.

Pregnancy delivery is one of the most sensitive issues in the life of women; hence a safe delivery place is essential. A study revealed that home delivery remains almost universal in Bangladesh and that use of a delivery place is higher among wealthier households (30%), educated mothers (23%) and in urban areas (22%) (Bangladesh Maternal Health Services and Maternal Mortality Survey 2001 Final Report [BMHS] 2003). Our study found a similar trend in the context of wealth, age, education, living children, household size, partner's occupation, location and discussion of FP with partners (Tables 1, 4 and 5). Similar to findings for ANC (Table 2), besides wealth, other positive characteristics (education, well-paid occupation, no living children, discussion with partners, etc.) influenced the use of delivery facilities. However, Table 1 revealed that wealth combined with the other positive characteristics further increases use of delivery facilities.

PNC Utilization

The three Bangladesh DHS surveys have provided data on ANC, place of delivery and delivery assistance, and limited information on PNC (Streatfield and Sabir, 2003) Another study revealed that of the three phases (ANC, delivery place and PNC), PNC is the most neglected (Goodburn et al. 1994). These two studies have similar findings to ours (Tables 1, 6 and 7). We also noticed that the magnitude of odds ratios is not much wider between the poorest and the richest quintiles in Table 7; as has been observed, this magnitude is wider in Tables 3 and 5. Possible reasons might be the associated costs, lack of privacy, preoccupation with the newborn, no reason to go and limited opportunity. The BMHS 2001 report also revealed that less than one in five women with recent deliveries reported having a PNC checkup for themselves and our study finding was almost identical, with an average of 19% of women received PNC. Logistics models (Table 7) showed that after wealth, education is the most powerful positive influence on PNC use.

Overall Conclusions

Proper care during pregnancy and after childbirth is important for the health of both the mother and her child. Findings revealed in Table 2 that only 56% of women utilized ANC; this figure dropped dramatically to 19% for PNC use (Table 6). Hadi and Gani (2005) found that about 37% of pregnant women had received ANC, while only half of them (18%) had used PNC. All background characteristics in this study differed significantly in influencing use of ANC services; however, this was not true for use of PNC, where mother's age, household size and household location were not found to be important.

The study here provided two important findings: the use of reproductive health services was largely inadequate at the aggregate level, and significant health sector inequality exists in Bangladesh. Though it is not certain whether the increased access to and the availability of services would lead to increased utilization of services among the poor and disadvantaged (Magadi, Madise et al., 2000), there was evidence to suggest that lack of availability of health services not only reduced the coverage

of services but also forced many women to seek alternative healthcare providers not acceptable by any standard (Whitehead et al. 2001). The socio-economic and regional inequality in the use of reproductive health services was very wide and poor women living in under-served regions suffered a greater burden than others during pregnancy and the post-natal period (Magadi, Madise et al., 2000).

Echoing the comments of Hadi and Gani (2005), although reproductive health services were expanded in the last two decades, they did not promote health equality because the services were available largely to urban centers. As a result, use of reproductive health services has remained very low among the poor and in under-served rural areas. Even in urban and better-served rural areas, the poor–rich inequality has continued to exist because health services were not designed for the poor (Hadi et al. 2001).

Inequalities in health and services utilization very largely reflect inequalities at individual and household levels, such as age, education, household size, living children, partner's occupation, location and discussion of family planning with partner (Wagstaff, 2002). This indicates that country policies and programs might need to aim at combating health sector inequalities. These include the quality and availability of health services, levels of knowledge and awareness – especially health-specific knowledge and awareness. Programs are needed to increase awareness and affordability in order to reduce inequalities among women irrespective of age, family size and existence of living children.

Bangladesh continues to face a formidable challenge in the improvement of health of the poor. In a society where incomes of the poor are too low to buy a minimum essential package, the provision should be developed to provide essential health services according to a sliding scale of fees for easily identified subgroups of the population. The health needs of the poor should be recognized and health interventions should be tailored to match the specific livelihood strategies of poor households. The distribution of health resources should focus not only on the size of the population but also on the burden of diseases (Whitehead et. al. 2001). As a short-term policy measure, targeted health interventions may produce desired outcomes. Evidence suggests that a targeted approach has the potential to significantly raise access to health services in Bangladesh (Chowdhury and Bhuiya 1999; Hadi et al. 2001).

Since the focus of the health program should be equitable health development, the current health system should include pro-poor health components (Hadi and Gani 2005). Essential elements of this strategy should be the sensitization of the community to the benefits of this approach, inclusion of the poor in decision-making and raising access of the poor to basic health resources and services. Healthcare should not only be subsidized for the poor, but the mode of services must be appropriate to reach them. Policy options to improve maternal health should also include testing new initiatives and systematic interventions that would help in designing the most effective intervention models for the poor and disadvantaged. Health development can only be ensured by enhancing the lives of women and by providing them with freedom (Sen, 1999). Poor women in Bangladesh should be given that freedom to avoid ill health during pregnancy and escapable maternal mortality.

Long-term policy options must incorporate several other issues, including expansion of health programs to under-served poor regions and behavioral change through adult education among relatively older women, women belonging to a bigger household size, and women with children. Among other alternatives, re-allocation of health resources to reduce poor–rich gaps may be the viable option. The study argues for the development of new approaches that will prioritize the needs of the poorest and most disadvantaged.

Regarding policy issues, health ministries might work more closely with other ministries, but should also take a wider view, for example, exploring alternative delivery methods to reach the poor and finding improved ways of increasing knowledge among the poor about healthy behaviours. Expanded pro-poor health development programs could substantially improve access to and utilization of health services among the poor.

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Geographic Targeting of Risk Zones for Childhood Stunting and Related Health Outcomes in Burkina Faso

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Abstract

Several studies seeking alternative intervention strategies for chronic food insecurity in food-poor nations now advocate the simultaneous evaluation of multiple causative agents to identify and monitor at-risk populations. This study attempted to do so using a three-tiered conceptual framework that expressed childhood nutritional health outcomes as a function of basic, underlying and immediate causes that are manifested at the regional/community level, the household level and the personal level. Focusing on stunting (short stature) as a direct cumulative indicator of food insecurity, the geographic patterns of this nutritional health outcome were mapped using empirical data from Burkina Faso. The spatial analysis revealed several isolated pockets of at-risk populations. Further analysis using logistic regression methods revealed significant disparities in childhood vulnerability based on factors such as urbanization, geographic accessibility, poverty, maternal education and occupation, environmental health, and age, gender and dietary intake of the child. Contrary to research expectations, there were no observed relationships between childhood nutritional health outcomes and the biophysical characteristics of the communities. The odds ratios of stunting in the marginal areas with harsh environmental conditions were comparable to those observed in the wetter, crop-intensive regions. Overall, the findings underscore the need for broadening the scope of research beyond physical environmental conditions to include more socio-economic and anthropogenic factors that result in long-term effects of food insecurity, particularly among young children.

Introduction

The dramatic transformation in agricultural practices over the last four decades, coupled with increasing restructuring of agricultural systems worldwide, has resulted in higher food produc-

tivity and greater self-sufficiency among residents in several countries. Despite these developments, roughly 15% of the world's population still suffers from persistent hunger and malnutrition (Food and Agricultural Organization of the United Nations [FAO] 2002). These conditions are particularly disturbing in sub-Saharan Africa, where about a third of the population is believed to be malnourished, including 31 million children under the age of five (Rukuni 2002). This region has shown the smallest improvement in the average daily per capita calorie consumption and statistical forecasts now point toward a grim outlook with a projected 44% rise in nutritional deficiencies within the next decade (Shapouri and Rosen 1999).

Chronic food insecurity conditions compromise the well-being of the population, and those at greatest risk of suffering irreparable health consequences are the young children. Nutritionally deprived children are vulnerable to cognitive and developmental impairments including lower intelligence, poor academic functioning, stunting (short stature), wasting and a diminished capacity for work in adulthood (Frongillo et al. 1997; Olson 1999; Weinreb et al. 2002).

In the quest for new approaches to deal with these concerns, researchers and policy makers alike are now exploring alternative strategies to expand the role of preventive and early warning mechanisms to help identify at-risk populations and regions. For example, in a recently published article on world hunger and food insecurity, Struble and Aomari (2003) argued that simplistic solutions such as short-term food aid, limiting population growth or increasing agricultural productivity are no longer adequate measures for dealing with these conditions. Rather, they called for broader, more integrative, approaches that embrace many issues, including food access, promoting healthy diets and lifestyles, improving environmental health, incorporating nutritional objectives into development policies, and assessing, analyzing and monitoring at-risk populations. Similar suggestions have underscored the need for the simultaneous assessment of multiple causes so that synergies between these factors can be obtained and new approaches developed to assist the vulnerable groups (Frankenberger 1996; Frongillo et al. 1997).

A variety of analytical tools and information systems are also now emerging to assist in data integration, analysis and surveillance of food insecurity conditions at different spatial scales. Measures of food productivity and stock levels, food prices, accessibility, biophysical attributes of communities and the socio-economic, health and nutritional status of individuals and households are now being collected and analyzed systematically using geo-statistical methods (Parris et al. 2002; Wiebe et al.1998; Curtis and Hossain 1998). Poverty maps using small-area estimation techniques are also being developed based on the integration of multiple data sources (FAO 2003). All of these applications allow for the spatial characterization of vulnerable population groups and the joint evaluation of several risk factors that account for these conditions. In concert with these efforts, this paper will discuss the multi-dimensional causes of food insecurity conditions, analyze the relationships between food insufficiency and nutritional health outcomes among children, and identify the demographic, socio-economic and environmental correlates of these conditions. Emphasis is placed on the proximate and immediate causes of childhood malnutrition. Empirical evidence is drawn from data generated in Burkina Faso, West Africa. Three questions, posed at the beginning of the study, are addressed: (1) How is food insecurity manifested at different spatial scales in Burkina Faso? Does it follow a rural-urban dichotomy, an agro-ecological dimension or political subdivision of the country? (2) What are the long-term nutritional health consequences of food-insecure conditions on young children, and can these health outcomes be analyzed spatially to identify and monitor the high-risk areas? (3) What are the linkages between the childhood health outcomes and the bio-physical characteristics of the communities, transportation infrastructure, the socio-economic attributes of the households, maternal characteristics and access to health services?

The paper is organized into five sections. The first provides an overview of food insecurity conditions and health implications for young children, based on documented evidence from food-poor as well as food-rich nations. The causative factors of food insecurity and nutritional outcomes are also discussed within the context of a causal framework. The second section describes the study area, Burkina Faso, highlighting the regional characteristics and the specific challenges facing residents in

the country. The research design and analytical methods are then described, followed by a presentation of the results. The paper concludes with a summary of pertinent findings and research implications.

Food Insecurity Conditions and Childhood Vulnerability: An Overview

Following the initial definition proposed by the World Bank (1986), multiple characterizations of food security/insecurity have emerged over the last two decades, several of which focus on key dimensions such as food availability, entitlement, access, safety and security. Food insecurity conditions are said to exist when individuals or households lack access to nutritionally adequate foods (in terms of quality, quantity, safety and culturally acceptability), or their ability to obtain these foods is limited, at risk or uncertain (Saad 1999; Frongillo 1999; Smith et al. 2000; Nnakwe and Yegammia 2002). More recently, others have suggested a more comprehensive operationalization of food insecurity that extends beyond the nutritional needs of individuals to include additional items such as (i) the livelihoods of various population groups, (ii) their perceptions, coping mechanisms and responses to recurrent hazards, as well as the trade-offs made between acquiring food versus other basic necessities such as healthcare, education, housing, or selling off livestock and other productive assets and (iii) the degree of vulnerability associated with those conditions (Maxwell et al. 1999; Goldberg and Frongillo 2001).

For studies evaluating differential levels of vulnerability, the consensus has been that children are among the most susceptible population group, as well as older adults, and pregnant and lactating women. This conclusion has been noted in both food-rich nations such as the United States and in developing countries undergoing chronic conditions of food insecurity (Nnakwe and Yegammia 2002; Olson 1999). Among children in developing countries, anthropometric indicators such as stunting and wasting have been identified as the most direct nutritional consequences of food insecurity (Campbell 1991, WHO 1995). Children undergoing long-term nutritional deficiencies are vulnerable to growth retardation, stunting and impaired physical development. While these indicators reflect the visible outcomes of childhood malnutrition, there are other less discernible yet deleterious effects of undernutrition on children. Specifically, inadequate nutrition and poor feeding patterns affect the cognitive functioning of children, limiting their ability to concentrate and perform complex tasks. The most direct link between undernutrition and childhood cognition has been established through iron-deficiency anemia, a prevalent nutritional disorder that influences the child's attention span, memory and overall ability to learn (Skalicky et al. 2000).

Nutritionally deprived children are also more likely to suffer from chronic illnesses. Weinreb et al. (2002) investigated the independent contribution of hunger on the health of preschool and school-aged children. Their results confirmed that severe hunger was indeed a significant predictor of chronic illnesses even after controlling for low birth weight, the life events of the child and other extraneous factors. Malnutrition is now considered the leading indicator of childhood mortality in food-poor countries and explains why one in seven children in these countries is likely to die before reaching the age of five (FAO 2002).

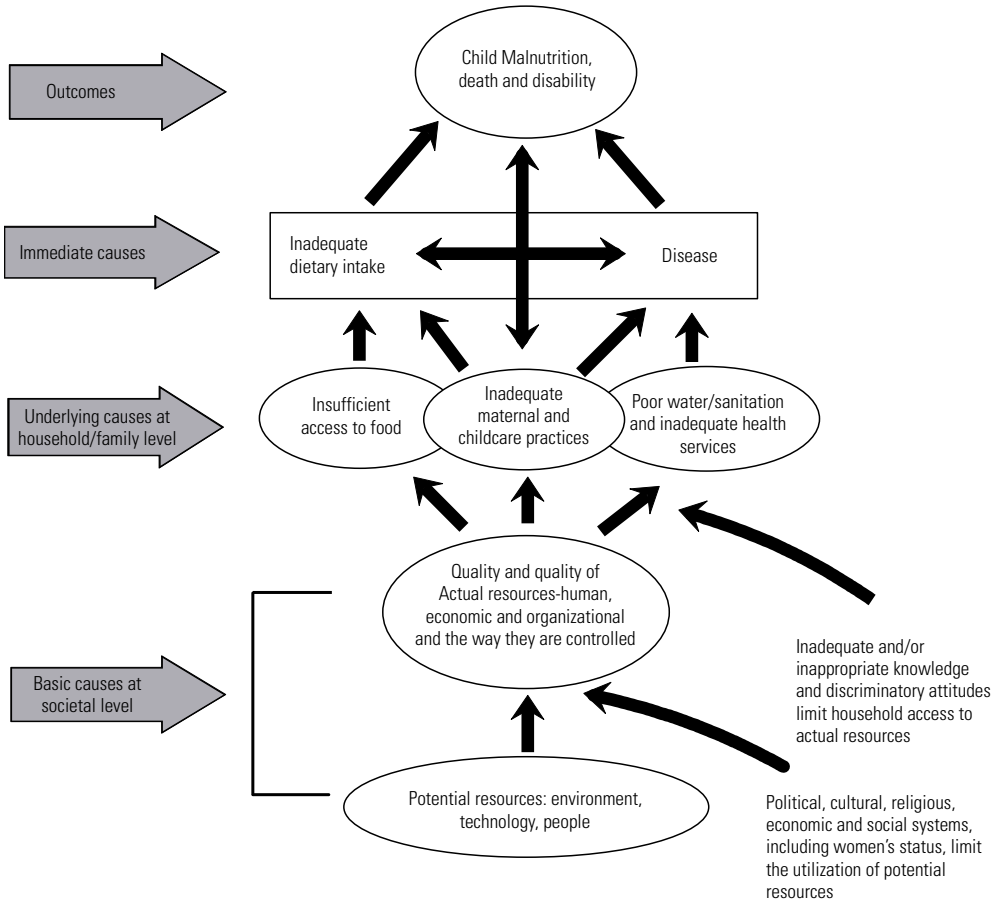
Additional evidence from international agencies points toward the increased susceptibility of nutritionally deprived children to common infectious and potentially fatal diseases such as malaria, acute respiratory illness and measles. These conditions are further complicated by the fact that sick children are more likely to have poor appetites and therefore consume less food, leaving them with fewer nutrients required for their cognitive and physical development (Smith et al. 2000).

Multiple Causes of Childhood Malnutrition

Extensive research on food insecurity confirms the multifactorial nature of the problem, particularly in sub-Saharan Africa (Curtis and Hossain 1998; Goldberg and Frongillo 2001; Girma and Genebo 2002; FAO 2002, 2003). Food insecurity conditions are triggered, and in some instances exacerbated, by events at different spatial scales including the household, community, regional, national and international levels (Smith et al. 2000). Figure 1 provides a conceptual framework that illustrates the causative linkages and contributory role of these factors in explaining the nutritional

status and health of children. This framework is based on the original proposition by the United Nations Children's Fund (UNICEF 1990) and subsequent modification by others (Jonsson 1995; Frongillo et al. 1997). The framework integrates several components of childhood malnutrition that range from large-scale factors such as the physical/environmental characteristics of a region and the economic/political systems to more specific characteristics of the child. Childhood food insecurity and the corresponding health outcomes are presented as endpoints resulting from the complex interplay between three types of determinants that are immediate, underlying or basic in nature. The immediate causes are associated with the individual child's nutrition and health which, as discussed in the preceding section, are the direct determinants of stunting, wasting, cognitive impairments and possibly death. Additional risk factors associated with the individual child include the birth weight, age, birth order and birth interval, all shown to be positively associated with malnutrition and related health outcomes (Girma and Genebo 2002; Garret and Ruel 1999).

Figure 1. Determinants of childhood malnutrition and associated health outcomes



Source: UNICEF, 1990

The immediate causes of childhood malnutrition result from three major underlying causes manifested at the household level: insufficient access to food, unsanitary household environments and poor caregiving practices. The latter, including the various ways in which the children are fed,

nurtured and raised in households, are particularly vital for their nutritional well-being. Further, the role of caregiving extends well beyond the mother to include the entire family, household and community within which the children reside. As documented by UNICEF (1990), both mothers and children require the care and support from their families, households and communities such that communities where mothers are well supported, educated and cared for often translate into better caregiving environments for the children. The health status of the mother, using a basic anthropometric measure such as the body mass index (BMI), is therefore a useful proxy of a child's nutritional status. Surveys conducted in developing countries have shown that undernourished mothers with a BMI below 18.5 are more likely to earn lower wages in jobs involving physical labour and consequently face greater threats to household food insecurity (FAO 2002). Other studies have found a consistently positive relationship between the mother's BMI and household food insecurity, even after controlling for variables such as employment status and income levels (Olson 1999). Additional attributes of the mother that are useful in evaluating childhood malnutrition include educational attainment, age, employment and marital status. Specifically, healthy mothers with moderate to high educational attainment, good occupational status and with equal or greater control over the household income and decision making are more likely to have nutritionally healthy children. With respect to age, some researchers have found that mothers in the youngest age group (15–19 years) and oldest age category (45–49 years) are more likely to be food insecure. Marital status has also been shown to influence household food insecurity, with more vulnerable conditions found among unmarried rural and divorced/separated urban women (Girma and Genebo 2002).

Other characteristics of the household that influence the nutritional and physical well-being of the child include access to health services and the hygienic state of the household in which the child resides. Limited access to healthcare facilities, the failure to immunize the child and the presence of unsanitary household conditions elevate childhood susceptibility to infectious diseases and indirectly influence children's nutritional and physical well-being (Girma and Genebo 2002).

Finally, at a broader level of conceptualization, the underlying factors are a function of several basic causes of food insecurity (Figure 1). These basic causes are manifested at larger spatial scales with variability at the community, regional or national levels. The regional or political subdivision of communities, the presence of environmental hazards (droughts, land degradation, floods, pests), economic/developmental challenges (trade imbalances, currency devaluations, market failures), structural adjustment policies, poor transportation networks, and armed conflicts (rebel incursions, civil strife, wars) have all been identified as the basic causes of food insecurity in different parts of sub-Saharan Africa. These conditions have been compounded recently by the HIV/AIDS epidemic that has devastated the workforce, leaving behind a less productive population of old adults and orphaned children.

To summarize, Figure 1 provides a comprehensive three-tiered framework for understanding food insecurity and the nutritional health outcomes among children. A crucial step toward evaluating these conditions requires an appropriate mix of geospatial data, analytical tools and strategies that will enable the simultaneous assessment of these variable sets to identify areas with vulnerable population groups. The rest of the paper attempts to do so using data from Burkina Faso. Emphasis is placed on evaluating the underlying and basic circumstances leading to food insecurity, including the maternal and household characteristics, the physical and infrastructural characteristics of the communities, and how these conditions affect the nutritional and physical state of young children, the most susceptible population group.

The Study Area

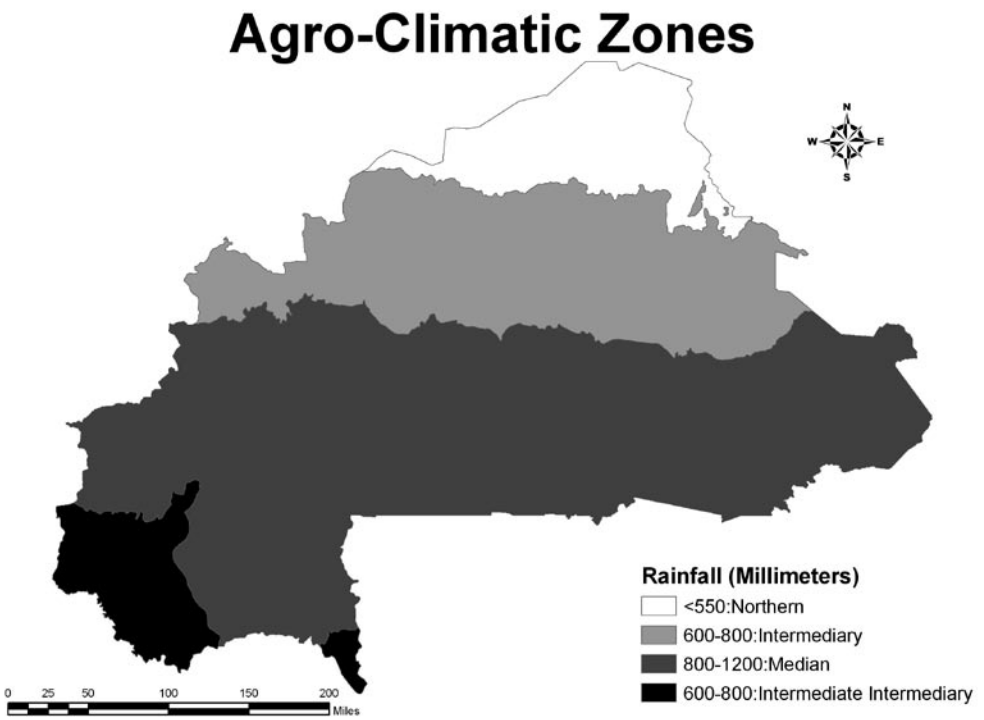
Burkina Faso, West Africa, is a classic example of a country where food insecurity conditions are multifactorial and must therefore be understood within these varied contexts, including: (i) its landlocked location with limited infrastructure and accessibility to external markets, (ii) a multi-ethnic society characterized by diverse groups, with distinct livelihood strategies and behavioral adaptations in different ecological zones, (iii) the prevalence of recurring hazards in a marginal environment and

(iv) a turbulent political past and ongoing struggle to establish a democratic state.

Burkina Faso gained independence in 1960, along with a political economy that never fully recovered from the deliberate colonial policies of underdevelopment. The country has since struggled to establish a democratic state as it flip-flops continually between military and civilian governments. Its economy has been regarded as one of the world's poorest, suffering from currency devaluation, market failures and other destabilizing forces. In 2003, the country was ranked 173rd of 175 countries in the Human Development report (United Nations Development Program 2003). More than 45% of the population live below the poverty line and most residents are highly food insecure. These conditions have worsened in recent years due to the political conflict in Cote D'Ivoire, forcing migrant workers to return home as well as limiting the export of livestock, the second major source of external revenue for residents.

Beyond the economic and political challenges, Burkina Faso is also known for its myriad environmental hazards, exacerbated by its proximity to the Sahara Desert. There are four agro-climatic zones with varying amounts of rainfall and soil quality, particularly in the northern and eastern regions (Figure 2). The most recurring hazards are drought conditions and locust attacks, both of which limit agricultural productivity. Burkinabes, though, have found ways to adjust to these environmental conditions and the challenges they present. Goldberg and Frongillo's (2001) study confirmed a significant diversification of labour and resources within the various productive zones. Residents are pastoralists (raising and herding livestock) and farmers, but most are also involved in a number of off-farm activities to supplement their income. These include seasonal employment in urban areas, small-scale fishing, petty trading, craft making and tanneries using leather and animal skins.

Figure 2. Agro-climatic zones in Burkina Faso



Source:Office de la Recherche Scientifique et Technique Outmer et Ministere de la Cooperation, 1976; Rebublique de Haute-Volta Ressources en Sols

Demographic indicators reflect a population growing rapidly, at a rate of about 3%. With a total population of about 12.3 million, about 50% of the people belong to the Mossi group and the rest are members of less dominant groups such as the Gurunsi, Senufo, Lobi, Bobo, Mande and Fulani. Of notable significance to this research is the fact that roughly half of the country's residents (49%) are children below 15 years of age. A nutritional profile of the country recently submitted by the FAO (2004) showed a persistent trend with childhood malnutrition rates still higher than the maximum acceptable standards set by the World Health Organization (WHO). Childhood food insecurity is threatened further by the increasing prevalence of HIV/AIDS, which has resulted in about 260,000 orphans (0–17 years). A recent report by the United Nations concluded that HIV/AIDS has impacted Burkina Faso more than any other country in West Africa with the exception of Cote D'Ivoire. About 300,000 adults and children are now living with the disease, with an adult prevalence rate of 4.2% (UNAIDS 2004). These conditions are expected to have severe long-term consequences on the children and the economic viability of the nation as a whole.

Data Sources and Methods

Three major sources of data were used in this study. First, the food balance sheets including per capita food production, non-food crop production, and general population statistics were derived from the United Nations Food and Agricultural Organization's database. Second, digital–spatial data layers at different scales were secured from the African Data Dissemination Service, which had earlier compiled this information from four sources: United States Geological Service (USGS), National Aeronautics and Space Administration (NASA), National Oceanic and Atmospheric Administration (NOAA) and Chemonics International Inc. The data included transportation infrastructure, cropland use intensity, agro-climatic conditions and administrative boundary files at four levels. Figure 3 illustrates the administrative subdivisions at the provincial level. All metadata for these layers were secured from their original sources.

The third data set was generated from the Demographic and Housing Survey III (DHS). DHS is a nationally representative survey administered to residents in several countries worldwide. The program has been in operation since 1984 and is carried out by Macro International with funding from USAID (U.S. Agency for International Development). A two-stage random sampling approach is used in these surveys. Initial sampling is based on a cluster design in which homogeneous geographical areas (clusters) are first selected within administrative subdivisions (Figure 3). Households or individuals are then selected within the clusters as the ultimate sampling units. Surveys are administered using two instruments: a household questionnaire and an individual questionnaire for women of reproductive age (15–49 years).

Data used in this study were from the childhood-based file generated from the individual questionnaire administered to women of reproductive age in 1999. The data consisted of nearly 6000 records of children, their health and nutritional status, the maternal characteristics including reproductive histories, and the socio-economic and hygienic characteristics of the households. The data were preprocessed extensively, including the reclassification and creation of new variables for use in subsequent analysis. Following is a brief description of the preliminary steps taken to process the data.

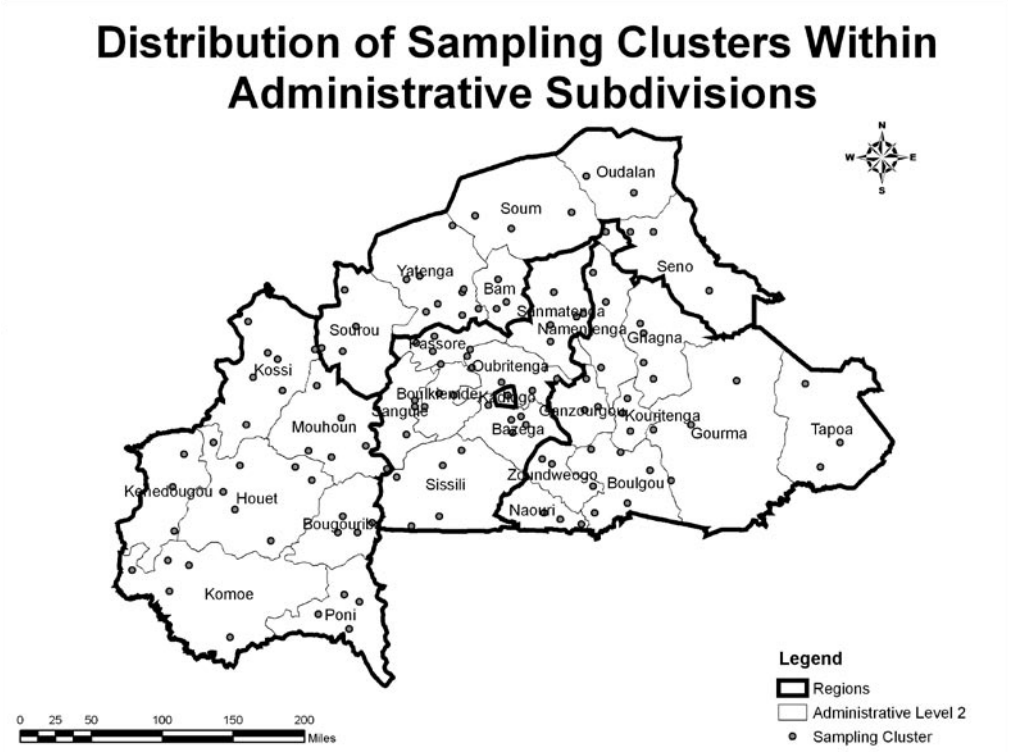
Preprocessing and Integration of Data

The major analytical objective, as indicated earlier, was to embark on a simultaneous evaluation of the proximal factors that best explain the spatial distribution of childhood nutritional health outcomes. To accomplish this, DHS data were first queried to remove all children under three months of age, since the weight and other anthropometric measures of these children are influenced largely by prenatal conditions and maternal risk factors. The remaining childhood data file, consisting of 4673 records, was used to evaluate the nutritional outcomes.

Earlier studies had identified stunting, wasting and underweight characteristics of children as three anthropometric indicators that reflect the direct consequences of food insecurity (Campbell 1991). This study focused on stunting, an indicator of the long-term cumulative effects of food

insecurity in which the child's height-for-age is below two standard deviations of the median height-for-age of the standard reference population (WHO 1995). Using this classification, a binary variable was created for stunting by assigning a value of 1 to all cases in which the nutritional health outcome of stunting was evident and a value of zero to those in which the outcome was absent.

Figure 3. Data sampling clusters

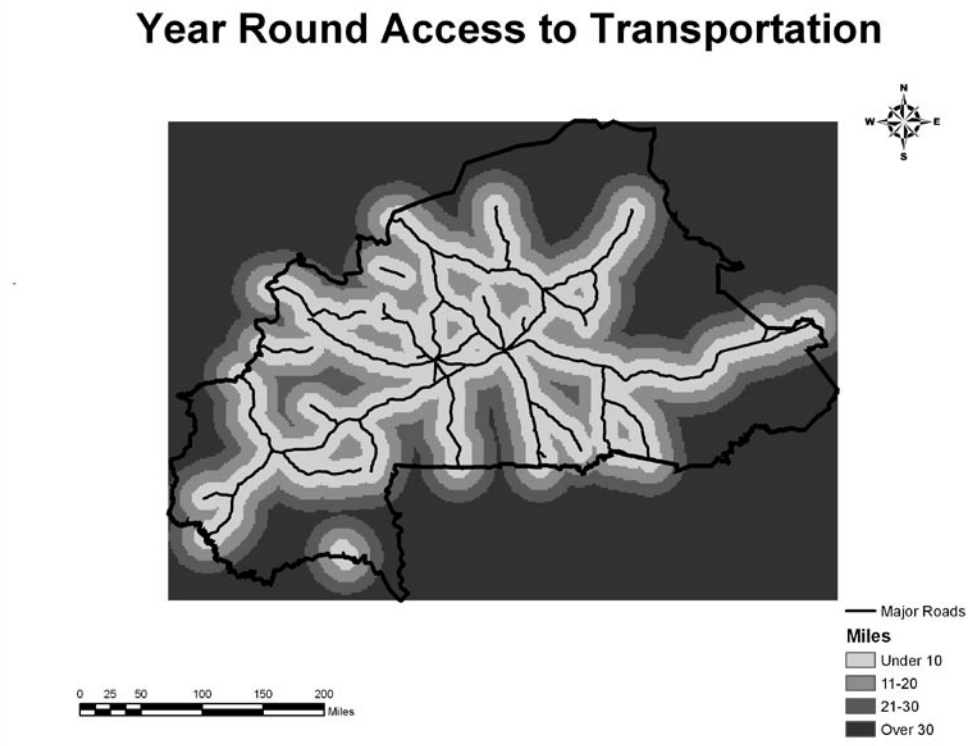


Additional variables deemed relevant to the analysis were also secured from the DHS survey. The age, gender and current nutritional and health status of each child were garnered. Maternal attributes including educational achievement, age, marital status, occupation and BMI were also secured. Among the household and community characteristics, the regional location (administrative subdivision), type of residence (rural/urban) and the total number of kids under five years were integrated into the data file. Using an approach previously proposed by Curtis and Hossain (1998), a proxy index of socio-economic status was calculated based on whether the child's residence was equipped with eight different amenities (electricity, radio, refrigerator, bike, motor bike, car and a modern floor). The index, ranging from 0 to 8, was used to categorize the households into three socio-economic groups: low income with 0–2 amenities, middle income with 3–5 amenities, and high income households with 6–8 amenities. The environmental health attributes were based on two proxies: household access to drinking water and the type of toilet facilities.

Finally, three spatially referenced files representing transportation infrastructure, agro-climatic conditions and cropland use patterns were integrated into the analysis. Using the transportation infrastructure, geographic accessibility of each household within a cluster sampling unit was assessed. First, a query was performed to identify all the primary and secondary roads with year-round access. Seasonal roads were excluded from the analysis. Next, the distance analysis function in ArcGIS

(a Geographic Information Systems software) was performed and the results categorized based on proximity to these major roads. As shown in Figure 4, the least accessible areas are in the far north and east of the country where some communities are 40 to 60 miles away from major road networks. As expected, Ouagadougou and the surrounding central region are the most connected areas. There also appears to be a slight western orientation in the transportation network, which is not surprising given the historical legacy of the colonial era. Year round access to these transportation lines is deemed relevant for the swift and efficient delivery of resources to various parts of the country. More importantly, the major roads increase the range of access to various food sources, thereby decreasing group vulnerability to food insecurity. Therefore, communities or households within a proximal distance to these major transportation lines are more likely to be food secure than others. The distance of each household from the major roads was computed and integrated into the childhood-based file for subsequent analysis.

Figure 4. Year round transportation access



The staple diet in Burkina Faso is cereal based, so household food security must be evaluated using factors that influence the production of cereals, notably millet, sorghum, maize and rice (FAO 2004). In this study, a decision was made to use the agro-climatic conditions, identified earlier in Figure 2, with each zone reflecting the biophysical conditions conducive to cereal production in varying parts of the country. The intensity of cropland use was also integrated into the statistical analysis. There is limited crop productivity in the drier northern parts of the country where residents have far less favourable conditions for growing cereals than those in the wetter regions in the central and western parts of the country. The eastern region also has constraints for crop productivity due to poor soil conditions. Children residing in these areas are expected to be more susceptible to food insecurity than their counterparts in the central and western regions. Data values from these files

were added to the childhood-based file by first performing spatial queries using the cluster-based identification number of each childhood residence. The final comprehensive database consisted of several data layers for use in mapping and statistical validation to discern the spatial characteristics of childhood nutritional heath outcomes in Burkina Faso.

Investigating the Geographical Distribution of Childhood Stunting

Based on the sample data and the WHO guidelines mentioned earlier, the prevalence rate of stunting at the national level in Burkina Faso is approximately 28% for children under five years. However, this national rate camouflages the significant disparities in stunting levels observed across the country. These patterns are best seen in Figure 5, which portrays the regional variability in childhood stunting, with several isolated pockets of high-risk areas. The map was derived using the ordinary kriging algorithm in the Geostatistical Analyst extension of ArcGIS. Kriging was used to evaluate the spatial prevalence of stunting, based on local weighted averaging (Kleinschmidt et al. 2000). Specifically, using the sample data gathered across the country, the estimated prevalence rate of stunting denoted as $\hat{Z}$, at any given location with coordinates (X_o and Y_o), was calculated as follows:

$$\hat{Z}(X_o, Y_o) = \sum_{i=1}^{n} \lambda i \, Z_{obs}(X_i, Y_i)$$

where, Z_{obs} refers to sampled data values obtained at *n* nearest locations (X_1, Y_1), (X_2, Y_2), and … (X_n, Y_n). The associated weights (λi) in the analysis were based on a variogram that captures the degree of spatial dependence or autocorrelation between the observed measurements. Kriging was selected because of its notable strength in producing the best linear unbiased estimates with known minimum variances. It is beyond the scope of this paper to provide a full description of this technique and its advantages in the geospatial modelling of disease risks. More detailed descriptions of the technique can be found in Cressie (1993), Oliver and Webster (1990), Goovaerts (1997) and several other applications.

Figure 5. Kriged risk zones for childhood stunting

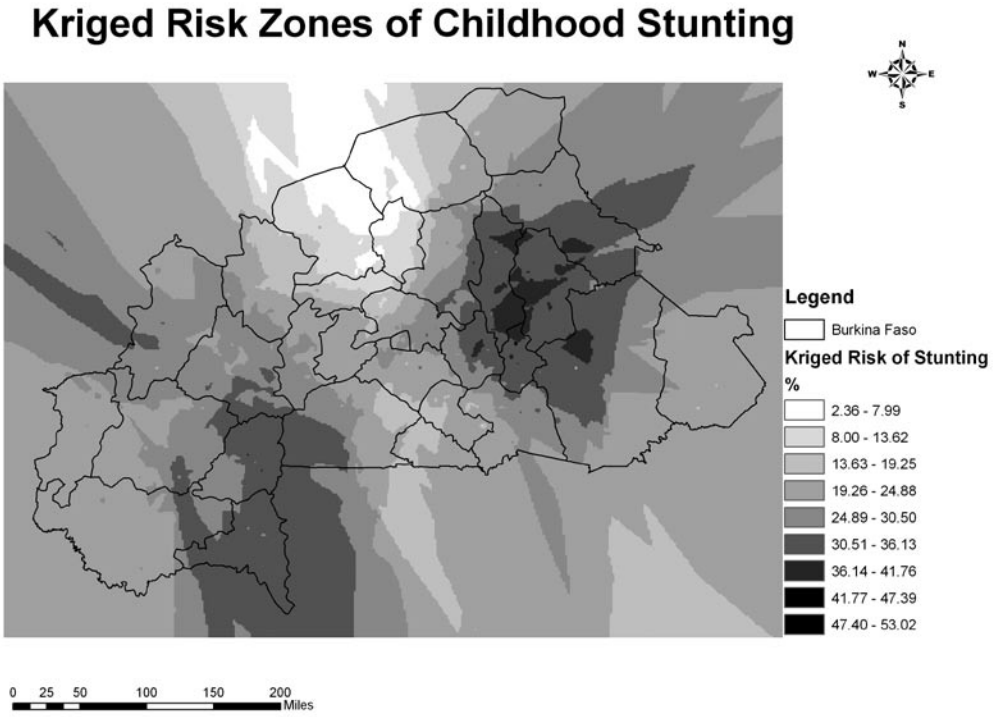


Figure 5 shows the kriged risk zones that reflect spatial variability in childhood stunting. Generally, the highest incidences are found in the eastern quadrant, especially in communities in Gnagna, Nametenga, Seno and Kouritenga where the levels of stunting appear to exceed 40%. High-risk groups are also observed in the south in the provinces of Poni and Bougouriba and in the western province of Kossi. Stunting levels found in the capital city region, Ouagadougou, in the centre north around Bam, and in some western provinces such as Kenedougou are below the observed national rates.

The final analytical step in this study involved the use of two complementary statistical methods to help explain the observed spatial differences in stunting levels as a function of the three groups of determinants cited earlier. First, a chi-square test was performed to evaluate the bivariate relationships between stunting and the basic, underlying and immediate factors (Tables 1 to 3). Next, a logistic regression analysis was performed to determine the differential levels of risks of stunting among the children. The statistical results based on the odds ratios [*EXP(B)*], the 95% lower and upper confidence bands, and the level of significance of the Wald Statistic are summarized in Table 4. For variables that are statistically significant ($p < .05$), the children in categories with odds ratios greater than 1 are considered to be at significantly greater risk of stunting than those children within the reference category. Following is a more detailed discussion of the statistical results.

Table 1. Basic causes of stunting: Unweighted percent distribution among categorical independent variables

Community Characteristics	n (%)	%Stunted Observed	X^2	Sig.
Major Administrative Regions			26.15	.001***
North	326 (7.0)	26.1%		
East	968 (20.7)	33.5%		
Central/South	1086 (23.3)	28.9%		
West	1568 (33.6)	27.0%		
Ouagadougou	722 (15.5)	22.7%		
Place of Residence			20.67	.001***
Rural	3900 (83.5)	29.4%		
Urban	773 (16.5)	21.3%		
Crop Land Use Intensity			.886	.829
50-70%	206 (4.4)	28.2%		
30-50%	2020 (43.2)	28.0%		
5-20%	567 (12.1)	29.6%		
0-5%	1880 (40.2)	27.6%		
Agro-Climatic Regions			5.19	.158
Northern	107 (2.3)	29.0%		
Intermediary	929 (19.9)	29.1%		
Median	3114 (66.6)	28.4%		
Inter-Intermediary	523 (11.2)	23.9%		
Proximity to Roads with Year-round Access			25.95	.001***
Within 10 miles	3549 (75.9)	27.2%		
11 to 20 miles	650 (13.9)	30.8%		
21 to 30 miles	304 (6.5)	28.9%		
31 to 40 miles	70 (1.5)	41.4%		
41 to 50 miles	74 (1.6)	40.5%		
51 to 60 miles	26 (0.6)			

*** Highly Significant at 0.001; ** Significant at 0.05; * Marginally Significant at 0.1; Unmarked Not Significant

Table 2. Underlying causes of stunting: Unweighted percent distribution among categorical independent variables

	n (%)	%Stunted Observed	X^2	Sig.
Household Characteristics				
Socioeconomic Status			26.25	.001***
Low	3066 (65.6)	29.2%		
Middle	1436 (30.3)	27.7%		
High	171 (3.7)	11.1%		
Children under 5 years in Household			4.93	0.085*
1-5 children	2675 (57.2)	27.3%		
6-10 children	1750 (37.4)	28.3%		
More than 10 children	248 (5.3)	33.9%		
Environmental Health Status				
Source of Drinking Water				
Piped or Bottled	643 (13.8)	20.5%	20.92	.001***
Other	4030 (86.4)	29.3%		
Type of Sewage facility			9.338	.009***
Toilet	25 (0.5)	12%		
Latrine	1062 (22.7)	25.4%		
No Facility	3425 (73.3)	29.3%		
Maternal Characteristics				
Education			26.29	.001***
None	4146 (88.7)	29.0%		
Some	393 (8.4)	24.7%		
High School and higher	134 (2.9)	9.7%		
Body Mass Index			3.862	0.145
Underweight (Under 18.5)	656 (14.0)	26.7%		
Normal (18.5 to 29.5)	3666 (78.5)	28.7%		
Overweight(Over 29.5)	351 (7.5)	24.2%		
Marital Status			7.549	.001***
Married	4275 (91.5)	28.4%		
Living Together	273 (5.8)	25.3%		
Widowed	51 (1.1)	17.6%		
Divorced/Not Living Together	36 (0.8)	13.9%		
Never Married	38 (0.8)	31.6%		
Occupation			28.06	.001***
Not Working	883 (18.9)	25.3%		
Prof., Tech., Manag.,	32 (0.7)	3.1%		
Sales	1496 (32.0)	28.5%		
Agri-Self employed	1822 (39.1)	30.4%		
Services	36 (0.8)	11.1%		
Manual	293 (8.4)	25.4%		

*** Highly Significant at 0.001; ** Significant at 0.05; * Marginally Significant at 0.1; Unmarked Not Significant

Basic Causes of Childhood Stunting

Table 1 summarizes the statistical results for the five variables used to assess the basic causes of stunting. Starting with the major administrative subdivisions, the results confirmed significant regional differences in stunting levels. Highest levels were in the eastern region where, on average, 33.5% of the children were stunted. The lowest level was observed in the capital city, Ouagadougou. Using the latter as the reference category in the logistic regression analysis that was performed later, the risk of stunting was highest in the east followed by the central/south region (Table 4). Children in the north and west of the country had similar, though slightly elevated, risks compared with the children in Ouagadougou. These findings were generally consistent with the spatial patterns observed in Figure 5.

Table 3. Immediate causes of stunting: Unweighted percent distribution among categorical independent variables

	n (%)	%Stunted Observed	X^2	Sig.
Child Characteristics				
Age (months)			155.9	.001***
4-12	852 (18.2)	12.3%		
13-24	966 (20.7)	36.9%		
25-36	936 (31.7)	31.7%		
37-48	1048 (31.4)	31.4%		
49-60	871 (25.7)	25.7%		
Gender			5.58	.018**
Male	2405 (51.5)	29.6%		
Female	2268 (48.5)	26.5%		
Nutritional Status				
Breastfed			1.785	0.185
No	2615 (56.0)	28.8%		
Yes	2058 (44.1)	27.1%		
Milk			5.53	0.019**
No	4580 (98.0)	28.3%		
Yes	93 (2.0)	17.2%		
Formula			2.24	0.134
No	4656 (99.6)	28.1%		
Yes	17 (0.4)	11.8%		
Table Food			19.43	.001***
No	3459 (74.0)	26.3%		
Yes	1214 (26.0)	32.9%		

*** Highly Significant at 0.001; ** Significant at 0.05; * Marginally Significant at 0.1; Unmarked Not Significant

The residential location of the children (urban/rural) was also useful in pinpointing the high-risk areas. As expected, higher incidences of stunting were found among rural children than those residing in urban areas. Further analysis using logistic regression confirmed that rural children were one and a half times more likely to be stunted than urban children (Table 4).

Another major predictor of childhood nutritional insecurity was access to year-round transportation lines. For communities within 10 miles of major thoroughfares, the prevalence of stunting among children was about 27%, almost the same as the observed national rate. With increasing distance, the odds of stunting increased, particularly among children residing in communities that were 30 miles or more from these roads.

Assessment of childhood variability in stunting was also based assessed on the agro-climatic conditions and cropland use intensity. Contrary to expectations, however, there were no statistical differences in nutritional health outcomes across these areas. The levels of stunting cases observed in the marginal environments were statistically comparable to the levels observed in all other climatic regions. Similarly, the levels of childhood stunting were similar across the varying levels of cropland productivity. Children residing in northern communities with limited precipitation and land use were at no greater risk of stunting than those residing in more productive areas in the south and west.

Findings generated at the basic level suggest that variability in childhood stunting is primarily a function of socio-economic/political factors rather than the physical/environmental characteristics of these communities. The political/regional subdivision of the country, the degree of urbanization and transportation infrastructure were more relevant at this level. Even though the northern reaches of the country faced more physical constraints, the odds ratios indicated little change in the likelihood of developing long-term nutritional health outcomes of food insecurity. One explanation for this may relate to the low levels of population density in these marginal areas when compared with the southern areas with greater crop intensity but denser populations and therefore greater competi-

tion for food and other resources. Another potential explanation for this observed pattern may be due to the interventions in recent years by donor agencies. Given the intense media coverage on desert encroachment and famine in the Sahelian regions in previous years, most agencies made a conscious decision to focus their efforts in these areas. Specifically, most of the provinces targeted for food assistance in recent years have been in the north, including Oudalan, Soum, Seno, Yatenga, Bam and Passore. These programs have helped minimize the cumulative effects of food insecurity in these marginal environments. Finally, a third explanation may have to do with the livelihood of

Table 4. Odds ratios for logistic model of childhood stunting

	Odds Ratios [Exp(∃)]	95% CI Exp(∃)	Wald Statistic Sig.
Basic Causes			
DHS Administrative Regions			.001***
North	1.20	0.88, 1.62	
East	1.71	1.73, 2.13	
Central/South	1.36	1.11, 1.72	
West	1.25	1.02, 1.55	
Ouagadougou(Ref.)	1.00		
Place of Residence			.001***
Rural	1.53	1.27, 1.84	
Urban (Ref.)	1.00		
Crop Land Use Intensity			0.828
50-70%(Ref.)	1.00		
30-50%	0.99	0.72, 1.37	
5-20%	1.07	0.75, 1.52	
0-5%	0.97	0.71, 1.34	
Agro-Climatic Regions			
Northern	1.29	0.82, 2.06	0.159
Intermediary	1.30	1.02, 1.66	
Median	1.26	1.09, 1.56	
Inter-Intermediary(Ref.)	1.00		
Proximity to Roads with Year-round Access			.003***
Within 10 miles (Ref.)	1.00		
11 to 20 miles	1.19	0.99, 1.43	
21 to 30 miles	1.09	0.84,1.41	
31 to 40 miles	1.89	1.17, 3.06	
41 to 50 miles	1.82	1.14, 2.92	
51 to 60 miles	0.01	0.00,2.66	
Underlying Causes			
Household Characteristics			
Socioeconomic Status			.001***
Low	3.28	2.02,5.32	
Middle	3.05	1.87,4.99	
High (Ref.)	1.00		
Children under 5 years in Household			.086*
1-5 children(Ref.)	1.00		
6-10 children	1.05	0.92, 1.20	
More than 10 children	1.36	1.03, 1.79	
Environmental Health Status			
Source of Drinking Water			.001***
Piped or Bottled(Ref.)	1.00		
Other	1.60	1.31, 1.96	
Type of Sewage facility			.011**
Toilet (Ref.)	1.00		
Latrine	2.49	0.74, 8.39	
No Facility	3.04	0.91, 10.16	

Table 4. Continued

	Odds Ratios [Exp(∃)]	95% CI Exp(∃)	Wald Statistic Sig.
Underlying Causes			
Maternal Characteristics			
Education			.001***
None	3.77	2.12, 6.71	
Some	3.03	1.64, 5.62	
High School and higher(Ref.)	1.00		
Body Mass Index			0.146
Underweight (Under 18.5)(Ref.)	1.00		
Normal (18.5 to 29.5)	1.10	0.92, 1.33	
Overweight(Over 29.5)	0.87	0.65, 1.18	
Marital Status			.1074
Married (Ref.)	1.00		
Living Together	0.85	0.64, 1.13	
Widowed	0.54	0.26, 1.11	
Divorced/Not Living Together	0.40	0.15, 1.09	
Never Married	1.16	0.58, 2.30	
Occupation			.001***
Not Working (Ref.)	1.00		
Prof., Tech., Manag.,	0.11	0.01, 0.72	
Sales	1.17	0.97, 1.42	
Agri-Self employed	1.29	1.08, 1.55	
Services	0.37	0.12, 1.05	
Manual	1.02	0.77, 1.33	
Immediate Causes			
Child Characteristics			
Age (months)			.001***
4-12 (Ref.)	1.00		
13-24	4.41	3.25, 5.28	
25-36	3.30	2.58, 4.22	
37-48	3.25	2.55, 4.14	
49-60	2.45	1.91, 3.17	
Gender			.018**
Male	1.17	1.02, 1.33	
Female(Ref.)	1.00		
Nutritional Status			
Breastfed			0.18
No	1.09	0.96, 1.24	
Yes (Ref.)	1.00		
Milk			0.021**
No	1.89	1.10, 3.26	
Yes (Ref.)	1.00		
Formula			0.153
No	2.93	.066, 12.80	
Yes (Ref.)	1.00		
Table Food			.001***
No	0.35	0.33, 0.39	
Yes (Ref.)	1.00		

*** Highly Significant at 0.001; ** Significant at 0.05; * Marginally Significant at 0.1; Unmarked Not Significant

residents, especially in the northern reaches of the country. Specifically, raising cattle, not farming, is the dominant economic activity in these areas. Children in the areas therefore have greater access to milk in this region than their counterparts in other regions, thus concealing the nutritional deprivation that is captured by stunting. All of these factors may be at work in determining the relatively low levels of stunting in spite of the varying levels of crop productivity.

Underlying Causes of Childhood Stunting

Among the underlying causes of stunting, three sets of variables were evaluated: (i) household attributes, (ii) maternal characteristics and (iii) the environmental health status of the household (Table 2). In assessing the socio-economic status of the household, almost two thirds were classified as low-income, 30% as middle-income and 3.7% as high-income families. Subsequent analysis using logistic regression confirmed that the risk of childhood stunting was very high in both the low-income and middle-income households, where children were three times more likely to be stunted than the children from high-income households (Table 4). These findings were basically consistent with several other studies documenting poverty and the socio-economic status of households as key predictors of childhood vulnerability to malnutrition (Frongillo et al. 1997; Olson 1999; Weinreb et al. 2002, Girma and Genebo 2002).

The second household attribute selected for analysis was the number of children under five years residing in the household. The sample data showed that 57.2% of the households had one to five children, 37.4% had 6 to 10 children, and 5% had more than 10 children. It is not uncommon to find such large families in Burkina Faso and other African countries, particularly in rural communities. Goldberg and Frongillo (2001) alluded to this in their research, describing the typical Mossi household as essentially an extended family system or boodoo consisting of the husband and several wives, their children and their married sons' families. Access to food in such households, they argued, was based on one's ranking, with younger lineage members, females and lower status co-wives and their children facing the greatest threat to food insecurity (Goldberg and Frongillo, 2001). Children in such households are also less likely to receive the same amount of attention, time and care as children from smaller households. In this study, the statistical analysis produced a marginally significant variable, with the risk of stunting high only among households with more than 10 children (Table 4).

Two other attributes, both reflecting the environmental health status of the household, were statistically related to the prevalence of stunting. Children residing in households without access to piped or bottled water faced a greater risk of stunting than their counterparts. Also significant was the type of sewage facility used in the household. Based on the sample data, nearly three quarters of the households did not have access to a toilet facility. Some of these families relied on pit latrines, and others did not have any facility at all. The risk of stunting was significantly greater (over three times) among children residing in those households. Both measures point to the relevance of environmental quality in minimizing childhood illnesses. Children residing in unsanitary conditions face frequent bouts of illness that in turn affect their dietary intake and result in long-term nutritional outcomes.

Among the maternal characteristics, education and occupational status emerged as key determinants of childhood nutritional security. Mothers without any formal education were nearly four times more likely to have stunted children when compared with those with at least 12 years of education ($p < .01$). Based on the occupational status of the mother, the highest levels of stunting were observed among mothers who were self-employed in agriculture and sales. Children whose mothers were gainfully employed in professional, technical, managerial or service sectors were better off, with lower risks of stunting ($p < .01$).

The overall nutritional status of the mothers was encouraging when compared with the children's. About 78% of mothers had normal a BMI between 18.5 and 24. Only about 14% had a BMI below 18.5. Contrary to previous studies however, BMI was not a statistically significant predictor of childhood stunting.

The marital status of the mothers was also evaluated. Based on the chi-square analysis, the prevalence rate of stunting was highest among mothers who had never married (31%). However, logistic regression results showed that even though the risk was slightly elevated among unmarried mothers, it was statistically insignificant. In this study, nearly all mothers (91%) interviewed were married, and that may have led to the difficulty in isolating the unique effects of this variable on childhood

malnutrition. Further analysis would require a more equitable representation of mothers in all five categories used to calibrate this variable.

Immediate Causes of Childhood Stunting

The immediate causes of childhood nutritional outcomes were all based on the personal characteristics of the children (Table 3). The age of the child was significantly related to childhood stunting. The incidence of stunting was highest among one- and two-year-old children, with risks four to five times greater than the reference group (Table 4). The risk was also higher among two- to four-year-olds but declined by the age of five. Among the nutritional indicators, results showed that, surprisingly, breastfeeding recipients did not have any notable advantage over others. However, the risk of stunting was slightly elevated among children whose diet was based primarily on table foods. Also, a significant relationship was found between stunting and milk consumption. Specifically, those who did not consume milk on a daily basis were nearly twice as likely to be stunted as those receiving milk as part of their daily diet. Gender disparities in stunting also emerged among the children. Boys were found to be at slightly higher risk for stunting than girls. This pattern has been documented by other studies as well, even though no plausible explanation has been offered for the observed disparity in childhood vulnerability (Garrett and Ruel 1999).

Research Summary and Implications

The upward trend in chronic food insecurity conditions in sub-Saharan Africa does not bode well for the young children who are likely to suffer irreparable health consequences. In Burkina Faso, where nearly half the population is under the age of 15, this study examined the various dimensions of this problem in an attempt to identify and explain the distribution of at-risk areas. The findings support several implications. First, they underscore the need for continued emphasis on a multifactorial approach to address the problem. In this study, the successful integration of the DHS survey data along with spatial–digital coverages allowed for the joint evaluation of the various risk factors.

Second, the emergent patterns observed in this study revealed several risk areas for childhood malnutrition in Burkina Faso, with the likely causes extending beyond physical/environmental conditions. Factors such as the regional subdivision of the country, urbanization and access to reliable transportation services were clearly more influential in explaining the geographic distribution of childhood malnutrition in these areas. Thus, reactive approaches once used by donor agencies, focusing on food emergencies caused by biophysical conditions, must incorporate these additional risk factors.

This research also supports the need for geographic targeting of at-risk populations beyond the broad regional and community levels to include more detailed assessment at the household and individual levels. For example, at the household level, the study illustrated that the most significant means of ensuring nutritional security of young children included better incomes and access to amenities and other resources that improve the quality of life of household members, good sanitary conditions, better education and occupational opportunities for the mothers who are the primary caregivers. At the individual level, results confirmed the existence of differential susceptibility among the children, implying that intervention efforts must also target children with poor diets, one- and two-year-olds, and boys.

One drawback in this study was the failure to incorporate data on HIV/AIDs prevalence, which, as noted earlier, has emerged as a major risk factor in childhood nutritional insecurity. As more reliable indicators of this pandemic become available, the integration of the data into the comprehensive analytical framework would contribute toward an even better understanding of childhood food insecurity in this region.

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A Pilot Study to Evaluate Malaria Control Strategies in Ogun State, Nigeria

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Abstract

With limited evidence of decreases in malaria-related mortality and morbidity, and nearly half the time to the 2010 deadline of Roll Back Malaria (RBM) targets now past, we conducted this study to assess the awareness, accessibility and use of malaria control strategies among at-risk groups within the context of RBM in Nigeria. It was a descriptive, cross-sectional pilot study of 34 registered women attending antenatal clinics and 34 mothers of children less than five years old, using a questionnaire in a malaria holo-endemic community of Ogun State, Nigeria. Results showed that 14.7% and 16.2% of all respondents interviewed were aware of the home management of malaria (HMM) program (17.6% of mothers of children under five years vs. 11.8% of pregnant women) and the change in policy on malaria treatment (23.5% of mothers of children under five years vs. 8.8% of pregnant women) respectively. Younger respondents knew more about HMM than older ones (p <.05). Most (63.2%)

of the 68 respondents (64.7% of mothers of children under five years vs. 61.8% of pregnant women) interviewed knew about insecticide treated nets (ITNs); however, only 22.1% were using the treated material. Reasons given by those not using ITNs included: they did not know about ITN prior to the interview (43.3%), they had no money (41.5%) and they did not know where to get it (7.6%). Only 5.8% of mothers of children less than five years old, and none of the pregnant women, had taken the new combination drug. Eight (23.5%) of the 34 pregnant women interviewed knew about intermittent preventive treatment of malaria for pregnant women (IPT), while two (25.0%) of these eight women had received a preventive treatment dose. The results of this pilot study showed that efforts need be intensified to make adequate information and materials relating to the different malaria control strategies more available and accessible at the community level to achieve and sustain the RBM goals, both in Ogun State and in Nigeria in general. However, a larger study is needed to provide more generalized findings.

Introduction

Malaria is a life-threatening parasitic disease transmitted by female anopheles mosquitoes. Most malaria infections, particularly in sub-Saharan Africa, are caused by *Plasmodium falciparum*. It is a major cause of death and threatens 2.4 billion people, or about 40% of the world's population living in the world's poorest countries (WHO 2000a). Pregnant women and their unborn babies as well as children under five years of age are most vulnerable to malaria. At least 300 million acute cases of malaria in people of all ages are reported globally each year, and approximately 100 million episodes of malaria occur among children under five years of age. More than one million deaths are attributable to the disease annually (WHO 2000a).

In areas of Africa with stable malaria transmission, such as Nigeria, infection during pregnancy is estimated to cause as many as 10,000 maternal deaths each year, 8–14% of all low-birth-weight babies and 3–8% of all infant deaths. In Nigeria, malaria prevalence is as high as 80–85% and is the most common cause of outpatient visits to health facilities. With a case mortality rate ranging from 8–12.5% in infants and children, malaria accounts for 30% of child mortality in the country and is consistently recorded as one of the five leading causes of childhood mortality (Akpan 1996; Ekanem, 1996; UNICEF/National Population Commission [NPC] 1998). It is responsible for about 300,000 deaths each year among children, particularly those under five years of age in remote rural areas with poor access to health services (Akpan 1996; WHO 1998a; 1998b; WHO 2000a; Diallo et al. 2001; Hamel et al. 2001; Kelley et al. 2001; WHO/UNICEF 2003).

Typically, malaria produces fever, headache, vomiting, loss of appetite and other flu-like symptoms (Akpan 1996; Ekanem 1996). However, severe consequences of malaria include anemia, premature delivery, low-birth-weight babies, increased risk of neonatal death, neurological problems, epilepsy and impaired cognitive development (Brewster et al. 1990; Marsh 1992; Warrell 1992; Slutsker et al. 1994a; 1994b; Holding et al. 1999). These compromise the health and development of children in particular in the malaria-endemic regions of the world.

Despite decades of significant input of resources and efforts at control, malaria is still highly endemic and has remained a major public health problem alongside HIV/AIDS and tuberculosis in both rural and urban communities of sub-Saharan Africa including Nigeria (UNICEF 2004). In 1998 the World Health Organization (WHO) initiated the Roll Back Malaria (RBM) Programme, making available a number of key evidence-based and cost-effective malaria control interventions. The goal of the RBM program is to halve malaria deaths worldwide by 2010 (Nabarro and Tayler 1998). The RBM thrust, however, conforms with the ongoing health sector reform (HSR) initiative in Nigeria. Its first phase of implementation, from 2004 to 2007, seeks to ensure that the health of citizens is guaranteed (Federal Ministry of Health 2005).

Key RBM interventions include the home management of malaria (HMM), with emphasis on early and appropriate treatment of malaria, particularly for children less than five years old; intermittent preventive treatment (IPT) of malaria for pregnant women; insecticide-treated nets (ITNs) and, recently, recommended use of artemisinin-based combination therapy (ACT) in place

of chloroquine and sulfadoxine-pyrimethamine, which are failing due to increasing parasite resistance (WHO 2001; Attaran et al. 2004).

In the Abuja Declaration of April 2000, African heads of state at the African summit on RBM resolved to support the RBM strategy to have at least 60% of populations at risk of malaria sleep under ITNs by 2005. Furthermore, 100% of at-risk populations would have prompt access to affordable and appropriate treatment by 2010. These at-risk populations are mainly pregnant women and children less than five years old (TDR News 2000; 2002; WHO 2004). Since 2001, subsequent to the 2000 Abuja Declaration, the Nigerian Government has been proactively promoting RBM interventions such as ITNs through the NetMark initiative, a United States Agency for International Development (USAID)–funded regional public-private partnership (UNICEF/Federal Ministry of Health 2002). Similarly, the change in the country's national policy on malaria treatment, recommending the combination of artemether and lumefantrine (Coartem®), and artesunate and amodiaquine in place of chloroquine, was effected in 2004.

Results of the 2003 Nigeria Demographic Health Survey showed that only 2.2% of households (1.0% urban and 2.9% rural) had at least one ITN. The percentage ranged from 0.3% in the South-West to 3.9% in the North-Central region. Results further showed that the percentage of pregnant women who slept using an ITN prior to the study was 1.3% (0.4% urban and 1.6% rural) (NPC and ORC Marco, 2004). The survey reported that 1.0% of pregnant women attending antenatal clinics received IPT (2.0% urban and 0.6% rural). IPT use ranged from 0.2% in the South-East to 1.3% in the South-South (NPC and ORC Marco 2004).

With limited evidence of decreases in malaria-related mortality and morbidity, and nearly half the time to the 2010 deadline past (Attaran et al. 2004), the need to assess the impact of the interventions is imperative. Knowledge of how socio-behavioural, economic, political and health-system factors affect and are affected by disease patterns and disease control efforts is important for identifying future needs and opportunities for improved control of diseases (WHO 2000b). In this regard, we assumed that the socio-economic and demographic characteristics of people in the community, particularly pregnant women and mothers of children less than five years old, will significantly determine their awareness, access to and use of malaria control strategies. The objectives of this pilot study were to (1) investigate the use of ITNs among pregnant women and children less than five years old, (2) examine the availability of IPT for pregnant women, (3) find out which antimalarials are in use in the community and (4) assess the home management of malaria among mothers of children less than five years old. We believe that this preliminary study will provide relevant insights to guide a large-scale study to provide important information to support the RBM thrust in Nigeria and other malaria-endemic countries.

Methods

Study Area

The study was carried out in August 2006 in Ijebu-Igbo, a malaria holo-endemic community in the rainforest of Ijebu North local government area (LGA) of Ogun State, South-West Nigeria. The LGA is one of 20 in Ogun State. It is predominantly a Yoruba-speaking community and had an estimated population of 206,923 in 2005, based on the projections of the 1991 national population census in Nigeria (INLG 1997; Omikunle 1999). In 2005, an estimated 18.7% and 21.9% of the Ogun State population were children less than five years old and women of childbearing age (15–49 years), respectively (NPC 2002). Basic social amenities like roads, water, health facilities and educational institutions abound in the LGA. Health facilities in Ijebu North LGA include a general hospital, Primary Healthcare Centres (PHCs), health clinics, health posts and private clinics. Patent medicine sellers (PMSs) also abound in the LGA (INLG 1997; Omikunle 1999).

Study Design

This was designed as a descriptive, cross-sectional pilot study of the awareness, accessibility and use

of the malaria control strategies within the context of RBM among at-risk groups in Ogun State. It entailed both clinic and household surveys in which registered women attending antenatal clinics and mothers of children less than five years old were interviewed.

Data Collection Procedures

A sample size of 61 but approximated to 64 was calculated using the table for a minimum sample size estimate for a population survey with 95% confidence interval (Lemeshow et al. 1990). The sample size was calculated using the formula:

$$n = \frac{Z^2\, p(1\text{-}p)}{d^2}$$

where n = sample size, $Z = 1.96$, $p = 0.80$, $d = 0.10$

$$n = 1.96^2\, \frac{[0.80(1\text{-}0.80)]}{0.10^2} = 61$$

However, of the 79 women (38 mothers of children under five years vs. 41 pregnant women) approached and offered opportunity to participate in the surveys, a total sample size of 68 respondents was actually interviewed. This comprised of 34 pregnant women and mothers of children less than five years old respectively. Overall, the response rate was 86.1% (89.5% for mothers of under five children vs. 82.9% pregnant women). The non-response bias experienced with some of the participants, particularly the pregnant women, could be attributed to a time factor. Many of the pregnant women, for example, were impatient to be interviewed as they were in a hurry to leave the clinic immediately after being attended to at the antenatal clinic.

An exit method of interview was adopted in administering the questionnaire. Respondents to the clinic survey were selected using the systematic random sampling method (Neuman 1994; Moser and Kalton 1997). The clinic register of pregnant women with appointments on antenatal clinic days during the survey period was used as the sampling frame in randomly selected health facilities (two public and two private clinics). The women were interviewed as they left the antenatal clinics. Respondents for the household survey were selected using a combination of simple random and systematic sampling methods (Neuman 1994; Moser and Kalton 1997). The sampling frame for the household survey was a list of all enumeration areas (EAs) based on the delineation exercise for the study LGA in preparation for the 2006 national population and housing census in Nigeria obtained from the NPC.

Interviewer-administered semi-structured questionnaires were used in the clinic and household surveys. Three trained interviewers administered the questionnaires. Interviewers were trained together under the same conditions prior to the survey and were closely supervised and monitored by the principal investigator.

The main contents of the questionnaires were questions on background characteristics of the respondent, such as age, religion, level of education, marital status and nature of occupation. Other sections of the questionnaire probed the respondent's knowledge and perception of the mode of malaria transmission, signs and symptoms of malaria, prevention and treatment of malaria at the household and individual levels, knowledge of ITN and its use, and antimalarials in use for malaria treatment. Moreover, the respondent's health-seeking behavioural pattern with emphasis on knowledge, attitude, perception and practices of home management of malaria for children less than five years old and availability of IPT for pregnant women, and the extent of ITN use in malaria prevention in the home by these two categories of the study population were probed.

We obtained the informed consent of study participants after explaining the purpose of the study and the benefits, risks and discomforts in participating. Participants' informed consent in the form of signature or thumbprint was obtained to signify their willingness to participate in the clinic and

household surveys before we enlisted them. Those who could neither read nor write were asked to thumbprint their consent form in the presence of a witness.

Data Analysis

Completed questionnaires were first edited for clarity, completeness and uniformity in responses to questions. Codes were then assigned to all responses to questions, using a prepared coding guide to facilitate data entry. Thereafter, coded data were entered into the computer and analyzed using the EpiInfo 6.04a software (Centers for Disease Control and Prevention 1994).

Associations between relevant variables in the quantitative analysis were determined using the analysis of variance (ANOVA) and chi-square test at 95% level of significance. ANOVA was used in showing the relationship between measurements of the mean and variance of each subgroup under study. This helped in providing information needed to determine if the difference between the two was significant, while the chi-square test was used to determine whether subpopulations of respondents differed in their knowledge, access to and use of malaria control strategies relative to their socio-economic and demographic characteristics.

Results

Background of Respondents

Thirty-four (50.0%) of the respondents were pregnant women and 34 were mothers of children less than five years old. Their ages ranged from 18 to 38 years, with an average of 25 and 27 years among the pregnant women and mothers of children less than five years old, respectively. Most (83.8%) were married, while others were never married (10.3%), separated (4.4%) and divorced (1.5%). A high level of literacy was reported among the respondents as 100.0% had formal education: primary (33.8%), secondary (50.0%) and tertiary (16.2%). Of the 68 respondents, 41.2% were artisans and 30.9% were traders. Others were unemployed (7.4%), formally employed (5.9%), housewives (5.9%), students (5.9%) and farmers (2.9%).

Respondents' Perceived Causes and Signs/Symptoms of Malaria

Results showed that most respondents knew the causes of malaria, as summarized in Figure 1. Signs and symptoms of malaria that respondents mentioned are displayed in Figure 2. Most (66.2%) respondents seek appropriate healthcare outside the home within 24 hours of onset of malaria signs or symptoms. A further 27.4% seek care between 24 and 48 hours, and 5.9% reported they usually seek care after 48 hours. Preventive measures respondents take against malaria range from clean surroundings (47.1%), residual home spraying with insecticides (23.5%), use of window/door net (7.4%), eating at the right time (5.9%), taking herbs (4.4%), avoiding stress (4.4%) and taking home drugs (2.9%) to using ITNs (2.9%). However, 1.5% were indifferent. Statistical tests showed that factors such as respondents' age, education and occupation had no significant relationship with their awareness and perception of the causes and signs/symptoms of malaria ($p > .05$).

Respondents' Awareness of, Access to and Use of HMM, ACTs, ITNs and IPT

Table 1 shows that only 14.7% and 16.2% of respondents were aware of the home management of malaria (HMM) program (17.6% of mothers of children under five years vs. 11.8% of pregnant women) and the change in policy on malaria treatment using antimalarials (23.5% of mothers of children under five years vs. 8.8% of pregnant women) respectively. Conversely, 85.3% and 83.8% were not aware of the HMM program and change in policy on malaria treatment. Statistical tests using ANOVA showed that more of the respondents who knew about HMM were younger, with a mean age of 23.3 years, compared with 26.7 years for those who did not know about HMM ($p < .05$). The respondents' level of education had a direct association with their awareness of the change in antimalaria drug policy, as presented in Table 2 ($\chi^2 = 8.39$, $df = 2$, $p < .05$).

Figure 1. Perceived causes of malaria among respondents

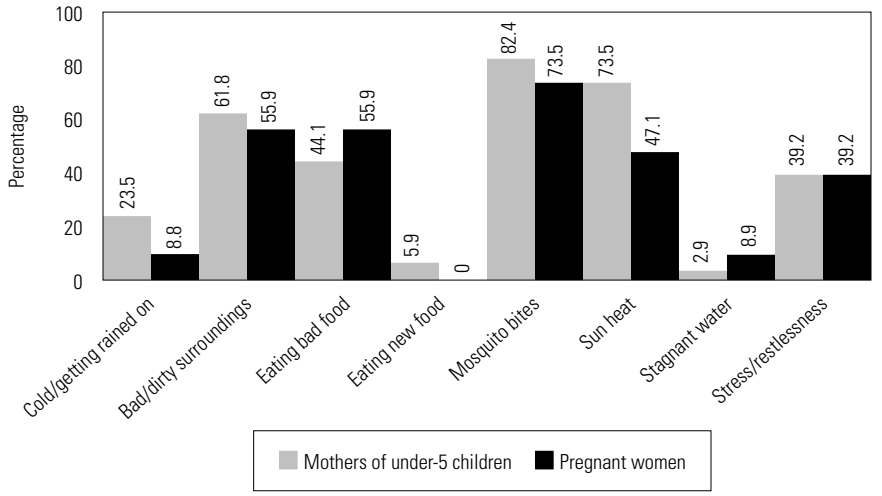
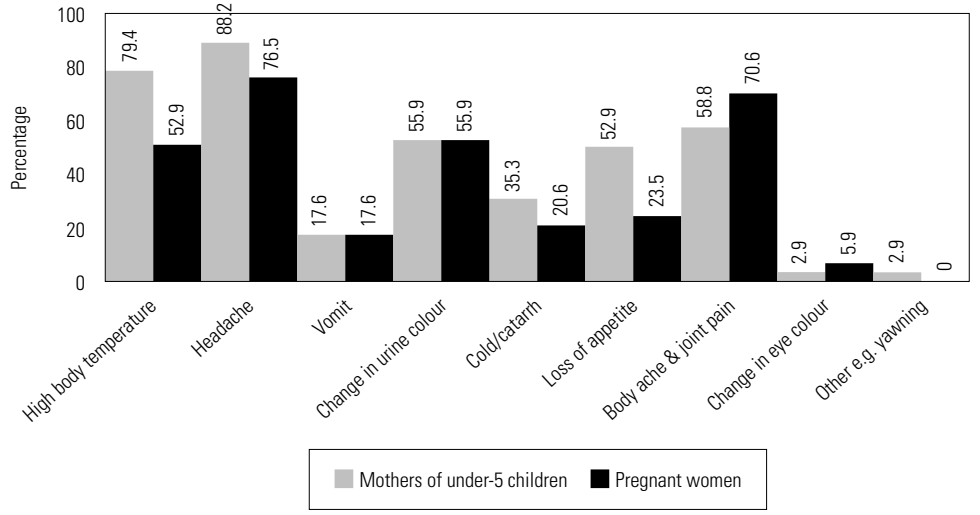


Figure 2. Signs/symptoms of malaria mentioned by respondents



Half (50.0%) of the 68 respondents reported that they take home drugs to treat malaria following onset of signs/symptoms, whereas 25.0% go straight to the hospital for appropriate treatment, 14.7% use a herbal remedy and 7.4% visit patent medicine sellers; 2.9% of respondents were undecided.

Results presented in Table 3 show that only one of 68 respondents (1.5%) mentioned ACTs when asked to name three antimalarials they preferred taking for malaria treatment when they or any member of their household had malaria. Results showed that an average respondent prefers taking analgesics with paracetamol for malaria treatment.

When respondents were asked whether they have ever taken ACTs, only two (5.8%) of the 34 mothers of children less than five years old said they had taken the new combination drug, while 94.2% had never taken ACTs. None of the pregnant women had taken ACTs.

On ITNs, most (63.2%) of the 68 respondents (64.7% of mothers of children under five years

vs. 61.8% of pregnant women) interviewed knew about them. In contrast, only 22.1% were actually using the treated material. Respondents' level of awareness and use of ITN is displayed in Table 4. Of 15 respondents who reported that they use ITNs, six (40.0%) reported getting the treated nets free of charge from government hospitals in 2003, and five (33.3%) and four (26.7%) bought the treated nets from pharmacy and wholesale shops, respectively. Reasons given by the 53 respondents not using ITNs included the following: they did not know about ITN prior to interview (43.3%), they had no money (41.5%), they did not know where to get it (7.6%), and 7.6% were indifferent. When asked who they deemed fit to use the nets in their respective households if an insecticide-treated net were freely provided for each household they belong, respondents mentioned the following: self and young children (25.0%), self and grown-up children (22.1%), grown-up children (22.1%), self and spouse (14.7%), self only (10.3%) and young children (2.9%). Two percent were undecided.

Table 1. Respondents' awareness of HMM and change in policy on antimalaria drugs

Awareness of HMM	Mothers of Children under Five Years		Pregnant women		Total	
	Number	%	Number	%	Number	%
Yes	6	17.6	4	11.8	10	14.7
No	28	82.4	30	88.2	58	85.3
Total	34	100.0	34	100.0	68	100.0
Awareness of Policy on Change in Antimalaria Drugs						
Yes	8	23.5	3	8.8	11	16.2
No	26	76.5	31	91.2	57	83.8
Total	34	100.0	34	100.0	68	100.0

Table 2. Respondents' awareness of policy on change in antimalaria drugs

Level of Education	Are you aware of policy on change in antimalaria drugs?					
	Yes		No		Total	
	Number	%	Number	%	Number	%
Primary	2	8.7	21	91.3	23	100.0
Secondary	4	11.8	30	88.2	34	100.0
Tertiary	5	45.5	6	54.5	11	100.0
Total	11	16.2	57	83.8	68	100.0

Among the pregnant women interviewed, only eight (23.5%) knew about IPT. Seven (87.5%) of the eight knew about the benefits of the preventive treatment dose, but only two (25.0%) had received a preventive treatment dose. The two women were among those attending private clinics for antenatal care.

Discussion

Respondent's knowledge of the signs/symptoms of malaria and their perception of dirty surroundings and mosquito bites as predisposing factors to malaria infection is encouraging. However, it is

disturbing that many had misconceptions about the causes of malaria, as evident in Figure 1, and a few misconstrued "yawning" as a sign/symptom of malaria, as shown in Figure 2. This suggests an urgent need to strengthen educational programs on malaria that emphasize the causes and signs/symptoms of the infection. We believe that improved knowledge will empower people in endemic communities to take preventive measures against malaria. Also, knowing how to adequately diagnose malaria at the onset of the signs/symptoms, as emphasized in the WHO's home management of malaria initiative, will help reduce malaria-related mortality and morbidity (WHO, 2004).

Table 3. Preferred drugs for malaria treatment among respondents

Drug of Choice	Mothers of Children under Five Years			Pregnant Women		
	1st Choice	2nd Choice	3rd Choice	1st Choice	2nd Choice	3rd Choice
Chloroquine	3 (8.8%)	7 (20.6%)	2 (5.8%)	4 (11.8%)	4 (11.8%)	4 (11.8%)
Other antimalarials	7 (20.6%)	7 (20.6%)	5 (14.7%)	1 (2.9%)	5 (14.7%)	4 (11.8%)
ACTs	-	-	1 (2.9%)	-	-	-
Analgesics with paracetamol	18 (52.9%)	16 (47.1%)	13 (39.2%)	18 (52.9%)	12 (35.3%)	8 (23.5%)
Antibiotics	-	1 (2.9%)	2 (5.8%)	-	-	-
Herbs	6 (17.6%)	1 (2.9%)	1 (2.9%)	8 (23.5%)	3 (8.8%)	1 (2.9%)
Undecided	-	2 (5.8%)	10 (29.4%)	3 (8.8%)	10 (29.4%)	17 (50.0%)
Total	34 (100.0%)	34 (100.0%)	34 (100.0%)	34 (100.0%)	34 (100.0%)	34 (100.0%)

Table 4. Awareness and use of ITNs among respondents

	Mothers of Children under Five Years		Pregnant Women		Total	
	Aware	Use	Aware	Use	Aware	Use
Yes	22 (64.7%)	7 (20.6%)	21 (61.8%)	8 (23.5%)	43 (63.2%)	15 (22.1%)
No	12 (35.3%)	27 (79.4%)	13 (39.2%)	26 (76.5%)	25 (36.8%)	53 (77.9%)
Total	34 (100.0%)	34 (100.0%)	34 (100.0%)	34 (100.0%)	68 (100.0%)	68 (100.0%)

The age of respondents influenced their awareness of the HMM program and how soon they sought appropriate professional care outside the home, particularly for their febrile children less than five years old. The women's experience may play a major role in this context. Older women tended to stay home 24 to 48 hours or more, relying on their wealth of experience in child care. Conversely, younger ones tended to seek early appropriate care for their children from health workers outside the home within 24 hours of onset of febrile conditions. Efforts therefore need be intensified in health education relating to HMM, with emphasis on the importance of seeking early appropriate care outside the home for febrile children after 24 hours of home-based treatment if the child's febrile condition does not improve, as emphasized by the WHO (2004). These education efforts should target more of the older women with children less than five years old. Effectively communicating this information will involve languages and tools that are meaningful to these women in a socio-cultural context.

Results presented in Table 1 showed respondents' poor chemotherapeutic practices for malaria treatment. Most respondents take analgesics to treat malaria, rather than antimalaria drugs. This finding is similar to results reported by Salako et al. (2001) and Nsimba and Rimoy (2005) in studies

on home management of malaria in mothers of children less than five years old in rural communities of Nigeria and Tanzania, respectively. It implies that people tended to neglect the real cause of illness by taking analgesics rather than antimalarials. This could be attributed to the fact that more than three quarters of all malaria cases are first treated at home with drugs purchased from small local drug shops, without the advice of a health professional as reported by earlier studies (Foster 1995; Breman 2001; Mash et al. 2003; Muller et al. 2003; Guyatt and Snow 2004; Kofoed et al. 2004). The need for health education programs in the community is urgent. Programs should advocate behavioural change at the individual, household and community levels by promoting the importance of appropriate malaria treatment and by emphasizing the health consequences of inappropriate treatment (Nsimba and Rimoy 2005) and of analgesics abuse (Hering-Hanit et al. 2001; Le Jeunne 2001; Takase et al. 2005). Schools and health facilities could be used as complementary effective channels for this health education. Advocating behavioural change in this regard is important, going by Kasl and Cobb's (1966) definition of early and appropriate treatment of illness as a behaviour.

Awareness of malaria control strategies, particularly HMM and the change in antimalaria drug policy, as well as the actual use of ITN and IPT use reported by study respondents, are far below expectations, given the length of time the HMM and ITN programs have been implemented. It needs emphasizing that the low proportion of ITN use presented in Table 4, for example, is well below the target of 60% of populations at risk of malaria expected to be sleeping under ITNs by 2005, as set at the Abuja Malaria Summit in April 2000 (TDR News 2000; 2002). Moreover, it is unfortunate that with barely four years to the end of the 2001–2010 United Nations decade to roll back malaria, most respondents reported that they either couldn't afford ITNs or did now know where to get the treated materials. Poor awareness of ACTs among respondents perhaps explains the low use of the WHO-recommended combination drugs in the study community.

Based on these preliminary results, efforts need be intensified to make the different malaria control strategies more available, accessible and affordable in communities where malaria is holoendemic. This is important if the country is to achieve appreciable success in the targets of the 2001–2010 United Nations decade to roll back malaria (Nabarro and Tayler 1998; TDR 2000; 2002) and the Millennium Development Goals (MDGs) (NPC 2005).

To realize these goals, the need to re-appraise the distribution chains of information and materials for RBM interventions in the country is urgent. Community-based organizations such as the Co-operative Thrift & Credit Union and faith-based and women's groups could be encouraged to collaborate and participate in RBM activities. We believe that this will complement government efforts in achieving a wider and effective reach to the grassroots as emphasized by Alnwick (2000). This approach has been successfully implemented in other health programs such as HIV/AIDS, particularly in the area of improving access to care and treatment (UNAIDS/WHO 2002), and in outreach programs on adolescent reproductive and sexual health (Senderowitz 1997; 2000; James-Traore et al. 2001). Moreover, the routine immunization of children less than five years old under the National Programme on Immunisation offers a promising opportunity for promotion and delivery of a number of RBM interventions such as ITNs and IPT, as demonstrated by Schellenberg et al. (2001) in Tanzania.

It is also important for RBM program managers to understand the mindset and environment of the people, such as their level of awareness, attitude to ITN use and ability to pay for ACTs, in order to minimize any gap between planning at the government level and utilization by the people at the grassroots. To bridge the gap between program planning and utilization, we need to embrace more community involvement and participation in planning and implementing these malaria control strategies.

There is a need for regular monitoring and evaluation of the activities revolving round the RBM program in the country. We suggest that outcome-based (changes in the population's knowledge, attitude and practice to malaria and use of malaria interventions) and impact-based (mortality and morbidity) indicators be evaluated regularly at the local, state and national levels.

The main limitation of this pilot study is the small sample size from one part of Nigeria. A larger

study with adequate sample size to represent the geo-political zones of the country is therefore needed to provide better and more generalized findings. Nonetheless, the limitation does not undermine the validity of the study's findings. Given the widespread concerns about the limited evidence of decreases in malaria-related mortality and morbidity, the results of the preliminary study may be useful as a baseline for malaria control improvement efforts with the aim of meeting the targets of the RBM initiative in the country by 2010.

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Performance of Universal Health Insurance: Lessons from South Korea

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Abstract

The aim of this study was to assess the maturity of the South Korean healthcare system in comparison with those of the 30 countries of the Organization for Economic Co-operation and Development (OECD) and to provide a foundation to evaluate the performance of the South Korean healthcare system. Using OECD Health Data 2005, we evaluated the performance of the healthcare system of the 30 industrialized countries. The evaluation focused on three dimensions that have remained central to healthcare debates internationally for years: access, cost and outcomes. Although South Korea has successfully implemented its universal health insurance scheme in a very short period of time and possesses highly advanced medical technologies, we found that South Koreans incurred more out-of-pocket expenditures on healthcare. Health outcomes were of relatively low quality compared with those of other OECD countries, but compared relatively well with the four countries (Greece, New Zealand, Portugal and Spain) with similar per capita gross domestic product (GDP).

Introduction

The purpose of the study was to identify the current status of South Korean healthcare in comparison with worldwide healthcare and, through this international comparison, to provide an initial step to evaluating the quality of the South Korean healthcare system. Comparisons focus on three dimensions that have been central in healthcare debates across countries for years: access, cost and

outcomes. We examined whether South Korea has shown improvement relative to other industrialized countries on any of these dimensions during the period from 1980 to 2003. The performance of the South Korean healthcare system in terms of access to care and health cost-sharing as of 2003 may provide some insight for world healthcare systems, which have struggled with the shared tensions and goals among fair contributions, cost control and quality care (WHO 2000). Understanding how well the South Korean universal healthcare system performs may give a reference level for the potential effectiveness of similar reforms in other countries.

The South Korean healthcare system has developed dramatically over the past three decades. The most remarkable achievement in its evolution has been the adoption of universal health insurance. In 1977, the government mandated compulsory medical insurance for employees and their dependants in large corporations of more than 500 workers. Since that time, national health insurance (NHI) coverage has been continually expanding to include more occupational groups of citizens such as government employees, teachers, workers in smaller firms and the self-employed. Ultimately, all South Korean citizens were covered by NHI by 1989. Until the economic crisis in 1997, the South Korean universal health insurance system was financially and administratively stable. Subject to the minimal guidelines imposed by the central government, decentralized insurance societies, either private-sector initiatives or medical insurance societies, served the covered enrollees (Jeong 2005). Each independent insurance society had autonomy in managing the scheme for enrollees and set the level of contributions and benefits, collected premiums and co-payments and reimbursed and monitored providers of medical care services for their enrollees. Financial feasibility was the responsibility of each society (Peabody et al. 1995; Kwon 2002; Jeong 2005).

However, the inefficiency of operating more than 300 individual insurance societies and financial inequity across societies gradually emerged as serious problems in the administration of universal health insurance. The economy-wide crisis in 1997 dramatically increased the overall NHI's financial deficit. Concerns regarding both the inequity in healthcare financing between employment categories and the chronic deficit of health insurance societies for the self-employed led the Korean government to instigate the Korean healthcare reform of 2000. Reform involved the merger of all health insurance societies into a single insurer, the newly formed government agency of the National Health Insurance Corporation (NHIC) (Lee 2003; Jeong 2005; Kwon and Reich 2005). Additional to the integration reform for equity and efficiency, the government implemented another major reform in 2000: the separation of drug prescription by medical doctors and drug dispensing by certified pharmacists in order to improve specialization and quality of care (NHIC 2005). The NHIC covers basically the entire national population as beneficiaries to the NHI, that is, government employees and teachers, the self-employed and industrial workers.

Another feature noted as a primary contributor to the success of universal health insurance in South Korea is the active role of private-sector initiatives. The private sector, consisting of three health insurance societies, insured 90% of the population, while the South Korean government insured the remaining 10% (Kwon 2002): "The rapid economic growth, the policies implemented by the military regime, and the design of a pluralistic insurance system based on separate insurance societies for different employee categories all contributed to the rapid expansion of health insurance" (Kwon 2002: 16).

To extend health insurance coverage to the population, the Korean military regime adopted the strategy of separating the working population into employees and the self-employed (Peabody et al. 1995). Mandating employers to cover their employees has been an effective way to extend coverage from the government's perspective. The notable point associated with the mandatory expansion is that "universal health insurance coverage has been accomplished without any major disruption to the overall economy, any apparent harm to specific industries, or any adverse impact on small firms" (Anderson 1989: 2).

In the South Korean experience, the rapid expansion to population coverage, however, has resulted in several problems, such as low contribution levels with limited health benefits, little involvement of the public sector in healthcare delivery, cost inflation and financial distress (Kwon 2002). Although

launching the NHIC was to improve the financial soundness of the health insurance system and enhance efficiency and equity among South Korean beneficiaries, a limited number of studies to evaluate the performance of the South Korean healthcare system have been completed. Analysis of the development and reform process of the health insurance system may provide meaningful implications for healthcare reform in other countries (Anderson 1989; Peabody et al. 1995).

Data and Sample

We used the Organization for Economic Co-operation and Development (OECD) Health Data 2005 for the analysis. The OECD health data provide rich information on per capita spending, utilization rates, health status, demographic factors and other data on 30 industrialized countries over the years from 1960 to 2003. While complete data are available for each country annually, there may be some technical and data collection issues involved in an international comparison. Nonetheless, the data are useful in outlining how well a particular healthcare system is performing and have been used in many previous studies (Anderson 1997). In particular, the data allow researchers to evaluate a country's progress in comparison with that of other industrialized countries. The OECD has taken the lead in collecting and publishing data for conducting international comparisons in recent years.

Performance of the South Korean Healthcare System

Access to Care – Insurance Coverage

The achievement of universal health insurance coverage for all citizens in South Korea has been very rapid. Before 1976, when the military regime initiated the NHI program in South Korea to assure universal health insurance coverage for all citizens, less than 10% of the population had health insurance and the per-capita income was less than $800 per month (Anderson 1989). Although South Korea has experienced considerable political turmoil in the intervening years, it finally achieved its goal of universal health insurance coverage in 1989, as the plan was originally designed (Anderson 1989; Peabody et al. 1995; Kwon 2002). The prominent characteristic of South Korea's universal health insurance coverage is that it was achieved via private-sector initiatives through an incremental process. These initiatives "relied on a series of self-contained medical insurance societies to collect revenues, determine benefits, and accumulate reserves" (Anderson 1989: 27). In general, the medical insurance societies were wholly owned subsidiaries of for-profit private corporations, and their primary goal was to provide insurance to the employees of the owner corporations. Owing to the absence of competition, the medical insurance societies often lacked financial incentives to pursue profits and thus did not earn a profit for all their activities (Anderson 1989; Kwon 2003). They did not "exercise their bargaining power in relation to health providers, and there was no selective contracting with providers" (Kwon 2003: 66–67). They were functioning as "financial intermediaries that channeled funds to providers" (Kwon 2003: 67).

Another notable feature of the South Korean experience in expanding health insurance coverage is the mandatory aspect. Coverage was compulsory and gradually expanded through a series of laws requiring incremental phase-in of universal coverage. During this process,it is noteworthy that the South Korean economy did not experience any major disruption to the overall structure, any apparent harm to specific industries, or any adverse impact on small firms (Anderson 1989). Over the period 1976 to 1989, South Korea enjoyed one of the fastest economic growth rates in the world, about 12.2% per year, which supported the mandatory implementation of the employment-based health insurance for industrial workers (Lee 2003).

The program to guarantee coverage started with the employed population. All firms with more than 500 employees were required to provide health insurance in 1976, and the company size limit was reduced to more than 16 employees in 1982 under the expanded obligation imposed on employers. Corporations and employees negotiated the benefit package as long as it met a minimum set of benefits established by the government. The health insurance societies, joined by corporations with more than 16 employees, provided health insurance coverage to the employees. Over 30% of

the population was covered through the employment-based scheme by 1988.

The second insurance program, established in 1977, covered the indigent. It was a categorical program similar to the U.S. Medicaid program that covered individuals living in public facilities, those who were unemployed and relied on family assistance for financial support and those who were medically needy owing to high medical expenses (Anderson 1989). The percentage of the population eligible for this government assistance program has remained relatively constant at 10% since the program was established (Kwon 2002).

Table 1. Publicly mandated coverage for in-patients and acute hospital care among OECD countries, 1977–2003

Country	1977	1989	2003
Australia	100.0	100.0	100.0
Austria	98.0	99.0	97.0
Belgium	99.0	98.0	99.0
Canada	100.0	100.0	100.0
Czech Republic	100.0	100.0	100.0
Denmark	100.0	100.0	100.0
Finland	100.0	100.0	100.0
France	98.0	99.3	99.9
Germany	92.3	89.3	90.9
Greece*	98.0	100.0	100.0
Hungary	100.0	100.0	100.0
Iceland	100.0	100.0	100.0
Ireland	85.0	100.0	100.0[b]
Italy	100.0	100.0	100.0[e]
Japan	100.0	100.0	100.0[a]
South Korea*	14.5	100.0	100.0
Luxembourg	-	-	99.6
Mexico	-	-	-
Netherlands	69.7	61.6	64.2[a]
New Zealand*	100.0	100.0	100.0
Norway	100.0	100.0	100.0
Poland	-	-	-
Portugal*	98.0	100.0	100.0
Slovak Republic	-	-	19.3
Spain*	84.0	98.9	-
Sweden	100.0	100.0	100.0
Switzerland	94.8	99.3	100.0
Turkey	37.8	53.6	66.0[e]
United Kingdom	100.0	100.0	100.0
United States	-	23.3	25.3[a]
Median	100.0	100.0	100.0

Source: *OECD Health Data 2005* (Paris: Organization for Economic Co-operation and Development, 2005)
Note: [a]2001, [b]2000, [c]1999, [d]1998, [e]1997, – not available.
* Countries with GDP per capita ranging from $18,000 to $24,000 in 2003.

Coverage for government workers, school employees and pensioners began in 1979, with the third type of health insurance (Anderson 1989; Peabody et al. 1995). In this program, the government and the insured shared the contributions equally (Kwon 2002). Payroll deductions were relatively higher than deductions for industrial workers because utilization rates were higher for this population, who tended to be older than the members of the industrial societies. These health insurance plans covered about 10% of the entire population annually until 1998, when they were merged with the industrial societies (Anderson 1989; Kwon 2002).

Table 1 shows changes in the percentage of the population with health insurance coverage in in-patient and acute care services during the period 1977 to 2003. The insurance rate of 14.5% in South Korea in 1977 was the lowest among 25 countries that reported relevant information. As South Korea completed the expansion of coverage to all citizens in 1989, the coverage rate increased from 14.5% in 1977 to 100%, the fastest increase in the 25 industrialized countries.

According to Table 1, 18 countries have achieved 100% coverage publicly mandated for in-patient and acute hospital care, and the majority (23 of the 30 OECD countries) have more than 90% coverage for the services. Though all South Koreans hold basic coverage from the mandatory NHI, many people, as in other countries, opt to purchase supplemental private health insurance against disastrous medical bills from serious illness such as cancer and heart disease. The most affluent Germans had private health insurance as well as public insurance (Iglehart 1991a, b). Similarly, the Netherlands had achieved universal coverage through a combination of public and private insurance. While publicly mandated insurance coverage was only 64.2% in the Netherlands in 2001 (Anderson 1997), the higher-income employee groups, the self-employed and state government officials had private health insurance for receiving better treatment not covered by publicly mandated insurance (Schut 1995).

As shown in Table 1, the U.S. coverage rate was relatively low, since the insurance rate represented only coverage by public programs such as Medicare and Medicaid and excluded the coverage by private insurance, which most Americans purchase through their employment. The rate of public insurance coverage in the U.S. rose from 23.3% in 1989 to 25.3% in 2002, and the slight increase during the 1990s may be attributed primarily to the expansion of Medicaid eligibility. Private health insurance based mostly on employment-related plans covered about 60% of the U.S. population for in-patient and acute care services. An estimated 15.2% of the population had no health insurance coverage during 2002, challenging the entire healthcare system in the U.S. via cost increases and inequity in access to health services (U.S. Census Bureau 2003).

Healthcare Use and Supply

Service Use and Resource Supply

Table 2 shows the average use of physician services and hospital beds among the 30 OECD countries in 2003. The average number of annual physician visits per capita[1] (column 1) varies widely, from 2.5 in Greece and Mexico to 14.1 in Japan, with a median of 6.15. South Koreans made 10.6 annual visits per capita and were ranked with the 5th highest utilization. The majority of OECD countries had from 5 to 10 annual physician visits per capita. Only five countries (Japan, Czech Republic, Slovak Republic, Hungary and South Korea) had annual physician visits per capita higher than 10 in 2003. Unless South Koreans are particularly unhealthy compared with populations of other developed countries, the high utilization of physician services in South Korea indicates that either South Koreans tend to be more dependent on medical help for mild health problems or they are more likely to be subject to "moral hazard" problems in their demand for healthcare, due to universal coverage. The moral hazard problem, as a general rule, refers to the situation where "having health insurance leads people to consume more healthcare services than they would have purchased if they had to pay for such services" (Shi and Singh 2003: 590).

More than two-thirds of the OECD countries had between two and four practising physicians per 1,000 citizens in 2003, with the median for the OECD being 3.1. Greece had the largest

Table 2. Use of physician services and hospital facilities among OECD countries, 2003

Country	Physician Visits per Capita	Number of Practising Physicians per 1,000	Average Visits per Physician	Hospital Acute Care Days	Hospital Acute Care Beds per 1,000
Australia	6.0 (17)	2.5[a] (21)	2,400[a] (11)	6.2[a] (19)	3.6[a] (15)
Austria	6.7 (12)	3.4 (7)	1,971 (17)	5.8 (21)	6.0 (4)
Belgium	7.8[a] (8)	3.9[a] (3)	2,000[a] (16)	7.7[e] (9)	4.0[a] (10)
Canada	6.2[b] (14)	2.1 (26)	2,952[a] (8)	7.4[d] (10)	3.2[a] (17)
Czech Republic	13.0 (2)	3.5 (6)	3,714 (6)	8.3 (6)	6.5 (3)
Denmark	7.3 (9)	2.9[a] (17)	2,517 (9)	3.6 (30)	3.4[b] (16)
Finland	4.2 (21)	2.6 (19)	1,615 (21)	4.3 (28)	2.3 (25)
France	6.9[a] (11)	3.4 (7)	2,029 (15)	5.6 (22)	3.8 (13)
Germany	7.3[c] (9)	3.4 (7)	2,147[a] (14)	9.2[a] (3)	6.6[a] (2)
Greece*	2.5[e] (27; 5)	4.4[b] (1; 1)	568[c] (28; 5)	6.2[c] (19; 4)	--
Hungary	12.2 (4)	3.2 (12)	3,813 (5)	6.7 (15)	5.9 (5)
Iceland	5.6[b] (18)	3.6 (4)	1,556[a] (22)	5.2[h] (24)	--
Ireland	--	2.6 (19)	--	6.5 (18)	3.0 (22)
Italy	6.1[c] (15)	4.1 (2)	1,488[a] (23)	6.8[a] (14)	3.9[a] (11)
Japan	14.1[a] (1)	2.0[a] (27)	7,050 (1)	20.7 (1)	8.5 (1)
South Korea*	10.6[a] (5; 1)	1.6 (28; 5)	6,625 (2; 1)	10.6 (2; 1)	5.9 (5; 1)
Luxembourg	6.3 (13)	2.7 (18)	2,333 (13)	7.4[g] (10)	5.7 (8)
Mexico	2.5 (27)	1.5 (29)	1,667 (20)	3.9 (29)	1.0 (27)
Netherlands	5.6 (18)	3.1 (14)	1,806[b] (19)	8.6[b] (5)	3.2[a] (17)
New Zealand*	3.2 (24; 4)	2.2 (24; 4)	1,455[e] (24; 3)	4.9 (26; 5)	--
Norway	--	3.1 (14)	--	5.4 (23)	3.1 (19)
Poland	6.1 (15)	2.5 (21)	2,440[a] (10)	7.9[a] (7)	5.1 (9)
Portugal*	3.7 (22; 3)	3.3 (10; 2)	1,121[b] (25; 4)	7.3 (12; 2)	3.1 (19; 2)
Slovak Republic	12.4 (3)	3.1 (14)	4,000 (3)	7.9 (7)	5.9 (5)

Country	Physician Visits per Capita	Number of Practising Physicians per 1,000	Average Visits per Physician	Hospital Acute Care Days	Hospital Acute Care Beds per 1,000
Spain*	9.5 (6; 2)	3.2 (12; 3)	2,969[b] (7; 2)	7[b] (13; 3)	3.1 (19; 2)
Sweden	2.9[b] (25)	3.3[a] (10)	879[a] (27)	4.8[a] (27)	2.4[c] (24)
Switzerland	3.4 (23)	3.6[a] (4)	944 (26)	9 (4)	3.9 (11)
Turkey	2.6[b] (26)	1.4 (30)	1,857[a] (18)	5.2 (24)	2.3 (25)
United Kingdom	5.2 (20)	2.2 (24)	2,364 (12)	6.7 (15)	3.7 (14)
United States	8.9 (7)	2.3[a] (23)	3.870 (4)	6.7 (15)	2.8 (23)
Median	6.15	3.1	2,088	6.7	3.7

Source: *OECD Health Data 2005* (Paris: Organization for Economic Co-operation and Development, 2005)
Note: ALOS stands for average length of stays. [a]2002, [b]2001, [c]2000, [d]1999, [e]1998, [f]1997, [g]1996, – not available. Ranking is reported in the brackets.
* Countries with GDP per capita ranging from $18,000 to $24,000 in 2003; ranking is reported out of the 30 OECD countries; out of the 5 countries with similar GDP to South Korea.

number of practising physicians (4.4 per 1,000) and Turkey the least (1.4 per 1,000). South Korea, despite its high utilization of physician care (measured by physician visits per capita), had a relatively small number of practising physicians (1.6 per 1,000) and was ranked third from the bottom next to Mexico (1.5 per 1,000) and Turkey (1.4 per 1,000), indicating a short supply of physicians to meet the demand for services. The shortage of physicians in South Korea, combined with the high utilization of services, produced the second highest number of visits. The average number of annual visits per physician in South Korea was 6,625. The large number of visits or patients per physician in a given period of time may degrade the quality of care or the responsiveness of care to patients' satisfaction, with the resulting problems of difficulties in making an appointment, long waits in the service setting and short consulting time with a doctor.

The average length of stay (ALOS) in acute care hospital beds per capita ranged from 3.6 days in Denmark to 20.7 days in Japan (Table 2). There has been a consistent trend toward shorter in-patient stays per capita in many OECD countries since 1980 (Anderson and Hussey 2001). Worldwide health policies, particularly in the U.S., have centred on keeping people out of hospitals and keeping hospital stays as short as possible to slow down the increases in health expenditure. The average length of hospital acute care stay in South Korea was 10.6 days, the second longest stay. If Japan, with the longest ALOS, relies on hospital in-patient care primarily for its high portion of elderly citizens, the same aging problem that is rapidly progressing in South Korea may also be the reason for its long stays in hospital in-patient beds.

Contrary to the case of physician supply, the number of hospital acute care beds per 1,000 population in South Korea was the 5th (5.9 beds) highest among the 30 OECD countries. Beds per 1,000 people ranged from 1.0 in Mexico to 8.5 in Japan. Notably, the U.S had relatively fewer beds, 2.8 per 1,000 (23rd), indicating that, as a way of cost containment, the U.S. not only limits the length of stay in acute care beds but also cuts the supply of in-patient beds to generate additional cost savings.

In terms of controlling for income effects, among countries with a similar gross domestic product (GDP) per capita, ranging from $18,000 to $24,000 (i.e., Greece, New Zealand, Portugal, Spain and South Korea), utilization of healthcare services per 1,000 population, including physician visits, average visits per physician, hospital acute care days and hospital acute care beds, was highest in South Korea.

Table 3. Use of medical technology among OECD countries, per million population, 2003

Country	MRI	CT Scanners	Lithotripters
Australia	3.7 (19)	20.8[f] (7)	1.8[a] (13)
Austria	13.5 (4)	27.2 (4)	1.8 (13)
Belgium	6.6[a] (13)	28.8[a] (3)	--
Canada	4.5 (16)	10.3 (20)	0.5 (20)
Czech Republic	2.4 (24)	12.6 (18)	3.4 (6)
Denmark	9.1 (8)	14.5 (11)	--
Finland	12.8 (5)	14.0 (14)	0.4 (22)
France	2.8 (22)	8.4 (22)	0.7 (19)
Germany	6.0[a] (14)	14.2[a] (12)	3.3[a] (7)
Greece*	2.3[a] (25; 5)	17.1[a] (10; 2)	3.0[e] (9; 2)
Hungary	2.6 (23)	6.9 (24)	1.1 (17)
Iceland	17.3 (2)	20.7 (8)	3.5 (5)
Ireland	--	--	--
Italy	11.6 (6)	24.0 (6)	2.9[g] (10)
Japan	35.3[a] (1)	92.6[a] (1)	6.4[a] (2)
South Korea*	9.0 (9; 1)	31.9 (2; 1)	6.8 (1; 1)
Luxembourg	11.1 (7)	26.7 (5)	2.2 (12)
Mexico	0.2 (28)	1.5 (27)	0.3 (23)
Netherlands	3.9[h] (17)	--	--
New Zealand*	3.7 (19; 4)	11.5 (19; 5)	0.5 (20; 5)
Norway	--	--	--
Poland*	1.0 (27)	6.3 (25)	2.9 (10)
Portugal	3.9 (17; 3)	12.8 (17; 4)	1.4 (16; 4)
Slovak Republic	2.0 (26)	8.7 (21)	4.3 (4)
Spain*	7.3 (12; 2)	13.0 (16; 3)	1.8 (13; 3)
Sweden	7.9[d] (11)	14.2[d] (12)	--

Country	MRI	CT Scanners	Lithotripters
Switzerland	14.2 (3)	18.0 (9)	4.5 (3)
Turkey	3.0 (21)	7.3 (23)	0.9[b] (18)
United Kingdom	5.2[b] (15)	5.8[b] (26)	--
United States	8.6[a] (10)	13.1[a] (15)	3.2[a] (8)
Median	5.6	14.0	2.2

Source: *OECD Health Data 2005* (Paris: Organization for Economic Co-operation and Development, 2005)
Note: MRI and CT stands for magnetic resonance imaging and computed tomography, respectively. [a]2002, [b]2001, [c]2000, [d]1999, [e]1998, [f]1997, [g]1996, [h]1995, – not available. Ranking is reported in the brackets.
* Countries with GDP per capita ranging from $18,000 to $24,000 in 2003; ranking is reported out of the 30 OECD countries; out of the 5 countries with similar GDP to South Korea.

Medical Technology

For measuring the utilization rate of high-tech medical equipment, we used the supply of magnetic resonance imagers (MRIs), computed tomography (CT) scanners and lithotriptors as proxies for the availability of expensive medical technology. In previous studies in this line of research, the number of MRIs was the most common measure for the degree of technological advance in a given medical system (Anderson and Hussey 2001). The number of MRIs per million persons ranged from 0.2 in Mexico to 35.3 in Japan (Table 3). The availability of MRIs in South Korea was in the upper 30% of the OECD countries and was ranked ninth behind Japan, Switzerland, Iceland, Austria, Finland, Italy, Luxembourg and Denmark. The number of CT scanners ranged from 1.5 per million persons in Mexico to 92.6 in Japan. In South Korea, the number of CT scanners was 31.9, which ranked second behind Japan. The median number of lithotripters in OECD countries was 2.2 per million citizens, ranging from 0.3 in Mexico to 6.8 in South Korea. South Korea was ranked first, with more than three times the median.

As Table 3 shows, compared to other countries with similar income (i.e., Greece, New Zealand, Portugal and Spain), South Korea had the highest supply of all three types of technologically advanced medical equipment (MRIs, CTs and lithotriptors). The large supply of advanced medical technology in South Korea may have contributed to the cost-insensitive use of expensive medical services. On the other hand, as these services were not reimbursed by the NHI until 2005, individual providers and hospitals, which are under strict regulations on service pricing, may have sought high revenue by inducing demand for these uncovered services among their patients.

Healthcare Spending and Financing

Table 4 documents various measures of healthcare expenditure among the OECD countries. Health spending per capita (in U.S. dollars adjusted by purchasing power parity [PPP]) ranged from $452 in Turkey to $5,635 in the U.S. The U.S. continues to spend considerably more per capita on healthcare than any other country – more than double the 2003 median for OECD countries. Many studies have shown that most international differences in health spending could be explained by the average wealth level as indicated by GDP per capita (Anderson and Hussey 2001). Countries with higher average wealth spent proportionally more on healthcare, as exemplified by the U.S., Switzerland, Germany, France and Canada.

Healthcare expenditure per capita in South Korea ($1,074, 26th) was relatively low at less than half the OECD median ($2,269). South Korea's total health spending per capita and total health spending as a percentage of GDP were the lowest among the five countries (Greece, New Zealand, Portugal, Spain and South Korea) with similar per capita income. During the period 1995 to 2003,

Table 4. Healthcare spending among OECD Countries, 2003

Country	Health Spending per Capita, US$ PPP	Health Spending, Percentage of GDP	Annual Growth in Health Spending, 1995–2003	Public Expenditure on Health per Capita, US$ PPP	OOP Spending per Capita, US$ PPP
Australia	$2,699[a] (12)	9.3[a] (12)	7.8% (11)	$1,821[a] (13)	$529[b] (5)
Austria	2,280[a] (15)	7.6[a] (21)	3.1 (20)	1,593[a] (18)	399[a] (13)
Belgium	2,827 (10)	9.6 (10)	6.9 (16)	--	--
Canada	3,003 (6)	9.9 (7)	5.8 (25)	2,100 (10)	448 (9)
Czech Republic	1,298 (24)	7.5 (22)	6.1 (22)	1,170 (22)	108 (26)
Denmark	2,763 (11)	9.0 (14)	6.2 (21)	2,292 (6)	436 (10)
Finland	2,118 (19)	7.4 (23)	6.0 (23)	1,622 (17)	403 (12)
France	2,903 (9)	10.1 (6)	5.3 (28)	2,214 (7)	291 (21)
Germany	2,996 (7)	11.1 (3)	4.0 (29)	2,343 (5)	312 (17)
Greece*	2,011 (20; 1)	9.9 (7; 1)	7.6 (13; 3)	1,032 (23; 4)	935 (2; 1)
Hungary	1,115[a] (25)	7.8[a] (18)	9.3 (5)	783[a] (24)	293[a] (20)
Iceland	3,115 (5)	10.5 (4)	8.5 (8)	2,602 (3)	513 (6)
Ireland	2,386[a] (14)	7.3[a] (24)	13.7 (2)	1,793[a] (14)	314[a] (16)
Italy	2,258 (16)	8.4 (15)	5.9 (24)	1,697 (16)	468 (7)
Japan	2,139[a] (18)	7.9[a] (17)	5.6 (27)	1,743[a] (15)	370[a] (15)
South Korea*	1,074 (26; 5)	5.6 (30; 5)	12.5 (4; 1)	531 (26; 5)	450 (8; 2)
Luxembourg	3,190[a] (4)	6.1[a] (27)	7.8 (11)	2,725[a] (2)	379[a] (14)
Mexico	583 (29)	6.2 (26)	6.6 (18)	270 (29)	294 (19)
Netherlands	2,976 (8)	9.8 (9)	7.9 (10)	1,856 (12)	233 (22)
New Zealand*	1,886 (21; 2)	8.1 (16; 3)	6.4 (20; 5)	1,484 (19; 1)	296 (18; 4)
Norway	3,807 (2)	10.3 (5)	12.6 (3)	3,188 (1)	591 (4)
Poland	677[a] (28)	6.0[a] (28)	8.9 (6)	490[a] (27)	187[a] (23)
Portugal*	1,797 (23; 4)	9.6 (10; 2)	8.3 (9; 2)	1,253 (21; 3)	--
Slovak Republic	777 (27)	5.9 (29)	7.2 (14)	687 (25)	91 (27)

Country	Health Spending per Capita, US$ PPP	Health Spending, Percentage of GDP	Annual Growth in Health Spending, 1995–2003	Public Expenditure on Health per Capita, US$ PPP	OOP Spending per Capita, US$ PPP
Spain*	1,835 (22; 3)	7.7 (19; 4)	6.6 (18; 4)	1,306 (20; 2)	434 (11; 3)
Sweden	2,594[a] (13)	9.2[a] (13)	7.0 (15)	2,213[a] (8)	--
Switzerland	3,781 (3)	11.5 (2)	5.8 (25)	2,213 (8)	1,192 (1)
Turkey	452[c] (30)	6.6[c] (25)	28.9 (1)	284[c] (28)	125[c] (25)
United Kingdom	2,231[a] (17)	7.7[a] (19)	8.9 (6)	1,860[a] (11)	160[g] (24)
United States	5,635 (1)	15.0 (1)	6.8 (17)	2,503 (4)	793 (3)
Median	2,269	8.25	6.95	1,743	379

Source: *OECD Health Data 2005* (Paris: Organization for Economic Co-operation and Development, 2005)
Note: OOP, PPP, GNP stand for out-of-pocket, purchasing-power-parity and gross national product, respectively. [a]2002, [b]2001, [c]2000, [d]1999, [e]1998, [f]1997, [g]1996, [h]1995, – not available. Ranking is reported in the brackets.
* Countries with GDP per capita ranging from $18,000 to $24,000 in 2003; ranking is reported out of the 30 OECD countries; out of the 5 countries with similar GDP to South Korea.

however, South Korean healthcare spending rapidly increased at an average annual rate of 12.5%, almost twice as high as the average OECD annual rate of increase (6.95%).

Between 1960 and 1998, healthcare spending generally tended toward the mean; that is, countries with high healthcare spending in 1960 tended to have lower-than-average rates of growth in healthcare expenditure, while countries with lower spending per capita tended to have higher-than-average expenditure growth (Anderson and Hussey 2001). Also, countries such as South Korea, with more rapid economic growth, had higher rates of increase in healthcare spending. The case of South Korea clearly demonstrates the combination of relatively low initial per capita spending and high growth rate accompanied by a dramatic GDP growth and extension of universal health insurance to full coverage in only three decades. South Korea, however, is presumed to be facing a large future challenge in growing healthcare costs associated with an aging population.

Canada is an example of the opposite situation: high level ($3,003, 6th) and slow growth (5.8%, 25th) of per capita spending. The well-respected performance of the Canadian health system in terms of stabilized growth in health expenditure has generated enthusiasm among researchers and policy makers abroad about learning from the Canadian system.

Public health expenditure per capita in South Korea ($531) was less than one-third the OECD median. South Korea's public expenditure on health per capita was the lowest among the five countries (Greece, New Zealand, Portugal, Spain and South Korea) with similar GDP per capita. In the process of expanding the NHI, the central government of South Korea minimized its role in financing healthcare to mitigate any adverse effects on national economic growth, which was the top priority in government budgeting. As employers and employees made most contributions, public spending on healthcare per capita remained very low compared to other countries that ran an NHI system. For instance, per capita public health spending was $2,100 (10th) in Canada, $1,743 (15th) in Japan and $1,860 (11th) in the U.K. Another indicator that demonstrates the minimal role of the central government in financing the South Korean healthcare system is the percentage of total health expenditure to total public funding. This was only 49.4% in South Korea, compared with much higher rates in many other countries with an NHI system (69.9% in Canada, 81.5% in Japan and 83.4% in the U.K.).

With less support from the central government, the consumer's share of healthcare costs measured by per capita out-of-pocket (OOP) spending was high ($450, 8th) in South Korea, well above the OECD median ($397). Even after controlling for income effects, South Korean per capita OOP spending was second highest after Greece among the five countries with similar income (ranging from $18,000 to $24,000). In Germany and Japan, whose healthcare systems have been the benchmark for moulding healthcare financing in South Korea, per capita OOP was much smaller ($312, 17th for Germany and $370, 15th for Japan). Again, the proportion of total OOP spending to total healthcare expenditure was 41.9% in South Korea (the 3rd highest after Mexico [50.5%] and Greece [46.5%]), compared with only 14.9% in Canada, 10.4% in Germany, 17.3% in Japan and 14.1% in the U.S. These findings suggest that the successful expansion of health insurance coverage in South Korea has not necessarily guaranteed satisfactory financial protection against potentially catastrophic medical expenses that an average South Korean citizen might be exposed to.

Furthermore, low contribution rates of the insured beneficiaries and stringent public funding for the healthcare system have limited the range of services like benefit-in-kind. The wide variety of services commonly received by patients that remain uncovered by insurance may account for the high OOP spending in South Korea. On the other hand, the high rates of cost sharing may play a role in mitigating the previously mentioned moral hazard effect in utilizing health services. Many believe that the introduction of the cost-sharing rule could improve the financial stability of the NHIC in South Korea, which is the only insurer of the Korean NHI that has suffered a continuous deficit since 1997 up to 2003.

In summary, the benefits of Korean universal coverage should not be overemphasized, although the achievement, especially at such a rapid pace, is admirable. In practice, the range of benefit-in-kind in the Korean NHI package is insufficient to completely remove barriers to necessary care among the insured South Korean beneficiaries.

Health Outcomes

Life Expectancy

High and rapidly growing healthcare expenditure may nevertheless be beneficial if it actually improves health in the population. Though better health is unquestionably the ultimate goal of any healthcare system, it is inconvenient to measure and compare a variety of health outcomes (by nature, a qualitative attribute) across countries and their relationship with the type of health system and level of healthcare spending. Obviously, the marginal improvement of health outcomes generated by a unit investment in healthcare would be the best indicator of how well a health system performs. The most commonly used quantity measures for health outcomes include life expectancy at birth and infant mortality rate (Table 5).

Women's life expectancy at birth was 5.6 years longer (81.1 years) than men's (75.5 years) in the OECD median. Japan had the longest life expectancy for women (85.3 years) and the second longest for men (78.4 years), indicating the severity of aging-related problems presently arising in Japan. Life expectancy in South Korea was below the OECD median for both men (73.4 years, 24th) and women (80.4 years, 21st), and was the lowest among the other four countries with similar income (Greece, New Zealand, Portugal and Spain). Women lived seven years longer than men in South Korea.

To adjust for the loss of life expectancy due to various health problems, "potential years of life lost" (PYLL) measures the years of life lost before the age of 70 due to preventable conditions.[2] PYLLs of the South Korean population were about 5.7 years for men (16% above the OECD median for men at 4.95 years) and 2.7 years for women (3% above the OECD median for women at 2.6 years). This result contrasted with the case of Japan, where PYLLs were 25% below the OECD median for men (3.7 years) and 25% below for women (2.0 years). In the U.S., neither life expectancy nor PYLLs were particularly impressive. Average life expectancy in the U.S. was 74.5 for men (22nd) and 79.9 for women (23rd). PYLLs were 6.4 years for men (6th) and 3.7 years for women (3rd).

Table 5. Life expectancy and infant mortality among OECD countries, 2003

Country	Life Expectancy at Birth, 2003		Potential Years of Life Lost per 100,000 Population, 2003		Infant Mortality per 1,000 Live Births
	Males, 0–69	Females, 0–69	Males, 0–69	Females, 0–69	All
Australia	77.8 (4)	82.8 (6)	4.376[b] (22)	2.385[b] (21)	4.8 (13)
Austria	75.6 (14)	81.6 (12)	4.713 (18)	2.516 (19)	4.5 (16)
Belgium	75.1[a] (18)	81.1[a] (15)	5.576[f] (10)	3.053[f] (8)	4.3 (18)
Canada	77.2[a] (6)	82.1[a] (9)	4.425[b] (21)	2.636[b] (15)	5.4[a] (9)
Czech Republic	72.0 (26)	78.5 (26)	6.257 (7)	2.875 (11)	3.9 (24)
Denmark	74.9 (20)	79.5 (24)	4.953[c] (15)	3.055 (7)	4.4 (17)
Finland	75.1 (18)	81.8 (11)	5.219 (12)	2.294 (23)	3.1 (27)
France	75.8 (13)	82.9 (4)	5.590[b] (9)	2.624[b] (16)	3.9 (24)
Germany	75.5 (15)	81.3 (14)	4.789[b] (17)	2.523[b] (18)	4.2 (21)
Greece*	75.4 (16; 3)	80.7 (18; 3)	4.700[a] (19; 5)	2.200[a] (26; 4)	4.8 (13; 3)
Hungary	68.3 (29)	76.5 (29)	9.483 (2)	4.310 (2)	7.3 (4)
Iceland	78.7 (1)	82.5 (7)	3.661[a] (28)	2.526[a] (17)	2.4 (30)
Ireland	75.2[a] (17)	80.3[a] (22)	5.232[b] (11)	3.034[b] (9)	5.1 (11)
Italy	76.9 (9)	82.9 (4)	4.332[b] (23)	2.247[b] (25)	4.3 (18)
Japan	78.4 (2)	85.3 (1)	3.718[a] (27)	1.969[a] (29)	3.0 (29)
South Korea*	73.4[a] (24; 5)	80.4[a] (21; 5)	5.741[a] (8; 2)	2.716[a] (13; 3)	6.2[d] (7; 1)
Luxembourg	74.9[a] (20)	81.5 (13)	5.119 (14)	2.265 (24)	4.9 (12)
Mexico	72.4 (25)	77.4 (28)	11.129[h] (1)	6.486[h] (1)	20.1 (2)
Netherlands	76.2 (11)	80.9 (17)	3.966 (26)	2.677 (14)	4.8 (13)
New Zealand*	76.3[a] (10; 2)	81.1[a] (15; 2)	5.208[c] (13; 3)	3.108[c] (6; 1)	5.6[b] (8; 2)
Norway	77.0 (8)	81.9 (10)	4.273[a] (24)	2.492[a] (20)	3.4 (26)
Poland	70.5 (27)	78.9 (25)	8.315[a] (3)	3.477[a] (5)	7.0 (5)
Portugal*	74.0 (23; 4)	80.6 (20; 4)	6.547[a] (5; 1)	2.985[a] (10; 2)	4.1 (22; 4)

Country	Life Expectancy at Birth, 2003		Potential Years of Life Lost per 100,000 Population, 2003		Infant Mortality per 1,000 Live Births
Slovak Republic	69.9[a] (28)	77.8[a] (27)	8.117[a] (4)	3.638[a] (4)	7.9 (3)
Spain*	77.2 (6; 1)	83.7 (2; 1)	4.828[a] (16; 4)	2.187[a] (28; 5)	4.1 (22; 4)
Sweden	77.9 (3)	82.4 (8)	3.658[b] (29)	2.197[b] (27)	3.1 (27)
Switzerland	77.8[a] (4)	83.0[a] (3)	4.225[b] (25)	2.323[b] (22)	4.3 (18)
Turkey	66.4 (30)	71.0 (30)	--	--	29.0 (1)
United Kingdom	76.2 (11)	80.7 (18)	4.620[a] (20)	2.762[a] (12)	5.3 (10)
United States	74.5[a] (22)	79.9 (23)	6.435[b] (6)	3.733[b] (3)	7.0[a] (5)
Median	75.5	81.1	4.953	2.636	4.7

Source: *OECD Health Data 2005* (Paris: Organization for Economic Co-operation and Development, 2005)
Note: [a]2002, [b]2001, [c]2000, [d]1999, [e]1998, [f]1997, [g]1996, [h]1995 – not available. Ranking is reported in the brackets.
* Countries with GDP per capita ranging from $18,000 to $24,000 in 2003; ranking is reported out of the 30 OECD countries; out of the 5 countries with similar GDP to South Korea.

Life expectancy, however, may rely on many factors other than support from medical services, such as food, natural environment, ethnicity-specific physical conditions and healthy lifestyle. Unhealthy eating and lifestyle are gaining attention for their detrimental effects on life expectancy in many countries.

Infant Mortality

The comparison of infant mortality per 1,000 live births (Table 5) shows similar results to those for life expectancy. Japan had the second lowest infant mortality rate (3 per 1,000 live births) while the rate was quite high in the U.S. (7 per 1,000 live births, 5th) and South Korea (6.2, 7th). The South Korean infant mortality was about 33% above the OECD median of 4.7 per 1,000 live births and the highest among the other four countries with similar income (Greece, New Zealand, Portugal and Spain).

Immunization

The rate of immunization against life-threatening diseases, which is particularly critical for infants and children, is one of the most important preventive cares that may be highly related with long and healthy living among the population. Diphtheria, pertussis and tetanus (D.P.T.) and measles are examples of child vaccinations that most countries require or at least strongly recommend. As shown in Table 6, about 97% (14th, slightly above the OECD median) of South Korean children were vaccinated against D.P.T. and 90.2% (20th, below the OECD median) against measles. The South Korean NHI does not provide coverage for certain services, including vaccinations.[3] The lack of a comprehensive national-level immunization policy and insufficient vaccinations may have implications for the risk of prevalent communicable diseases. Nevertheless, these vaccination rates of over 90% were quite impressive as all costs were borne by consumers. South Koreans seem to have been well aware of the importance of proper immunizations and the potential harm a communicable disease might cause. It is probable that expanding insurance coverage for immunization services would successfully raise the immunization rates to 100%, as in Japan. Therefore, it is strongly recom-

mended that immunization rates are increased by including national immunization services in the South Korean NHI system in order to prevent the circulation of communicable diseases.

In spite of the variation in immunization rates across the OECD countries, many countries had achieved nearly universal immunization rates for communicable diseases such as D.P.T. and measles by 2003, with median OECD immunization rates of 97.0% and 93.5%, respectively. This is a very satisfactory and optimistic sign of better health worldwide in the future.

Unhealthy Lifestyle

The promotion of healthy lifestyles is a crucial aspect of the performance of a public health system (Anderson and Hussey 2001). Smoking and drinking are the most prevalent unhealthy activities (Table 6). The smoking rate among men aged 15 or more was highest in South Korea (61.8%), whereas the rate among women aged 15 or more was lowest (5.4%) among the 30 industrialized countries.[4] The smoking rate among South Korean men was almost double the median OECD value (31%). The very low rate of South Korean female smoking seems closely related to cultural practice. Social prejudices about female smoking contribute to the large gender gap in smoking, but this gap is rapidly diminishing with the decreasing male smoking rate and increasing female rate.

Per capita alcohol consumption among South Koreans aged 15 or older was ranked 16th (9.3 litres per year). Among the countries with similar income (Greece, New Zealand, Portugal and Spain), alcohol intake by South Koreans was third.

The heaviest drinkers were the French (14.8 litres per year), seemingly related to their culture, which is also shared by other Mediterranean countries, of savouring wine with everyday cuisine. Regardless of the relative extent of smoking and heavy drinking, unhealthy activities generate a serious risk as they tend to be addictive. Systematic provision of health education programs may be a reliable way to reduce smoking and heavy drinking and to promote healthy lifestyles, especially in South Korea.

Concluding Remarks

South Korea's achievement of universal health insurance within 12 years is remarkable. The incremental expansion of health insurance coverage from private employees in large firms to public employees and finally to self-employed rural residents was effective as it allowed private-sector manufacturers to smoothly accommodate the cost of providing health plans to their workers. Although the South Korean government lacked sufficient funds for universal coverage in 1977, at the commencement of the NHI, it was able to evade the heavy financial burden of supporting the NHI system by collecting contributions from private health insurance societies and by limiting government subsidies only to defaulting societies. Furthermore, the gradual implementation of the universal health plan provided the South Korean government with sufficient time to mediate any severe conflicts that might arise among insurance societies with varying financial statuses. In this process, the government successfully merged the insurance societies into a single insurer, the NHIC, while increasing government assistance to a financially challenged group, the self-employed, among NHI beneficiaries.

At the launching of NHI in South Korea, many predicted that it would suffer financial distress, but no significant sign of financial instability was observed in the trends in financial receipts and disbursements during the early 1990s. Clearly, South Korea benefited from its rapid economic growth during the 1990s (Lee 2003). However, the economic crisis of late 1997 introduced a severe financial deficit challenge to South Korea's NHI, and the deficit grew constantly each year (Kwon 2002; Lee 2003; Jeong 2005). Successful completion of universal insurance coverage has resulted in the rapid increase in healthcare expenditure in South Korea from $169 (4.0% of GDP) per capita in 1985 to $1,074 (5.6% of GDP) in 2003, an average annual growth rate of 29.8%.

Since 1998, the cost containment and stabilization of the NHI financial deficit has been a pressing mission for the South Korean NHIC. To contain healthcare spending, two consumer-side schemes have been implemented in South Korea. They require patients to obtain referrals from general

Table 6. Immunization and indicators of unhealthy lifestyle (smoking and drinking) among OECD countries, 2003

Country	Percentage of Children Immunized, 2003		Percentage of Population Aged 15 and Older Smoking Daily, 2003		Annual Litres per Capita Alcohol Consumption, Aged 15 and Older, 2003
	D.P.T.	Measles	Men	Women	
Australia	92.2 (21)	94.1 (14)	21.4[b] (27)	18.2[b] (21)	9.8[a] (13)
Austria	84.0 (29)	79.0 (27)	40.7[d] (5)	32.2[d] (1)	11.0[a] (10)
Belgium	97.1[d] (13)	75.0 (29)	30.0 (18)	25.0 (8)	9.6[a] (15)
Canada	84.2[e] (28)	94.5[a] (13)	19.0 (29)	14.0 (27)	7.8[a] (24)
Czech Republic	97.0 (14)	99.1 (4)	30.9[a] (17)	18.1[a] (22)	12.1 (5)
Denmark	96.0 (17)	96.0 (9)	31.0 (15)	25.0 (8)	11.5 (6)
Finland	96.0[a] (17)	97.0[b] (5)	25.7 (23)	19.3 (18)	9.3 (16)
France	97.2 (12)	86.5 (22)	32.0[a] (13)	25.6[a] (7)	14.8[a] (1)
Germany	97.5 (11)	92.5 (18)	29.8 (19)	19.1 (19)	10.2 (12)
Greece*	88.0 (25; 5)	88.0 (21; 4)	44.0[c] (4; 2)	27.0[c] (4; 1)	9.1[a] (18; 4)
Hungary	99.8 (2)	99.9 (2)	40.5 (6)	27.8 (3)	13.4[a] (4)
Iceland	97.0 (14)	93.0 (16)	25.4 (25)	19.6 (16)	6.5 (27)
Ireland	85.0 (26)	78.0 (28)	28.0[a] (20)	26.0[a] (5)	13.5 (3)
Italy	95.8 (19)	83.0 (24)	31.4 (14)	17.6 (24)	8.6[a] (20)
Japan	100.0 (1)	100.0 (1)	48.3 (3)	13.6 (28)	8.2[c] (22)
South Korea*	97.0 (14; 3)	90.2[d] (20; 3)	61.8[b] (1; 1)	5.4[b] (30; 5)	9.3 (16; 3)
Luxembourg	98.0 (6)	91.0 (19)	39.0 (8)	26.0 (5)	14.7[a] (2)
Mexico	97.9 (10)	96.4 (8)	39.1[a] (7)	16.1[a] (25)	4.6[a] (29)
Netherlands	98.0[a] (6)	96.0 (9)	39.0[b] (8)	30.0[b] (2)	9.8[a] (13)
New Zealand*	88.7[c] (24; 4)	85.0[c] (12; 5)	25.0 (26; 5)	25.0 (8; 2)	8.9 (19; 5)
Norway	90.0 (23)	84.0 (23)	27.0 (22)	25.0 (8)	6.0 (28)
Poland	99.0 (4)	97.0 (5)	37.0[b] (10)	19.5[b] (17)	8.1[a] (23)
Portugal*	99.0 (4; 1)	96.0 (9; 2)	32.8[e] (12; 4)	9.5[e] (29; 4)	11.5[a] (6; 1)

Country	Percentage of Children Immunized, 2003		Percentage of Population Aged 15 and Older Smoking Daily, 2003		Annual Litres per Capita Alcohol Consumption, Aged 15 and Older, 2003
	D.P.T.	Measles	Men	Women	
Slovak Republic	99.3 (3)	99.3 (3)	25.5[a] (24)	22.5[a] (14)	7.6 (25)
Spain*	98.0[a] (6; 2)	97.0 (5; 1)	34.2 (11; 3)	22.4 (15; 3)	11.2[a] (8; 2)
Sweden	98.0 (6)	94.0 (15)	16.7 (30)	18.3 (20)	7.0 (26)
Switzerland	95.0 (20)	82.0 (26)	31.0[a] (15)	22.8[a] (13)	10.8 (11)
Turkey	68.0 (30)	75.0 (29)	51.1 (2)	17.8 (23)	1.5 (30)
United Kingdom	91.3 (22)	82.3 (25)	28.0 (20)	24.0 (12)	11.2 (8)
United States	84.8 (27)	93.0 (16)	19.4 (28)	15.7 (26)	8.3[a] (21)
Median	97.0	93.5	31.0	21.0	9.45

Source: *OECD Health Data 2005* (Paris: Organization for Economic Co-operation and Development, 2005)
Note: DPT includes diphtheria, pertussis and tetanus. [a]2002, [b]2001, [c]2000, [d]1999, [e]1998 – not available. Ranking is reported in the brackets.
* countries with GDP per capita ranging from $18,000 to $24,000 in 2003; ranking is reported out of the 30 OECD countries; out of the 5 countries with similar GDP to South Korea.

practitioners to meet a specialist in general hospitals, and they require a high co-payment structure as a mechanism for suppressing the use of expensive and medically unnecessary treatments. These strategies, however, have not been regarded as very helpful in reducing health expenditure. Since the separation reform in pharmaceuticals, total heath expenditure increased greatly from $36.2 billion in 2000, the year of the reform's introduction, to $51.4 billion in 2003. This represents an average annual growth rate of 14%, which was much higher than that of 9.9% from 1995 to 2000. The per capita health expenditure also rose dramatically from $771 in 2000 to $1,074 in 2003, an average annual growth rate of 13.1% that was much higher than that of 11.1% from 1995 to 2000.

The lesson to be learned from the South Korean experience in escalating healthcare costs is that governmental policies to regulate the supply side of the market are essential to maintain the financial worthiness of the NHI system. The five-year experience after the integration reform in South Korea indicates that government cost containment in the absence of effective monitoring on the supply side can no longer succeed in controlling healthcare expenditure (Kwon 2002; Lee 2003). The South Korean government acknowledged the need to control providers' behaviour and conducted several pilot programs of the Diagnosis-Related-Group (DRG) system in the reimbursement scheme. The outcomes of these pilot programs were encouraging: less spending for a specific disease treated under the DRG system than under the fee-for-service system where fees for services provided by hospitals and physicians are set by the government (Kwon 2002). Unfortunately, the government failed in its attempt to enact the DRG reimbursement system for the entire NHI system due to the fierce opposition of the providers, medical professionals and hospitals. Therefore, few cost-containment programs have actually been developed in South Korea. The fixed-fee scheme was the most effective government regulation on providers but was rapidly disrupted when it faced unexpectedly fierce strikes by physicians (Lee 2003; Kwon and Reich 2005). The lack of regulation of the supply side and the expansion of insurance coverage to all citizens led to the rising healthcare costs (Kim et al. 2004). Furthermore, the rising healthcare cost was mostly shifted to consumers as a larger portion of their payrolls is deducted as their contributions. The larger portion of private expenditure (about 55% of the total healthcare expenditure) and high cost sharing for consumers in receiving healthcare

(as reported in Table 4) are consequences of the weak monitoring power of the NHIC.

The other important mission in a universal coverage system is to assure efficient use of medical resources. Concern has been raised that inappropriate and excessive utilization of resources may be generated by the universal coverage in South Korea (Anderson 1989). High coinsurance levels and a wide range of uncovered services were designated to reduce potential overutilization of health services by patients. This response has not been fully successful, however. Physicians tended to provide more uncovered services with higher margins than covered services with lower margins (Kwon 2002), and patients are misled by profit-pursuing physicians to seek the most sophisticated care for modest symptoms (Anderson 1989). Again, the role of the NHIC or any institution responsible for running a universal coverage system is crucial to effectively monitor consumers and providers simultaneously. The key point is to provide accessibility to quality care at reasonable contribution rates for consumers and enable providers to run on reasonable margins that allow investment in facility and medical technology development.

Even though South Korea has achieved universal health insurance for all citizens in a very short time and possesses highly advanced medical technologies, the rapid increase in healthcare expenditure that has been experienced remains a burden to policy makers. In this regard, precisely understanding provider-side incentive, as well as consumers' behaviour, in the healthcare market and constructing effective ways to monitor both consumers and providers are the most urgent and important elements of the policy agenda in South Korea's future healthcare reform. Simultaneously, other missions must be accomplished. The portion of the total OOP expenditure relative to total expenditure may need to be reduced so that people with limited private resources are not alienated from necessary medical care. As an example, the expedited provision of coverage for indispensable preventive services like immunization is desirable. In addition, enhanced health education programs targeting the younger population against unhealthy habits like smoking will be helpful in reducing healthcare expenditure and providing a healthy long life in the long-term.

Notes

1. The average number of visits per physician was calculated by dividing the number of physician visits per capita by the number of practising physicians per capita.

2. The PYLL per 100,000 population was calculated by the OECD centre based on the age-specific death statistics provided by the World Health Organization (WHO). The total OECD population in 1980 was taken as the reference population for age standardization.

3. "The NHI did not provide coverage for ultrasounds, MRIs (Magnetic Resonance Imaging), vaccinations, meals during hospitalization, home care, traditional medication, private hospital rooms (rooms with less than six beds), etc." (Kwon 2002: 26). In this list of health insurance benefits not covered by the Korean NHI, MRIs and hospital meal services were newly included in the covered benefits as of 2005.

4. The true rate of women's smoking, however, would be higher as most surveys rely solely on self-reporting; due to the social and cultural stigma against female smoking in Korea, many female smokers may have a good reason to report wrongly in any survey.

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Living Arrangements and the Role of Caregivers among the Elderly in Latin America

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Abstract

Using the SABE[1] data set, this paper describes the support that the elderly receive from family members, siblings, friends and the community where they live in four Latin American cities. It also reports the activities that the elderly do for their family members. In the four distinct cities included in the study, we find similar trends in terms of living arrangements, the role of caregivers and the type of activities that elderly people provide for their family members. Our findings indicate the elderly without any support tend to be in better health and socio-economic conditions than elderly persons with family or community support; this is likely because healthier individuals need less assistance. Surprisingly, most of the elderly without any help from family members do not receive support from the community either. Daughters inside the household are the most likely caregivers and receive most assistance from the elderly in return. The exchange of services and activities within the household reflects the higher gains that female caregivers receive from taking care of elderly relatives, or the lower wages and consequently their lower cost of providing care. Among the providers of money, sons and daughters share similar characteristics. A significant number of caregivers are in the productive years of their life. A discussion of the policy options to increase elderly health and to improve the role of caregivers is included.

I. Introduction

As the Latin American public becomes more aware of the economic, financial and social implications of the rapid demographic transition occurring in these economies, there is increased pressure to reform the network of health and social services that provide support to seniors. Evidence suggests that the populations of Latin American countries are aging at a faster rate than those of some developed countries (Shrestha 2000). Regional trends track global ones, but some important differences are worth noting. For example, in 2000, 5.5% of the region's population was over the age of 65. In the rest of the world, however, 6.9% of the population was over the age of 65 (Arriagada 2003). The percentage of elderly is projected to increase in Latin America to 6.5% by the year 2010 and to 8.5% by 2020, growing much faster than the average for the rest of the globe. In addition, the expected growth in the proportion of the region's population over the age of 80, the "very elderly," is faster than the global trend (Arriagada 2003). Rapid improvements in survival rates for this age group will have a tremendous impact on future medical care expenditures, which in time will force governments to develop policies to meet future demand.

Argentina and Chile, two of the countries included in this study, have expected growth rates in their elderly populations (as a proportion of their total population) that not only exceed global growth rates for this age group, but also exceed the average growth rate for all of Latin America. According to Arriagada (2003), by 2010, when 6.5% of the region's population is expected to be age 65 or older, the percentage in Argentina is estimated to reach 10.4%, and in Chile 8.8%. Even more significant, however, is the expected several-fold increase in the proportion of individuals over the age of 80. By 2020, for example, it is projected that 2.8% and 2.4% of Argentineans and Chileans, respectively, will be in this age group. The expected percentage for the other nations in this region averages only 1.8%. Currently there are approximately 50 persons older than 65 years of age for every 100 children under 5 years of age in Argentina and Chile, and these figures are expected to increase dramatically. By the year 2025, it is projected that in Argentina and Chile there will be 87 seniors for every 100 children under 5 (Arriagada 2003).[2]

The needs of these rapidly growing elderly populations, in particular the needs of the very elderly, may force these nations to develop new systems geared toward providing seniors with financial support, formal and informal social support, and healthcare. How governments in Latin American economies decide to distribute the costs of this rapid aging process among different members of society will affect fundamental economic and social changes in the future. Some of the suggested policies to handle this situation involve shifting part of these costs back to families.

The widespread pattern of co-residence among the elderly and adult children in this region may be viewed as an asset that could be utilized to redistribute this burden. Yet as the average family size becomes smaller, the number of relatives available to provide care for the elderly also declines. This reduction in the pool of available caregivers will be worsened by the increase in competing roles that caregivers will have in the future. Caregivers for the elderly often provide care at the expense of other choices in areas such as type of occupation, leisure, career prospects, education, income and pension benefits. This will be particularly relevant for women as their participation in the formal labour force increases and as they work more often outside their home.

Traditionally, the role of women as caregivers for the elderly has been regarded as a critical source of support for seniors. It is well documented that females assume a greater burden of caregiving activities for the elderly than males do (Stone et al. 1987; Conway-Giustra et al. 2002). For instance, Bos and Bos (2007) report that for 93% of all patients who had a stroke and returned home with some level of dependency, the caregivers were female. The role of women in the labour force is expected to increase rather than decline in importance in the years to come (Arriagada 2003) because of longer periods of low fertility. This increasing role of women's labour force participation in the economic growth of these countries may create conflicts with their ability to continue providing informal care for the elderly.

Using data on informal caregivers in Britain, Heitmueller and Inglis (2004) report that caregivers are less likely to participate in the labour force. Although this analysis was performed using data for

Britain, the findings could be relevant to developing countries, given the longitudinal nature of the data used in this analysis.[3] According to Heitmueller and Inglis's findings, only 14% of working-age individuals are caring for sick, disabled and elderly relatives and friends. The vast majority are women, and over 76% of all caregivers are combining work and caring responsibilities. In addition, caregivers who are not working when the caring activities end are less likely to re-enter the labour market. Lastly, adjusting for individual characteristics, pay differences between informal caregivers and non-caregivers could be around 6%, and this gap could be larger for women. Both the greater difficulty for older individuals to re-enter the labour force and the lower wages that caregivers will receive once they find a new job may reduce the likelihood that a female decides to quit her job to care for elderly relatives.

As women who work are less able and less willing to care for the elderly, more private and government expenditures will potentially be needed to substitute for this care. However, if the need to care for the aging population draws women out of the labour market, this in time could hurt their ability to save for retirement and the overall ability of these societies to sustain economic growth in the future. Additionally, human capital deterioration, including mental health and medical costs that result from the stress of providing care, is a serious concern (Van den Berg and Ferrer-i-Carbonell 2004). In particular, women may have a higher level of depression and in general a lower level of well-being than men (Pinquart and Sorensen 2006). On the other hand, assistance to the elderly may have a positive influence on the life of caregivers, their sons and daughters, and their relationships (Donelan et al. 2002). Examining these incentives and exploring alternatives in which women could simultaneously remain at their jobs and still provide care for the elderly are serious policy concerns that demand careful analysis.

Alternatively, one could foresee a greater role for men as caregivers within families as a consequence of changes to family structure driven by the demographic transition in the region. Thus, it is important to understand the main differences between the sexes during middle age in terms of the decision to work and to provide care for the elderly.

Lastly, informal care may be less expensive and more effective for the elderly than formal care. Minor changes in informal care could translate into lower demand for more costly formal care. For instance, in the case of the US, Van Houtven and Norton (2005) report that over the 2-year recall period, a 10% increase in the number of users of informal care leads to a 0.87 percentage point decline in the likelihood of home healthcare use and a 2-night reduction in nursing-home use. These authors also report that informal care reduces hospital use and physician visits. According to this study, informal care is a net substitute for formal healthcare expenditures. Hence there is a clear tradeoff for policy makers to develop alternatives that enhance the provision of informal care in these economies.

In summary, our analysis addresses the following three concerns:

(a) What are the demographic and socio-economic characteristics of the elderly without any support network?
(b) The elderly may underestimate the cost of living alone due to their inability to process information related to the transition into formal care use and the low rate of discount associated with long-term health consequences. What are the characteristics of the caregivers (both inside and outside the household) who provide care for the male and female elderly? What are the main services/tasks that female and male caregivers provide for the elderly?
(c) Are the elderly returning the care?

II. Theoretical Framework and Previous Empirical Findings

II.A. Theoretical Framework on Caregiving Activities for the Elderly

According to the literature females are more likely than males to provide informal care to their

elderly parents (see for example Finley 1989; Lee et al. 1993; Neal et al. 1997; Iacovou, 2000; Sarkisian and Gerstel, 2004). In an extensive review of the literature, Pinquart and Sorensen (2006) reported that females provide more caregiving hours, help with more caregiving tasks and assist with more personal care than males. In addition, they found the elderly who receive help from females have more health problems.

Five hypotheses have been advanced to explain the gender gap in the provision of informal care for the elderly: the cost-of-time or time-availability hypothesis, the socialization hypothesis, the external-resources hypothesis, the specialization-of-task hypothesis and the gender-of-parents hypothesis (see Finley 1989 and Lee et al. 1993). Each of these hypotheses is likely to be a factor in explaining the individual's decision to provide care to an elderly person.

In the first hypothesis, the assumption that informal care is more likely to be provided by females exists because they have less competing demands on their time for family activities than males do. Due to lower wages, females present a lower cost of providing care to an elderly. Empirical evidence suggests some problems with this hypothesis.

Regarding the second hypothesis, informal care is the consequence of gender-role socialization rather than a negotiation process related to the availability of time. Informal care is more the consequence of attitudes toward responsibility for elderly parents. An indirect test of this hypothesis could be of particular relevance in the context of Latin American countries. In particular, if gender-role socialization is found to be the case, working women and women outside the labour force should provide similar types and levels of informal care. Alternatively, if results suggest that working women are less likely to provide informal care than non-working women, they lend credence to the cost-of-time hypothesis. Comparing married and non-married women and their roles as informal caregivers could also shed some light regarding the second hypothesis.[4]

The third hypothesis, the external-resources hypothesis, asserts that relative resources obtained externally (such as income, education and career performance) determine the division of labour in the provision of informal care to the elderly. For instance, as the education of daughters becomes more similar to the education of sons, one will see a convergence of the responsibility to care for the elderly.

The fourth hypothesis suggests that females may be more efficient at providing informal care for the elderly than males are. In this case, the type of activities for the elderly could differ between males and females because of a process of specialization among family members.

Lastly, Lee et al. (1993) suggest that the gender of the caregiver depends on the gender of the parents requiring care. In particular, females are more likely to provide care to their mothers and males to their fathers. Therefore, since females report being sick and disabled more often than males and live longer, daughters would be more likely than sons to provide care for elderly parents.

Two additional hypotheses have been suggested to explain gender gaps in caregiving activities: differential gains for caregivers from taking care of the parents, and the principle of substitution (Shanas 1979). Regarding the former, elderly parents also contribute back in exchange for their offspring's caregiving activities. If this is the case, sons and daughters may receive different marginal benefits from taking care of aging parents. Variations in the amount and types of care could be due to differences in the value of these marginal gains. The second hypothesis, the principle of substitution, assumes that the choice of caregiver follows a hierarchical pattern. The established pattern of care is for the older adult's spouse to be the primary caregiver, with an adult daughter as the secondary caregiver should the spouse be absent. Without the availability of either, another family member assumes the primary caregiver responsibilities. Elderly individuals without family members must rely on community aid.

These previous hypotheses come mainly from work in sociology and social work. During the past 10 years, the economic literature has developed strategic models of bargaining within the family unit to predict the child's decision to provide care to an elderly parent. See, for example, Hiedemann and Stern (1999) and Enger and Stern (2002). Interestingly, most of the predictions from these economic models fit some of the previous hypotheses.

On the empirical side, the availability of long panel data and the possibility of finding good instruments to control for the endogeneity of some of the child and parent variables have been the major challenges to understanding the dynamics behind the child's decision to care for elderly parents. Sterns (1995), using panel data for the US, verifies some of these hypotheses after controlling for the endogeneity of some child variables, such as distance and working status. His findings suggest a moderate to low effect of the elderly parent's sex, age, race and health, and the caregiver's sex and marital status. Yet the parent's marital status and the child's distance to the parent's home have a large effect on the decision to provide care. After controlling for endogenous factors, work status is no longer significant in the child's decision to provide care (Sterns 1995).

In this report, due to insufficient data, we will not be able to test any of these hypotheses directly. In some instances, we will infer from the empirical findings the relevance of explanations. Our primary aim is to describe the living arrangements of the elderly in these countries and examine gender differences that we observe in the data regarding the help and support that the elderly receive from family members and friends.

II.B. Previous Empirical Findings

In spite of the relevance of these issues, few analytical papers explore the links between the health of the elderly population and the role of caregivers in Latin America. In this section, we will summarize some findings that have relevance to the current analysis. Although these findings are for Sao Paulo (Brazil), the general characteristics reported for the city are similar to those of the other cities included in this study. Most findings reported in this section are from a study by Saad (2002) using the SABE[1] data set.

In general, the elderly in this city report having an important family network that could be an asset and a source of informal care. For instance, in Sao Paulo, 57% of the elderly report having three or more living children. Regarding their living arrangements, 13% of the elderly live alone, 27% with their spouse, 40% with unmarried children and 11% with married children. This clearly reflects the relevance of informal care for these seniors. The elderly living alone are more likely to be unmarried males with fewer living children. Interestingly, elderly people living alone report higher educational levels and income than those not living alone.

A large proportion of the elderly in these economies receive some help from family members within the household. In Sao Paulo, 61% of seniors receive monetary transfers, while 78% receive help in the provision of home services. Clearly, these transfers from family members could be an important determinant of the health and medical care consumption of seniors in this country. Likewise, 49% of the elderly provide monetary transfers to family members within their household. As explained below, this interaction between the elderly and other family members influences the probability that an individual will provide informal care for the elderly. Lastly, household members are more likely to provide care than members outside the household. Household members are also more likely to receive monetary transfers from the elderly.

In this paper, we describe in further detail the characteristics of the elderly living alone and not receiving any support. We then move to analyze the characteristics of those receiving support from family members or friends. Lastly, we explore the caregivers' characteristics and the type of help they provide to the elderly.

III. Methods and Data Description

III.A. Methods

We first proceed to describe the elderly person's living arrangements and the individual characteristics of family members and friends providing care. This descriptive analysis is done separately for male and female elderly using the SABE data set for the following four cities: Buenos Aires (Argentina), Sao Paulo (Brazil), Santiago (Chile) and Ciudad de Mexico (Mexico). In this report, we use the country's name to refer to each of these cities.

The SABE data set collected information about the gender, age, family relationship, literacy, education, marital status and working condition of the caregivers, as well as whether they live inside or outside the household. From this analysis, we compare the individual characteristics of family members and friends who provide care with the characteristics of those who do not. For those who identify themselves as principal caregivers, the SABE data set provides additional information that will be analyzed in this project.

This analysis is done separately for male and female caregivers so that we could gain an initial idea about whether females are more likely than males to provide care to their aging parents. Notice that some of the hypotheses discussed above regarding differences in gender and caregiver roles could be indirectly evaluated at this level. For instance, we could determine if an employed son is less likely to provide care for his parent than an employed daughter. We could also evaluate differences among caregivers while holding gender constant. For example, we could ask if married females are less likely than unmarried ones to provide care for the elderly. Yet, with the available data, we could only establish statistical association between the determinants of caregiving activities rather than establishing cause–effect relationships between the individual's decision to provide care and his or her characteristics.

Next, we investigate the types of activities that caregivers provide for the elderly and whether this help is monetary or non-monetary (e.g., preparing meals, helping with transportation and assisting with activities at home). We perform this analysis separately for male and female caregivers. In sum, from this analysis we could gain some knowledge about the relevance of the specialization-of-task hypothesis. In addition, the SABE data set allows one to describe the type and frequency of activities that the elderly perform for other household members. Therefore, in this part of the analysis, we evaluate the monetary and non-monetary feedback that occurs within the household from the elderly to family members. Some of these results could be consistent with the differential-gains hypothesis.

In sum, from this descriptive analysis, we gain valuable insights that may inform policy makers about the design and implementation of policies that affect elderly populations in these countries.

III.B. Data Source and Relevance of the Data

The SABE database is a cross-sectional survey that collects information about the health status and health conditions of the elderly population in seven representative cities in Argentina, Barbados, Brazil, Chile, Cuba, Mexico and Uruguay.[5] The survey includes only representative samples of individuals older than 60 years of age living in urban areas. The weighting procedure used in each city is fully described in the User's Manual for the SABE databases published by the Pan American Health Organization (2004). In addition, the sampling design accounts for potential problems of under-representation in the final sample of individuals over 80 years of age, as well as institutionalized individuals. Information included in the survey is similar to that provided by the Health and Retirement Survey (HRS) in the United States.

Key features of the SABE survey make it particularly suitable for answering the questions this paper posed. First, it records information about individual characteristics of each person living in the household with the elderly. The survey also contains detailed information describing family and friends who provide care for the elderly who live outside the household. It also provides information about tasks that caregivers supply for the elderly. Finally, in each country included in the survey, similar questionnaires were used, facilitating a comparative analysis.

III.B.1. Measurement of Caregiving Activities in the SABE Database

Of particular relevance for this analysis are the battery of questions that the survey includes regarding the caregivers' characteristics and the activities that caregivers provide for elderly relatives. In the section on the social support network and transfers, the survey captures the main individual characteristics of family members within the household as well as those of children who do not live at home, brothers and sisters outside the household, and other family and friends.[6] The survey includes questions about the help that each of the individuals inside and outside the household give to the

elderly. It also identifies the transfers and help that the seniors receive from the community. As pointed out before, for each caregiver inside or outside the household, one is able to identify the relationship with the elderly person, the gender, age, marital status, literacy, education level and working status.

Regarding the type of activities that the caregiver provides, the survey reports whether he or she helps by giving money, providing services such as transportation, housework, and so forth, or giving things that the elderly need, such as food and clothing. The respondent was able to provide up to three choices. So one may have among the caregivers someone who provides all three activities, just two, or only one.

It is important to clarify that the respondent was not asked to rank which activity was the most important, or to quantify the magnitude of help provided. Given this limitation, we created three new dummy variables to identify the caregivers: money, which equals 1 if the household member was reported as giving money as first, second or third choice; services, equal to 1 if the household member was reported as giving services as first, second or third choice; and things, equal to 1 if the household member was reported as giving things as first, second or third choice. We identify a caregiver as an individual who provides either money, services or things (i.e., someone who reports any of the new variables equal to 1). We code as non-caregivers all individuals who do not provide any type of assistance.

The survey also includes a question regarding the frequency with which the caregiver provides help. In this case, frequency is in terms of times per period (week, month and year). Since the survey does not ask about the magnitude of help, this question was of little use. For instance, one may observe a household member who provides an amount of money once a month that is greater than that from the member who provides money four times a week. In sum, given the set of questions in the SABE questionnaire, we are not able to rank which activity is the most important for each caregiver.

Lastly, the instrument includes a similar set of questions to examine help that family members inside or outside the household receive from the elderly person. In this case, the survey also captures whether the elderly person provides childcare. To analyze this question, we create dummy variables for money, services, things and childcare. Once we identify the elderly who provide any type of help, we correlate these variables with information regarding the relationship between the elderly person and family members or friends who are receiving help. We use the following categories: wife, husband, daughter, son, other female relatives, other male relatives, non-relative females and non-relative males.

III.C. Initial Description of Household Characteristics

Table 1 describes the characteristics of households where at least one member is an elderly person for all the countries in this research. Findings suggest that the average elderly person in these countries lives with more than three people in the household. Mexico reports the highest number of household members (4.2), while Argentina reports the lowest (2.7). Interestingly, in most cases, an elderly person is head of the household. For instance, in Brazil, an elderly person is head of 89% of households. This figure reaches 90% in Argentina.

The average age of household members fluctuates between 46 and 61 years. Mexico shows the youngest composition of households. The typical household with an elderly resident has on average almost two females members. In all cities included in the study, the proportion of females in the household is around 50%.

In addition, each household in these countries reports having at least two literate members. The percentage of households with at least one college-educated member varies significantly. In Brazil the figure is 7.4%, while Mexico has the highest proportion at 28%.

Lastly, in Chile 63% of households included in the study have at least one married member. Interestingly, a similar proportion is reported in Brazil and Mexico, while Argentina reports the lowest proportion, 55%. In all countries with the exception of Argentina, at least one household member is employed or seeking employment.

Table 1. Brazil, Argentina, Mexico, and Chile

Household Characteristics Weighted Statistics	Brazil Mean	Argentina Mean	Mexico Mean	Chile Mean
1) Average number of household members	3.139 (0.071)[1]	2.696 (0.049)	4.207 (0.087)	3.931 (0.087)
2) Average number of households where an elderly is the head of the household	0.886 (0.010)	0.903 (0.009)	0.753 (0.011)	0.874 (0.013)
3) Average age of the household members	55.791 (0.694)	61.32 (0.531)	45.56 (0.581)	51.52 (0.772)
4) Average number of females in the household	1.730 (0.039)	1.501 (0.032)	2.378 (0.054)	2.105 (0.034)
5) Average number of literate individuals in the household	1.910 (0.061)	1.589 (0.045)	2.862 (0.069)	2.683 (0.071)
6) Fraction of household members with at least one member with college education	0.074 (0.007)	0.098 (0.062)	0.278 (0.015)	0.169 (0.032)
7) Fraction of households with at least one member who is married	0.613 (0.006)	0.551 (0.016)	0.646 (0.015)	0.629 (0.019)
8) Average number of household members employed or seeking employment	1.095 (0.052)	0.785 (0.032)	1.633 (0.051)	1.241 (0.049)

1) Standard error given in parenthesis.

IV. Results

In this section, we answer the three questions that we posed at the beginning of the paper. For each, we present results in the following order: Sao Paulo, Brazil; Buenos Aires, Argentina; Santiago, Chile and Ciudad de Mexico, Mexico. We then summarize the common findings in each city. Although we discuss results for all countries in the analysis, in the following section we show results only for Brazil. Similar tables that include specific findings for the remaining countries in the study are available on request from the authors.

IV.A. What are the demographic and socio-economic characteristics of the elderly without any support network?

Table 2 summarizes the results for Brazil. Interestingly, the elderly characteristics by support network are very consistent across countries included in the study when one compares the group of elderly not receiving any support from members within or outside the household. The group of elderly receiving the least support reports the highest functional self-reported health status, ADL index and IADL.[7]

Furthermore, not only is their functional health better, but they also show higher income and asset levels and more education than the other two groups of elderly receiving some support. Although the average age is very similar in all groups (see Table 2), members of this group are more likely to be male. This finding is consistent in all countries except Argentina.

IV.B. What are the characteristics of the caregivers (both inside and outside the household) who provide care for the male and female elderly? What are the main services/tasks that female and male caregivers provide for the elderly?

In Brazil (Table 3), caregivers within the household who provide money are more likely to be male,

around 49 years of age,[8] working and with more education than individuals who are not providing money. In addition, providers of money within the household are more likely to be married than household members who are not providing money. Findings indicate that providers of services are more likely to be female, older and less educated than household members not providing services.

Table 2. Brazil

Elderly demographic, socio-economic, and baseline health characteristics by support network Weighted Statistics					
	GROUP 1[2]		GROUP 2[3]		GROUP 3[4]
	Receiving any support within the household [5]		Among the 159 elderly receiving support from children, siblings or friends		Among the 74 elderly receiving support from the community
	Yes (1,650) Mean	No (159) Mean	Yes (85) Mean	No (74) Mean	No (74) Mean
Number of members in the household	3.55 (0.070)	2.654 (0.092)	2.376 (0.102)	2.946 (0.160)	2.965 (0.162)
Age of the elderly	69.101 (0.392)	67.576 (0.667)	68.102 (0.879)	67.026 (0.759)	66.877 (0.768)
Gender (1= female)	0.558 (0.012)	0.568 0.058	0.616 (0.073)	0.518 (0.066)	0.507 (0.066)
Years of education[6]	1.335 (0.060)	1.641 (0.164)	1.587 (0.190)	1.711 (0.220)	1.738 (0.229)
Total wealth[7]	352.371 (7.423)	401.2 (12.737)	427.5 (20.3)	373.0 16.8	373.1 (17.0)
Self-reported health status[8]	2.506 (0.083)	2.653 (0.083)	2.614 (0.145)	2.693 (0.094)	2.695 (0.096)
ADL index[9]	6.799 (0.092)	7.158 (0.219)	7.385 (0.246)	6.911 (0.349)	6.919 (0.353)
IADL index[10]	13.523 (0.104)	14.331 (0.163)	14.332 (0.147)	14.330 (0.260)	14.317 (0.265)

1) Standard error given in parenthesis.
2) Group 1 includes all elderly receiving support from inside the household.
3) Group 2 includes the elderly only receiving support from outside the household from children, siblings or friends.
4) Group 3 includes the elderly only receiving support from the community.
5) Support refers to any help in money, services, things or others.
6) Years of education was code 1 = elementary, 2 = secondary, 3 = technical, 4 = college.
7) Wealth is based on price index of assets in the household adjusted by household size.
8) Self-reported health status was coded 5 = excellent, 4 = very good, 3 = good, 2 = fair and 1 = poor.
9) ADL is an indicator from 0 to 10 (0 = worst condition).
10) IADL is an indicator from 0 to 15 (0 = worst condition).

Among providers of money within the households (Table 4), females are younger, better educated, more likely to be working and less likely to be married than males who provide money. For comparisons of male and female providers of services and things, results suggest smaller differences. This

Table 3. Brazil

Caregiver demographic and socio-economic characteristics by provision of money, services, and things Weighted Statistics												
	Money[1]				Services[2]				Things[3]			
	Yes		No		Yes		No		Yes		No	
	Mean	Std err	Mean	Std err	Mean	Std err	Mean	Std err	Mean	Std err	Mean	Std err
I. Caregivers within the household (n=3,500)	**1,405**		**2,095**		**2,269**		**1,231**		**1,569**		**1,931**	
Gender (females=1)	0.432	(0.018)	0.650	(0.015)	0.656	(0.011)	0.388	(0.019)	0.520	(0.016)	0.586	(0.014)
Age[6]	48.692	(1.135)	36.981	(1.105)	47.737	(0.828)	31.866	(1.186)	49.002	(0.891)	36.638	(1.090)
Literacy[4]	0.948	(0.009)	0.914	(0.010)	0.932	(0.008)	0.923	(0.010)	0.956	(0.007)	0.906	(0.010)
Level of education[7]	1.918	(0.062)	1.631	(0.055)	1.725	(0.050)	1.832	(0.074)	1.881	(0.057)	1.660	(0.059)
Marital status[9]	0.448	(0.021)	0.480	(0.016)	0.509	(0.015)	0.357	(0.016)	0.510	(0.021)	0.424	(0.015)
Work status[8]	0.704	(0.021)	0.466	(0.022)	0.530	(0.017)	0.694	(0.021)	0.675	(0.020)	0.489	(0.018)
II. Caregivers outside the household: children (n=1,689)	**836**		**853**		**551**		**1,138**		**803**		**886**	
Gender (females=1)	0.524	(0.024)	0.612	(0.024)	0.587	(0.035)	0.557	(0.025)	0.624	(0.024)	0.517	(0.023)
Age[6]	40.487	(0.604)	41.591	(0.775)	41.744	(0.917)	40.676	(0.596)	41.551	(0.755)	40.542	(0.644)
Level of education[7]	2.303	(0.103)	1.951	(0.121)	2.109	(0.102)	2.149	(0.113)	2.116	(0.108)	2.155	(0.107)
Marital status[9]	0.862	(0.018)	0.868	(0.021)	0.833	(0.019)	0.879	(0.019)	0.859	(0.018)	0.871	(0.018)
Work status[8]	0.797	(0.024)	0.716	(0.019)	0.697	(0.027)	0.785	(0.022)	0.776	(0.019)	0.743	(0.026)
Location[10]	0.812	(0.028)	0.887	(0.015)	0.926	(0.020)	0.814	(0.021)	0.877	(0.021)	0.824	(0.020)
III. Caregivers outside the household: siblings (n=246)[5]	**73**		**173**		**32**		**214**		**88**		**158**	
Gender (females=1)	0.515	(0.081)	0.631	(0.049)	0.573	(0.126)	0.601	(0.040)	0.669	(0.048)	0.549	(0.050)
Age[6]	65.157	(0.582)	63.286	(0.925)	61.113	(1.618)	64.451	(0.961)	61.415	(1.217)	65.432	(0.035)
Marital status[9]	0.668	(0.071)	0.558	(0.058)	0.572	(0.111)	0.596	(0.054)	0.626	(0.089)	0.570	(0.051)
Work status[8]	0.275	(0.061)	0.375	(0.046)	0.375	(0.082)	0.340	(0.044)	0.433	(0.061)	0.287	(0.048)
Location[10]	0.749	(0.066)	0.800	(0.051)	0.940	(0.040)	0.753	(0.047)	0.880	(0.039)	0.720	(0.057)

1) Money was coded 1 if the household member was reported as giving money as a first, second or third option.
2) Services was coded 1 if the household member was reported as performing services as a first, second or third option.
3) Things was coded 1 if the household member was reported as giving things as a first, second or third option.
4) Literacy was not reported for any caregiver outside the household.
5) Education was not reported for siblings or other caregivers.
6) Individuals younger than 12 years of age were not counted as caregivers .
7) Education was coded 0 = no school, 1 = elementary, 2 = secondary, 3 = technical and 4 = college.
8) Working Status was coded 0 = non-working, 1 = working.
9) Marital status was coded 0 = non-married,1 = married.
10) Location was coded 0 = living outside the city, 1 = living within the neighbourhood or in the same city.

may reflect the external-resources hypothesis, which predicts that working women are less likely to provide services such as transportation and housekeeping and more likely to provide money. This imitates the patterns of male assistance to the elderly that are conditional on working. One may expect the convergence of roles among male and female caregivers to continue as women remain in the labour force for longer periods and their wages become an important source of household income. The provision of informal care to elderly parents would change from providing service activities toward providing money.

Other caregivers outside the household who are the children of the elderly and provide money are more likely to be female, working and better educated than caregivers within the household. Child caregivers who provide money are less likely to be living in the same neighborhood or city as their parent than child caregivers who provide services. Checkovich and Stern (2002) show empirical evidence that distance from the parent, among other factors (e.g., gender, work status, number of siblings, occupation and marital status) influences the individual decision to provide care for the elderly. In particular, the farther away a child lives, the less likely he or she is to provide care for the parents. In service activities, caregivers are more likely to be female, outside the labour force and with fewer years of education. Male and female children who provide money are of similar age, but females are less well educated, less likely to be married and less likely to be in the labour force. This same pattern presents itself for providers of services and things. Of particular relevance would be the marital and work status of child caregivers, where females are far less likely to be married or working than males. Overall, these results fit the predictions from the time-availability hypothesis. In other words, females are more likely to provide services to the elderly since they have fewer competing demands on their time, given their employment and marital status.

Regarding siblings who provide services or things to the elderly, caregivers are more likely to be females who live in the same neighborhood or city as their brother or sister. Among sibling providers of money, services and things, males are more likely to be married than females.

As in Brazil, caregivers in Argentina who live within the household and provide money are more likely to be married males around 52 years of age, with more education and higher employment status than individuals who are not providing money. Providers of services within the household are more likely to be unemployed females and older than those who do not provide services. Lastly, providers of things are more likely to be married, older and with more education. Among providers of money within the household, females are younger, better educated and less likely to be married than males who provide money. Female providers of services and things within the household are more likely to be outside the labour force than males who provide the same services.

Unlike their counterparts in Brazil, child caregivers in Argentina outside the household who provide money have very similar characteristics to those of non-providers. Surprisingly, education rates are lower for children who provide money. In service activities, caregivers are more likely to be females outside the labour force, with fewer years of education.

Among providers of money in Argentina, female children are more educated and less likely to be married than male children. Of particular relevance would be the work status of child caregivers providing money, services and things, where females are far less likely to be working than males. Concerning siblings who provide services or things to the elderly, caregivers are more likely to be females living in the same neighborhood or city as their brother or sister.

In Chile, most caregiver characteristics follow patterns presented for Brazil and Argentina. Here, we will highlight only where these patterns differ.

In particular, providers of money within the household are less likely to be married than household members who do not provide money. Among these providers of money, males and females have similar education levels. As in Argentina, female providers of services and things in Chile are far less likely to be working than males providing these same services.

Child caregivers outside the household are more likely to be female. Chile presents a unique finding, where female siblings providing money are more likely to be working than males. Other

caregivers outside the household are more likely to be male for the provision of money, but female for the provision of services or things.

In Mexico, we also observe a similar pattern to that described for Brazil and Argentina. A comparison of males and females within the household who provide services and things reveals that females

Table 4. Brazil

Socio-economic characteristics of the providers of money, services, and things by gender Weighted Statistics												
	Money[1]				Services[2]				Things[3]			
	Male		Female		Male		Female		Male		Female	
	Mean	Std err	Mean	Std err	Mean	Std err	Mean	Std err	Mean	Std err	Mean	Std err
I. Caregivers within the household	**777**		**628**		**759**		**1,510**		**746**		**823**	
Age[6]	51.418	(1.376)	45.087	(1.222)	47.374	(1.071)	47.929	(0.924)	51.821	(1.166)	46.387	(0.994)
Literacy[4]	0.935	(0.012)	0.965	(0.009)	0.918	(0.010)	0.958	(0.008)	0.958	(0.008)	0.956	(0.010)
Level of education[7]	1.813	(0.070)	2.052	(0.087)	1.703	(0.046)	1.765	(0.079)	1.768	(0.070)	1.985	(0.066)
Marital status[9]	0.550	(0.030)	0.316	(0.024)	0.520	(0.023)	0.503	(0.017)	0.613	(0.028)	0.415	(0.025)
Work status	0.682	(0.023)	0.732	(0.030)	0.638	(0.024)	0.473	(0.020)	0.704	(0.023)	0.647	(0.028)
II. Caregivers outside the household: children	**400**		**436**		**211**		**340**		**315**		**488**	
Age[6]	40.646	(0.707)	40.338	(0.656)	41.608	(1.219)	41.849	(1.078)	41.811	(0.955)	41.383	(0.744)
Level education[7]	2.400	(0.146)	2.214	(0.110)	2.382	(0.168)	1.907	(0.089)	2.078	(0.157)	2.138	(0.108)
Marital status[9]	0.906	(0.023)	0.823	(0.025)	0.902	(0.026)	0.785	(0.030)	0.922	(0.021)	0.822	(0.023)
Work status[8]	0.964	(0.011)	0.646	(0.042)	0.937	(0.021)	0.528	(0.032)	0.962	(0.012)	0.664	(0.028)
Location[10]	0.823	(0.036)	0.802	(0.030)	0.891	(0.040)	0.951	(0.019)	0.894	(0.032)	0.866	(0.027)
III. Caregivers outside the household: siblings5	**37**		**36**		**16**		**16**		**31**		**57**	
Age[6]	65.183	(2.208)	65.135	(2.044)	60.444	(3.913)	61.646	(1.622)	60.401	(2.556)	61.891	(1.282)
Marital status[9]	0.789	(0.081)	0.554	(0.125)	0.739	(0.160)	0.447	(0.183)	0.825	(0.085)	0.527	(0.122)
Work status[8]	0.298	(0.103)	0.253	(0.068)	0.342	(0.148)	0.400	(0.139)	0.569	(0.116)	0.367	(0.085)
Location[10]	0.782	(0.071)	0.719	(0.117)	0.860	(0.081)	ID[11]	ID[11]	0.886	(0.073)	0.877	(0.048)

1) Money was coded 1 if the household member was reported as giving money as a first, second or third option.
2) Services was coded 1 if the household member was reported as performing services as a first, second or third option.
3) Things was coded 1 if the household member was reported as giving things as a first, second or third option.
4) Literacy was not reported for any caregiver outside the household.
5) Education was not reported for siblings or other caregivers.
6) Individuals younger than 12 years of age were not counted as caregivers.
7) Education was coded 0 = no school, 1 = elementary, 2 = secondary, 3 = technical and 4 = college.
8) Working status was coded 0 = non-working, 1 = working.
9) Marital status was coded 0 = non-married,1 = married.
10) Location was coded 0 =l iving outside the city, 1 = living within the neighbourhood or in the same city.
11) ID indicates insufficient data.

are less likely to be married or working than males. Interestingly, females providing money from within the household are less likely than males to be working. In addition, children outside the household who provide money are more likely to be male, and these males have more education than females providing money. Female child caregivers providing money are more likely to be married than male child caregivers who provide money. For the provision of money, services and things, male siblings are more likely to be working. Lastly, regarding siblings who provide care to the elderly, caregivers are more like to be males.

When one looks at the distribution of caregivers, as Table 5 illustrates, daughters are principle contributors of money, services and things in all countries. In Brazil and Mexico, daughters represent the largest share of caregivers in all categories of assistance – amounting to almost 30%. Chile is the only exception, where sons contribute the most, and daughters fall behind husbands in the provision of money, services and things. This may be a result of social practices, contradicting the socialization hypothesis stating females are socially more likely to provide informal care. Although daughters represent the largest share of caregivers, the difference in share between daughters and sons with respect to the provision of money is smaller than the difference with respect to services and things. In general, for services and things daughters play a larger role than sons do. Surprisingly, Levine et al. 2005 noted that in the US, young adult caregivers (aged between 18 and 25) are more likely to be males caring for an elderly relative than females. Most of these males care for an elderly female adult.

In summary, female caregivers who provide money tend to be more educated, less likely to be married and more likely to be in the work force than females who provide services and things. Stone et al. (1987) and Wakabayashi and Donato (2005) found similar results among females in the US. In particular, providing care for the elderly leads to reduced labour force participation as well as reduced weekly hours and annual earnings among those who are working. Additionally, in the US, Conway-Giustra et al. (2002) noted that due to the reduction in labour force participation, female caregivers in the US lose an average of $550,000 in lifetime wealth and $2100 annually in Social Security benefits. These US findings may indicate some changes that could take place in Latin American countries over the next two decades.

Moreover, using instrumental variable techniques, Ettner (1996) showed a large negative effect on the labour supply of both men and women who provide care for the elderly, with the effect of women being larger. Yet Doty et al. (1998) presented findings that contradict this negative relation between caregiving and labour force participation among females. According to their results, this conflict between employment and informal care happens within only a minority of caregivers, since the vast majority of primary caregivers decided to help their relatives when they were already in a stage of life beyond employment. This may be the case in our study, because the average age of caregivers in all countries is relatively high, around 45 years of age. In addition, Wolf and Soldo (1994) also provide evidence that there is no relationship between provision of elderly care and employment or conditional hours of work.

Finally, among providers of money within the household, females tend to be younger, better educated and less likely to be married than the males who provide money. Their labour force participation seems very similar to the working status of males. In the case of services and things, female caregivers tend to be less educated and less likely to be working than males providing services and things. In general, daughters play a larger role in services and things, while sons and daughters have a similar share in providing money. This distribution of activities may indicate a division of labour within the household. Basically, females specialized in activities such as preparing meals, housekeeping, transportation and providing clothes, where they could be more efficient than males.

IV.C. Are the Elderly Returning the Care?

As Table 6 shows, female relatives benefit from the largest share of elderly contributions. Significantly, daughters are the main beneficiaries of childcare in all countries. In Mexico, daughters are the greatest recipients of money, services and things. In Brazil, daughters receive the most services. In Chile, recipients of provisions are more likely to be sons. The largest recipient of things is actually female

relatives, but the distribution is more equitable and many relatives receive a share of between 15 and 20%. Wives of the elderly also receive notable contributions. In Brazil, wives receive the largest share of elderly support of money and things, and in Argentina, they receive the largest share of money and services. Overall, females are the main beneficiaries of elderly provision of money, services, things and childcare. These results may be consistent with the differential-gains-for-caregivers hypothesis, where females are more likely to provide care for the elderly than males because they receive more help from the elderly. The exchange of services and activities within the household reflects the marginal gains that female caregivers receive from taking care of elderly relatives.

Table 5. Brazil, Argentina, Mexico and Chile

Distribution of caregivers **Weighted Statistics**												
	Brazil			**Argentina**			**Chile**			**Mexico**		
	Money Mean[1]	**Services Mean[2]**	**Things Mean[3]**	**Money Mean[1]**	**Services Mean[2]**	**Things Mean[3]**	**Money Mean[1]**	**Services Mean[2]**	**Things Mean[3]**	**Money Mean[1]**	**Services Mean[2]**	**Things Mean[3]**
I. Caregivers within the household	**1,405**	**2,269**	**1,569**	**584**	**895**	**451**				**2,219**	**1,989**	**1,358**
Wife	0.089	0.242	0.136	0.125	0.223	0.222	0.109	0.107	0.155	0.035	0.122	0.138
	(0.009)[4]	(0.011)	(0.011)	(0.331)	(0.417)	(0.416)	(0.016)	(0.013)	(0.021)	(0.004)	(0.006)	(0.010)
Husband	0.246	0.123	0.194	0.217	0.135	0.113	0.189	0.213	0.206	0.232	0.120	0.169
	(0.015)	(0.007)	(0.011)	(0.413)	(0.342)	(0.317)	(0.014)	(0.014)	(0.020)	(0.010)	(0.007)	(0.011)
Daughter	0.267	0.264	0.285	0.233	0.199	0.235	0.197	0.113	0.102	0.300	0.332	0.293
	(0.018)	(0.013)	(0.015)	(0.423)	(0.400)	(0.424)	(0.013)	(0.011)	(0.008)	(0.011)	(0.001)	(0.013)
Son	0.232	0.131	0.181	0.242	0.148	0.164	0.226	0.271	0.248	0.297	0.160	0.193
	(0.022)	(0.012)	(0.015)	(0.429)	(0.356)	(0.371)	(0.016)	(0.011)	(0.018)	(0.012)	(0.011)	(0.013)
Other female relatives	0.072	0.125	0.090	0.080	0.164	0.144	0.170	0.113	0.113	0.047	0.156	0.107
	(0.010)	(0.011)	(0.011)	(0.272)	(0.371)	(0.352)	(0.013)	(0.014)	(0.014)	(0.006)	(0.011)	(0.010)
Other male relatives	0.085	0.087	0.104	0.098	0.120	0.118	0.095	0.152	0.152	0.082	0.086	0.087
	(0.008)	(0.007)	(0.009)	(0.297)	(0.325)	(0.322)	(0.018)	(0.014)	(0.014)	(0.006)	(0.008)	(0.009)
Non-relative females	0.005	0.011	0.008	0.002	0.001	0.004	0.008	0.009	0.008	0.003	0.007	0.003
	(0.003)	(0.004)	(0.005)	(0.041)	(0.033)	(0.067)	(0.002)	(0.003)	(0.004)	(0.002)	(0.003)	(0.001)
Non-relative males	0.004	0.003	0.001	0.002	0.003	0	0.003	0.008	0.009	0.002	0.001	0.004
	(0.002)	(0.001)	(0.001)	(0.041)	(0.058)	0	(0.002)	(0.003)	(0.002)	(0.001)	(0.001)	(0.003)
Domestic help	0	0.014	0.001	0	0.006	0	0	0.012	0.011	0.003	0.013	0.003
	0	(0.006)	(0.000)	0	(0.075)	0	0.000	(0.006)	(0.006)	(0.003)	(0.005)	(0.002)
Total column	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

1) Money was coded 1 if the household member was reported as giving money as a first, second or third option.
2) Services was coded 1 if the household member was reported as performing services as a first, second or third option.
3) Things was coded 1 if the household member was reported as giving things as a first, second or third option.
4) Standard error given in parenthesis.

Table 6. Brazil, Argentina, Mexico and Chile

Elderly provision of money, services, things, and childcare for members of the household Weighted Statistics	Brazil				Argentina				Mexico				Chile			
	Money[1]	Services[2]	Things[3]	Childcare	Money[1]	Services[2]	Things[3]	Childcare	Money[1]	Services[2]	Things[3]	Childcare	Money[1]	Services[2]	Things[3]	Childcare
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
I. Relationship with the elderly	**1,159**	**1,764**	**1,326**	**225**	**442**	**799**	**509**	**113**	**1,092**	**2,223**	**1,813**	**318**				
Wife	0.334	0.167	0.225	0.074	0.34	0.194	0.177	0.053	0.238	0.068	0.078	0.019	0.057	0.142	0.108	0.018
	(0.020)[4]	(0.010)	(0.014)	(0.027)	(0.472)	(0.396)	(0.382)	(0.225)	(0.014)	(0.006)	(0.007)	(0.009)	(0.011)	(0.014)	(0.012)	(0.011)
Husband	0.066	0.166	0.089	0.082	0.088	0.178	0.159	0.027	0.089	0.195	0.172	0.028	0.291	0.159	0.187	0.021
	(0.008)	(0.009)	(0.008)	(0.028)	(0.284)	(0.383)	(0.366)	(0.161)	(0.008)	(0.008)	(0.009)	(0.010)	(0.021)	(0.017)	(0.021)	(0.011)
Daughter	0.207	0.216	0.220	0.316	0.161	0.169	0.141	0.345	0.244	0.274	0.266	0.554	0.131	0.161	0.169	0.076
	(0.015)	(0.013)	(0.013)	(0.047)	(0.368)	(0.375)	(0.348)	(0.478)	(0.014)	(0.009)	(0.011)	(0.036)	(0.016)	(0.013)	(0.015)	(0.016)
Son	0.159	0.168	0.189	0.084	0.187	0.190	0.220	0.195	0.235	0.242	0.253	0.121	0.188	0.193	0.174	0.388
	(0.016)	(0.014)	(0.016)	(0.023)	(0.391)	(0.393)	(0.415)	(0.398)	(0.017)	(0.010)	(0.011)	(0.017)	(0.017)	(0.012)	(0.013)	(0.028)
Other female relatives	0.126	0.141	0.143	0.206	0.128	0.139	0.151	0.212	0.113	0.103	0.112	0.154	0.164	0.172	0.188	0.273
	(0.012)	(0.011)	(0.013)	(0.025)	(0.336)	(0.346)	(0.359)	(0.411)	(0.011)	(0.008)	(0.009)	0.025	(0.017)	(0.016)	(0.023)	(0.024)
Other male relatives	0.105	0.130	0.120	0.207	0.095	0.128	0.141	0.159	0.079	0.108	0.119	0.121	0.149	0.147	0.159	0.203
	(0.013)	(0.010)	(0.012)	(0.032)	(0.294)	(0.334)	(0.349)	(0.368)	(0.011)	(0.009)	(0.011)	(0.024)	(0.015)	(0.014)	(0.012)	(0.027)
Non-relative females	0.005	0.005	0.007	0.016	0	0	0	0	0.002	0.004	0.002	0	0.006	0.014	0.012	0.012
	(0.002)	(0.002)	(0.003)	(0.009)	0	0	0	0	(0.001)	(0.002)	(0.001)	0	(0.002)	(0.006)	(0.002)	(0.008)
Non-relative males	0.002	0.006	0.004	0.016	0.002	0.003	0.008	0.009	0	0.002	0	0	0.009	0.008	0.007	0.005
	(0.001)	(0.003)	(0.002)	(0.009)	(0.048)	(0.049)	(0.088)	(0.094)	0	0.001	0	0	(0.007)	(0.003)	(0.003)	(0.004)
Total column	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

1) Money was coded 1 if the household member was reported as giving money as a first, second or third option.
2) Services was coded 1 if the household member was reported as performing services as a first, second or third option.
3) Things was coded 1 if the household member was reported as giving things as a first, second or third option.
4) Standard error given in parenthesis.

V. Discussion of Findings

Our findings indicate that elderly people without any support tend to be better off than those with family or community support. However, selection factors may explain this result, as the healthier elderly may be choosing to live alone without needing any assistance. This may also suggest that privacy is a normal good among the elderly (Gruber and Wise 2001).

Living arrangements could be the consequence of elderly economic conditions or the result of family-specific characteristics. Although the health of individuals living alone is superior, the long-term costs associated with privacy could be substantially higher than expected from cross-section observations, due to information failure and time inconsistency.[9] In particular, in the long-run, seniors living alone may develop greater health and physical risks and reduced social interaction that may result in an increased likelihood of institutionalization and medical care use.

These results suggest that programs that explicitly and directly target the elderly living with family members could confer important social benefits. In addition, policies that promote maintaining maximum autonomy for the elderly should be favored over other alternatives, regardless of living arrangements.

Regarding caregivers, females are the most likely caregivers and receive the most assistance from the elderly in return. Among providers of money, sons and daughters share similar characteristics. However, among providers of services and things, females tend to be less educated, less likely to be in the labour force and more likely to be married than males. Location seems to be a factor that affects the decision to provide money, services and things for the elderly. Although the average age of female caregivers may suggest they are already out of the labour force, the data show significant numbers of caregivers are in the productive years of their life.

Despite the social benefits of caregiving activities, informal care may also affect caregivers' well-being and their current and retirement income. Polices to ameliorate the impact of caregiving activities should be considered in order to reduce the costs associated with informal care.

Because our findings suggest that the burden of caregiving activities appears more significant among females with low income and less education, direct government assistance could be justified. The extent to which lower current income for female caregivers may contribute to future poverty rates among elderly females is an issue that deserves further research and attention from policy makers. Payment for informal care as well as social security contributions for caregivers out of the labour force would reduce the negative income effect of informal care. Tax credit incentives for caregivers represent another alternative. Enforcing flexible work schedules for employed caregivers will help female caregivers remain in the labor force. Counselling for caregivers and training programs have proven to enhance the effectiveness of informal care for the elderly. Lastly, the introduction of a flat rate to subsidize care for the elderly, regardless of whether or not the care is formal or informal, would introduce consumer incentives that may increase efficiency in the allocation of resources to improve the health of the elderly in these countries. These cash transfers to caregivers could be supplemented with income transfers and benefit assistance programs directly targeted to the elderly. Lastly, offering tax credits to those individuals who buy long-term-care insurance could be another policy alternative.

VI. Concluding Remarks

Challenges in dealing with the fast-growing elderly populations in Latin American countries imply developing strategies in four different areas: (1) developing institutional and financial mechanisms to pay for future increasing long-term-care needs, (2) creating and promoting incentives to keep the elderly healthy and active in order to reduce future medical-care needs, (3) integrating the elderly into normal community life to reduce the financial burden on the working population and (4) organizing informal care services so that they more effectively serve the elderly's needs.

Three fundamental trends in these economies will shape how informal care will be provided in the future. First, male labour force participation is declining and female participation in these countries will likely have to increase. For women to provide a higher level of care, employers would

need to provide more flexible jobs attractive to females who have responsibilities at home. Second, if the level of long-term disabilities among the elderly is still increasing, the need for informal care at home would expand; in time this may require more part-time jobs for female caregivers. Lastly, if residence patterns continue to change toward fewer women living with their elderly parents or parents in-law, women will feel less obligated to leave their job to take care of elderly parents. Economic incentives to make caregiving activities more attractive may need to be in place to ameliorate this change in residence patterns.

Social and public policy reforms must be implemented soon to deal with the fast-aging population. If necessary changes are made now, daunting and costly tasks may not be necessary in the future. This study enriches our understanding of family caregivers for the elderly and suggests policy alternatives to complement the expansion of both direct medical care and pension benefits to support and protect the elderly population.

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Notes

1 The acronym SABE is short for Salud, Bienestar, and Envejecimiento – Health, Well-being, and Aging.

2 In Brazil, where the statistics closely resemble the region as a whole and the rest of the world, this figure is lower. Currently, there are 24 elderly Brazilians for every 100 children under 5.

3 They used the British Household Panel Study for the first 12 waves from 1991 to 2002.

4 A direct test for the socialization/ideology hypothesis would require data on attitudes toward providing help to the aging parents.

5 The SABE web page (www.ssc.wisc.edu/sabe) lists complete information on the agencies and researchers who participated in this project.

6 In the analysis, we include as caregivers members of the household older than 12 years old.

7 ADL and IADL are the Activities of Daily Living and Instrumental Activities of Daily Living indexes, respectively.

8 Similarly, Stone et al. 1987 reported that the average age of the caregivers in the US was 57.

9 The elderly may underestimate the cost of living alone due to the inability to process information related to the transition to formal care use and the low rate of discount associated with long-term health consequences.

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