HIV/AIDS AND ACCESS TO WATER:

A CASE STUDY OF HOME-BASED CARE IN NGAMILAND, BOTSWANA

B. N. Ngwenya*[1] and D. L. Kgathi[1]

[1]Harry Oppenheimer Okavango Research Centre, University of Botswana, P/Bag 285, Maun, Botswana

Abstract

This case study investigates access to potable water in HIV/AIDS related home-based care households in five rural communities in Ngamiland, Botswana. Primary data collected from five villages consisted of two parts. The first survey collected household data on demographic and rural livelihood features and impacts of HIV/AIDS. A total of 129 households were selected using a two-stage stratified random sampling method. In the second survey, a total of 39 family primary and community care givers of continuously ill, bed-ridden or non-bed-ridden HIV/AIDS patients were interviewed. A detailed questionnaire, with closed and open-ended questions, was used to collect household data. In addition to using the questionnaire, data were also collected through participant observation, informal interviews and secondary sources.

The study revealed that there are several sources of water for communities in Ngamiland such as off-plot, outdoor (communal) and on-plot outdoor and/or indoor (private) water connections, as well as other sources such as bowsed water, well-points, boreholes and open perennial/ephemeral water from river channels and pans. There was a serious problem of unreliable water supply caused by, among other things, the breakdown of diesel-powered water pumps, high frequency of HIV/AIDS related absenteeism, and the failure of timely delivery of diesel fuel. Some villages experienced chronic supply disruptions while others experienced seasonal or occasional water shortages. Strategies for coping with unreliability of water supply included economizing on water, reserve storage, buying water, and collection from river/dug wells or other alternative sources such as rain harvesting tanks in government institutions. The unreliability of water supply resulted in an increase in the use of water of poor quality and other practices of poor hygiene as well as a high opportunity cost of water collection. In such instances, bathing of patients was cut from twice daily to once or not at all. Depending on the severity of HIV/AIDS related symptoms, e.g. diarrhoea, 20–80 additional litres of water could be required daily. The case study demonstrates that, at individual level, access to water is an integral element of the patient's holistic healing process and psychosocial well being. At household and community levels, access to sufficient supplies of potable water when and where it is needed is central to mitigation of HIV/AIDS impacts. Access to water should therefore not be treated strictly as an economic good due to its importance as a basic human need, a social good and indeed a human right.

Keywords: Botswana; Community home-based care; HIV/AIDS; Water access

1. Introduction

According to a report of the World Commission on Water for the 21st Century, every human being should have access to safe drinking water as this resource is a necessary requirement for meeting basic human needs (Serageldin, 2000). Sustainable access to safe drinking water is one of the three targets set by the United Nations Millennium Declaration to achieve environmental sustainability (UNDP, 2005). The target is essential to achieve in order to decrease the prevalence of water related diseases. For those living with HIV/AIDS, access to safe drinking water is a critical factor due to their vulnerability to infections as

* Corresponding author. Tel.: +267 686 1833; fax: +267 686 1835.
E-mail addresses: bnngwenya@yahoo.com, bntombi@orc.ub.bw (B.N. Ngwenya).

their immune systems are impaired. As clearly put by Kaminga and Weglin-Schuringa (2003), access to safe water is an absolute necessity for people living with HIV/AIDS as it is needed for drinking, washing their soiled laundry, taking medicines, and keeping their home environment in hygienic conditions.

The HIV/AIDS epidemic poses a major threat to households in Ngamiland and the rest of Botswana and it is one of the development issues of major concern, worldwide. Though it is a global problem, its prevalence is concentrated in the developing countries, particularly in sub-Saharan Africa. Women are affected disproportionately and bear the main burden of care and support (Mutangadura, 2000; Budlender, 2004; Lesetedi et al., 2003; Ogden et al., 2004; Susser and Stein, 2004). The HIV prevalence rates for pregnant women in the sub-districts of Ngami and Okavango in Botswana were 34% and 41%, respectively, in 2002 as compared to the overall prevalence of all the districts of 35% (Ministry of State President, 2002). These figures can be compared with the recent figures of the Impact Survey II of 2004 which revealed that the proportions of the HIV positive people were 16% and 13% in Ngamiland South and Ngamiland North, respectively (Central Statistics Office, 2004). As result of this epidemic, development gains achieved before 1990 have been reversed. For instance, Botswana's rank for the human development index (HDI) has fallen by 21 places, between 1990 and 2003, to the 128th position out of a total of 177 countries (United Nations Development Program, 2005).

The increase in the impact of the HIV/AIDS epidemic led to the institutionalization of the home-based care programme in Botswana which aims at sharing the responsibility of caring for the terminally ill patients (Butale, 2005). Lack of access to safe drinking water will make the AIDS-afflicted persons, particularly those under home care, more vulnerable to HIV/AIDS as opportunistic infections are likely to thrive in poor hygienic conditions. HIV/AIDS is not simply a health issue; it is also a "social, economic, political, cultural and human rights problem, which cuts across all sectors of developing societies" (Kaminga and Weglin-Schuringa, 2003, p. 7). Thus strategies for prevention, treatment, care and support of those infected and affected by the disease should cut across all sectors of economy and society. This implies that the link between access to water and HIV/AIDS should necessarily be multidimensional.

This paper aims at assessing access to water in households with home-based care patients and the responses of households to limited access to water resources in an attempt to illustrate the inter-linkages between access to basic needs and HIV/AIDS. The paper first examines the context of the HIV/AIDS epidemic and the home-based care programme in Botswana, before providing a description of the study area and the methodology. The next section discusses the results, mainly based on fieldwork. The final section summarizes the discussion and also makes recommendations.

2. Conceptual framework

Although physical infrastructure for water may be available in the community, it may not be readily accessible to some social groups there. Access to natural resources such as water is determined by a number of factors such as social relations, institutions and organizations (Ellis, 2000). The indicators of access to water include the distance and time taken to the points of water collection (Howard and Bartram, 2003) and the ability to use water service delivery systems. Usability in turn depends on affordability as well as on institutional responsiveness and or accountability of service providers to client households.

Kaminga and Weglin-Schuringa (2003) have identified six perspectives that can be used to analyse the link between access to water and HIV/AIDS. These are consumer, health, gender, community, HIV/AIDS, poverty alleviation, and human rights perspectives. The consumer perspective posits that access to water is indispensable for provision of care and support to AIDS patients who need water for bathing, washing clothes and taking medication. The health perspective considers provision of safe water to be necessary for taking medication and for reducing the risk of diarrhoea and skin diseases. As Nxesi (quoted by Kaminga and Weglin-Schuringa, 2003) forcefully argues, access to safe water and sanitation is one strategy among others for managing opportunistic infections. Infected and affected individuals and families need to stay in hygienic conditions, free of harmful germs and bacteria. Access to sanitation, especially flush toilets for very sick patients, is important since they may be too weak to walk outside the house to relieve themselves. Regrettably, case studies on home-based care giving households in Botswana suggest the prevalence of poor management of home-based care clinical waste. In a sample of family care givers in Maun, Sehitwa and Shorobe, about 30% of care giving households used the 'bush' to relieve themselves (Butale, 2005; Phorano et al., 2005).

The gender perspective recognizes the fact that women predominate various types of care in the care economy both within and across generations (Elson, 2002), especially in households affected by HIV/AIDS (Budlender, 2004). Care-giving activities undertaken by women in AIDS affected households include collecting fuelwood and water; growing, storing, preparing and serving/distributing food; cleaning, washing, and bathing children and the sick. Gender refers to social roles, expectations, behaviours and attitudes of women and men defined by social mores and cultural norms of society. However, gender intersects with other variables such as economic status, race, ethnically, age, and religion.

The community driven development perspective focuses on how communities can develop 'HIV/AIDS competence', that is, the ability to accept the reality of the disease and to take necessary measures to minimize its impacts. The poverty alleviation perspective is about the impact of HIV in relation to other factors affecting livelihoods and

poverty. The perspective utilizes the sustainable livelihood framework (SLF), whereby access to water is considered an economic 'asset', with multiple functions as it is able to enhance household coping strategies (such as food security and income diversification). Finally, the human rights perspective puts emphasis on access to water as a human rights issue due to its centrality in human development and poverty alleviation.

The debate on whether water should be strictly treated as an economic good as suggested by the Dublin Principles on Water and the Environment is also relevant to the interconnections between HIV/AIDS and access to water (Savenije and Van der Zaag, 2002). Due to the critical nature of the need for water in home-based care, and prevalence of poverty in rural areas of developing countries, water cannot be strictly treated as an economic good. Access to water has an impact on physical/medical, emotional and psychosocial well being of patients, care givers, family and community relations. Medical needs, as defined by Nokwane (1993), include medication for relief, specific treatment of conditions, appropriate medical and nursing care, adequate nutrition, and patient comfort including privacy, hygienic conditions and facilities. Psychosocial needs include money to support the family and dependents, support for patient(s) at home, companionship, counselling, security and employment.

2.1. Family and community care

The health care system in Botswana, as in other parts of Africa, has not been designed to cope with a high occurrence of HIV/AIDS related continuously ill persons. In 1994, the Ministry of Health institutionalized the community home-based care (CHBC) programme as one way of alleviating the pressure of increasing numbers of HIV/AIDS related hospitalized patients. The Ministry of Health (1996a,b) defines a CHBC patient as a person who has been medically diagnosed as terminally or chronically ill and is registered as a CHBC patient by nurses and social workers implementing the programme. As of April 2005, there were 1369 CHBC patients in Ngamiland (North West District Council Annual Report, 2005).

In practice, home care involves the transfer of a patient's medical supervision from a formal institution – be it a hospital, clinic, or mental health facility – to the patient's family in a given community setting (Khan and Stegling, 2000; Jacques and Stegling, 2001; Ngwenya and Butale, 2005). The envisaged goals of the CHBC programme are to provide appropriate care to patients and their families in a home setting, and to help families maintain independence and achieve the best possible quality of life (World Health Organization, 2002). The CHBC programme in Botswana is not only meant for people living with HIV/AIDS, but also includes other chronically ill persons (such as those suffering from cancer, diabetes, hypertension, hemiplegia and paraplegia). The CHBC patients are eligible to receive a specified CHBC food basket valued differently according to one's health condition. There are five food baskets:

- for relatively healthy persons,
- for those who are terminally ill, but not on tube feeding,
- for terminally ill persons on tube feeding,
- for children under two and half years, and
- for those on special diet such as diabetics.

A continuously ill person can be defined as any person declared by a medical doctor as terminally ill and has an incurable disease such as cancer, sugar diabetes, high blood pressure and HIV/AIDS related illnesses. Home care giving can be defined as the nursing and protection of a continuously ill person, who may or may not be bed-ridden, by non-professional relatives (close or distant), members of the community, friends, neighbours or church groups. A family caregiver is a close kin (by descent or marriage) with a social obligation to care for a member's of the family during period of intense need or social distress (social crisis) due to illness, death, temporary or permanent disability. Borrowing from Barrow and Murphree (2001), we define a community care giver as a member of a grouping which has actual or potential physical boundaries and legitimacy to provide care for non-related member's of a family during period of intense need or social distress (social crisis). What is important in the definition of a community care giver, is a member of a social group involved in pooling and management of scarce resources in order to care for non-kin, and his/her intervention may or may not recreate social cohesion.

3. Study area and data collection methods

3.1. Study area

Ngamiland is part of the north-west District, and it is situated in northern Botswana. Its population, estimated at 124,532 in 2001, had a growth rate of 3% during the inter-censal decade 1981–1991, and 2.8% during the decade 1991–2001 (Kgathi et al., 2004). The reduction in population growth rate was partly attributed to HIV/AIDS, one of the key shocks adversely affecting livelihoods in the area (White and Robinson, 2000; Kgathi et al., 2004). However, the population of Maun, the District Capital of Ngamiland, increased by 6% and 5% during the inter-censal decades 1981–1991 and 1991–2001, respectively. The population growth rate of Botswana, including that of Ngamiland, is expected to continue to reduce in the future due to increasing HIV/AIDS related mortality and reduction in fertility. The Okavango Delta, a globally renowned Ramsar Site, is an important feature in Ngamiland District (Fig. 1).

The study areas included the five villages of Shorobe, Etsha 6, Seronga, Gudigwa, and Sehitwa in the Okavango Delta (Fig. 2). The 2001 national census estimated the population of these villages to range from 732 in Gudigwa to

Fig. 1. Botswana district map showing Ngamiland and the Okavango Delta.

2629 in Etsha 6. The number of households also ranged from 112 in Gudigwa to 580 in Etsha 6 (Table 1). Etsha 6 is one of the former 13 settlements of Angolan refugees who settled in this area in 1969/70. It is situated at the western fringe of the Okavango Delta. Seronga is situated in the northeastern part of the Okavango Delta commonly called the Panhandle. Located near to the permanently flooded Okavango River main channel, its households have perennial access to river water. Gudigwa is situated northeast of Seronga and it is predominantly a Basarwa (San people/bushmen) settlement. The households of Gudigwa have easier access to river water on a seasonal basis as it is situated near a seasonally flooded Okavango River channel. Sehitwa is situated 100 km southwest of Maun. The people of Sehitwa do not have access to river water. Shorobe is situated in the lower part of the Delta, about 50 km northeast of Maun. Households in Shorobe do not have access to river water as the Gomoti River has dried up. The main livelihood activities of these villages differ from village to village, but include arable agriculture, livestock agriculture, collection of veld products, and social protection programmes.

The number of private water connections and standpipes in the study areas is shown in Table 1. The number of standpipes ranged from 7 in Gudigwa to 20 in Sehitwa, whereas the number of private connections ranged from 20 in Gudigwa to 126 in Sehitwa. The per capita number of private connections is influenced by distance to the District Capital of Maun (see Table 1). For instance, the villages of Sehitwa and Shorobe which are only 100 and 60 km from Maun, respectively, have higher per capita number of private connections of 0.085 and 0.075. On the other hand, the villages of Etsha 6, Seronga, and Gudigwa, which are more than 260, 540 and 540 km, respectively, have much lower figures for per capita number of private connections

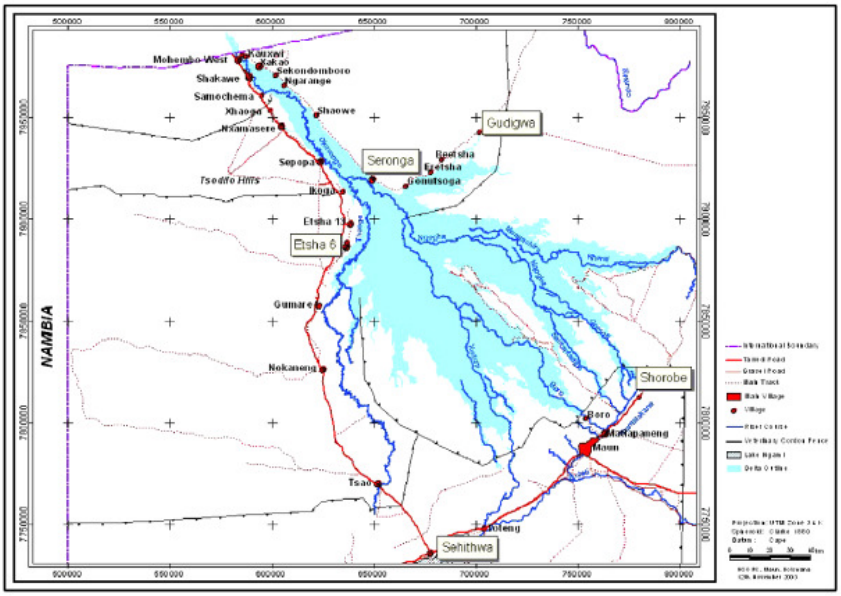

Fig. 2. Study villages.

Table 1
Communal and private connections in the study areas

Village	Population	No. of households	No. of standpipes	No. of private connections
Sehitwa	1478	416	20 (0.014)	126 (0.085)
Shorobe	955	201	15 (0.016)	72 (0.075)
Etsha 6	2629	580	7 (0.003)	120 (0.046)
Seronga	1641	364	12 (0.007)	78 (0.048)
Gudigwa	732	112	7 (0.010)	20 (0.027)

Figure in parentheses denotes per capita number of standpipes and private water connections.

of 0.046, 0.048 and 0.027, respectively. This is mainly because people who live near the district capital of Maun have more access to services and employment opportunities and tend to be more affluent. However, the per capita numbers of standpipes do not reveal this pattern as standpipes are provided by the Government.

3.2. Data collection

Primary data for this study were collected from the five study villages. Data collection consisted of two parts. The first survey (referred to as the first survey) was undertaken October 2003 and covered data on demographic features of households, sources of water supply, and impacts of HIV/AIDS. A detailed questionnaire was used to collect household data: The total number of households interviewed was 129, distributed as follows in the study areas: 36 in Etsha 6, 18 in Gudigwa, 28 in Sehitwa, 30 in Seronga and 17 in Shorobe. A two stage stratified random sampling method was used to select the sample. First, a random sample of enumerations was selected using a list of Enumeration Areas (EA) of the 2001 Population Census. Within each Enumeration Area, a systematic random sample was done. The sampling unit was a household, and those interviewed were heads of households or their wives.

The second survey was undertaken in September 2005, and it focused on HIV/AIDS, access to potable water and homecare. It was a baseline survey targeted at family primary care givers and active community volunteers providing respite care to the continuously ill persons (bed-ridden or non-bed-ridden patients, HIV/AIDS related or non HIV/AIDS related). The interviewed family care givers and community volunteers were those who had provided home care in the past 12 months. Care givers who had provided care to HIV/AIDS patients in the past five years, but were providing care to a bed ridden, non-HIV/AIDS patients were also included. A detailed questionnaire, with closed and open ended questions, was used to collect household data which included demographics, general community health problems, accessibility to water, patterns of water use and care giving, and perceptions of differences on water use for care giving.

Face-to-face interviews were conducted with a total of 39 caregivers, 87% female and 13% male. Of these 33% were community and 64% were family care givers. The mean age of a care giver was 43 years. In addition to the first and second components of the study, data were also collected through participant observation, informal interviews, literature review and use of secondary data from relevant government departments. Quantitative data were analysed, using SPSS (12.1), in the form of frequency distributions, measures of central tendency, and variation. Qualitative data were reduced and analysed thematically.

4. Results and analysis

4.1. Patterns of water use at household level

In Botswana, water supply to rural villages such as those of the study areas is the responsibility of the District Councils. The Department of Water Affairs has the overall responsibility for supplying water to the major urban villages, whereas the Water Utilities Corporation is the main supplier of water to urban centres. A large part of the population in Botswana depends on groundwater sources for its water supply (SMEC, 1991). Although surface water sources account for 35% of the total supply, they provide 90% of water used in urban areas. In contrast, the majority of rural villages obtain their water from groundwater sources which account for 67% of the total water supply in Botswana (Arntzen et al., 2002).

The first survey revealed that most of the households obtain their water from communal standpipes (73%) as compared to 16.7%, 4.8%, and 5.6% of the households who obtained their water from out-door piped connections, in-door piped connections, and other sources, respectively. The second survey revealed that 72% of the households in the study areas collected water from communal standpipes. The rest of the households obtained water from out-door piped connections (10%), indoor-piped connections (10%), and from other sources such as streams, rivers and pans (8%) (Fig. 3a). These findings are consistent with Kelekwang and Gowera's (2003) study that showed villages with a population of 1000–4999 in Botswana had 96.5% of their households with access to piped water.

Water consumption in the study areas ranged from 50 m^3/day in Gudigwa to 183 m^3/day in Sehitwa. In per capita terms the figures ranged from 55 l/c/d in Shorobe to 82 l/c/d in Sehitwa (see Table 2). The figures include consumption by schools and clinics. The actual household per capita consumption figures (without consumption by government institutions, etc.) were estimated by the second

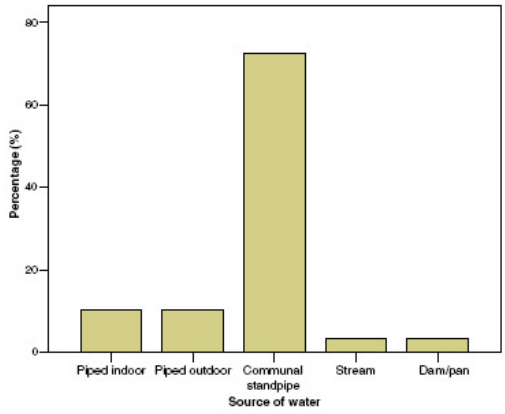

Fig. 3a. Source of water supply for CHBC care givers.

Table 2
Water demand, standpipes and private connections in the study areas

Village	Projected to 2005[a] population $P_n = P(1+r)^n$	Demand[b] (m^3/day)	Demand[c] (l/c/d)
Sehitwa	1796	147.0	81.8
Shorobe	1160	63.4	54.7
Etsha6	3195	183.3	57.4
Seronga	1995	154.5	77.4
Gudigwa	890	49.6	55.7

Source: NWDC, Water and Waste Water Department (2005).

[a] Used 2001 population data (census). Average growth rate is 4.2% as per DWA design manual, but on consideration of migration of people after drought problems and CBPP, it has been assumed to be 5%.

[b] Calculation of demand has included schools, hospitals, police stations and secondary schools.

[c] Demand for water is expressed in litres per capita per day (l/c/d).

survey to be less than 30 l/c/d. At this level of consumption the minimum basic needs are achieved, but basic hygiene may be greatly compromised as water for household use is insufficient (Howard and Bartram, 2003). The above view was confirmed by the fact that some of the households in the study areas said they sometimes suspended bathing or doing laundry in an attempt to economize on water. Due to the smallness of the sample, it was not possible to assess water consumption according to the sources of water supply and also according to socio-economic status.

The average time spent on water collection from the standpipes per day was 21 min, whereas the average distance walked by 93% of the households to and from the collection points was less than 500 m, and only 3% of the households travelled more than 500 m to collect water. According to Howard and Bartram (2003), access to water as determined by distance is considered to be of an intermediate level if it is between 100 and 1000 m, whereas in terms of time, it is considered to be of basic level if it takes about 5–30 min, and to be of intermediate level if it takes about up to 5 min.

Care givers were asked whether social differences based on education, landownership, family/community standing, and male/female headship affected access to water from public facilities, and most of the households (89%) said they did not. Water from communal standpipes is currently 'free' and the question of affordability does not arise. However, socio-economic status, measured by possession of productive assets, makes a difference between those who can afford to pay for the connection of water in their yard or in-houses. In the first survey, 45% of respondents were low income, and only 18% had a standpipe in the yard. Care givers rate the difference in quality of care relative to proximity to a water source. Table 3 gives a summary of caregivers' perceptions regarding the contribution the water source makes to quality of care and patient comfort.

Informal interviews revealed that the ability to pay for these installations depends on the life status of a breadwinner whose loss to HIV/AIDS could mean survivors' inability to install a standpipe in the yard or to pay water tariffs. The opportunity cost of water collection was another factor that limits water consumption in households whose members collect water from off-plot sources. While those with on-plot connections (both outdoor or indoor) pay for water, the tariff structure is progressive with large consumers (across the country) helping to subsidize those least able to pay for the service. The charge for the highest use band (over 41 m^3) is P 8.15, seven times the charge of the lowest use band (up to 5 m^3) of P 1.25 pula[1] (Department of Water Affairs, 2004).

Access to water is not only about affordability, but also about reliability. Water supply is sometimes very unreliable (particularly in the village of Shorobe). This unreliability is also very unpredictable, making it extremely difficult for households to prepare coping measures. The unreliability of water supply could be chronic, seldom, occasional or seasonal. In Shorobe, water shortage is exacerbated by the fact that humans and animals compete for the same source in standpipes. Unlike Seronga and Gudigwa villages, there is no direct access to water from Okavango Delta channels in Shorobe. The impact of occasional unavailability of water from standpipes is therefore more severe in Shorobe. Of the total number of households interviewed in the follow-up survey, 70% of them revealed that water supply was unreliable in the village of Shorobe as compared to an average of 52% for the other four villages. Of those who said the supply was unreliable in Shorobe, 63% of them said it was "extremely unreliable" as compared to 38% who said it was "very unreliable". However, 29% of the households thought that the unreliability of water supply had greatly reduced compared to the situation five years ago. Other households thought the unreliability of water supply had slightly reduced (32%) or had reduced

[1] The exchange rate at the time of research was roughly 1 US dollar = 5.5 pula.

Table 3
Water sources and quality of care giving

Water source	Excellent	Good	Fair	Poor	Very Poor
Communal standpipe	–	26 (68%)	12 (32%)	–	–
Tap in yard	15 (40%)	22 (58%)	1 (2.6%)	–	–
Tap in house	34 (87.2%)	3 (7.7%)	1 (2.6%)	1 (2.6%)	–
Mogobe/stream	2 (5.45%)	–	2 (2.5%)	12 (32.4%)	21 (56.8%)
Self-dug well	–	1 (2.6%)	2 (2.5%)	16 (43.2%)	15 (40.5%)

(11%), whereas some (29%) of the households thought the situation had in fact worsened.

In some cases, residents on the outskirts of Shorobe travelled distances of up to 10 km and took up to 6 h to collect water from the nearby village of Matsaudi. While households spent an average of 20 min to collect water from standpipes when the water pressure was normal, they took an additional time of 40 min waiting in the queue when the pressure was low, sometimes leading to drying up of communal taps. The survey revealed that water may not be available for up to 7 days, and this creates a 'time crunch' for family caregivers. The literature suggests that the unreliability of water supply tends to influence household water consumption such that areas with high unreliability of water supply tend to have low water consumption (Howard and Bartram, 2003). In our study areas, the village of Shorobe confirms this as it has the highest unreliability as well as the lowest per capita consumption.

The unreliability of water supply was also confirmed by the Principal Water Engineer for the North-West District who, however, said that the problem was not as serious as stated by the households in the study areas. According to him, lack of water usually occurred for one or two days due to breakdowns of engines, poor communication between the water operator and the office which supplies fuel for water pumps, and the high frequency of absenteeism from work by water engine operators mainly due to HIV/AIDS related illnesses or attendance of funerals (Mwankenja, 2005, personal communication). In this regard, HIV prevalence appears to have an impact on the functioning of the organization as well as on the efficiency of service provision.

Nonetheless, whatever the causes of unreliability of water supply, 66% of care givers indicated that water shortage inconveniences them, whereas 24% said it was somewhat inconvenient and only a few said it was neither convenient nor inconvenient. In Sehitwa and Seronga, water shortage was seldom while in Shorobe, the situation was described as chronic. Households adopted five main coping strategies when faced with lack of water: (1) economized on the use of water by either re-using waste-water or using water sparingly, (2) utilized stored water from reserve containers/tanks, (3) collected water from other sources such as rivers and boreholes, collected water from government institutions and also (4) bought water (Fig. 3b).

The above-mentioned coping strategies are associated with socio-economic and health costs. Open-ended responses revealed that 'buying' water from donkey cart

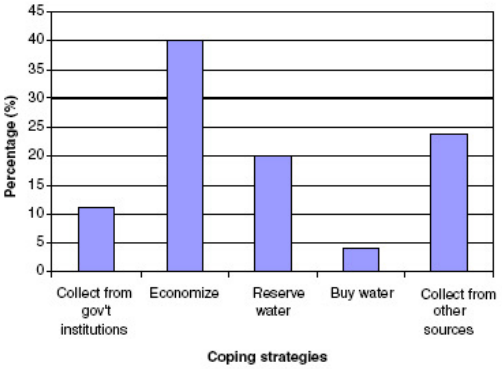

Fig. 3b. Household coping strategies.

owners was considered 'expensive' at approximately P5 per 20 litres. Furthermore, economizing on water could translate into reducing the number of meals cooked per day. This practice was likely to adversely affect the nutritional status of the household members and further weaken the health of HIV/AIDS patients. Care givers associated the use of river water with the risk of developing diarrhoea and other opportunistic infections. Those who resorted to the use of river water in response to water shortage in the villages of Gudigwa and Seronga revealed that it made them sick and they had instead decided to use the water for washing their laundry.

4.2. HIV/AIDS status, water use and household hygiene

The importance of access to water and subsequent upkeep of social relations, physical and emotional well-being is important because some families and care givers have experienced multiple care giving stressors. From a social and emotional point of view, some care givers have provided care to more than one patient over the years, either simultaneously or sequentially. About 30% of care givers provided care to their patients at the same time whereas 65% provided care to patients one after the other (Fig. 4).

On average, care givers had provided care to 2 patients over the past five years and most of them (36%) cared for one patient. The remaining 21% of care givers cared for

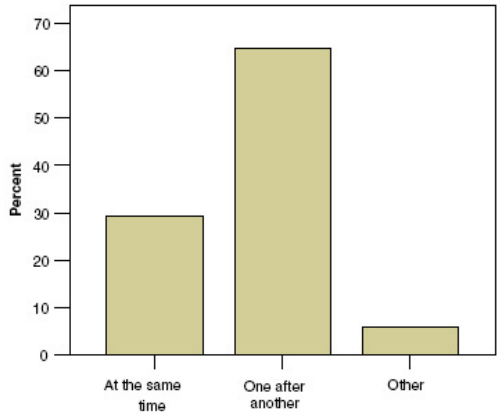

Fig. 4. Care giving sequence.

two; 18% for three; 14% for four and 4% for five and above (Fig. 5).

4.2.1. HIV status of patient

The majority of carers (94%) knew the illness of their patient, and on average 56% of patients were HIV+. About 41% of care givers indicated that they provided care to patients who were HIV+ and were on anti retroviral medication (ARVs), whereas 15% were providing care to patients who were HIV+ but were not on ARVs. HIV+ patients who were on ARVs were largely asymptomatic, meaning that they did not display AIDS related symptoms. Other patients were HIV− and had other terminal illnesses such as cancer and chronic diabetes. However, perceptions of care givers suggest that they thought that provision of ARVs to HIV+ patients would reduce the water demand for potential care giving households as it reduces the number of HIV related bed-ridden patients. About 91% said provision of ARVs would reduce household water demand, and 89% said that access to water reduces the risk of cross infection from opportunistic diseases.

Informal interviews suggest that in the past five years, care givers had lost between 2 and up to 10 loved ones, either spouses, own children or parents, sibling(s) and relatives. Provision of water, while nurturing some patients to life, also mediates public cleansing rituals of grief and loss (food preparations and washing clothes and blankets during and after funerals). As a result of medical intervention including access to ARVs or tuberculosis (TB) treatment, 48% of respondents said patient(s) cared for were still living, 24% said their patient(s) had died, whereas 28% said some had died and others were still alive (Fig. 6).

About 97% attributed mortality to HIV/AIDS and 69% to diarrhoea, although with the latter, informal interviews suggested that some people did not die from diarrhoea; rather, deaths were due to failure to disclose HIV status until too late for remedial actions.

Physically and emotionally, the length of care giving matters in terms of water demands especially of bed-ridden patients. About 22% said they cared for their patient for <1 year, 19% for 1 year, 30% for 2 years, 11% for 3 years and the remainder for 4 years and more (Fig. 7).

Informal interviews suggested that, physically, care givers were chronically fatigued due to lifting (bathing, clothing and feeding) bed-ridden patients. Emotionally, they felt obligated to keep the patient clean because they are close kin. About 42% cared for their own son/daughter and 27% for a brother/sister (Fig. 8).

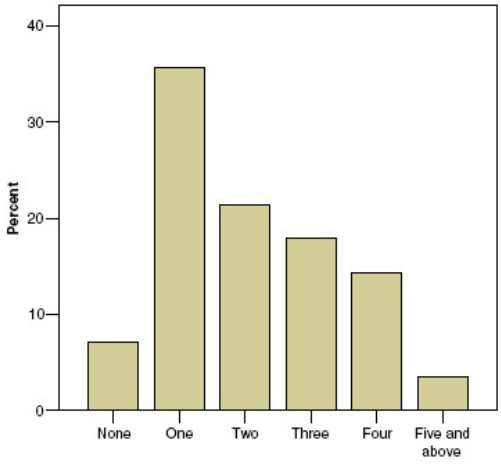

Fig. 5. Patients ever cared for in past 5 years.

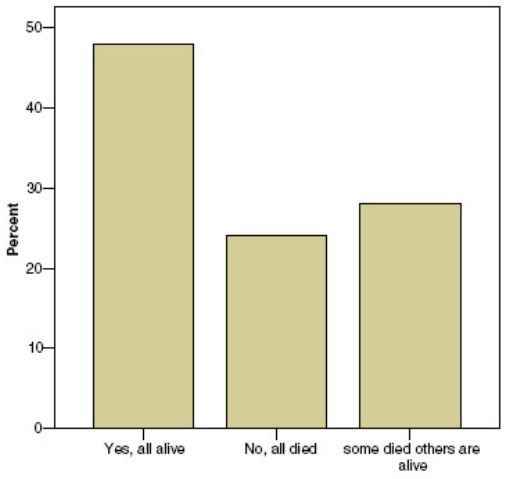

Fig. 6. Patient's life status.

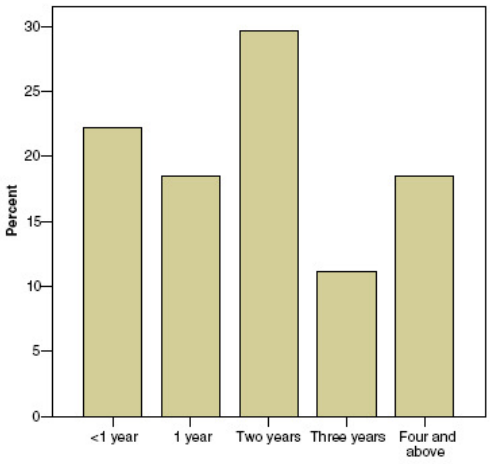

Fig. 7. Duration of patient caregiving.

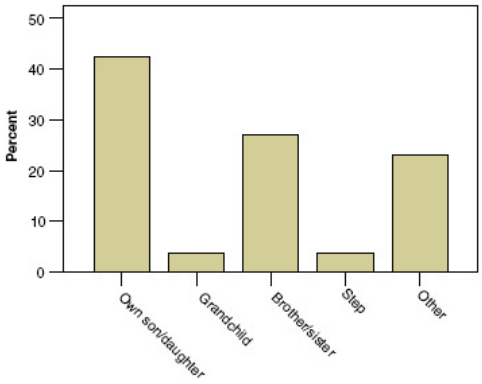

Fig. 8. Caregiver–patient relations.

4.2.2. Care giving and use of water

Informal interviews suggest that the consumption of water is likely to increase as infected people, especially from urban areas, return to their home villages to be cared for and/or to die. The amount of water consumed depends on whether care giving is for a continuously ill bed-ridden patient or for non-bed-ridden patients. The second survey revealed that 44% of the patients were continuously ill and bed-ridden, whereas 41% of them were continuously ill but not bed-ridden, and the remainder were relatively healthy. A continuously ill bed-ridden patient may experience bouts of HIV related diarrhoea or incontinence (induced by malfunctions of the urinary system). As we have already indicated, on average, a household consumes less than 30 litres per day. A caregiver with a diarrhoeal bed-ridden patient (who may or may not have access to a bed pan and diapers), on average, uses an additional 20 litres of water. Informal discussion indicated that in some cases, depending on the severity of the diarrhoea problem, there were care givers who required up to 80 litres of water for pre-washing, washing and rinsing soiled blankets, clothes and sheets, and for scrubbing floors and sterilizing bathrooms or toilets.

It is therefore not surprising that, when asked whether care giving households use more water compared to non-care giving households, 82% of care givers said that care giving households 'definitely use more water' than non-care giving households. However, 8% said care giving households probably use more water than non-care giving households, and 10% said they use the same amount of water. As one care giver put it, care giving households use more water because water is needed "to eliminate the offensive odour and sanitize the social and health environment for the household as whole and for the comfort of the patient as well as the visitors".

4.2.3. Unreliability of water supply and care giving

The unreliability of water supply has immediate and long-term effects on the physical, emotional, social and psychological effects that impinge on the patient, the caregiver, the household and the community as whole. Formal interviews and open ended questions revealed that care givers cut the number of times they give a patient a bath from twice daily to once during periods of water stress. In extreme cases, they resorted to giving the patient a 'dry bath', that is, the wiping of essential body parts and wounds. When water supply is stable, 72% of care givers said they gave their patients a bath daily (morning and evening), 5% said they do it once or three times a week (Fig. 9).

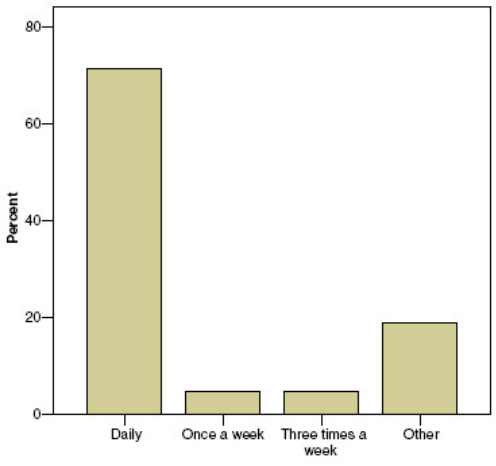

Fig. 9. Frequency of washing/bathing patient.

In order to prevent dehydration, some care givers micro managed potable water by reserving it in 'easy to use 2.5 litre bottles' for patient's and young children's sole use. However, other care givers indicated that, in the process of 'economizing' stored water to minimize social stress, they reserved potable water only for drinking for all family members and for taking medication, and use untreated river water for bathing and washing laundry. In households where no such conscientious apportionment between treated and untreated water is made, consumption of untreated water may expose members to the risk of water borne diseases. This situation of bouts of diarrhoea and bilharzia was confirmed by clinic staff in Seronga, Gudigwa, Sehitwa and Shorobe.

Keeping soiled laundry becomes problematic and makes it difficult for care givers to keep the house odourless. Depending on the season, in Ngamiland, temperatures in summer can peak at 40 °C. This scenario is problematic for care givers, patients and visitors. The patient's body, as respondents put it, 'fails to breath properly', and this may lead to body rash, outbreak of skin diseases and chronic sleeplessness. Emotionally, the patient becomes irritable, uncooperative (refusing to eat or take medication) and depressed. Physical discomfort interferes with the patient's recovery process, which in turn stresses out the care giver and strains relations between the two. Socially, visitors could be turned-off by unhygienic conditions and blame the caregivers for the situation. The care giver is unable 'to offer tea' to visitors who come to wish the patient speedy recovery (*lekola molwetsi*) and offer 'prayer' (*merapelo*). The social support networks are crucial for the emotional as well as spiritual well being of both the care giver and the patient.

The resultant effect, as one care giver put it, is social isolation or ostracism. Family care givers are thus deprived of immediate community support which they desperately need. Informal discussions with health providers suggest that in order for a community to minimize the social impact of care giving, and to enhance HIV competence, whatever brings people together and strengthens social relations, should not be compromised. According to the health provider, the least a care giver can do is to offer a visitor a cup of water: "Everyone understands that we all live in poverty" (*re tshelela mo lehumemng*).

Lack of access to water, therefore, predisposes care givers to social exclusion at a time when they need more community partnerships with individuals from different social groups and institutions (private or public). It is not surprising that, although 85% of care givers indicated that home-based care infrastructure is available in their community, 50% of their patients were not registered with the community home-based care programme. Since care giving is location bound, social mobility of a caregiver comes with external social support and palliative care from friends and neighbours, including help with provision of water, especially for older carers. When asked whether the unreliability of water supply increases the burden of care giving, 70% of the care givers said it greatly increased, 26% said it somewhat increased, and 4% said it has not changed much (Fig. 10). Patients that are cared for simultaneously may increase the household water demand.

The majority of care givers (90%) agreed that household hygiene, nutritional and health status and children's education would worsen if there were no access to potable water. Conversely, most of the households (62%) strongly agreed that access to potable water reduces the risk of cross-infection from HIV/AIDS related diseases. This is important because about 50% of care givers said that they had no access to protective gloves or masks. For care givers with patients who are either incontinent or have bed sores, let alone diarrhoea, adhering to simple universal precautions such as hand washing after body contact with the patient, is important. When asked how regularly they wash their hands after contact with the patient's body fluids, 51% of the care givers said they do so regularly (Fig. 11) because it is important that they keep their hands clean prior to holding or feeding children or household food preparation.

Not only does the unreliability of water supply affect health status of a patient and concomitant family and community relations, it also impacts on the health of care givers. Informal interviews revealed that some of the care givers suffer from chronic conditions such as diabetes and hypertension. Carrying water (20 litres) on a daily basis can exacerbate pre-existing health conditions. Participant observation suggested that the majority of family care givers did not have the means of transport (donkey carts, bicycles, etc.) that could alleviate the physical stress that goes with head-loading. The livelihood survey revealed that only 27% of the respondents had donkey carts, whereas 10% had vans and 24% had wheel burrows. Having these assets

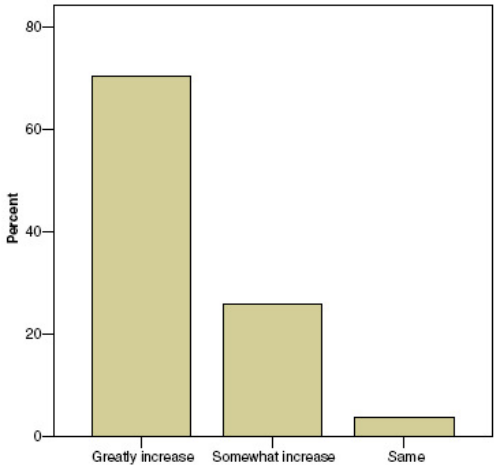

Fig. 10. Water shortage and burden of care.

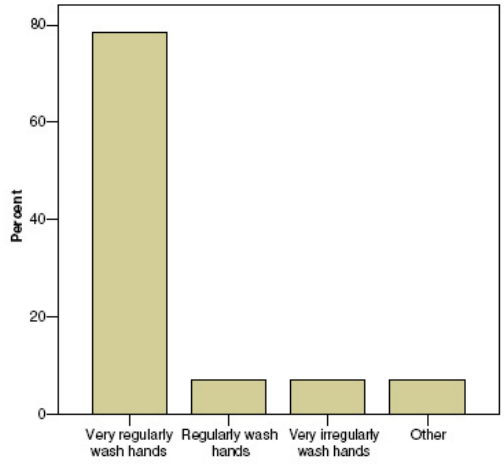

Fig. 11. Regularity of handwashing.

is important during period of water shortage when water has to be drawn from alternative sources which are more than a kilometre away.

5. Discussion and conclusion

Although the infrastructure to deliver water in Botswana is in place, the burden of care giving is worsened by the reduced access to water supply among care giving households, especially those who collect water from communal standpipes. There is a problem of the unreliability of water supply caused by the breakdowns of diesel-fuelled pumps, high frequency of HIV/AIDS related absenteeism, and the failure to deliver diesel fuel in time. This problem has led to an increase in the use of water of poor quality and other practices of poor hygiene as well as a high opportunity cost of water collection. The use of untreated water has potential to increase the risks of public health, further worsening the condition of HIV/AIDS patients with impaired immune systems. In addition, the study findings are consistent with Ashton and Ramasar (2003, p. 9) that the epidemic adversely affects the productivity of the water personnel due to an increase in mortality and morbidity of staff and the general population.

The study revealed that households with home-based care patients use more water than those without these patients. Although on average water consumption in households with home-based care patients was 30 l/c/d, households with patients suffering from diarrhoea used an additional 20–80 litres of water per day, depending on the severity of this disease. However, care givers had a perception that the rolling out of anti retroviral therapy (ARVs), reduced the number of bed-ridden patients thereby decreasing water demand and the various costs associated with increased water use for bed-ridden patients.

Access is also about the ability of care giving families to use and receive benefits from the water service delivery system. The fact that water sources dry up for up to 7 days due to institutional failures suggest that the service delivery system is not responsive enough or accountable to consumers. Access to water can be an important asset, which affects a care giving household's 'stock' of social capital (that is, reciprocity networks, norms and trust that facilitate coordination and cooperation for mutual benefit). Social capital is an important precondition for recovery of the patient and psychosocial well being of the care giver and other family members. Access to a sufficient and reliable supply of potable water is therefore an important household coping strategy. As shown above in terms of ostracism, unreliability of water in the community changes the norms of reciprocity, and contributes to erosion of social capital. A holistic approach to access to water and care giving considers not only the physical needs of the patient, but the total living environment, institutional and social relations in which care giving takes place. Access to water is important for care givers as they are better able to cope with increased stress due to reciprocity networks.

The results of this study also suggest that, as Savenije (2002) points out, water should not be strictly treated as an economic good. Its importance as a basic need and social good is clearly demonstrated by our case study on home-based care. We support the view of Perry et al. (1997) that water is an economic good in most cases (except during a severe drought) and the critical issue is whether it should be treated like other private goods or like public goods. Depending on the amount of water supplied to the household, water should be treated like an ordinary private good or a public good. It is an obligation of the Government of Botswana to supply water for basic human needs, hence it is necessary to treat water differently at different levels of consumption. In view of the greater use of water for home care, which is a basic need, we recommend that the volume for the lowest use band should be increased from its current level of 5 m^3 to 7 m^3 and the charge should remain the same. In other words, water should be considered a basic need up to 7 m^3, and beyond this level of consumption it should be treated like other private goods. Given that access is not only about direct monetary cost to the consumer, but also about supplies of water of good quality where and when it is most needed, it is recommended also that the Government subsidize installation of on-plot water infrastructure such as standpipes.

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