

NORWEGIAN UNIVERSITY OF LIFE SCIENCES



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Abstract

Despite free healthcare in public facilities, access to medicines is a serious problem in Uganda. Unavailability of drugs in the public sector, high prices in the private sector, and the absence of a national insurance system result in high out-of-pocket expenditures for households.

Drug shops run by the communities present an opportunity to improve access to medicines for people in the poor rural northern west district Koboko. Managed by community members and provided with medicines by a non-governmental organization, such shops could offer lower prices than the private sector. To initiate such a project insights into the local health sector are required. In this context this thesis offers a starting point for the implementation of community run drug shops.

Using a household questionnaire, 105 households were surveyed in Koboko District. On average almost 3 sicknesses per household were documented resulting in a dataset of 292 sicknesses. To gain a better understanding of the current situation, household's healthcare seeking behaviour, barriers in accessing medicines, and coping strategies with acute illness costs were investigated. Principal Component Analysis was used to estimate the socioeconomic status of each household and in addition to descriptive analysis, logistic regressions were run to identify relevant explanatory variables concerning seeking behaviours and coping strategies.

Results show that most households consult mainly public health centres in case of sicknesses; this includes households with a higher socioeconomic status (contrary to what was hypothesized). Informal treatments do not play an important role. At the same time medicines are usually obtained from private facilities. Urban and wealthier households were found to have significantly better access to medicines emphasizing the problem of health equity. Unavailability of medicines and high prices in the private sector are identified as major barriers in accessing healthcare while geographical and quality issues are less serious obstacles. To finance acute sickness costs, many households have to sell food, even though it is usually used for their own consumption. In particular rural households can seldom rely on savings.

These results demonstrate that community run drug shops have the potential to improve access to medicines. Nevertheless, several challenges remain, such as promoting community awareness and the organization of a well functioning management.

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Acronyms and Abbreviations

ACT	Artemisinin Based Combination Therapy
AGHA	Action Group for Health Human Rights and HIV/AIDS
CBHI	Community Based Health Insurance
CCCP	Community Cash and Carry Pharmacy
DHO	District Health Officer
DRC	Democratic Republic of Congo
EMHS	Essential Medicines and Health Supplies
GoU	Government of Uganda
HC	Health Centre
HSSP	Health Sector Strategic Plan
IMF	International Monetary Fund
JMS	Joint Medical Store
KTC	Koboko Town Council
MDG	Millennium Development Goal
MMV	Medicines for Malaria Venture
MoH	Ministry of Health
NGO	Non-Governmental Organization
NMS	National Medical Store
PCA	Principal Component Analyses
PHP	Private Health Practitioner
PHRplus	Partners for Health Reform plus
PNFP	Private Not For Profit Organization
PPP	Purchasing Power Parity
SES	Socioeconomic Status
SURE	Securing Ugandans' Right to Essential Medicines
TCMP	Traditional and Complementary Medicine Practitioner
UCBHFA	Uganda Community Based Health Financing Association
UNCST	Ugandan National Council for Science and Technology
UNDP	United Nations Development Programme
USh	Uganda shillings
WDI	World Development Indicators
WHO	World Health Organization

1 Introduction

Illness is identified as one of the most frequent causes and consequences of poverty. The Ugandan Demographic and Health Survey (GoU 2007) and Lawson (2004) provide empirical evidence of a significant association between ill health and households moving into poverty in Uganda. These two country specific examples of the well established relationship between health and poverty demonstrate that health is fundamental for wellbeing and that it affects a country's development. In line with this, development and health economists focus on issues such as equity, efficiency, and health funding to improve access to healthcare in developing countries.

International, regional and national signatures of the Government of Uganda (GoU) guarantee the right to health, but healthcare supply to the Ugandan population is unsatisfactory. Despite financial support from global initiatives and improvements in the Ugandan health service delivery such as political decentralization or an increase in the budget allocation, surveys regularly demonstrate the lack of access to health services (AGHA 2007; GoU 2008b; GoU 2008c; GoU 2009; GoU 2010; Lindelöw et al. 2003; MMV 2008; Okwero et al. 2010; SURE 2010a). Since 2001 health services have become free of user fees in public Ugandan facilities, including the provision of medicines. However, constraints arising from geographical access, unavailability of drugs, and the lack of a social health insurance scheme, force people to pay out-of-pocket for healthcare in the private sector. Drug prices in private pharmacies are estimated to be three to five times higher than national procurement costs (GoU 2008b) and, hence, are not affordable for the majority of the population. Long distances to public health facilities and drug stock-outs, i.e. the non-availability of drugs in public Health Centres (HCs), have a disproportionate effect on the more than ten million Ugandans who live below the national poverty line (World Bank 2011). The Commission on Macroeconomics and Health suggests that “*out-of pocket expenditures by the poor communities should increasingly be channelled into community financing*” (WHO 2001: 60).

Suffering under the consequences of various civil wars in Uganda, the Democratic Republic of Congo (DRC), and the South Sudan, development indicators of the rural northern-west district of Koboko are below the national average. Here limited access to healthcare is considered to be a crucial factor that impedes development. Since neither the state nor the free market is able to fulfil healthcare needs of its poor population, innovative solutions are required.

A possible way to reduce out-of-pocket expenditures and to improve access to healthcare may be the idea of small drug shops called Community Cash and Carry Pharmacies (CCCP).¹ Managed by young, trained people from the communities and located close to each public HC, these shops could buy drugs from a parastatal NGO who already provides the private sector with medicines in a satisfactory way. CCCPs would be able to sell medicines at fair prices with low mark-ups to cover running costs; high prices from the private market could be avoided. Since consultation from the private sector is likely to be unprofessional, only drugs that were prescribed in a public HC would be handed out to ensure that a professional consultation was sought. A first bulk of medicines and a simple physical infrastructure could be provided by donors; afterwards CCCPs would function independently of external funds.

In a second step CCCPs could be extended into a prepayment scheme to prevent households from financial illness shocks. Health risks are mostly idiosyncratic, i.e. risks that affect particular individuals and not all members of a community. Hence, there is the potential to insure health shocks within the community. Analogous to micro finance institutions that try to replace the absence of financial organizations, community insurance schemes are a substitute for missing formal insurers.

Before initiating such a project it is necessary to establish the extent of the problem. By providing empirical evidence about access to healthcare, healthcare seeking behaviour and coping strategies with illness costs in Koboko District, this thesis can be regarded as a starting point of a project which seeks to implement CCCPs if required.

Where health systems are characterised by high out-of-pocket payments and a range of public and private healthcare providers, understanding the healthcare seeking behaviours of the population is essential if adequate access to services is to be achieved (Grundy & Annear 2010). For example, since CCCPs would hand out drugs only if consultation was sought from public HCs, it is important to know whether large parts of the population consult the private sector, traditional healers, or stay without consultation. In this context my first specific objective is *to document a household's healthcare seeking behaviour*.

¹ The expression and the business concept are based on the idea from the District Health Officer of Koboko District, Alfred Driwale.

Geographical access to healthcare facilities, availability, affordability and quality of medicines are relevant issues when considering access to medicines. The extent of access to medicines is limited and the identification of major barriers may present crucial rationales as to why introducing CCCPs is meaningful and if they have are an adequate approach to enhance the situation. Therefore the second specific objective of the thesis is *to identify and understand barriers in accessing medicines*.

Households in rural developing countries have developed different ways of coping with medical bills. Coping strategies used by different types of households in Koboko District are relevant to have an idea on how households would pay for drugs from CCCPs. For example, it might be the case that many households take credits from private clinics; an option that CCCPs might not be able to offer. For that reason the third and last specific objective is *to explore how households cope with out-of-pocket health payments*.

Based on these objectives specific research questions addressed are:

- 1) Where do households seek healthcare from?
- 2) What are major barriers in accessing medicines?
- 3) How do households cope with acute illness costs?

In the next chapter, I provide background information on Uganda, the study area, the Ugandan administrative health system, and general access to medicines in Uganda. Chapter three includes the theory. The conceptual framework is presented and the most important theories as well as empirical findings regarding healthcare seeking behaviour, access to medicines, and coping strategies with illness costs are reviewed. The fourth chapter is dedicated to field methodology, data variables, and statistical methods. Results are presented in chapter five. In the last chapter I summarize main findings and end the thesis by stating several challenges related to the implementation of CCCPs.

2 Background

2.1 The Republic of Uganda

Uganda is a landlocked country situated in East-Africa, bordered by Kenya, South Sudan, the Democratic Republic of Congo, Rwanda, and Tanzania. It was ruled by Great Britain as a protectorate from 1894 until independence in 1962. In 1971 a putsch by Idi Amin deposed the elected government from power. His military regime was responsible for the deaths of some 300.000 Ugandans (CIA 2012) and ended in 1978. After some further years of chaos the rule of President Museveni has brought relative stability since 1986.

In 2011 Uganda had a projected population of 35 million with population growth of 3% (WDI). About 50% of the population is aged between 0-14 years (WDI) and with an average of almost seven children per woman Uganda has one of the highest fertility rates in the world (GoU 2007). 87% of the Ugandans reside in rural areas (WHO) with most of them working in the agricultural sector. Numerous ethnic groups exist and both, English and Swahili, are official languages.

Figure 2.1: Map of Uganda



Economic growth has been stable over the last two decades. With an average increase in real GDP of 6% the economic overall performance was one of the best in Africa as well as on a global level (Okwero et al. 2010). In line with economic growth, poverty declined significantly in the last twenty years. Uganda is on track for the Millennium Development Goal (MDG) to halve the proportion of people whose income is less than one dollar a day until 2015. Despite these improvements Uganda, with a GDP per capita of 1.200, measured in Purchasing Power Parity (PPP) in international-\$, remains among the poorest countries in the world (IMF). Still 31% of the population live under the national poverty line (WDI) and high inequality persists between rural and urban areas. In the Human Development Index 2010 of the United Nations (UNDP) Uganda ranked on position 141 of 169 countries. Ugandan profile data are summarized in table 2.1 at the end of this subchapter.

Uganda's well functioning healthcare system collapsed during the Idi Amin regime. Health indicators fell dramatically in the period of unrest and civil war from the mid-1970s to the early 1980s. Since peace had been restored in the late 1980s, Uganda started the process of rebuilding the social sector and progressed in improving the health of the population. But, overall health indicators remain poor. Referring to the World Development Indicators and the database of the World Health Organization life expectancy at birth is increasing rapidly (2000: 45 years; 2008: 53 years) but is still considerably lower than in high income countries. Uganda's under-five mortality rate as well as the infant and the maternal mortality rate – the latter is one of the highest in the world - are progressing unsatisfactory and are not on track to meet the MDG. Major causes of morbidity and mortality are malaria, HIV/AIDS and tuberculosis. In particular malaria accounts for 50% of the ill population and about 20% of mortality are attributable to malaria related illnesses (MMV 2008). Approximately 6.4% of adults are infected by HIV/AIDS (Okwero et al. 2010). The GoU recognizes that three-fourths of the disease burden is preventable through improved hygiene and sanitation, vaccination against child killer diseases, good nutrition and other preventive measures (GoU 2010).

In 2007 6.3% of the GDP were spent on health in Uganda (WDI). A possibility to increase health expenditures is given in a comprehensive research of the World Bank (Okwero et al. 2010) which criticizes waste in the Ugandan Health Sector. Ghost workers, theft and expired drugs as a consequence of poor management and procurement leave fiscal space and considerable room to improve efficiency. It is stated that in fiscal 2005/06 approximately 36 billion Ugandan Shillings (USh) or 13% of health sector spending was lost due to waste. A related problem is the absence of workers; Chaudhury et al. (2006) found an absence rate of 36% in primary HCs in Uganda. Furthermore, two global health initiatives, the "Global Fund

for the Fight against AIDS, Tuberculosis, and Malaria” and the “Global Alliance for Vaccine Initiative”, stopped at different times their support in Uganda, citing management concerns. To benefit from such initiatives Uganda should enhance its capacity to program external funds.

Table 2.1: Profile of Uganda

Aspect	Indicator	Number	Year	Source
General data	Population (million)	32.709	2009	WDI
	Population growth rate (%)	3	2009	WDI
	Rural population (%)	87	2008	WHO
	Population ages 0-14 (%)	49	2009	WDI
Socioeconomic data	GDP per capita (PPP Int.-\$)	1,196	2009	IMF
	Real GDP growth (annual %)	7	2009	WDI
	HDI (ranking out of 169)	143	2010	UNDP
	Poverty headcount ratio at national poverty line (%)	31	2006	WDI
General health data	Life expectancy at birth (years)	53	2008	WDI
	Infant mortality rate (per 1000 live births)	79	2009	WDI
	Under five mortality rate (per 1000 children)	128	2009	WDI
	Maternal mortality rate (per 100.000 life births)	550	2005	WHO
	Physicians (per 1.000 people)	0.12	2005	WHO

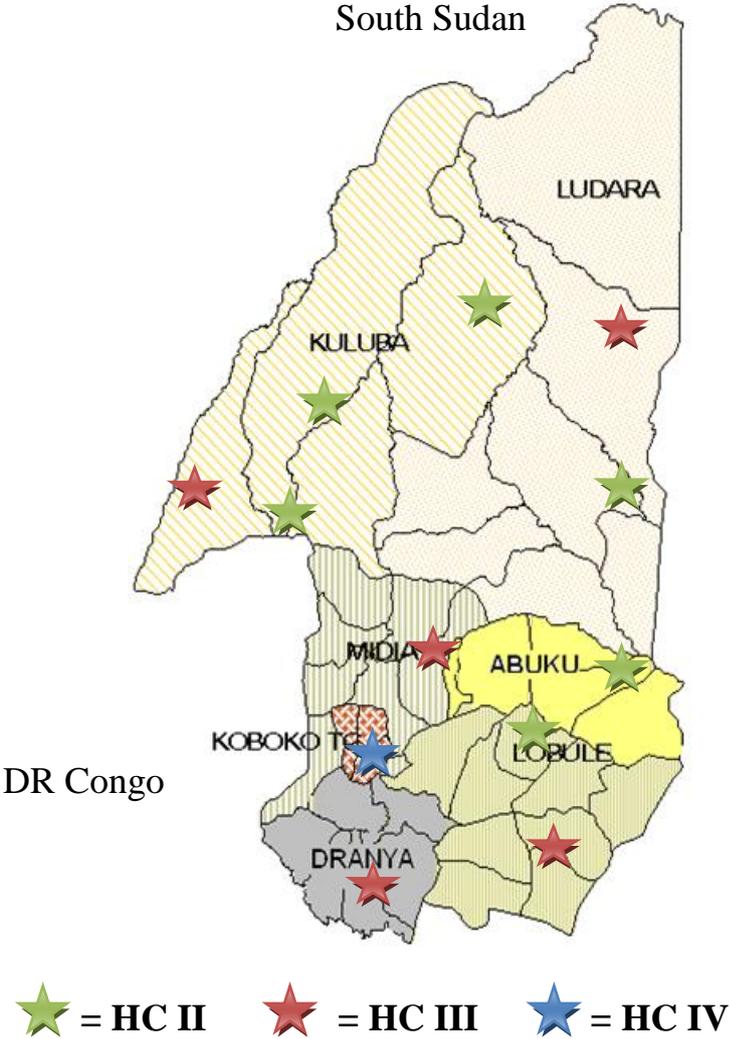
2.2 Koboko District

Koboko is situated in the extreme northern west of Uganda. The district covers an area of 820 km² and borders in the north on the Republic of South Sudan and in the west on the DRC. The population was estimated to be 196.000 in 2009, approximately 80% live in rural areas (GoU 2006). The district was created in 2005 and comprises of one county, Koboko, and has one Urban Council namely Koboko Town Council (KTC). The administrative and commercial centre KTC is one of seven sub-counties. Furthermore, the district comprises of 47 parishes and 389 villages with an uneven population distribution.

Koboko is a very poor district and its human development indicators are below national averages. Some households even cannot afford one meal a day. The lack of productive resources, illiteracy, and the impacts of civil wars are all causes and consequences of poverty. 80% of the population works in the agricultural sector, mainly practicing subsistence farming. In addition to food, tobacco is the major cash crop and another important source of livelihood. Businesses like general merchandise and transport services are benefiting from the proximity to the Sudan and the DRC.

Given that Koboko was the home area of Idi Amin, extensive looting by troops from Obote, Ugandan political leader who overthrew Amin, occurred in the early 1980s. Large parts of the population fled and health facilities were almost entirely destroyed (Witter & Osiga 2004). Since then remoteness, poor transport, ongoing rebel incursion from South Sudan, and refugee influxes from the two neighbouring countries have hindered development. In the last decade peace had been restored and the district is recovering. One example is the implementation of several HCs in rural areas which has improved geographical access to healthcare significantly.

Figure 2.2: Map of Koboko District



No hospital is located in Koboko but in neighbouring districts Yumumba, Marracha, and Arua. For example, 1 NGO mission hospital in Yumumba is not far away for people living in Abuku sub-county. 1 HC IV operates in KTC and several HCs II and III in rural areas (see next section for a description of HCs and their levels). Private clinics are located in urban KTC with exception of one working in Kuluba sub-county. In addition to private clinics, 1

NGO mission HC is situated in KTC. This non-profit HC charges little fees and is equivalent to a public HC III in terms of its services offered. Several private drug sellers are profiteering in urban as well as in rural areas.

2.3 Administrative Health System

The public national health system was decentralized by the 1997 Local Government Act to devolve decision making to lower levels. Currently about 90 districts exist and its number increases steadily. Unfortunately, in many districts management capacity is very limited: leadership, management and specialist skills are in short supply (GoU 2009).

The public sector is made up of 7 levels: Health Centres I – IV, General Hospitals, Regional Referral Hospitals, and National Referral Hospitals. Each hospital as well as each HC is determined by the qualification of the staff and the set of services delivered. HCs I have no physical structure and consist of a team of people which works as a link between health facilities and the community; in practice they do not exist. HCs II provide a first level of interaction between communities and the formal health sector and should be able to treat common diseases like malaria. HCs III offer basic preventive and curative care. A HC IV is mini hospital that should have wards for men, women, and children and provide inpatient care. Local governments own the HCs and General Hospitals while the Ministry of Health (MoH) is responsible for Regional and National Hospitals. In theory each district should have a district hospital. For realization the GoU has to allocate resources to upgrade an existing HC IV or to build a new hospital by the time new districts are created. But, resource allocation is inadequate and fails to compensate districts for its responsibility. One example is Koboko District where no public hospital operates.

Public health facilities did not charge user fees before 1993. After decentralization of the public health sector, local district authorities were given the right to charge a levy for the services they deliver. There was some evidence that the quality of services and supply of medicines improved in some areas (Xu et al. 2005), but with the intention to facilitate access to healthcare for the poor, President Museveni abolished user fees during the election campaign in 2001.

Like in many other developing countries the private sector is becoming more and more important for health service deliveries and fills gaps where public services are not available. It comprises of three different types of organizations: Private Not for Profit Organization (PNFP), Private Health Practitioners (PHPs) and the Traditional and Complementary Medicine Practitioners (TCMPs). The PNFP sector is mainly present in rural regions while

PHP facilities are prominently concentrated in urban areas. Private providers comprise clinics, retail pharmacies, and drug shops operating formally as well as informally. Both the PNFs and the PHPs charge user fees to run their facilities. Dual employment is common and more than the half of the doctors working in the private sector are additionally employed in the government sector (GoU 2010). Evidences from other countries indicate that partnerships between public and private sectors can result in positive impacts on equity (Patouillard et al. 2008; Prata et al. 2005). The high presence of private facilities in Uganda argues for such a partnership, a policy which aims to improve coordination is in draft (GoU 2010).

Uganda has an emerging pharmaceutical industry but production is far below installed capacity; about 90% of all medicines are imported (GoU 2010). The GoU forecasts how much medicine will be needed to treat the population and subsequently the National Medical Stores (NMS), a parastatal organization that is responsible for medicines procurement and distribution, purchases and stores the medicines centrally. The variety of public medicines is limited to medicines on the Essential Medicines List. Districts receive drugs through Credit Line, a pull system by districts placing orders to NMS for medicines needed using a quarterly budget. NMS delivers every two months. Drug supply within districts works on a push system with central health facilities sending drugs to smaller ones. The private sector receives drugs from Joint Medical Store (JMS), a governmental authorized NGO.

2.4 Access to Medicines in Uganda

The GoU (2010) states that cultural beliefs within the society lead many Ugandans to seek care from TCMPs before visiting the formal sector. Konde-Lule et al. (2010) found, in rural Uganda, that 63% of the respondents consulted private health facilities in the case of illness. A study in Arua, a district located close to Koboko District, showed that in 80% of treated sicknesses, households sought healthcare elsewhere before attending a public HC (Osiga 2002; cited in Witter & Osiga 2004). It seems to be common that many Ugandans do not consult free public HCs in case of sicknesses. Limited access to medicines related to availability, accessibility, quality, and affordability of drugs can be regarded as one reason for this behaviour.

Regarding availability, empirical evidence from Uganda demonstrates regular unavailability of drugs in public HCs. The GoU (2009) confirms that 72% of governmental health facilities have monthly stock-outs of any indicator medicine and key essential medicines were only partially available (46%) during an assessment of the pharmaceutical situation (GoU 2008b). Various studies revealed in particular the unavailability of CoArtem, the first line malaria

treatment. Frequent stock-outs and low availability of CoArtem were found for example by AGHA (2007) and MMV (2008). Further evidence was also provided by a study of the NGO “Securing Ugandans' Right to Essential Medicines” (SURE); only 25% of facilities surveyed were able to treat malaria with the first choice medicine (SURE 2010a).

On the other hand accessibility to public health facilities in Uganda has been improving steadily in the last two decades and currently about 72% of the population is living within 5 km of a public or a PNFP health facility (GoU 2009) in comparison to 49% in 1990 (Kiwanuka et al. 2008). Moreover, Konde-Lule et al. (2010) offers evidence that private healthcare providers reach a wide client base also in rural Uganda. According to the World Bank (Okwero et al. 2010), only 10% of those who did not seek healthcare in case of sickness cited distance as a reason.

Concerning quality of medicine treatment, the Ugandan annual health sector performance report 2008/09 revealed that only 40% of available equipments in public health facilities were in good conditions (GoU 2008c). By tracking the supply of malaria drugs lack of storage standards was detected: just 30% of the facilities exhibited adequate storage (SURE 2010a). A national quality management system tries to ensure the quality of medicines through sample testing, but counterfeit products on the market has become an increasing problem (GoU 2010). Moreover, Uganda faces a short supply of qualified health workers, especially in rural areas and in the northern part of the country. Bad working conditions encourage many skilled workers to leave the country. The majority of dispensing facilities investigated by the GoU (2008a) did not have a pharmacist and the World Bank (Lindelöw et al. 2003) found evidence for excessive and inappropriate drug prescriptions.

The unavailability of drugs in public HCs raises the issue of affordability. Half of the national health expenditures were due to out-of-pocket household expenditures (GoU 2010) and 9% of total household consumption were dedicated to the health sector (Okwero et al. 2010). Since only 1% of the population holds a private insurance (GoU 2008a), household expenditures were mainly highly inequitable out-of-pocket payments. The GoU has proposed a social insurance scheme for individuals in the formal sector, however the scheme is still not implemented and only about 400.000 people are estimated to be covered by such an insurance (Okwero et al. 2010).

Uganda does not have a policy regarding medicine prices and no national medicine price monitoring system for retail prices exists. In a study from the GoU (2008b) drug prices in the private sector were estimated to be three to five times higher than public procurement costs

and international reference prices; high mark-ups seem to be common. MMV (2008: 6) summarizes its report: “91 days of average household income is needed to purchase artemetherlumefantrine [CoArtem] for the household from the private sector”. These findings explain why only 36% of people surveyed (GoU 2008a) agreed to be able to afford the medicines they need.

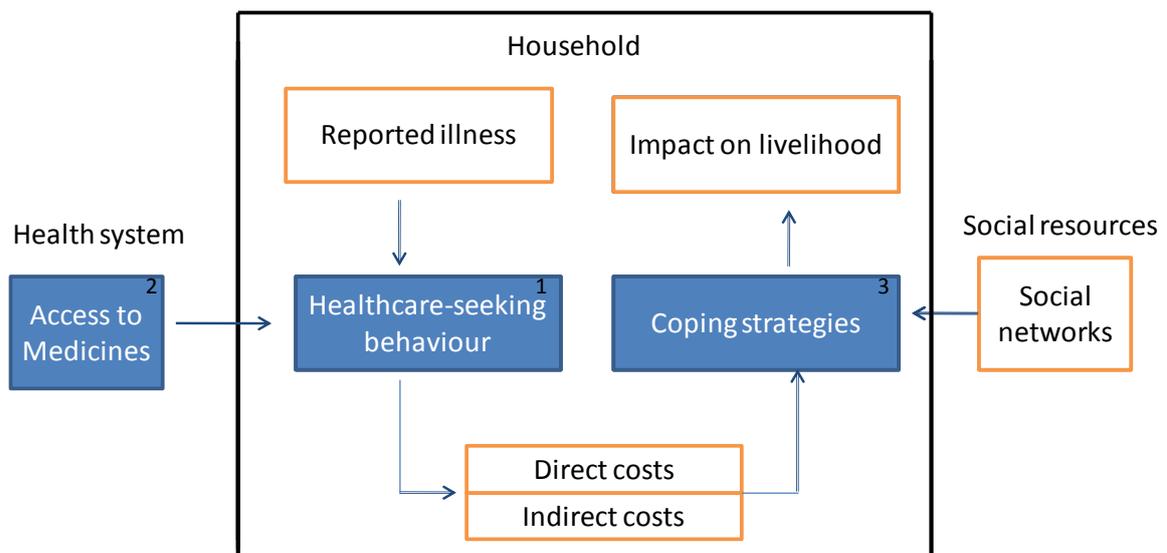
To deal with the problem of affordability and financial health shocks Community Based Health Insurances (CBHIs) became popular the last two decades. A CBHI is a voluntary health insurance scheme organized at the community level with the objective to protect households from high out-of-pocket expenditures. Members are supposed to pay a fixed amount of money periodically for a predefined package of health services. Like a social insurance, premiums are set to the risk faced by the average member, i.e. premiums do not distinguish between members (Bennett & Gilson 2001). But in contrast to a social insurance, enrolment is voluntary and no link to the employment status exists; the informal sector is targeted. CBHI schemes are run by a private non-profit entity and are usually applied where household expenditures on health are high. Empirical evidence about successfully operating CBHIs in Africa include the DRC (Criel 1998), Rwanda (Shimeles 2010), and Senegal (Jütting 2003). The first CBHI scheme in Uganda was launched in 1996 and the Ugandan Community Based Health Financing Association (UCBHFA), umbrella organization for all CBHI initiatives in Uganda, counted 33 CBHIs in Uganda in 2009 (UCBHFA 2009). As stated in the introduction, successfully operating CCCPs could be extended into a prepayment scheme at a later stage that would be closely related to the concept of CBHIs.

3 Theory

The conceptual framework in figure 3.1 provides an overview of the scope of the thesis. Blue boxes are linked to the 3 research questions stated in the introduction. White boxes were only a limited part of the research.

Once a household member falls sick the household has to decide first whether and then where to seek healthcare from. These decisions will depend amongst other things on the availability and access to medicines provided by the health system, represented in box 2 outside the household. The choice of healthcare service provider then affects the costs or burden of care. Costs can be split into direct costs including medicines, consultation, and transportation and into indirect costs due to losses in productive labour time. Costs that are greater than the available budget require coping strategies regarding how to deal with the illness shock. Coping strategies are, in part, affected by the social network of the household. Costs and coping strategies can have short and long run impacts on livelihood.

Figure 3.1: Conceptual Framework



Source: Based on Russell (2004)

This chapter provides the theoretical background and previous empirical findings regarding healthcare seeking behaviour, access to medicines, and coping strategies with illness costs. Note that the first two are more related to the science of public health while coping strategies with illness costs is more related to economic theory.

3.1 Healthcare Seeking Behaviour

Healthcare seeking behaviour can be defined as a “*sequence of remedial actions that individuals undertake to rectify perceived ill health*” (Bhuiya 2009: 69-70). The time span from symptom onset to contacting a healthcare provider, the type of healthcare provider chosen by the household, and the patient’s compliance with treatment are included in this definition.

Apart from the barriers arising from the health service system that will be discussed in the next section, what individual characteristics influence household’s health behaviour? A large body of literature deals with this question and several theories and models in psychology, public health, sociology, and anthropology have been developed to provide a theoretical framework. The economic health model by Grossmann (1972) is more relevant in analyzing demand for the commodity “good health” rather than explaining where households seek healthcare from.

Psychological models include pathway models and health belief models (Hausmann-Muela et al. 2003; Prosser 2007). Pathway models describe different steps in decision making and focus on the path households follow until they use healthcare. One example is given by Nyamongo (2002) who tracked treatment seeking sequences for malaria in Kenya and found that households are likely to observe the sickness for a relatively long time before seeking a professional consultation. Generally, pathway models rely more on qualitative studies. On the other hand health belief models deal with the idea of decision making through perceptions and evaluations. Perceived susceptibility, severity, benefits and barriers are important concepts (Hausmann-Muela et al. 2003; Prosser 2007).

An alternate type of model is so called behavioural model. This model aims to identify key variables and determinants that affect health seeking behaviours. The most famous one was developed by R. Andersen during his dissertation and later published together with J.F. Newman (Andersen & Newman 1973). Several extensions exist, see Andersen (1995) and Kroeger (1982), which adjust for conditions in developing countries. Given the model provides, in its simplest form, a straightforward overview of potential key variables that influence healthcare seeking behaviour, I present a brief overview of it in order to provide insights as to which variables might influence healthcare seeking behaviour in Koboko District.

The model views healthcare seeking behaviour as influenced by: societal determinants, like technology and norms; the health service system, including its resources and organization;

and individual characteristics. Note that the first two characteristics are only relevant if healthcare behaviour between different areas is compared, while individual characteristics matter when analyzing different behaviours within one region. Individual features are clustered into three groups: predisposing factors, enabling factors, and need factors, see figure 3.2.

- Predisposing factors: Based on personal characteristics some individuals tend to use more and/or different services than others. These characteristics exist prior to the onset of a certain illness. In particular socio-demographic factors like age, gender, profession, and education are relevant. But also individual beliefs including attitudes towards health services and knowledge about the illness are part of these factors. For example, some households might have had negative experiences with non-availability of drugs in public HCs and are not willing to visit public facilities anymore.

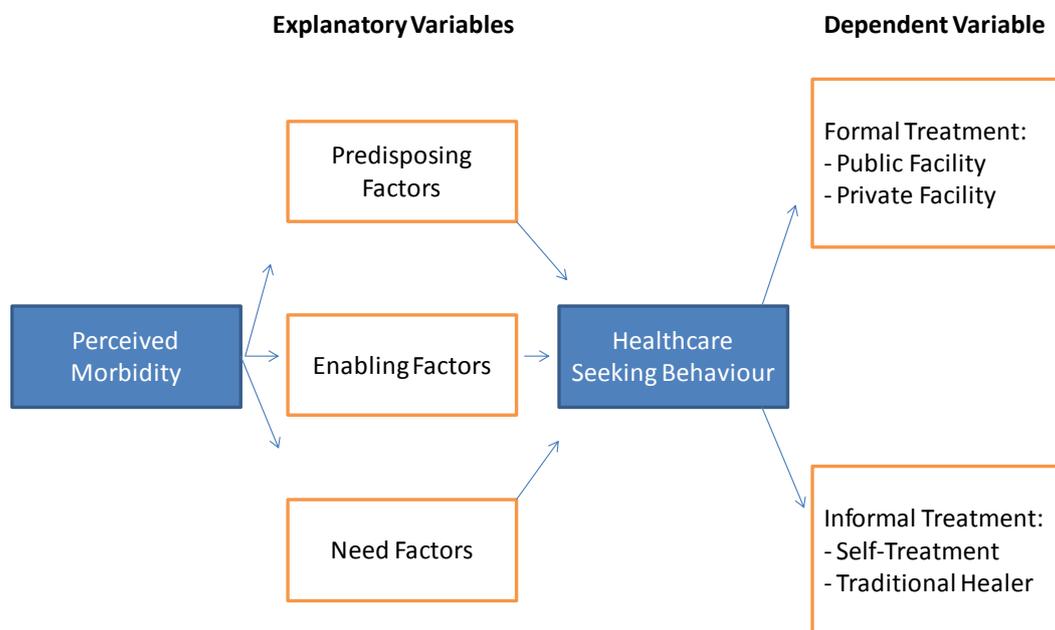
Empirical findings in developing countries regularly provide evidence of the importance of predisposing factors. Prosser (2007) found that higher educated households in rural Kenya were more likely to seek formal treatment than those with a lower level of education. Female children were estimated to be twice as likely to receive care than males in India (Pillai et al. 2003). In Kenya female-headed households were found to rely significantly on private clinics (Taffa et al. 2005). Finally, a relatively new research identified trust as an important consideration that influences people's healthcare seeking behaviour (Ozawa & Walker 2011).

- Enabling Factors: Any condition which permits a family to use a health service is defined as enabling (Andersen & Newman 1973). In other words, enabling factors are related to the means a household has to obtain health services. Such means can be measured for example by income, access to credit, or the proximity to a service provider.

Enabling factors are closely linked to economic concepts. First, the budget constraint impedes poor household's access to formal healthcare. Secondly, among others development economics deal with improving access to credit in rural areas. Rural households often have limited access to formal credits. Reasons are the absence of appropriate collaterals, the problem of moral hazard based on asymmetric information, and covariate risks (Ray 1998b). Credit can be used for investments, consumption smoothing, to cope with ex post risk shocks, but it also affects healthcare seeking behaviour. Third, proximity is associated with transportation costs that increase total costs and lower demand.

The list of empirical studies giving evidence for the importance of enabling factors in explaining healthcare behaviour is extensive. Amin et al. (2010) found wealth was associated with the utilization of maternal and child health services in rural Bangladesh. Fosum (1994) identified a proxy for income as being highly correlated with use of medical services in Uganda; while Noorali et al. (1999) pointed out the importance of distance to a private facility for the choice of the health facility in Pakistan. Moreover, Odaga & Cattaneo (2004) offer evidence that poorer Ugandan households were more inclined to treat themselves or use traditional care than wealthier ones and identified at the same time proximity as an important reason for the decision of the provider.

Figure 3.2: Behavioural Model



Based on Andersen & Newman (1973) and Kroeger (1982)

- Need Factors: Though predisposing and enabling factors are necessary for the use of health services, they are not sufficient. The actual use of health services is triggered by need during illness. This need is seen as the most immediate cause for seeking healthcare. Examples are the individual perception of the severity of the sickness, the number of days one has already been ill, and the difference between acute and chronic illnesses. One example is typhus which leads to an acute confusing state making households more inclined to consult traditional healers.

Predisposing, enabling, and need factors influence households' decision with regard to whether to seek care and where to seek it from as well as where to obtain medicines from. The decision regarding what type of care includes first to choose between formal and informal

healthcare. Formal healthcare is considered to be conventional (modern) medicines. A second decision must be taken to opt between public and private health facilities in case of formal treatment, and between self-treatment and traditional healer if informal treatment is sought.

The discussion of the importance of the three factors developed by Andersen reveals the existence of a large number of possible independent variables to explain healthcare seeking behaviour. However, the final set of exogenous explanatory variables used must be determined by the researcher in each specific case. Bearing in mind predisposing, enabling, and need factors, I formulate the decision to seek healthcare consultation from a public HC (P) in Koboko District and to use the full dose of medicines required (D) as

$$P = f(\text{SES, Location, GH, AH, EH, GS, AS, TOI})$$

$$D = f(\text{SES, Location, GH, AH, EH, GS, AS, TOI})$$

where P indicates if consultation was sought from a public or private provider, D if the full dose of medicines was taken during the sickness, SES is the socioeconomic status of a household, location an indicator for the distance to a public HC, GH AH and EH gender, age, and education of the head of the household, GS and AS gender and age of the sick person, and TOI a distinction between acute and chronic sicknesses.

I derive 2 hypotheses regarding my first research question related to healthcare seeking behaviour. First, I hypothesize that the *seeking of a consultation in public HCs is lower amongst households with a higher socioeconomic status*. I expect these households to be more likely to try to avoid waiting times and avoid being confronted with unavailability of drugs in public HCs. Poorer households are more likely to be faced with consulting free public HCs to avoid costs in the private sector. Secondly, I hypothesize that *members of households with a higher socioeconomic status are more likely to use the full dose of medicines required*. Wealthier households are expected to have better opportunities to reach public HCs, but above all they are more able to pay for medicines in private facilities.

3.2 Determinants of Access to Medicines

Access to medicines is defined by the WHO as the “*percentage of population who have access to a minimum list of 20 essential medicines, which are continuously available and affordable at a health facility or medicines outlet, within one hour’s walk from the patient’s home*” (WHO 2007: 1). Moreover, good quality medicines and that guidance and knowledge are available for proper use of the medicines is also required.

This definition of access to medicines is closely related to an approach proposed by Penchansky and Thomas (1981) about 30 years ago. The authors offered a definition of the term ‘access to healthcare’ since the concept had been used ambiguously and in various ways. They defined access as a measure of fit between characteristics and expectations of providers and clients that could be measured across five dimensions: accessibility, availability, affordability, accommodation, and acceptability. Note that the concept of access is related but not identical to enabling factors explained in the former subchapter. Access is better described as a general concept summarizing a set of specific areas of fit between the population and the health system, while enabling factors focus on particular variables representing the ability to seek healthcare.

3.2.1 Accessibility

Accessibility refers to the geographical relationship between healthcare provider and clients. It is determined by travel time to the next public and or private health facility, distance, and transportation costs. Hence, not only distance in kilometers matters, but also types of transport available and costs to reach the health facility.

Living far away from a health facility impacts access to medicines, because transportation costs increase. Transportation costs can be added to the costs of the final product. If total costs are too high, demand for the product will be zero even when the final product is for free. Government interventions that lower transportation costs, e.g. through the construction of more HCs or better roads, can increase demand and thereby improve access to medicines.

3.2.2 Availability

Availability is the link between volume and type of health service provisions and the need of the population. In the context of access to medicines it refers to the availability of medicines in the private and public sector.

Availability of medicines in the private sector underlies market forces that do not necessarily lead to a satisfactory outcome. Hart formulated in 1971 the well known inverse care law: “*The*

availability of good medical care tends to vary inversely with the need of the population served” (Hart 1971: 1). Beyond the literature on the inverse care law, the key point is that a free market cannot be expected to shift investments to where it is needed. Without any governmental intervention, medicine availability is not ensured.

Since access to healthcare, including medicines, might not be satisfied by the private sector in one of the dimensions described here, providing public healthcare is supposed to enhance access to healthcare. However, there are several reasons why availability of medicines in the public sector might be a problem. The following factors, complemented with examples from Uganda, can be considered to be the most important reasons for drug stock-outs/shortages in the public sector in a developing country:

- Inadequate funding of the health sector: An increase in the budget allocation is supposed to increase availability of medicines in public HCs. But, cross-country comparisons have demonstrated that public health spending has often had less impact on the national health status than expected (Filmer et al. 2000; 2002), indicating that a focus only on funding would be wrong.

Ugandan health care leaders tend to claim inadequate funding as the principal problem of unavailable drugs. These complaints should have in mind that Uganda is a developing country facing a strict budget constraint.

- Inefficiencies in the procurement process and in the distribution of drugs: To ensure availability of medicines a well-coordinated system of selection and distribution of drugs is required (DCP 2008).

Frequent complains about the NMS delivering system are common in Uganda. Delayed and wrong deliveries make it difficult for districts to manage drug storage.

- Lack of skilled health workers: Skills in forecasting type and quantity of medicines needed are important to ensure correct and timely delivery.
- Theft: Health workers might steal medicines and subsequently sell them.

Since 2010 public Ugandan drugs can be identified through a stamp on each tablet making theft more difficult. Nevertheless, it remains an issue.

- Distrust in the public health system: Distrust in the public health system can affect drug availability. The combination of free provision of drugs and the absence of illness-tests might result in a run on public health facilities when drugs are delivered. Assuming a stock-out will occur, people store medicines at home.

The Ugandan MoH (GoU 2008a) provides evidence that only 33% of the households believe that medicines are available in public healthcare facilities, which explains why in most areas runs on public HCs are common once medicines are delivered.

3.2.3 Affordability

Affordability refers to the ability of the population to receive care from the health system. Client's income, the presence of insurance schemes, and prices in the private sector affect affordability.

In addition to low income levels, rural areas in developing countries usually lack the supply of insurances. Asymmetric information, as a consequence of high transportation costs, results in moral hazard and adverse selection issues that complicate the development of private insurance companies (Binswanger & Rosenzweig 1986). At the same time social insurance schemes by the government do not cover the informal sector (Okwero et al. 2010). Due to high risk aversion at low income levels, the demand for insurance is high.

An important factor influencing prices in the private sector is competition. Economic theory predicts, excluding the case of increasing returns to scale, that the higher the competition among sellers the lower their market power and the lower market prices. Competition is high when a large number of suppliers exists, a condition that is likely to fail in rural areas.

3.2.4 Accommodation & Acceptability

Accommodation and acceptability are related to the organisation of supply resources (waiting times, opening hours) and the client's attitudes about the provider. In terms of medicines it mainly refers to the quality of medicine treatment. Three major quality aspects are relevant:

- Quality of the medicine itself: Counterfeit products, i.e. fake medicines are illegal and can be harmful for the patient's health.
- Skilled health worker: The education of health workers affects management, adequate utilization, and appropriate dispensing of medicines.
- Equipment quality: Medicines require appropriate storage to avoid degradation and any negative impacts on their effectiveness.

The discussion of these five dimensions measuring access to healthcare is intended to give an overview of potential key barriers in access to medicines. However, the theories of public health offer limited frameworks regarding how to find appropriate measures for these dimensions (Wyszewianski 2002).

3.3 Coping Strategies with Financial Costs of Illness

Income risk is part of daily life in developing countries. Risk has different sources and can be distinguished between common and idiosyncratic risks (Dercon 2002; Ray 1998a). While common risks are covariate risks that affect all members of a community, idiosyncratic risks affect only particular individuals. Crop risks due to weather conditions are a typical example of a common risk. Health risks are in most cases idiosyncratic and health shocks are one of the most sizable and least predictable shocks (Gertler & Gruber 2002).

Households have developed several strategies to deal with risks since formal credit and insurance markets are usually missing or incomplete in low developing countries. The literature uses different terminologies on such strategies. For example, Alderman and Paxson (1994) call ex ante strategies risk management and ex post strategies risk coping, while other authors refer to any strategies applied during crises as coping strategies (stated in Dercon 2002). However, I use the term and concept of coping strategies to explain household responses to adverse financial shocks although I am aware that in particular in case of sicknesses coping with time losses is an issue, too.

Coping strategies for illness costs can be distinguish between ex ante and ex post strategies (Ding et al. 2008). Ex ante strategies deal with preventions. Examples include securing safe drinking water and sleeping under a mosquito net to reduce the likelihood to fall sick, and investing in insurance and in liquid assets, in order to be prepared for possible health costs. Strategies that decrease the probability of falling sick are usually much cheaper than ex post strategies but often are not applied as described by Banerjee & Duflo (2011) in the chapter “Low Hanging Fruit for Better (Global) Health?”. On the other hand ex post strategies relieve the impact of an illness. Examples are borrowing money or increasing labour supply to meet the extra expenses.

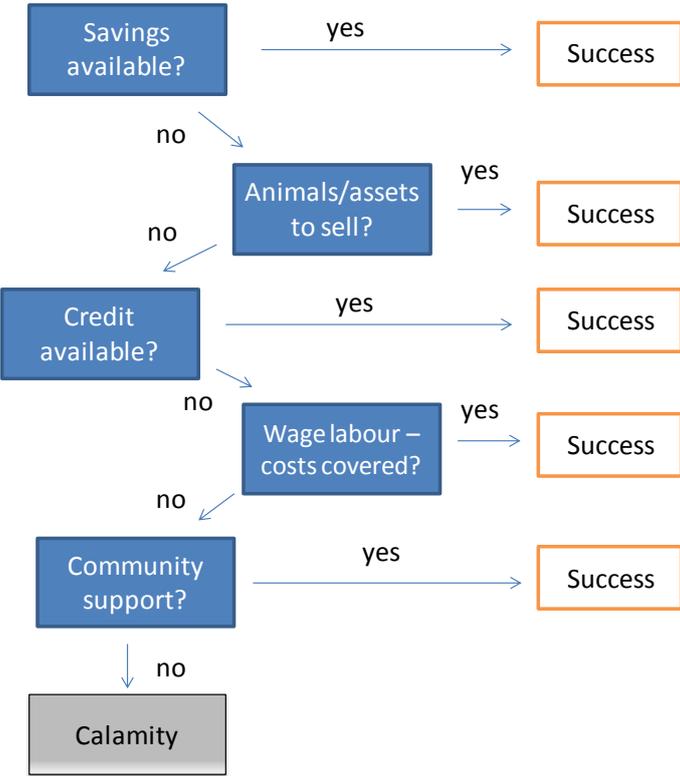
Sauerborn et al. (1996) provide one of the studies that examine a household’s ex post coping strategies with illness. The authors investigated strategies for managing financial illness costs in rural Bangladesh where households were not insured. See figure 3.3 which illustrates the sequence of coping strategies Sauerborn et al. identified.

Savings were found as the first employed strategy. But, the ability to rely on savings depends on the economic situation of the region and the household. In addition to low income levels, rural household’s incomes are often seasonally restricted. Consequently, it is unsurprising that several studies have shown that relying on savings is only feasible for a small proportion of the population (Kabir et al. 2000; Russell 1996; Wilkes et al. 1998). In a country comparison

Leive and Xu (2008) point out that wealthier and urban households are more likely to use income and savings, indicating that rural areas are often less cash driven than urban ones.

If savings are not enough to cover health costs, Sauerborn et al. identified sellable livestock as important second factor influencing the coping choice. In addition to livestock further assets might be sold to obtain cash, e.g. land or food. But, the evidence on selling assets is mixed and other studies have found it as an uncommon response (Kabir et al. 2000; Wilkes et al. 1998). Apart from selling food which is usually seen as last resort, an explanation why assets are often not sold is that these assets might be a productive and an integral resource for livelihood. In other words, selling assets can have serious adverse effects on future wellbeing. It is worth noting that modern poverty analysis deals with dynamic asset poverty. If selling assets leads to an endowment of productive assets that is below a certain asset threshold called a Micawber threshold, households may fall into a poverty trap (Carter & Barrett 2006). Selling assets can be unsustainable and causes or sustains impoverishment.

Figure 3.3: Sequence of Coping Strategies with Financial Illness Costs



Based on Sauerborn et al. (1996)

In some areas there exists the ability to take loans if savings and sellable assets are not available. If the household does not own livestock or other possible collaterals, loans are generally not accessible. Hence, in particular poor households might have to rely on further

strategies. One possibility is to reduce leisure time by selling own labour or increasing the workload on the own farm to generate additional revenue.

Finally, and in many cases a very important coping strategy, is relying on community support. This includes borrowing money from friends or relatives or obtaining gifts. Since illness risks are idiosyncratic, such support is much more likely to occur than if it was a common risk. Community support depends crucially on the social networks a household has. If no savings and sellable assets are available, no access to credit exists, no possibilities to increase revenues through a higher workload, and no community support is present, households might remain without any healthcare even in cases of serious sicknesses.

I already stated that social networks, the location, and the socioeconomic status of a household effect which strategy is feasible. Obviously, the magnitude of the cost is crucial, too. For example, Wilkes (1998) concluded that households in rural China are generally able to finance short periods of sickness with a reduction in consumption and Gertler & Gruber (2002) found that Indonesian families are able to insure small frequent illnesses but unable to insure costs for major sicknesses.

To investigate which factors are significant in explaining if households can use savings (S) or have to sell assets or borrow money, I write the decision of a household in Koboko District to cope with acute sickness costs by using savings (S) as

$$S = f(\text{SES, location, Costs, GH, AH, EH})$$

where the dependent variable S is 0 if the household uses savings and otherwise 1, SES the socioeconomic status, location an indication if the household lives in rural or urban areas, costs a measure of the amount of money needed, and GH, AH, and EH socio-demographic control variables for the gender, age, and education of the head of household. Wealthier households have larger financial backgrounds and therefore I hypothesize that *households with a higher socioeconomic status are more likely cope acute sickness costs with savings.*

4 Methodology

4.1 Study Design

I used a population-based, cross-sectional survey design to answer the research questions. For logistical reasons self-reported rather than observational data were gathered. During my stay at Makerere University in Kampala I developed a questionnaire for administering during a face-to-face interview. Some questions were similar to a household survey related to access to medicines conducted by the GoU (GoU 2008a), but most components were based upon the specific needs of my research. The entire questionnaire is presented in appendix A.

With the intention to get familiar with the area and to test the questionnaire I visited Koboko District before the final data collection. The questionnaire was piloted in a few households in rural and urban areas. Piloting the questionnaire revealed that households seemed to have a quite accurate memory regarding sicknesses and treatment what allowed to set the recall period to 12 months. Furthermore, several questions related to asset ownership required modification for the final version of the questionnaire.

Data collection using a paper form took place during five weeks in May and June 2011 together with a health worker from a HC IV who I introduced into the research idea and the questionnaire. The health worker translated during the interviews since local languages, Kakwa and Lugbara, were more present than English. He not only translated but also drove the motorcycle and created contacts to sub-county (LC III) as well as village leaders (LC I). On both administrative levels background and objectives of the study were explained. In agreement with the local translator a household was defined by the husband (note polygamy is common in the north of Uganda). He usually lives with his wife or wives and children in several clustered houses. Interviews were conducted with the main healthcare decision maker of the household, usually the head of household.

To evidence quantitative findings, qualitative data were collected when the household survey was completed. Three one-to-one interviews with health workers in two rural HCs and one interview with a health worker in urban HC IV were conducted. These interviews were complemented by a focus group discussion with three experienced health workers in HC IV (see appendix A for issues discussed in the interviews).

The research was collaborative across various administrative levels. The District Health Officer (DHO) was involved in the research and supported data collection in several ways. Due to this cooperation information such as the population distribution and a list of all

villages in Koboko District were handed out by the town council. The application for permission to undertake research was submitted at the Ugandan National Council for Science and Technology (UNCST) in March 2011. The application was possible because of to the collaboration of the German NGO “Welthungerhilfe” which operated as a local institution of affiliation. The approval of the research permission lasted eight weeks and is presented in appendix B.

It is necessary to say something about the limits of data quality. My imperfect cultural knowledge of the area visited and no knowledge of the local languages restricted my understanding of the people. First of all information might have been lost during the translation process resulting in misinterpretations. Secondly, there are possible weaknesses in my questionnaire. Questionnaires are never perfect and there is always room for improvements, in particular in the context of limited cultural awareness. Third, many of the interviewees were illiterate what might have led to weak responses. Nevertheless, the translator did a great job and since he was well aware of objectives and procedure of the research, he regularly intervened in case of misunderstandings.

4.2 Sampling Approach

The sample size had to be feasible for the scope of the study but large enough to provide an overview of the status quo. I decided to visit 21 villages and 4-6 households in each village. In total 105 households participated in the survey.

Village sampling was based on following three steps:

1. Population distribution between the seven sub-counties was used to determine the number of villages in each sub-county participating in the survey.
2. To avoid including too closely located villages in rural areas, maximal 1 village per parish was selected.
3. Villages were chosen randomly based on the former two restrictions.

Two slight deviations from the sample selection and the final sample are noted. First, in Kuluba sub-county 1 village less and in KTC 1 village more than sampled were included because of practical reasons during data collection. Secondly, the restriction of 1 village per parish in rural areas failed in Ludara sub-county. Both deviations can be considered to have no significant impact on the outcomes. Principal sampling results of the sample selection are presented in table 4.1.

Households within the villages were selected randomly. If a household could not participate because of absence or other reasons it was replaced by the nearest household in the neighbourhood. The absence of a household was assumed to be uncorrelated with variables studied. Appendix C includes a table with names of all villages and parishes as well as the corresponding numbers of households that took part in the survey.

Table 4.1: Village Sampling

Sub-county	% of total population	Number of villages visited	Number of villages outside of 5 km of a HC
Koboko Town Council (urban)	22.68	6	0
Lobule (rural)	18.77	4	1
Ludara (rural)	14.07	3	2
Kuluba (rural)	13.76	2	1
Midia (rural/urban)	12.98	3	0
Dranya (rural)	9.51	2	0
Abuku (rural)	8.24	1	1
Total	100.00	21	5

4.3 Data Variables

The household questionnaire comprised of three big parts. First, household characteristics and asset ownership were identified. Secondly, the respondent was asked if any of the household members suffered an acute illness within the last twelve months or if a chronic disease is present. If yes, detailed questions about every sickness were recorded. The third part included opinions of respondents as well as questions regarding medicines stored at home by the household.

4.3.1 Outcome Variables

Healthcare seeking behaviour:

- *Healthcare consultation:* The respondent was asked in each case of sickness if and where the household sought consultation from. HCs II/III/IV, NGO mission facilities, private clinics/drug sellers, traditional healers, or hospitals outside Koboko District were possible service providers. For regression analysis the variable was converted for all formally treatments into a binary variable distinguishing between public and private providers.
- *Medicine Taken / Required Dose:* These two variables point out the usage of medicines. “Medicine Taken” indicates if the sick person took some medicines during the sickness while the variable “Required Dose” distinguishes between sicknesses that were treated with the whole dose and those that were not.

- *Origin of medicines:* If some medicines were taken households were asked where they were obtained from.
- *Medicine at home:* At the time the interview took place the respondent was asked if the household currently stores any medicines at home. If so, type and origin of these medicines were of interest.

Barriers in accessing medicines

- *Reason:* If interviewees said that no medicine at all or not the required dose was taken, reasons were reported.
- *Opinions:* Households were asked to give several opinions concerning accessibility, availability, affordability, and quality issues. The most important ones were: Do you think that drugs in the next public HCs are usually available? Do you think that your household usually can afford to buy drugs from the private market? Do you think that the quality of healthcare provision in public HCs is good? Do you think that the next public HC is too far away?
- *Geographical access to medicines:* On a village level walking times to the closest public and private facilities were of interest. On a household level type and timing of transport to the next public HC and to HC IV in KTC were asked for. Time was converted into a categorical variable with time spans of less than 15 minutes, 15 minutes - 1 hour, 1 – 2 hours, and more than two hours.
- *Quality of medicines usage:* Quality of medicine treatment was investigated by asking if medicines taken during a sickness were prescribed by a doctor. To check if medicines can be considered to be effective or not, respondents were also asked if the medicines taken contributed to overcome the sickness. Furthermore, medicines that were stored at home were shown by the interviewee and it was recorded whether primary package and labels were available and in good condition.
- *Approximated mark-ups:* In addition to the household questionnaire prices for medicines from the private sector with those from the national distributor NMS were compared. Although these approximated mark-ups are not exact, they give some insights into the supply side of the pharmaceutical market.

Coping strategies

The outcome variable on the topic of *coping strategies* indicates how the household financed the medicines used in each acute illness documented. Savings/income, borrowing from a friend/relative, borrowing from a private clinic, selling assets, and selling animals were

common answers. To identify characteristics when households can use savings and income the variable was also converted into a binary variable indicating if savings/income were used or assets sold/money borrowed.

4.3.2 Explanatory Variables

- *Socioeconomic status:* Wealth was used as a proxy for the SES of a household and was estimated through a set of variables. Binary variables to estimate the SES were housing quality, source of water, the presence of electricity, education level, as well as the ownership of a store house, car, motorcycle, bicycle, cell phone, radio, watch, or latrine. Moreover, count data indicating the number of cows, goats, sheep, and chickens possessed as well as rooms and land owned per household member were included in the assessment. How these variables were used to estimate the SES is the subject of the next section. As a result of that analysis each household was categorized into 1 of 3 socioeconomic groups. The SES was considered to be a key variable in explaining all three relevant issues: access to medicines, healthcare seeking behaviour, and coping strategies
- *Geographical location:* Geographical location of a household was described by two binary variables. First, several households were indicated as being located farther away than 5 kilometres from the next public HC. Secondly, a variable distinguishing between rural and urban households was created. Since all urban households are living within 5 kilometres of a public HC both variables are highly correlated with each other.
- *Socio-demographic factors:* Socio-demographic factors included age and gender of the head of the household as well as the sick person, and education of the household's head. Gender and education were binary variables indicating if the person of interest was female or male, and if the head of household at least finished primary school.
- *Type of sickness:* All types of illnesses were documented. For further analysis illnesses were distinguished between acute and chronic sicknesses. This difference was supposed to affect in particular the household's healthcare seeking behaviour.
- *Costs:* The amount of money spent on a sickness treatment was considered to be the key variable in explaining coping strategies.

4.4 Data Management and Analysis

Collected data were entered into an excel form using Excel 2007. Data entry was rechecked and variables recoded. Subsequently the dataset was exported to STATA (version 11.1). STATA was used to analyze data, Excel to design tables and figures.

4.4.1 *Estimating the SES: Principal Component Analysis*

First of all the SES of each household was determined. Assuming wealth is reflected in housing characteristics and assets owned by the household, this research used wealth as a proxy for the SES. As in the Demography and Health Surveys conducted by the World Bank (Rutstein & Johnson 2004), Principal Component Analysis (PCA) based on Filmer & Pritchett (1998) was applied to construct a socioeconomic index.

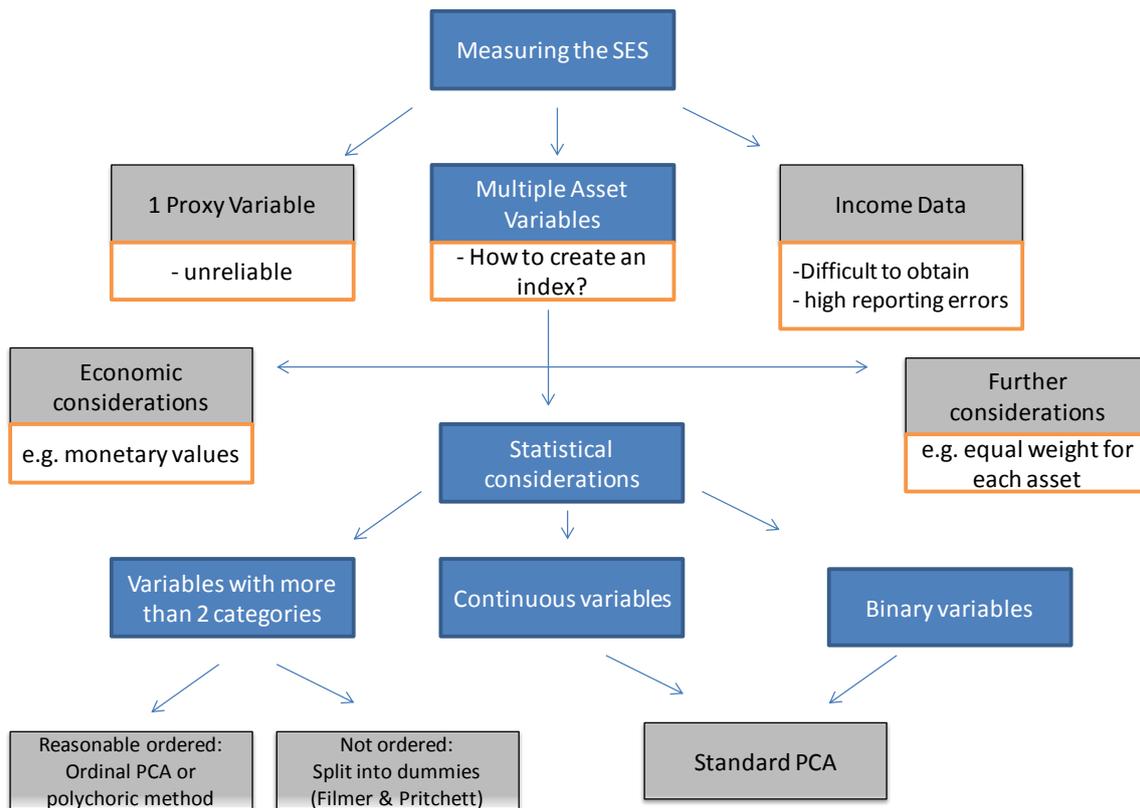
How to measure the SES of a household?

Figure 4.1 gives an overview of different alternatives to measure the SES. One way is to try to obtain income and expenditure data. But, these data have high reporting errors and are difficult to obtain in particular in areas where subsistence farming is common. Asset variables are easier to observe and can be used as proxies for the wealth of a household. The researcher might use a single proxy variable for the SES, e.g. the education of the head of the household, but such a proxy is likely to lead to unreliable results (Kolenikov & Angeles 2009). Hence, the use of multiple proxies in form of asset variables is preferable to have more reliable estimations. Key question when using multiple assets as proxies for the SES is how to allocate weights to each variable. These weights might come from economic considerations, e.g. giving each asset a monetary value, from statistical considerations, e.g. PCA, or from further consideration, e.g. equal weight to each asset. In the following I focus on PCA and when to use it.

What is PCA?

PCA is a statistical technique to identify patterns in data and used to reduce the number of variables in a dataset. It is useful when data on several variables are available and some or all are correlated with one another. Because of these correlations it is possible to reduce the number of variables into a smaller number of artificial variables called principal components. Regarding the measurement of the SES: asset variables are supposed to be correlated and, hence, reducible into the artificial variable “socioeconomic status”.

Figure 4.1: Measuring the SES



What is a principal component?

Technically, a principal component is a linear combination of optimal weighted variables. It is a linear combination as scores for each variable are added together to create a principal component. The variables are optimal weighted because the resulting component accounts for a maximal amount of variance in the dataset. The number of components in a PCA is equal to the number of observed variables. The first principal component accounts for the maximal amount of variance in the observed variables; further components account for less variance and are uncorrelated with all other components. McKenzie (2005) considered including more than just the first principal component in the analysis and concluded that only the first one is necessary to measure wealth.

How to conduct a PCA?

Scoring weights for each observed variable are given by the eigenvectors of the correlation matrix. Once weights for each variable are calculated, principal components are linear combinations of these weights and the subject's score on each variable. When observed data had not been standardized, the following formula is used to determine subject j^{th} score on the first principal component:

$$A_j = f_1 \times (a_{j1} - a_1) / (s_1) + \dots + f_N \times (a_{jN} - a_N) / (s_N)$$

where f_1 is the weight for the first variable related to the first principal component as determined by the procedure, a_{j1} is the j^{th} subject's score for the first variable and a_1 and s_1 are the mean and standard deviation of the first variable over all subjects. Principal components have zero mean by construction. Eigenvalues represent the amount of variance that is accounted by the corresponding component and are usually used to determine the number of relevant principal components.

When is PCA appropriated to measure the SES?

PCA assumes multivariate normal data and is therefore best used with continuous data. But, most of the variables used in studies applying PCA are discrete either in form of binary, ordered categorical, or non-ordered categorical variables. In such cases the normality assumption is violated.

Looking back on figure 4.1 it becomes obvious that PCA is not always the best statistical approach to deal with multiple asset variables. In a paper analyzing discrete data used in PCA, Kolenikov and Angeles (2009) state that continuous variables are preferable and that “*the binary ownership indicators tend to produce reasonable results, too*” (Kolenikov & Angeles 2009: 139). However, in case of categorical variables with more than 2 outcomes the type of analysis depends on how data are ordered. If there is a well established ordering of the categorical variables the authors suggest a polychoric method or an ordinal PCA depending on how important the proportion of explained variance is. Only if there are no information about the ordering process, categorical variables should be split into several dummy variables as proposed by Filmer and Pritchett (1998).

What must be considered in practice when PCA is applied to estimate the SES?

- Different areas have different indications of wealth (Vyas & Kumaranayake 2006). In the current study this problem is reflected by the fact that both households from rural and urban areas were interviewed. In rural areas the ownership of animals can be identified as an important contributor to the wealth of a household, in urban areas assets like motorcycles or cell phones are better indicators.
- Often binary variables are used to indicate the ownership of an asset. But, simple ownership neither captures quantity nor quality of the asset. An example demonstrating the problem would be two households with one owning four new cell phones and one owning one old cell phone. Both households are allocated the same score for the ownership of this asset.
- Clumping is described as households being grouped together in a small number of clusters. This occurs if households do not own the assets asked for and households that do

own them have the same ones. Similarly, in case of truncation households are spread over a narrow range, making differentiating between socio-economic groups difficult, i.e. it is difficult to distinguish between the poor and the very poor (McKenzie 2005). To avoid clumping and truncation the use of more variables, in particular continuous variables, is an option.

4.4.2 Descriptive Analysis and Logistic Regression

Once the SES of each household was estimated, further analysis of the data was descriptive using numbers and percentages, and analytical by running multiple logistic regressions. Descriptive analysis included t-, chi square, and Fisher's exact tests. The t-test was only applied once to check if a sampled mean differs significantly from a hypothesized value. Of more importance were chi square and Fisher's exact tests to identify relationships between two categorical variables. Both tests differ from each other in their assumption: while the chi square test assumes that the expected value of each cell is five or higher, Fisher's exact can be used regardless of how small the expected frequency is.

A statistically more demanding approach was the use of multiple logistic regressions to identify patterns in healthcare seeking behaviour and coping strategies. Generally, regression models involve calculating the strength of the relationship between many independent variables and their effect on an outcome variable. Contrary to the standard ordinary least squares model, logistic regressions are used when the outcome variable is binary and can be either 0 or 1.

The model assumes that there is an unobserved latent variable that influences a household's or individual's decision. The latent variable model can be written as

$$y^* = x\beta + \varepsilon, y = 1[y^* > 0] \quad (\text{Wooldridge 2002: 532})$$

where y^* is the unobserved latent variable, x a vector of exogenous and observable variables that influence the decision making, β a vector of parameters, and ε a for the researcher unobservable component that influences the decision making, too. The logistic regression model assumes that ε has a standard logistic distribution defined here as $G(\varepsilon)$. We do not observe y^* but we observe an indicator variable y which is assumed to take on the value 1 if y^* is positive and 0 if y^* is negative. Based on the latent variable equation and its assumptions the probability that an event occurs, i.e. $y = 1$, given the value of explanatory variables can be formulated as

$$\text{Pr}(y=1|x) = G(x\beta)$$

Like in every regression the most important assumption for obtaining correct estimations is that all independent variables are exogenous, i.e. are not correlated with the error term. In other words, if an unobserved variable influencing the outcome variable at the same time has effects on one or more explanatory variables, estimations of the coefficients will be biased.

I have opted to display coefficients rather than odd ratios. Sign and significance of the coefficient and the marginal effect of the variables were of interest. Results were considered significant at the 5% level. As in many other analyses that run logistic regressions no goodness of fit measures were calculated but the percentage of correctly classified observations is given. Since sickness was the unit of analysis, household clustered robust standard errors were used controlling the fact that more than 1 illness can be contributed to each household. Post-estimations included tests on misspecification (“Linktests”) as well as tests on multi-collinearity by using the variance inflation factor. Both tests did not indicate any problems.

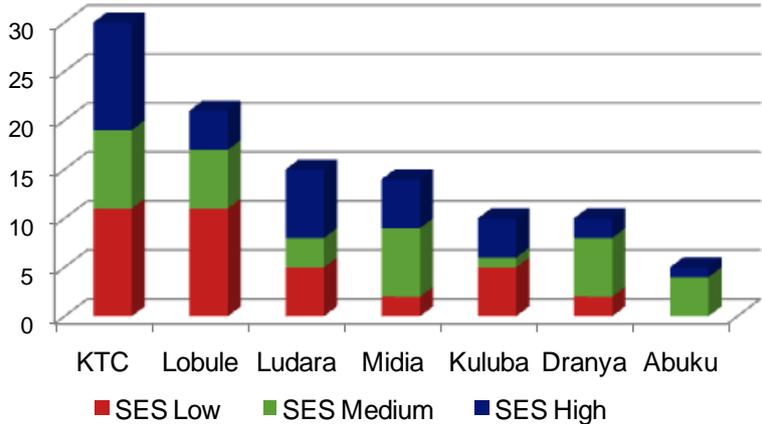
5 Results

The PCA analysis to estimate the SES of each household is demonstrated in appendix D. The following sections use its results, i.e. the classification of households into 3 different socioeconomic groups. Before addressing the research questions two sections are dedicated to describing the household characteristics of surveyed households and morbidity patterns of reported sicknesses.

5.1 Household Characteristics

Figure 5.1 displays the number of households surveyed in each sub-count. The diagram illustrates that some sub-counties were found to be poorer than others: in Lobule approximately half of the households were categorised into the low socioeconomic group while in Ludara sub-county a relatively high percentage of households was part of the high group.

Figure 5.1: Surveyed Households in Sub-counties



105 households were surveyed including 71 rural and 34 urban households. 66% of the households were Muslims and 34% Christians with a higher percentage of Christians in urban areas (47%). Polygamy was common in several household and the higher the SES the more it was present (Low: 8%; Medium: 17%; High: 24%). 869 people were covered by the survey resulting in a mean household size of 8.28 persons per household. In urban (9.00) and wealthier households (High: 8.39) the average household size was slightly above average. 53% of all household members were females and a significant percentage of members still attended school (43%). Household characteristics controlling for the SES and the location of households are summarised in table 5.1.

Table 5.1: Household Size and Characteristics

	SES			Location		Total
	SES 1	SES 2	SES 3	Rural	Urban	
Number of households	36	35	34	71	34	105
Muslims*	67%	66%	65%	72%	53%	66%
Polygamy*	8%	17%	24%	20%	9%	16%
Total population	275	292	302	563	306	869
Mean household size	7.64	8.11	8.39	7.93	9.00	8.28
Females**	52%	54%	53%	53%	55%	53%
Students**	43%	38%	47%	41%	47%	43%

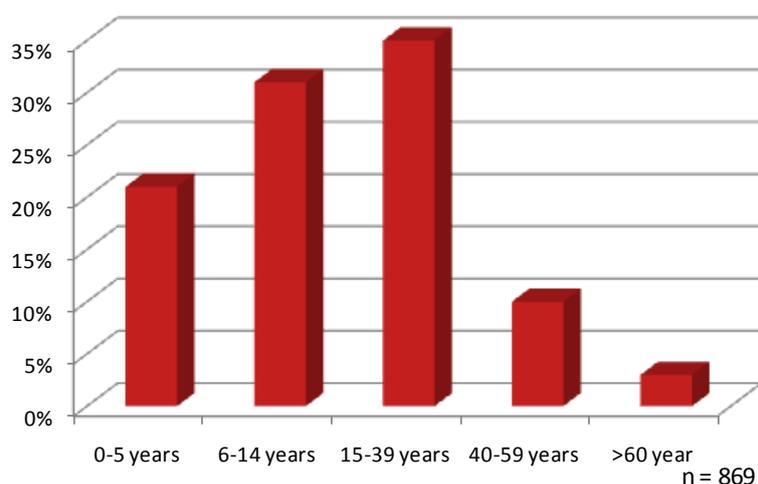
* Percentage of households within the column

** Percentage of total population within the column

Note: SES 1 = SES Low, SES 2 = SES Medium, SES 3 = SES High.

Figure 5.2 shows the percentage of household members in 5 different age groups. Around 20% of all household members covered by the survey were under 6 years and further 30% aged between 6 and 14 years. Consequently, half of all household members were younger than 15 years old and very few older than 60 years (3%). These data are consistent with the Ugandan Demographic and Health Survey (GoU 2007) where 52% of the population aged 15 or less years and only 14% were older than 40 years.

Figure 5.2: Household Members in Age Groups



With one exception, all heads of households in rural areas were male while in KTC several households were headed by widows or divorced women (see table 5.2). In addition to all rural households, some households in urban KTC lived off farming, resulting in 89% of households who depended directly on agriculture. Since official employment is very rare most other households survive by running small shops. Regarding education, 39% of all heads of households had no schooling at all with a higher percentage in rural areas (42%).

Interviews were conducted with the main healthcare decision maker of a household. Usually the head of household took these decisions and was interviewed (89%). In a few cases the healthcare decision maker was not at home and other family members were asked to call upon her or his knowledge regarding illnesses and related expenditures. In total 82% of the respondents were male whilst in urban areas this figure was lower at just 56%.

Table 5.2: Characteristics of Heads of Household and Respondents

	<i>Rural</i>	<i>Urban</i>	Total
Male head of households	99%	68%	89%
Farmers	97%	44%	80%
No schooling at all	42%	32%	39%
Head of household as respondent	94%	76%	89%
Male respondent	94%	56%	82%

n = 105

5.2 Morbidity Patterns

At least one case of acute (e.g. malaria, typhus, cough) or chronic illness (e.g. heart conditions, asthma, chronic malaria) was documented for each household and around half of the households reported both. A total of 153 cases of acute illness and 139 of chronic sickness were recorded resulting in an average of 2.8 illnesses per household. Significant differences in the number of sicknesses reported were neither found between urban and rural households nor between households in the three socioeconomic groups. In 30% of the households an acute illness was present at the time surveyed.

Table 5.3 presents the distribution of sicknesses between 4 age groups. Red numbers indicate that the percentage of illnesses in this age group was higher and green numbers indicate that it was lower than the population share of the specific age group. Children less than 6 years and adults older than 40 years were affected disproportionately more by acute illnesses. Moreover, the latter group accounted for 39% of all chronic diseases although they represented only 14% of all household members.

Table 5.3: Prevalence of Illnesses in Age Groups

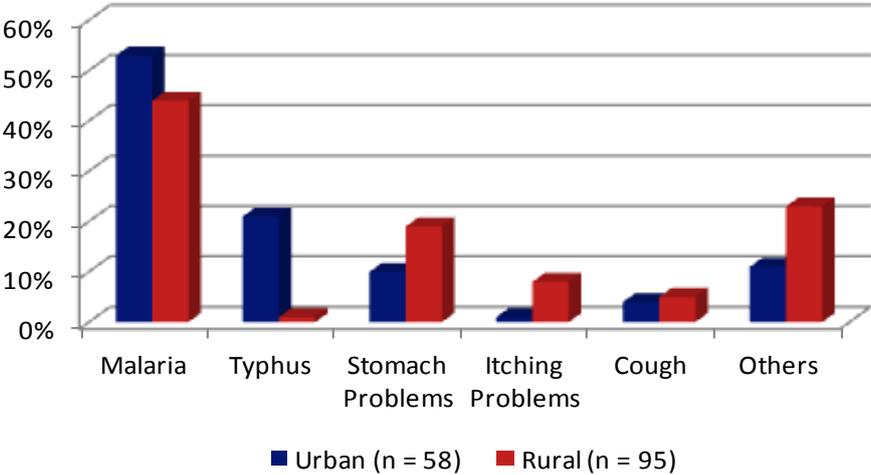
	Population	Acute Illnesses	Chronic Diseases
0-5 years	21%	31%*	11%*
6-14 years	29%	16%*	6%*
15-39 years	36%	31%	44%
> 40 years	14%	22%*	39%*
Total	100%	100%	100%

* = significantly different from the population share at the 5% level

Figure 5.3 illustrates reported types of illnesses. Chi-square and Fisher’s exact tests indicated that the type of acute illnesses differed significantly between rural and urban areas. Almost half of all acute illnesses were related to malaria (47%) and 45% of these malaria cases occurred in children under 6 years. Several respondents explained that malaria is very common in children and did not regard it as a serious illness. Since this study only recorded sicknesses that had been classified as serious by the interviewee these malaria cases were not documented. Consequently, the share of malaria related illnesses can be considered to be even higher than 50%. Qualitative data from interviews with health workers confirmed this result; on average the percentage of malaria cases was estimated by health workers to be around 65% of all illnesses.

Stomach problems (16%) represented the second most reported symptom. Typhus (9%) was almost not present in rural areas but accounted for 21% of acute illnesses in urban areas. This difference can be explained by contaminated water as a result of latrines located close to wells in urban KTC. Further symptoms which were reported with some frequency were itching (5%) and coughing problems (3%). Other sicknesses like diarrhoea or haemorrhoids accounted for only 2% or less.

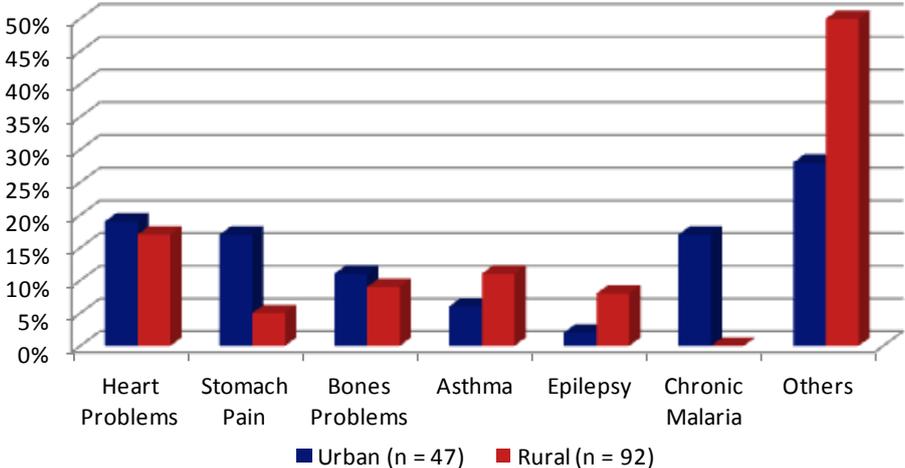
Figure 5.3: Types of Acute Illnesses



Types of chronic diseases were found to be significantly different between urban and rural areas, too. As figure 5.4 reveals no specific sickness was reported differently than any other. The most frequent chronic diseases were related to heart problems (18%), followed by stomach pain (9%), asthma (9%) and problems related to bones (9%). Chronic stomach pains as well as chronic malaria were more present in urban areas, whilst asthma and epilepsy more in rural areas. Again, the higher percentage of stomach problems in urban areas can be attributed to poor water in urban areas. Only 5 cases of HIV/AIDS were documented resulting

in a HIV/AIDS rate of 0.5% which is significantly lower than the national average. Two explanations can be given: people might not know their HIV status and respondents might avoid talking about this type of disease.

Figure 5.4: Types of Chronic Diseases



5.3 Research Question 1: Where Do Households Seek Healthcare From?

5.3.1 Descriptive Results

Healthcare consultation

Figure 5.5 illustrates where households sought first healthcare consultation from with respect to each illness. The diagram demonstrates unmistakably that most households consulted a public facility (66%) during the 292 illnesses documented. This is in contrast to other empirical findings in Uganda that found consultations in private facilities and from traditional healers to be common (GoU 2010; Konde-Lule et al. 2010; Osiga 2002 cited in Witter & Osiga 2004). Healthcare seeking behaviour is likely to differ between regions and in Koboko District public HCs seem to be the most important source for consultation.

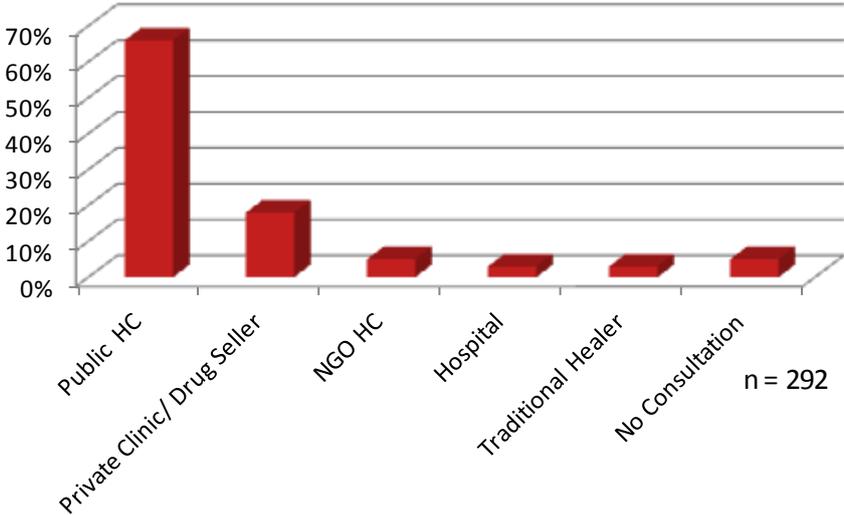
The second most common consultations were provided by private clinics and drug sellers (18%). A clinic is supposed to deliver professional feedback but according to health workers from qualitative interviews its services are often inadequate due to a lack of professional doctors. Hence, differences between clinics and drug sellers are not meaningful and consultation quality can be expected to be poor.

Further formal healthcare providers were of much less importance. Only 5% reported having visited a NGO health facility. This was either the case in Abuku sub-county where a NGO health facility in the neighbouring Yumumba District operates or in KTC. In 3% of illnesses first consultation was sought from a hospital outside of Koboko District.

Surprisingly, very few households relied on the informal sector. Just 3% saw a traditional healer and 5% used self treatment. Interviewees seemed to be willing to talk about traditional healers and it was not a taboo to mention them. Those few who treated themselves usually cited lack of money as reason.

During 15% of all illnesses households sought a second consultation. This took place when the HC or drug seller visited advised patients to seek consultation elsewhere. Second consultation was primarily sought either in a hospital (51%), a HC IV (24%), or private clinics (16%).

Figure 5.5: First Healthcare Consultation



Medicine usage

Having sought consultation in a facility does not mean that medicines were obtained. While during the majority of acute and chronic illnesses ill individuals took medicines (93%), only 73% of acutely ill people took the whole dose and just 18% of chronically ill household members used the medicines needed regularly. Hence, 27% of acutely ill persons went either without any or with a shortened dose and 82% of chronically ill people did not take the medicines they should have taken. It must be remembered that only serious illnesses were considered in the questionnaire and one can expect that the number of those without appropriate medical treatment would have been even higher if less severe illnesses had been included.

Table 5.4 offers an overview of the usage of medicines controlling for socioeconomic status and the geographical location of a household. The table provides some evidence that households in a higher socioeconomic group and urban households have better access to

medicines. For example, 82% of sick persons in the high socioeconomic group stated to have taken the whole dose, while only 60% from the low socioeconomic group did so. Another example is that 28% of chronic sick individuals from urban KTC said to have taken regularly medicines to treat the sickness in contrast to 13% in rural areas. Note that the test is with respect to variation within socioeconomic groups and geographical locations the “row” variable differs in its outcome significantly.

Table 5.4: Medicine Usage within Socioeconomic Groups and Rural/Urban Households

	SES			Location		Total
	SES1	SES2	SES3	Rural	Urban	
Acute Illnesses (n=153)						
Medicine taken	85%*	98%*	96%*	91%	97%	93%
Required dose taken	60%*	77%*	82%*	67%	81%	73%
Chronic Diseases (n=139)						
Medicine taken	89%	95%	95%	91%	96%	93%
Always medicine	14%*	8%*	29%*	13%*	28%*	18%

* = statistically significant different according to chi2 and Fisher's exact tests

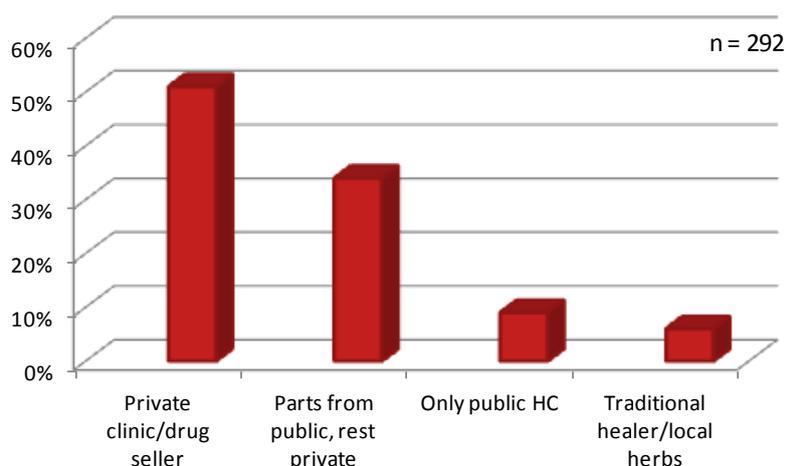
Source of medicines

Figure 5.6 gives an impression of the source of medicines taken. In just 9% of sicknesses drugs had been obtained exclusively from a public HC, i.e. either the whole dose was handed out or the household did not buy the rest elsewhere. This is an indication that the availability of free medicines in public HCs seems to be a serious problem; more on that later.

During more than the half of illnesses medicines were bought only from the private sector. Moreover, during 33% sicknesses households received parts of the medicines from the public sector and purchased the rest from drug sellers. Hence, private facilities were found to be the most important source of medicines.

Similar to the low proportion that had visited traditional healers for consultation, only 6% used local herbs or alternative medicines from these healers. This is lower than expected and it seems that most households aim to treat illnesses with conventional (modern) medicines.

Figure 5.6: Source of Medicines Taken



Medicines at home

Finally, about one fourth of all households stored some medicines at home at the time interviewed. Significant differences were apparent between urban (41%) and rural households (18%), this provides further evidence that urban households have better access to medicines than rural households. The most frequent types of medicines found at home were painkillers (30%) and antimalarials (23%). 77% of these medicines were obtained from a private facility confirming earlier results.

5.3.2 Regression Results

Hypothesis 1: Households in a higher socioeconomic group are less likely to seek consultation from a public HC.

A logistic regression was run to identify factors associated with the household's decision to seek consultation from a public HC. The dependent variable took on the value 1 if consultation was sought in a public facility (HC II/III/IV) and 0 if in a private (NGO HC, drug seller, clinic, hospital). Independent variables included a dummy variable indicating if the household lives within a five kilometre radius of a public HC, two dummy variables for the three socioeconomic groups ("SES1"/"SES low" was the reference category), a set of predisposing factor variables (gender, age, and education), and a dummy variable if the illness was acute or chronic. Those few observations that included informal treatment were excluded from the model. Regression results are displayed in table 5.5.

There is no statistical evidence that wealthier households consult the private sector more often than households in lower socioeconomic groups: SES dummies are not significant at any conventional level. It seems that the decision to seek healthcare from a public or private

provider is independent of household SES, hence, hypothesis 1 can be rejected. A possible explanation might be that also wealthier households appreciate consultation quality in public HCs even though medicines might not be available and waiting times are longer.

Table 5.5: Factors Associated with Seeking Public Healthcare Consultation

	Public Consultation	
	Coefficients	Marginal Effects
SES_2 (dummy: 1 if SES is medium)	-0.279 (0.606)	-0.048
SES_3 (dummy: 1 if SES is high)	-0.334 (0.574)	-0.057
5Km (dummy: 1 if within 5 km of HC)	2.241*** (0.484)	0.457***
Gender Head (dummy: 1 if female)	-0.771 (0.656)	-0.148
Age Head	-0.008 (0.0198)	-0.001
Education Head (dummy: 1 if pc completed)^o	-0.2899 (0.447)	-0.047
Gender Sick Person (dummy: 1 for female)	0.558* (0.316)	0.093*
Age Sick Person	-0.012 (0.00936)	-0.002
Type of Sickness (dummy: 1 if chronic)	1.245*** (0.365)	0.202***
Constant	-0.759 (0.938)	
Observations	271	
Correctly classified	76%	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

^opc = primary school

While none of the predisposing variables are significant at the 5% level, proximity to a public HC is. Households living within a 5km radius of a public HC were more likely to seek consultation from a public than from a private facility. The marginal effect of 0.457 shows that the variable has even a very strong effect on the decision: holding all other independent variables at its mean value, households living within 5 kilometres of a public HC are estimated to be 46% more likely to consult them than households living further away than 5 kilometres.

Furthermore, the variable “Type of Sickness” is positive and significant at the 1% level indicating that households seek public consultations more often during chronic illness episodes than during acute ones. An explanation might be that households are more willing to accept costs in the private sector when they know that the acute illness will be cured afterwards. Chronic diseases are long lasting and support from public bodies may be preferred.

Hypothesis 2: Members of households with a higher socioeconomic status are more likely to use the full dose of medicines required.

The second logistic regression aimed to look at variables associated with the use of medicines. The outcome is a binary dummy being 1 if the whole dose was taken during an acute sickness or if medicines were taken regularly in case of chronic diseases. If this was not the case the value is 0. Explanatory variables are equal to the former regression with one exception: I replaced the variable indicating the distance to a public HC with one that distinguishes between rural and urban households. Results can be reported in table 5.6.

The highest of the socioeconomic status dummies is significant at the 5% level and has a positive sign while the other dummy is not significant at any conventional level. Household members in the high socioeconomic group have a 30% higher likelihood to treat the sickness with the whole dose than households in the lowest socioeconomic status (holding all other variables at its mean value). Even though one dummy is not significant, this is evidence that wealthier households have significantly better access to medicines. Hypothesis 2 cannot be rejected.

The variable “Urban” is positive and significant at the 5% level, too. It can be concluded that household members in urban households seem to be significantly more likely to treat the sickness with the appropriate dose of medicines (24% more likely than rural households). Urban households have advantages in accessing medicines which can be explained by shorter distances to health facilities, better access to cash driven business, and superior social networks that are useful in case of financial shocks. Health equity, among others defined as equal access to healthcare across socioeconomic groups and households from different geographical locations would appear to be an issue in Koboko District.

Again and not surprisingly the type of illness matters, too. In case of chronic diseases it is less probable that the sick person always takes the medicine needed than that an acutely ill person takes the full dose of medicines. The probability difference is high at 57%. Since chronic diseases are long lasting and need a continuous treatment this result was expected. Similar to the previous regression socio-demographic factors do not show any significance and therefore no statistical evidence exists that these factors influence in any way healthcare seeking behaviour.

Table 5.6: Factors Associated with the Use of Medicines

	Required Dose Taken		
	Coefficients		Marginal Effects
SES_2 (dummy: 1 if SES is medium)	0.503	(0.408)	0.125
SES_3 (dummy: 1 if SES is high)	1.247**	(0.498)	0.302
Urban (dummy: 1 if urban)	0.998**	(0.449)	0.244
Gender Head (dummy: 1 if female)	-0.594	(0.593)	-0.14
Age Head	0.004	(0.0172)	0.0009
Education Head (dummy: 1 if pc completed)^o	-0.231	(0.377)	0.057
Gender Sick Person (dummy: 1 if female)	-0.0180	(0.268)	0.004
Age Sick Person	-0.0134	(0.00826)	-0.003
Type of Sickness (dummy: 1 if chronic)	-2.638***	(0.389)	-0.569
Constant	0.522		
Observations	292		
Correctly classified	77%		

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

^opc = primary school

5.4 Research Question 2: What are Major Barriers in Accessing Medicines?

One result of the former section was that only 73% of acutely ill individuals took the whole dose and only 18% of chronic ill household members took all the medicines needed regularly. The question arises regarding whether accessibility, availability, affordability, or quality of medicines restricts access to medicines.

Approximately 90% of those who reported that no medicine at all or that the required dose was not taken during all illness episodes documented, cited unavailability of drugs in public HCs and non-affordability of drugs from the private sector as reason. Two statements from farmers in rural areas represent well the healthcare problem of the majority of the population in Koboko District where none of the households surveyed owned insurance:

“The health centre did not have the medicines we needed. The health worker told us to buy them from a drug seller, but we had no money.”

“In the public HC we only received cheap Panadol. We were told to buy the expensive medicines from a private pharmacy. We had no money to buy them.”

It is important to add that only three respondents (2%) found the place where medicines were available as too far away and therefore did not access them. Moreover, just three interviewees did not expect any improvements from medicines because of negative experiences in the past;

they did not even try to obtain some. Hence, almost all households considered drug unavailability in public HCs and high prices in the private sector as more serious barriers than geographical or quality obstacles during specific sicknesses.

Availability

The problem of unavailability drugs is also obvious in general opinions independently asked from specific illnesses. As table 5.7 displays, 96% of the respondents said that drugs in the next public HC are usually not available and 93% did not believe there was usually availability of drugs in the biggest health facility in Koboko District, HC IV. During interviews health workers confirmed these findings and explained that in particular the proximity to the South Sudan and the DRC leads to many Southern Sudanese and Congolese citizens seeking free healthcare from Uganda; an important reason why the district budget allocation is too low to satisfy drug demand.

Table 5.7: Household Opinions Regarding Access to Medicines

Do you think that....	Yes	No
drugs in the next public HCs are usually available?	4%	96%
drugs in HC IV are usually available?	7%	93%
your household usually can afford to buy drugs from the private market?	8%	92%
quality of healthcare provision in public HCs is good?	50%	50%
the next public HC is too far away?	29%	71%

n = 105

Affordability

Since drug availability seems to be a problem, affordability becomes an important issue. Only 8% of the households stated that they can usually afford the medicines needed from the private sector. A typical statement one farmer gave when he was asked if the household can usually afford to buy drugs was:

“If money is available I can spend money. If no money is available, I cannot spend anything for medicines.”

The risk not being able to afford the medicines needed once a household member had fallen ill seems to be high.

Obviously, income levels are low across the board. To give some insights into the supply side table 5.8 compares prices for some essential medicines from one drug seller and one private

clinic with the cost from the national drug distributor NMS.² The difference between prices and cost should not be declared as truly correct as it estimates the mark-ups which would include an estimation of total input costs for the seller. However, in an area like Koboko District the costs for the drug seller are mainly the amount of money spent for the drugs. Therefore I use the term “approximated mark-ups”.

The table reveals variations between 25% and 800% among the different types of drugs. Painkillers like Diclofenac (670%) or Panadol (225%) showed very high approximated mark-ups in comparison to antibiotics (average: 62%). CoArtem is financed by development partners; prices for the first line malaria treatment were therefore not available from NMS. With 25% the anti-malaria Quinine had a relatively low approximated mark-up while those for de-worming tablets were considerably higher and varied between 276% and 800%. There is no acceptable definition of “affordable prices” in economics, but having these price comparisons in mind the former mentioned opinions regarding affordability of medicines do not surprise. The price difference also suggests that this is not a competitive market, otherwise there would be similarity.

Table 5.8: Price Comparisons

		Drug Shop	Clinic
Antibiotics	Amoxicilin	50%	50%
	Ampicilin	81%	n.a.
	Seprin	n.a.	67%
Painkillers	Diclofenac	670%	670%
	Panadol	225%	225%
Antimalarials	Quinine	n.a.	25%
Deworming Tablets	Albendazol	305%	713%
	Mebendazol	276%	800%

Note: Percentages reflect how much higher the selling price was in comparison to prices from the national distributor

Accessibility

Opinions were surprisingly positive in the context of accessibility. 71% of the respondents considered the next public HC not to be located too far away (table 5.4) although 8 of 14 rural villages were found to be less than 1 hour walk from the next public HC. In three villages walking distance was more than 2 hours. Half of the households said to have to walk to the HC with the other half going by bicycle.

² Prices from NMS are similar to those from JMS, the NGO providing the private sector with medicines.

The picture was similar regarding distances to the next private facility. Walking distances were less than one hour in 9 of 14 rural villages and more than two hours in three villages. Most of private facilities were simple drug sellers since only one private clinic operates in rural Kuluba sub-county with others located in KTC.

These data demonstrate that geographical access can be a serious barrier to accessing medicines in Koboko District. But, general opinions and reasons given for not having taken medicines in case of sickness indicate that households seem to accept long distances to obtain drugs. Accessibility is an issue in particular in emergency cases.

Quality

Regarding quality of healthcare provision in public HCs, opinions differed from those about availability and affordability, too. Looking back at table 5.7 half of the respondents considered quality in public HCs as good. Human beings are likely to criticise quality aspects and specifically when they are disappointed about drug unavailability. Therefore, dissatisfaction with other services, in particular consultations, seemed to be significantly lower than displeasure with drug unavailability and high prices.

On a sickness level households were asked if the usage of drugs was successful. In 76% of acute illness and in 81% of chronic diseases the interviewee stated that the medicine taken improved the status quo. It should be added that only 73% took the full course during acute sicknesses. Hence, most people were pleased with the drugs they received and no indication of serious problems regarding counterfeit or harmful expired medicines was found. Furthermore, prescriptions were considered to be an aspect of quality in the medicine treatment. Surprisingly in 73% of acute illness drugs were prescribed by a doctor from a public HC. Although drugs are often not available in public facilities, medicines were still prescribed during consultations.

While there were neither evidences regarding qualitative bad medicines nor excessive usage of unprescribed drugs, packages of medicines found in households were inadequate: 56% of medicines stored in households did not have a primary package and on 73% of these drugs had no labels. Drugs were often handed out rolled in a piece of paper as can be seen in one of the pictures in the appendix.

5.5 Research Question 3: How Do Households Cope With Acute Illness Costs?

5.5.1 Descriptive Results

Chronic diseases require continuous care, and thus expense and coping strategies are likely to differ each time money is needed. Therefore I limited my investigation of coping strategies to acute sicknesses, i.e. how households finance the one time need for cash to pay for healthcare costs. Healthcare costs consist mainly of drug expenditures; 98% of households said that medicines are the major source of healthcare expenditures.

Expenditures ranged from US\$ 1.15 to US\$ 57 measured in PPP in international dollars.³ To cope with these costs, households used three different strategies: savings/income, selling food/animals/assets, and borrowing from friends/relatives/private clinics.

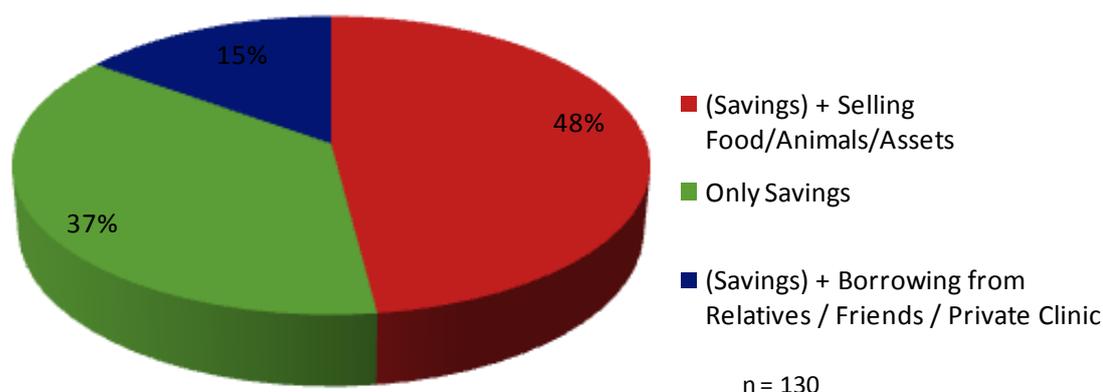
Most households relied on the sale of assets as primary financial source (48%). This does not mean that in these cases no savings were used, but these saving were not enough and selling assets was required. The sale of assets included food, animals, and further commodities. Villagers called attention to the fact that food can be seen as a last resort since it is usually consumed within the family. It is only sold to cover healthcare costs in very difficult situations. Nonetheless, 27% had to sell food to finance healthcare. If available, households preferred to sell chicken (19%) and very few urban households said to have sold further goods (2%) that most other households do not own.

During only 37% of acute sicknesses households used savings exclusively to pay for healthcare expenditures. Many households, in particular in rural areas, do not have any financial reserves and cannot rely fully on savings to cover required expenditures. Cash sources are mainly the sale of tobacco or small businesses in urban KTC.

Finally, 15% borrowed to cope with the costs. None of the households stated having access to formal or informal credits from local moneylenders and borrowing took place either within the community or through arrangement with private clinics. Numerically speaking, 8% borrowed money from relatives or friends, and 7% were given the opportunity to pay at a later point in time. Since lack of money is a general problem across the population, borrowing from community members is difficult and private clinics only offer to well known customers this form of credit.

³ Converted from US\$ at http://pwt.econ.upenn.edu/php_site/pwt70/pwt70_form.php

Figure 5.7: Coping with Illness Costs



5.5.2 Regression Results

Hypothesis 3: Households with a higher socioeconomic status are more likely cope acute sickness costs with savings.

A third logistic regression was run to identify what types of households are more likely to use savings and income to pay for healthcare costs. Only cases where money was spent during outpatient acute sicknesses were included. Sicknesses that required inpatient care and therefore high amounts of expenditures were handled as outliers and excluded from the regression.

The dependent variable is 0 if the household used income/savings and 1 otherwise, i.e. if money was borrowed or assets/animals/food sold. Explanatory variables were again dummy variables for the SES of the household, a dummy variable if the household lives in rural or urban areas, the amount of money spent on the treatment⁴, as well as socio-demographic factors gender, age, and education of the head of the household. Results of the regression are given in table 5.9.

The SES variables did not show any significance implying that the SES has no influence on the coping strategies a household uses. This was surprising and hypothesis 3 can be rejected: households in higher socioeconomic groups do not cope more with savings. Wealthier households might invest available cash but not accumulate it for financial health shocks.

⁴ I divided the amount of money spent through 1000 to obtain a coefficient that is 1000 times higher than the one that I would have obtained without this operation.

Two variables were found to be significant in explaining copying strategies. First, the higher the costs the more likely the household is to sell assets or borrow money. Obviously, the higher the costs the more difficult it is for households to use income or savings.

Secondly, and more interestingly, urban households were less likely to sell assets or borrow money than rural households. The marginal effect of the “Urban” variable is almost -0.6, i.e. urban households are 60% less likely to sell assets or borrow money than rural households when all other variables are held at their mean value. This difference between urban and rural households can be considered to be very large; a difference that I expected to find between households in different socioeconomic groups. An explanation is that KTC is more cash driven than rural areas in Koboko District that depend mainly on subsistence farming. Hence, rural households have very limited access to cash and if available it is used for school fees or production inputs. On the other hand households in KTC are often involved in different businesses. Their life is more integrated into cash driven transactions.

Finally, and similar to the findings regarding healthcare seeking behaviour, none of the socio-demographic variables did show any significance and are not useful to explain the different use of coping strategies.

Table 5.9: Factors Associated with Borrowing Money and Selling Assets to Cope with Acute Illness Costs

	Coping Strategies	
	Coefficients	Marginal Effects
SES_2 (dummy: 1 if SES is medium)	0.436 (0.679)	0.0917
SES_3 (dummy: 1 if SES is high)	0.295 (0.792)	0.0371
Urban (dummy: 1 if urban)	-2.982*** (0.633)	-0.5989
Costs	0.0815*** (0.0210)	0.0177
Gender Head (dummy: 1 if female)	1.050 (0.868)	0.1671
Age Head	0.0210 (0.0285)	0.0044
Education Head (dummy: 1 if pc completed)^o	0.704 (0.595)	0.1652
Constant	-1.139 (1.127)	0.0922
Observations	114	
Correctly Classified	74%	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

6 Conclusion

Access to medicines is crucial to cure sicknesses and to save lives. Moreover, financial shocks due to illnesses can have negative long run impacts on livelihoods and impede development. This thesis can be regarded as starting point for a project in Koboko District that aims to implement drug shops managed by the community, called CCCPs. I have provided empirical evidence concerning healthcare seeking behaviour, barriers in accessing medicines, and coping strategies with acute illness costs to offer insights into the current situation.

My results concerning healthcare seeking behaviour are good news for CCCPs. In contrast to other evidences in Uganda most households in Koboko District seek healthcare consultation from formal providers and most of them in the public sector. Even wealthier households were found to trust consultations in public HCs more than private facilities. Since CCCPs would only hand out drugs if drugs were prescribed by a public HC, low trust and unimportance of public facilities would have been a problem to deal with. Moreover, most households receive drugs from private facilities indicating that CCCPs have the potential to be successful.

Regarding barriers in accessing medicines my results confirm initial expectations. I identified the unavailability of drugs and high prices as major barriers while geographical access and quality of medicines were found to be less serious problems. Any policy trying to improve access to medicines should focus on either increasing medicine availability in public HCs or decreasing prices in the private sector. Therefore, my findings provide evidence that by offering significant lower prices, CCCPs provide the possibility to improve access to medicines substantially. In particular rural and poorer households can be expected to benefit from CCCPs. Both were found to have less access to medicines than their urban and wealthier counterparts; CCCPs can be a step towards health equity.

Finally, I provided empirical evidence that most households cannot rely on selling assets to cope with acute illness costs. Many households even had to sell food which is usually used for consumption within the household. Most households could not rely on savings, in particular rural households usually cannot. Borrowing money from the community or private clinics is difficult. Lower medicine prices in CCCPs could increase the use of savings and income to pay for drugs and therefore stop households from selling food or animals to obtain medicines.

Access to healthcare is a fundamental right and limited resources of the communities should be used efficiently to ensure it. Even though CCCPs are an option that has the potential to be successful, several challenges remain:

- To initiate the project donors must be found to finance a simple physical infrastructure and a first bulk of medicines.
- Community awareness is crucial for the success of CCCPs and community members must understand well the idea behind CCCPs. The principal message that has to be sent is: CCCPs are owned by the communities and not by the government. This requires rethinking in terms of opportunities and responsibilities.
- CCCPs might be located close to public HCs to reduce transportation costs. Once consultation is sought and drugs in the public HC are not available, patients can buy these drugs in CCCPs. But at the same time the proximity of CCCPs to public HCs could send a wrong message. Patients might have the incorrect feeling that free medicines from the government are being sold. Hence, the geographical location of CCCPs should be considered well.
- Mismanagement and corruption must be avoided through an appropriate monitoring system. Furthermore, good training of staff is required: medicines are a sensitive issue that require good knowledge about the right storage and dispensing.
- The extension of CCCPs into a prepayment scheme at a later stage could cause difficulties. It is questionable if the idea of prepayment will be understood and accepted. Participation might be low. Adverse selection and moral hazard have to be taken into account and the typical enforcement constraint must hold: utility from being in the scheme must be higher than utility of not participating.

My study was very limited in time and cash resources, but a first step is done. Now a more definitive research on what would happen if CCCPs were introduced is required and can be based on my findings.

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Appendix A: Household Questionnaire and Interview Script

Household Questionnaire

CONTROL INFORMATION		
Task	Date	Status ok?
Interview and checking questionnaire		
Entering data		
Checking and approving data entry		

IDENTIFICATION		
	Name	
1. Sub-county <i>Codes below</i>		
2. Village name		
3. Household number (ID)		
<i>Codes for sub-counties</i>		
1 = Koboko TC	2 = Ludara	3 = Kuluba
4 = Mdia	5 = Labule	6 = Dranya
7 = Abuku		

Use: -8 = does not apply; -9 = respondent does not know

Tasks for getting the interview started:

- Explain the goals of the research
- Explain the guarantees of anonymity and confidentiality
- Summarize parts of interview
- Ask for consent to conduct the interview

1. BASIC INFORMATION ON HOUSEHOLD MEMBERS

PIN	1. Name of household member	2. Relation to head of household Codes below	3. Gender 0 = male 1 = female	4. Age in years	5. Education 1 = no schooling at all, 2 = completion of or currently attending primary school, 3 = completion of or currently attending secondary school or higher	6. Occupation Codes below
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
Codes for column 2: Relation to head of household						
1 = head of household		4 = grandson/granddaughter		7 = uncle/aunt		
2 = spouse		5 = father/mother		8 = nephew/niece		
3 = son/daughter		6 = brother/sister		9 = other household member		
Codes for column 6: Occupation						
1 = farmer		5 = civil servant		9 = unemployed		
2 = teacher		6 = health worker		10 = not in labor force / retired		
3 = artisan		7 = self employed/own business		11 = other (specify)		
4 = office worker		8 = student/pupil				
Religion of the household members 1 = Christian, 2 = Muslim, 3 = Other						
Identification of main respondent (Main health care decision maker)				PIN		

2. ASSETS

HOUSES AND LAND	
1. Number of houses the household owns except "kitchen", "toilet" and store houses:	
2. Total number of rooms in these houses:	
3. Number of store houses:	
4. Hectare of land the household uses for agriculture	
5. Is this land owned by the household? <i>0 = no, 1 = yes</i>	

HOUSING CHARACTERISTICS	
6. Relative quality of housing materials: <i>1 = low, 2 = medium, 3 = high</i>	
7. Main source of water <i>1 = stream, river, pond; 2 = common well/ rain-fed reservoir, 3 = own well/rain-fed reservoir; 4 = piped water, 5 = other (specify)</i>	
8. Type of toilet <i>1 = stream, river, pond, field, forest; 2 = shared latrine with pit, 3 = own latrine with pit, 4 = own flush toilet, 5 = other (specify)</i>	
9. Does the household have electricity? <i>0 = no, 1 = yes</i>	

INFRASTRUCTURE	
10. Travel time for children to primary school (in the usually used way of transport):	
11. Travel time to KTC (in the usually used way of transport):	

FURTHER ASSETS

12. Does the household have a private health insurance?

0 = no, 1 = yes

13. Which of the following assets does the household own?

	Number		Number
Transport		Agricultural equipment	
Car		Tractor	
Motorcycle		Plow	
Bicycle		Water pump	
Other transport:		grain/flour mill	
Electrical/mechanical		wooden cart	
Cell phone		Furniture	
Television		beds	
Radio		mosquito nets (y/n)	
Sewing machine		Dining table	
Other electronic:		clock/watch	

14. Which of the following animals does the household own?

animal	number	animal	number
cows/calves		sheep	
bull		pig	
oxen		donkey	
chicken		other (specify)	
goat		other (specify)	

3. ILLNESS

I will ask now several questions about every case of illness under which a household member suffered within the last twelve months. Please include every case of illness, even when nobody went to seek health care. Every person might have had several illnesses; I will document each of these cases.

Use the pages acute illness and chronic disease for documentation. When finished continue here.

15. Conclude: Number of acute illnesses within the last twelve months:	
16. Conclude: Number of chronic diseases within the household:	
17. Has currently anyone in this household an acute illness? <i>0 = no, 1 = yes</i>	

4. ACCESS TO MEDICINE

GEOGRAPHICAL ACCESS TO HEALTH CARE	
18. What type of health facility is the closest one for this household? <i>1 = HC II; 2 = HC III; 3 = Koboko Town (HC IV / Private clinic/ drug seller)</i>	
19. How does a household member usually go to this facility? <i>1 = car/ motorcycle, 2 = bicycle, 3 = walking</i>	
20. Travel time using this transportation to this facility <i>1 = less than 15 min; 2 = 15 min – 60 min; 3 = 60 min – 120 min; 4 > 2h</i>	
21. How does a household member usually go to the public HC IV/private clinics in Koboko Town? <i>1 = car/ motorcycle, 2 = bicycle, 3 = walking</i>	
22. Travel time using this transportation to Koboko Town: <i>1 = less than 15 min; 2 = 15 min – 60 min; 3 60 min – 120 min; 4 > 2h</i>	

OPINIONS AND EXPERIENCES		
23. Some opinions regarding access to medicines		
	<i>Agree</i>	<i>Disagree</i>
Geographical access		
The next public health center is too far away	<input type="checkbox"/>	<input type="checkbox"/>
HC IV and private clinics in KTC are too far away	<input type="checkbox"/>	<input type="checkbox"/>
Availability		
The next HC has usually all the medicine we need	<input type="checkbox"/>	<input type="checkbox"/>
HC IV usually has all the medicine we need	<input type="checkbox"/>	<input type="checkbox"/>
Private clinics/drug sellers usually have all the medicine the hh need	<input type="checkbox"/>	<input type="checkbox"/>
Affordability		
Medicines are the major source of health care related expenditures	<input type="checkbox"/>	<input type="checkbox"/>
The expenditures on health care are high and effect the hh well being	<input type="checkbox"/>	<input type="checkbox"/>
The hh can always afford to buy medicine from the private sector	<input type="checkbox"/>	<input type="checkbox"/>
Coping strategies		
Sometime the hh sells assets to pay for health care	<input type="checkbox"/>	<input type="checkbox"/>
Sometime the hh borrows money to pay for health care	<input type="checkbox"/>	<input type="checkbox"/>
Quality		
The quality of health care supply in public health facilities is good	<input type="checkbox"/>	<input type="checkbox"/>
The quality of health care supply in private clinics is good	<input type="checkbox"/>	<input type="checkbox"/>

5. MEDICINES AT HOME

MEDICINES AT HOME					
24. Does the hh have any medicine at home?					
0 = no, 1 = yes					
25. Let you show all the medicine that is at home					
Type of medicine 1 = anti-malarials, 2 = antibiotics, 3 = pain killer, 4 = other (specify)	Where did you get the medicine from codes below	Label Ok? (medicine name, dose and expiration date)		Primary package ok?	
		yes	no	yes	no
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Codes medicine obtained from:					
1 = public facility		2 = private facility		3 = traditional healer	
4 = NGO/mission		5 = friend/relative		6 = other (specify)	

6. CONCERNS AND SUGGESTIONS

26. Are there any concerns this questionnaire did not capture and you want to tell me about?

27. Do you have any suggestions on how the problem could be improved?

ACUTE ILLNESS

IDENTIFICATION

<i>Sick Persons Name</i>	<i>PIN</i>	<i>Household number</i>	<i>Acute illness number</i>
--------------------------	------------	-------------------------	-----------------------------

ILLNESS

1. How serious was this illness? <i>0 = not so serious, 1 = serious,</i>		
2. What type of health symptoms did the sick person have during the illness?		
1. Cough, runny nose, sore throat, ear ache	<input type="checkbox"/>	
2. Difficulty breathing, fast breathing	<input type="checkbox"/>	
3. Fever, headache, hot body	<input type="checkbox"/>	
4. Convulsions, fits	<input type="checkbox"/>	
5. Stomach ache	<input type="checkbox"/>	
6. Pain, further aches	<input type="checkbox"/>	
7. Bleeding, burn, accident	<input type="checkbox"/>	
8. Itching	<input type="checkbox"/>	
9. Other (specify) _____	<input type="checkbox"/>	
3. From which of the following did the household seek health care consultation?		
1. No health care seeking	<input type="checkbox"/>	5. Private clinic
2. HC II/HC III	<input type="checkbox"/>	6. Traditional healer
3. HC IV	<input type="checkbox"/>	7. Hospital outside of Koboko District
4. NGO health facility	<input type="checkbox"/>	8. other (specify) _____

MEDICINE

4. Did the sick person take any medicine during the illness? <i>0 = no, 1 = yes</i>		
5. Some details about all the medicine taken during the illness:		
Type of medicine	Medicine obtained from <i>codes below</i>	Medicine was prescribed <i>0 = no, 1 = yes</i>

Codes type of medicine		
1 = only anti-malarials	2 = anti-malarials in combination with pain killer	3 = only antibiotics
4 = antibiotics in combination with pain killer	5 = only pain killers	6 = other (specify)
Codes medicine obtained from		
1 = public	4 = traditional healer	
2 = private	5 = friends relatives	
3 = partially public rest private	6 = other	

6. Did the household get all the medicine needed to treat this illness (or was it sometimes not available or not affordable etc.)? <i>0 = no, 1 = yes</i>	
7. What was the main reason why the sick person did not take medicine / why the household did not get all the medicine needed? 1. Medicine was not available at the public health facility and not affordable from the private sector <input type="checkbox"/> 2. The place where medicines are available is too far <input type="checkbox"/> 3. There was no advice to take medicine to treat the disease <input type="checkbox"/> 4. Symptoms have gotten better <input type="checkbox"/> 5. Other (specify) <input type="checkbox"/>	
8. Was the use of medicine successful, i.e. did the symptoms disappear because of the use of the medicine? <i>0 = no, 1 = it became better but the symptoms came back, 2 = treatment was successful</i>	

COSTS	
9. How much did the household pay for the medicines? <i>In US\$</i>	
10. How much did the household pay for transportation related to this illness? <i>In US\$</i>	
11. How much did the household pay for consultation related to this illness? <i>In US\$</i>	
12. Further expenditures related to this illness: <i>In US\$</i>	
13. How did the household finance these expenditures in addition to the use of savings and income? 1. only from savings and income <input type="checkbox"/> 2. borrowing money elsewhere <input type="checkbox"/> 3. selling assets <input type="checkbox"/> 4. other (specify) <input type="checkbox"/>	

CHRONIC DISEASE

IDENTIFICATION

<i>Sick Persons Name</i>	<i>PIN</i>	<i>Household number</i>	<i>Chronic illness number</i>

ILLNESS

1. What chronic disease does the sick person have?

1. Hypertension, high blood pressure	<input type="checkbox"/>	8. Cancer	<input type="checkbox"/>
2. Heart disease, heart attack consequence	<input type="checkbox"/>	9. HIV/AIDS	<input type="checkbox"/>
3. Diabetes, high blood sugar	<input type="checkbox"/>	10. Tuberculosis	<input type="checkbox"/>
4. Asthma, wheezing, chronic difficulty breathing	<input type="checkbox"/>	11. Liver Diseases	<input type="checkbox"/>
5. Arthritis, chronic body pain	<input type="checkbox"/>	12. Chronic stomach pain	<input type="checkbox"/>
6. Epilepsy, seizures, fits	<input type="checkbox"/>	13. Other (specify)	<input type="checkbox"/>
7. High cholesterol	<input type="checkbox"/>	_____	<input type="checkbox"/>

2. From which of the following did the household seek health care consultation?

1. No health care seeking	<input type="checkbox"/>	5. Private clinic	<input type="checkbox"/>
2. HC II/HC III	<input type="checkbox"/>	6. Traditional healer	<input type="checkbox"/>
3. HC IV	<input type="checkbox"/>	7. Hospital outside of Koboko District	<input type="checkbox"/>
4. NGO health facility	<input type="checkbox"/>	8. other (specify) _____	<input type="checkbox"/>

MEDICINES	
3. Does the sick person take medicine to treat the disease? <i>0 = no, 1 = yes</i>	
4. Where does the household obtain the medicine from?	
1 = public	4 = traditional healer
2 = private	5 = friends relatives
3 = partially public rest private	6 = other
5. Does the chronic sick person always take the medicine? (Or is it sometimes not possible to get all the medicine needed?) <i>0 = no, 1 = yes</i>	
6. Why does the chronic sick person not take medicine / not take all the medicine as recommended?	
1. Medicine was not available at the public health facility and not affordable from the private sector	<input type="checkbox"/>
2. The place where medicines are available is too far	<input type="checkbox"/>
3. There was no advice to take medicine to treat the disease	<input type="checkbox"/>
4. Symptoms have gotten better	<input type="checkbox"/>
5. Other (specify) _____	<input type="checkbox"/>
7. Does the medicine improve the health status? <i>0 = no, 1 = yes</i>	

COSTS	
8. How much money does the household spend per month on this medicine? <i>In US\$</i>	
9. Please estimate: How much are further direct costs related to this illness per month? <i>In US\$</i>	
10. How does the household finance these expenditures in addition to the use of savings and income?	
1. only from savings and income	<input type="checkbox"/>
2. borrowing money elsewhere	<input type="checkbox"/>
3. selling assets	<input type="checkbox"/>
4. other (specify) _____	<input type="checkbox"/>

Interview

Identification:	
Date:	
Sub-county:	
Type of health facility:	

Type of illnesses:
<ol style="list-style-type: none">1. Is any type of acute illness significant dominant? If yes, could you estimate how many percent of illnesses are of this type? Is any type of chronic disease dominant?2. Do you have any concerns regarding any type of illness?

Health seeking behaviour:
<ol style="list-style-type: none">3. Do you think people first seek health care in public health and making use of public consultation although there is no medicine available?4. Do you think many people just go to buy drugs from private drug sellers without any professional consultation (usage of not prescribed drugs is a serious problem)?

Access to medicines:
<ol style="list-style-type: none">5. What do you want to tell me related to unavailability of drugs in this facility (any type of medicine always available or some never; time of availability; what happens if drugs arrive...)?6. Is it possible to hand out drugs with a primary package and label?

Possible solutions:
<ol style="list-style-type: none">7. Do you have any suggestion on how the situation could be improved?8. Explain the idea of community run drug shops. Ask what they think about it.9. Explain the idea of a community based insurance scheme. Ask what they think about it.

Appendix B: Research Permission



Uganda National Council for Science and Technology

(Established by Act of Parliament of the Republic of Uganda)

Our Ref: SS 2511

13/05/2011

Mr. Johannes Othello Dill
Deutsche Welthungerhilfe e. V.
Diplomate Zone, Block 244 Plot 1369 Muyenga
P.O Box 71223
KAMPALA

Dear Mr. Dill,

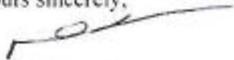
RE: RESEARCH PROJECT, "ACCESS TO MEDICINES: EMPIRICAL EVIDENCE FROM KOBOKO DISTRICT, UGANDA"

This is to inform you that the Uganda National Council for Science and Technology (UNCST) approved the above research proposal on **March 17, 2011**. The approval will expire on **August 17, 2011**. If it is necessary to continue with the research beyond the expiry date, a request for continuation should be made in writing to the Executive Secretary, UNCST.

Any problems of a serious nature related to the execution of your research project should be brought to the attention of the UNCST, and any changes to the research protocol should not be implemented without UNCST's approval except when necessary to eliminate apparent immediate hazards to the research participant(s).

This letter also serves as proof of UNCST approval and as a reminder for you to submit to UNCST timely progress reports and a final report on completion of the research project.

Yours sincerely,


Leah Nawegulo
for: Executive Secretary
UGANDA NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

LOCATION/CORRESPONDENCE

Plot 6 Kimera Road, Ntinda
P. O. Box 6884
KAMPALA, UGANDA

COMMUNICATION

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WEBSITE: <http://www.uncst.go.ug>

Appendix C: Names of Villages that Participated in the Survey

Sub-county	Parish	Village	Number of households
Koboko Town Council	Appa	Anjirigo	4
	Teremunga	Injabi	5
	Mengo	Nyarilo	4
	Mengo	Abele	6
	Malenga	Demgbelenga	6
	Appa	Gbukutu	6
	Lobule	Lurojo	Kolua
Lobule		Manabu B.	5
<i>Not identified</i>		Ombokolo	5
Ginyako		<i>Dowonga (on the border between Dranya and Lobule. Here counted as Lobule)</i>	5
Ludara	Nyajo	Agodoa	5
	Ludara	Indiga Cental	5
	Nyajo	Lokiri	5
Midia	Dricile	Moje	5
	Midia	Pakayo	5
	Godia	Kulubu	4
Kuluba	Monodu	Tanyaji	5
	Kuluba	Nyaragala	5
Dranya	Aunga	Olengaku	4
	Ginyako	Korobolu	6
Abuku	Unyokunga	Komba	5
7	18	21	105

Appendix D: Principal Component Analysis

One urban and one rural socioeconomic index were designed by using PCA to cope with different indicators of wealth in both areas. The education level of the head of household, rooms per household member, housing quality, and durable assets such as bicycles or cell phones were the variables used in both analyses. Furthermore, hectare of land owned per household member, the possession of a store house, and animals held by the household were part of the rural analysis while the urban analysis included variables related to the type of toilet, source of water, electricity, and ownership of an automobile. A description of all variables used is offered in table I.

Table I: PCA Variables Description

Variable	Type of variable	Description
Education	binary	1 if head of household finished primary school
Rooms/person	continuous	Number of rooms per household member
Store house	binary	1 if household owns a store house
Land/person	continuous	Hecatere of land per household member
Housing quality	binary	Rural: 1 of housing quality is medium Urban: 1 if housing quality is high
Source of water	binary	1 if household uses water from a bore whole
Latrine	binary	1 if household owns a own latrine
Electricity	binary	1 if household has access to electricity
Car	binary	1 if household owns a car
Motorcycle	binary	1 if household owns a motorcycle
Bicycle	binary	1 if household owns a bicycle
Cell phone	binary	1 if household owns a cell phone
Radio	binary	1 if household owns a radio
Watch	binary	1 if household owns a watch
Cow	continuous	Number of cows the household owns
Chicken	continuous	Number of chickens the household owns
Goat	continuous	Number of goats the household owns
Sheep	continuous	Number of sheep the household owns

The idea behind using PCA to estimate the SES is based on correlated asset variables that can be reduced into one artificial variable reflecting the SES. To provide an overview of the correlation between the observed variables, correlation matrices for both variable sets are provided at the end of appendix D. While the correlations between the variables in the urban set are high, correlations in the rural set seem to be low. In addition to high correlations between variables, PCA works best when variables are unequally distributed across households. Variables with low standard deviations have low weights. Variables which are identical for all households are weighted zero and have limited usefulness. With this in mind a

descriptive analysis was carried out to decide which variables to include in the analysis. Variables covering agricultural equipment or animals like donkeys or pigs were not kept by any household. In rural Koboko no household used electricity or owned automobiles. Furthermore, the ownership of animals did not play a key role in urban areas. On the other hand mosquito nets were possessed by every household due to a recent donor program. Variables showing no variation were excluded from the analysis and are not part of the descriptive analysis in table II.

Table II: PCA Descriptive Analysis and Results

Variables	Rural						Urban					
	Obs.	Mean	Std. dev.	Min	Max	Factor score	Obs.	Mean	Std. dev.	Min	Max	Factor score
Education	71	0.58	0.50	0.00	1.00	0.23	34	0.68	0.47	0.00	1.00	0.22
Rooms/person	71	0.55	0.26	0.13	1.25	0.31	34	0.51	0.27	0.14	1.14	0.22
Store house	71	0.48	0.50	0.00	1.00	0.11	0	0.00	0.00	0	0	0.00
Land/person	71	0.42	0.31	0.00	1.33	0.34	0	0.00	0.00	0	0	0.00
Housing quality	71	0.93	0.26	0.00	1.00	0.10	34	0.18	0.39	0.00	1.00	0.33
Source of water	0	0.00	0.00	0.00	0.00	0.00	34	0.74	0.45	0.00	1.00	0.33
Latrine	0	0.00	0.00	0.00	0.00	0.00	34	0.82	0.39	0.00	1.00	0.14
Electricity	0	0.00	0.00	0.00	0.00	0.00	34	0.15	0.36	0.00	1.00	0.32
Car	0	0.00	0.00	0.00	0.00	0.00	34	0.09	0.29	0.00	1.00	0.28
Motorcycle	71	0.06	0.23	0.00	1.00	0.11	34	0.35	0.49	0.00	1.00	0.34
Bicycle	71	0.55	0.50	0.00	1.00	0.33	34	0.44	0.50	0.00	1.00	0.29
Cell phone	71	0.46	0.50	0.00	1.00	0.19	34	0.82	0.39	0.00	1.00	0.30
Radio	71	0.52	0.50	0.00	1.00	0.26	34	0.74	0.45	0.00	1.00	0.30
Watch	71	0.21	0.41	0.00	1.00	0.19	34	0.50	0.51	0.00	1.00	0.33
Cows	71	1.18	2.81	0.00	20	0.40	0	0	0	0	0	0
Chicken	71	3.08	3.91	0.00	20	0.38	0	0	0	0	0	0
Goats	71	2.04	2.51	0.00	10	0.37	0	0	0	0	0	0
Sheep	71	0.51	1.00	0.00	4	0.12	0	0	0	0	0	0
Eigenvalue 3.12 (0.22 %)						Eigenvalue 4.84 (0.40 %)						

Results from the first principal component in urban and rural areas are provided in the column “Factor score”. Since variables were designed in a way that a higher value is in line with an increment in wealth, all factor scores have the expected positive sign. The lowest factor score in the urban analysis is given to the ownership of a latrine (0.14), possessing a motorcycle is allocated the highest weight (0.34). However, further scoring weights are not significantly lower. The eigenvalue of the first principal component in the urban set is 4.84 and explains 40% of the variation. This can be considered a relatively high amount of variation explained by the first of 12 principal components. Variation of factor scores in the rural set is higher since weights range from 0.1 for housing quality to 0.4 for the number of cows a household

owns. In addition to the number of cows owned per household member, the amount of land per person, rooms per person, the ownership of a bicycle, and the possession of additional animals were allocated high weights. These variables were considered to be key indications of wealth in rural Koboko showing that results are in line with theory. Unfortunately, the eigenvalue of the first principal component in the rural analysis accounts only 22% of total variation. Explanations for this result are the high numbers of variables used and low correlations among these variables.

Using the calculated factor scores, a new dependent variable was created for both areas. These artificial variables can be regarded to be the socioeconomic score indices with a higher score indicating a higher SES. Both indices have 0 mean by construction. “Shapiro-Wilk” and “Shapiro-Francia” tests were conducted on normal distribution of the indices. These tests lead to the conclusion that the urban index is normal and the rural index non-normal distributed; results can be found at the end of this appendix. A non-normally distributed index indicates clumping and truncation and therefore reveals difficulties in differentiating between households.

To provide a more straightforward analysis cut-off points were applied to the SES score and have been used to classify households into 3 equally large socioeconomic groups. Table III shows the mean socioeconomic score for each of the 3 categories. Differences between the means of each group are more even in the urban index than in the rural index indicating again that the SES score of the urban set is more uniformly distributed.

Table III: PCA Mean Socioeconomic Score by Socioeconomic Groups

	Low	Medium	High
Rural	-1.74 (24)	-0.14 (24)	1.97 (23)
Urban	-2.3 (12)	0.05 (11)	2.46 (11)

Note: Number of households in brackets

Once households were assigned to 1 of the 3 socioeconomic groups, internal coherence was checked. Internal coherence compares the mean value of each variable between the 3 groups. For binary variables the mean value is written as percentage of households with the value 1. From table IV it can be concluded that both analyses are internally coherent. The mean value of each variable included in the analysis increased by the socioeconomic group without exception. For example, in rural areas the average number of cows owned by households in the low socioeconomic group was 0.17, in the middle group 0.33, and 3.00 in the high group.

In urban areas, 8% of the households in the low group owned a bicycle, 45% in the medium group and to 82% in the high socioeconomic group.

Table IV: PCA Internal Coherence

Variables	Rural			Urban		
	Low	Medium	High	Low	Medium	High
Education	29%	63%	83%	42%	73%	91%
Rooms/person	0.37	0.54	0.74	0.39	0.50	0.66
Store house	42%	50%	52%	/	/	/
Land/person	0.22	0.43	0.62	/	/	/
Housing quality*	88%	96%	96%	0%	0%	55%
Source of water	/	/	/	25%	100%	100%
Latrine	/	/	/	67%	91%	91%
Electricity	/	/	/	0%	0%	45%
Car	/	/	/	0%	0%	27%
Motorcycle	0%	8%	9%	0%	18%	91%
Bicycle	17%	58%	91%	8%	45%	82%
Cell phone	25%	54%	61%	50%	100%	100%
Radio	29%	42%	87%	25%	100%	100%
Clock/watch	8%	13%	44%	8%	45%	100%
Cows	0.17	0.33	3.13	/	/	/
Chickens	0.88	2.88	5.61	/	/	/
Goats	0.54	1.92	3.74	/	/	/
Sheep	0.25	0.58	0.70	/	/	/

*Remember from table I: variable for housing quality differs between rural and urban areas

To summarise, for urban Koboko District no indications of clumping or truncation were found. The socioeconomic score index is normally distributed and the eigenvalue of the first principal component explains a satisfactory amount of the variance. Finally, the index is internally coherent. It can be concluded that the classification of urban households into three socioeconomic groups was successful. The picture is somewhat different for the rural index. A non-normal distribution of the socioeconomic score index indicates clumping and truncation and the eigenvalue of the first principal component accounts for only 22% of the variance. Clumping and truncation can result from using variables that cannot distinguish households, but it can also reflect the fact that households are a homogenous group. The latter of these two explanations is expected to be the case in rural Koboko. Most households can be regarded as very poor and, hence, are a more homogenous group than in urban KTC. Differentiation of these households is difficult.

Correlation Matrices

Urban Index

Variable	Correlations												
	1	2	3	4	5	6	7	8	9	10	11	12	
1	1.00												
2	0.31	1.00											
3	0.16	0.38	1.00										
4	0.30	0.25	0.28	1.00									
5	0.17	0.43	0.21	0.07	1.00								
6	0.11	0.24	0.68	0.25	0.19	1.00							
7	0.22	0.11	0.67	0.19	0.14	0.75	1.00						
8	0.38	0.21	0.63	0.44	0.02	0.56	0.42	1.00					
9	0.23	0.14	0.37	0.40	0.10	0.47	0.35	0.46	1.00				
10	0.50	0.49	0.21	0.60	0.39	0.19	0.14	0.34	0.41	1.00			
11	0.30	0.19	0.28	0.85	-0.10	0.25	0.19	0.44	0.40	0.42	1.00		
12	0.19	0.25	0.46	0.60	0.31	0.42	0.31	0.49	0.41	0.46	0.47	1.00	

Note: N = 34

Variables

1 Education 4 Source of water 7 Car 10 Cell phone
 2 Rooms/person 5 Latrine 8 Motorcycle 11 Radio
 3 Housing quality 6 Electricity 9 Bicycle 12 Watch

Rural Index

Variable	Correlations													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1.00													
2	0.21	1.00												
3	-0.04	-0.10	1.00											
4	0.10	0.59	0.03	1.00										
5	-0.01	0.03	0.15	0.03	1.00									
6	0.21	0.03	0.25	0.05	0.07	1.00								
7	0.03	0.31	0.13	0.45	0.19	-0.02	1.00							
8	0.23	0.18	-0.10	0.14	0.15	0.02	0.11	1.00						
9	0.15	0.20	-0.04	0.13	0.07	-0.01	0.10	0.33	1.00					
10	0.09	0.07	-0.01	0.07	0.14	0.32	0.19	0.21	0.22	1.00				
11	0.16	0.19	0.20	0.28	0.04	0.12	0.26	0.09	0.31	0.18	1.00			
12	0.35	0.07	0.10	0.20	0.08	0.07	0.20	0.22	0.20	0.23	0.55	1.00		
13	0.20	0.24	0.20	0.21	-0.04	-0.05	0.34	-0.02	0.22	-0.04	0.54	0.45	1.00	
14	-0.05	0.13	0.14	0.17	0.14	0.12	0.15	-0.19	-0.02	-0.13	0.05	0.05	0.28	1.00

Note: N = 71

Variables

1 Education	4 Hectare of land/person	7 Bicycle	10 Watch	13 Goats
2 Rooms/person	5 Housing quality	8 Cell phone	11 Cows	14 Sheeps
3 Store house	6 Motorcycle	9 Radio	12 Chickens	

Tests on normal distributed indices

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
pca_urban	34	0.97	1.04	0.08	0.47
pca_rural	71	0.93	4.31	3.18	0.00

Shapiro-Francia W' test for normal data

Variable	Obs	W'	V'	z	Prob>z
pca_urban	34	0.98	0.82	-0.38	0.65
pca_rural	71	0.93	5.01	3.08	0.00

Conclusion: While in the urban data set the hypothesis of normal distributed data cannot be rejected, it can be rejected in the rural data set for both tests.

Appendix E: Pictures



Admission in a HC III in Koboko District



Drugs handed out by a public HC in rural Koboko District