Hum Ecol (2009) 37:79–94
DOI 10.1007/s10745-009-9217-6

Indigenous Medicine and Primary Health Care: The Importance of Lay Knowledge and Use of Medicinal Plants in Rural South Africa

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Published online: 21 January 2009

Abstract Indigenous medicine is important to rural livelihoods, but lay knowledge and use of medicinal plants has not been extensively studied. Research in KwaZulu-Natal, South Africa, showed that medicinal plants were frequently used by villagers and contributed to their ability to cope with health problems. Knowledge of plants and household remedies was extensive and varied in that households often held different knowledge. Villagers mainly relied on common species, and were generally aware of alternative species for a certain ailment. People were flexible in their use of indigenous and western health care, which were both perceived as beneficial. Improved cooperation between health care systems could improve health standards. Extraction of medicinal plants has been described as unsustainable in the region—a situation not found in the study area. It is argued that conservation policies aimed to restrict access should be differential and potentially not include local consumption, since this may be ecologically unnecessary and entail local hardships.

Keywords South Africa · KwaZulu-Natal · Medicinal plants · Natural resource use · Indigenous knowledge · Health care strategies · Sustainable use · Conservation

Introduction

Just how important access to a variety of natural resources is to rural people has been clearly documented in recent research (Koziell and Saunders 2001; Campbell and Luckert 2002). Medicinal plants are such a resource, which a majority of people in Africa depend on for physical, social, cultural and economic well-being (Marshall 1998; WHO 2002). In South Africa lay peoples' knowledge of indigenous medicine, their strategies when utilising different health care systems and practices of self-medication have been studied for urban settings (Joubert *et al*. 1984; Cocks and Dold 2000; Botha *et al*. 2007). Research on indigenous medicine in rural areas includes documentation of medicinal plants, but lay knowledge and practices are seldom explored (Hutchings 1989; Tyiso and Bhat 1998). However, research on non-timber forest products show that rural people collect medicinal plants for own use and that this is of economic importance to poor households (e.g. Shackleton and Shackleton 2004). These studies focus on quantitative aspects, and need to be complemented by qualitative research to become more useful in efforts to improve the livelihood security of poor households (Brown 1995; Srivastava *et al*. 1996). In South Africa the harvesting of medicinal plants for trade in urban markets has been described as unsustainable, and the need of conservation measures emphasised (Cunningham 1989, 1991; Mander 1998). As advocated in recent literature, conservation strategies need to be understood and planned for based on an understanding of indigenous knowledge and practices (Berkes and Turner 2006). We need to know how rural people view and use indigenous and western health care respectively, how knowledge systems are created, maintained, and transformed, and whether present practices are sustainable or not.

The present research was conducted in a rural community situated in and adjacent to the Mkuze Wetlands in KwaZulu-Natal (Trygger 2003). Here local people have a long history of utilising a variety of natural resources and still substantially depend on them (Andrén 2001; Dahlberg 2005). The study was part of a research programme on the

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social and ecological dynamics of the wetlands (Dahlberg *et al*. 1999), and the objectives were to explore (1) the extent of knowledge that villagers with no special training in indigenous medicine have about medicinal plants, (2) how this knowledge is used in everyday health care, (3) how the knowledge is produced and transferred, (4) local perceptions of changes in availability of medicinal plants, including the sustainability of present practices, and (5) the role of self-medication with medicinal plants in relation to other available health care strategies. The final discussion looks to the future and potential effects of social and environmental change.

Indigenous Knowledge and Medicinal Plants in South Africa

Indigenous knowledge is defined by Grenier (1998: 1) as "the unique, traditional, local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular area." This quote calls for two clarifying comments. First, children and youth should naturally be included, since their experience of social and environmental change is vital to the evolution, transmission and transformation of knowledge. Second, it illustrates the proliferation of terms used. Indigenous, local, traditional and cultural, are all frequently used and differentiations within these terms, e.g. indigenous technical knowledge (ITK), are common. As discussed in Sillitoe and Bicker (2004) criticism can be levied against all. For example, it is problematic to decide who is 'local' or 'indigenous' (McIntosh 2002), and 'traditional' tends to imply a static remnant of the past (Mander 1998). Most research from South Africa has used the term indigenous, and we do so in this paper.

Irrespective of the term used these knowledge systems are dynamic, and represent generations of experiences and experiments, where new knowledge is continually added and irrelevant knowledge is lost (Grenier 1998; Berkes and Turner 2006). For example, indigenous medicine in South Africa changes through new practices emerging within 'local' systems (Dold and Cocks 2000), as well as by the assimilation and adaptation of external knowledge (Dauskardt 1991; Cocks and Dold 2000). The range and variety of indigenous knowledge held by the extended community is an intellectual "gene pool" of crucial importance when people need to adapt to changes in the social and ecological environment (McNeely 1992). However, it is important not to romanticise indigenous knowledge, and to recognise that it can be fragmentary, contested and reflect social divisions within communities (Neumann 2005). The definition of indigenous knowledge provided by Sillitoe and Bicker (2004: 2) quite neatly covers the essentials, "…any understanding rooted in local culture. It includes all knowledge held more or less collectively by a population that informs interpretations of things. It varies between societies. It comes from a range of sources, is a dynamic mix of past tradition and present innovation with a view to the future."

In South Africa indigenous and western health care options exist side by side. There are western clinics and hospitals, African chemists (*amayeza* stores), *muthi* markets for indigenous remedies and ingredients, indigenous healers such as herbalists, diviners, faith healers and midwives, and the practice of self-medication including use of household remedies (Cocks and Dold 2000). Although many black South Africans make use of western health care, indigenous medicine still has an estimated 27 million consumers (Mander 1998). Rural households utilise medicinal plants for self-medication and studies have provided quantitative proof that this constitutes an economic value and is important in maintaining good health (Shackleton *et al*. 2002; Twine *et al*. 2003; Shackleton and Shackleton 2004). Ambitious attempts to record species used and their medical properties have been made in South Africa (van Wyk and Gericke 2000), and specifically for the Zulu (Hutchings *et al*. 1996). A few studies in urban areas have analysed self-medication, i.e. when laymen buy plant material to make their own remedies or buy ready-made prescriptions without consulting a healer, and found that this is a common initial response to illness and considered successful for the treatment of many ailments (Joubert *et al*. 1984; Cocks and Møller 2002). Research in rural areas mentions that ordinary people know how to treat minor ailments (Ngubane 1977; Hutchings 1989), but few studies focus on their knowledge or on their ability of self-diagnosis and self-medication, as noted also by Joubert *et al*. (1984) and Cocks and Dold (2000). According to the latter this is due to a biased interest in the more complex rituals and treatments practiced by indigenous healers (ibid.). When lay people are included the data are seldom differentiated in terms of knowledge held by them and by indigenous healers respectively (e.g. Bhat and Jacobs 1995; Tyiso and Bhat 1998; Grierson and Afolayan 1999), although a few studies include examples of lay knowledge of plants and recipes (Hutchings 1989; Dold and Cocks 2000). A qualitative understanding of local lay knowledge and use of medicinal plants and the role of household remedies in relation to other health care options is even less covered (although see Rothwell 1998).

In KwaZulu-Natal, high reliance on indigenous medicine and the resulting large scale commercial exploitation for urban markets are seen as a threat to biodiversity values (Cunningham 1988a; Mander 1998; Rothwell 1998). Cunningham (e.g. 1988b, 1991) has stressed the need for conservation measures to ensure the survival of popular medicinal plants, e.g.

through increased cultivation, utilisation of alternative supplies and a stricter enforcement of conservation regulations. He notes that the pressure on remaining indigenous vegetation is caused by the transformation of vast areas by outsiders, e.g. into plantations of sugar cane and exotic tree species (Cunningham 1988a), as also discussed by Brown (1995) for other parts of Africa. This is generally ignored in the debate about conservation and sustainable use of natural resources, where instead local people are blamed for resource depletion. Others argue that rather than enforcing restrictions government should promote the sustainable exploitation of resources for rural development (Shackleton *et al*. 2002). Discussing this issue for other parts of Africa, Brown (1995: 201) states that the "…direct local use of [medicinal] plant resources contributes to the preservation of species and habitats, and can be used as the basis for conservation policies centred on indigenous management regimes and utilisation."

Lack of employment opportunities, especially for rural women, is cited as a reason for exploitive harvesting of plants for commercial gain (Cunningham 1991). However, for many households such trade is only practiced as a safety-net in times of need, is small-scale and occurs on an ad hoc basis (Shackleton *et al*. 2002). Low education levels and lack of access to western health care have also been cited as important reasons for reliance on indigenous medicine (Cunningham 1991; Tyiso and Bhat 1998). Others refute this and show that instead cultural background determines the choice of health care, and that an adherence to indigenous medicine centres on the strong links among culture, belief systems and health (Dauskardt 1991; Marshall 1998). Indigenous medicine represents a holistic perspective on personal well-being, where the individual is seen as closely linked to his/her social and environmental surroundings (Hutchings 1989; Cocks and Møller 2002). It can be much more expensive to consult a traditional healer than a western professional, but this does not seem to deter people (Marshall 1998). Indigenous medicine is thus very important to black South Africans and is used alongside western medicine. However, policymakers and practitioners of western medicine are reluctant to accept indigenous medicine as part of the national health system (Mander 1998; Tyiso and Bhat 1998), in spite of studies showing how collaboration could improve the efficiency of overall health care (Marshall 1998; El Ansari *et al*. 2002).

Methods

Fieldwork was carried out during July and August 2002 using qualitative and quantitative methods. In-depth interviews were complemented with participatory observation, collection of plant species for scientific identification and GPS data on collection sites. In total 30 individual interviews and one group interview were conducted targeting primarily local people without any formal training in either western or indigenous medicine. The selection of respondents was mainly through strategic snowballing where sometimes informants would spontaneously suggest others to interview, but usually we would specify characteristics important in additional respondents. Here, consideration was given to factors likely to influence medicinal knowledge and practices (cf. Cunningham 2001), and through strategic selection individuals of different ages, gender, education, religion and location of homestead were interviewed. Individual interviews were held with 19 villagers (13 women, six men) aged between 20 and 90, with most in the age bracket 30 to 50, and with eight indigenous healers (three women and five men), i.e. diviners (*sangomas*) and herbalists (*nyangas*) resident in the community. Interviews with community members covered a number of set questions that included household composition and history, livelihood strategies and wealth. However, the central aim was to record knowledge of plant species and their use, and also where and how plants were collected. Respondents were asked to name and describe all medicinal plants they knew of and used, including details about growth form and plant parts used in different remedies. The production of these lists of species and use was followed by open-ended questions about availability and change in abundance of plants, health care options, cultural beliefs and transmission of medical knowledge. On these latter issues focus varied between interviews, and thus not all questions were discussed in all interviews.

The group interview included 17 pupils, aged between 17 and 24, and aimed for an appreciation of medicinal knowledge and practices among youths. Questions concerned such issues as knowledge of species and the importance of indigenous medicine in relation to western medicine. Individual answers to all questions were not recorded, but the session revealed patterns of consensus and divergence. All interviews were conducted in Zulu with the aid of an experienced local interpreter. Information was also collected from the head nurse and an HIV/AIDS health worker at the community clinic, and from a staff member at the provincial conservation organisation, Ezemvelo KwaZulu-Natal Wildlife. One interview session usually lasted between 1 and 3 h, and most respondents were visited several times. Thus, the total length of some interviews extended to 15 h, including a field-walk to collect species and map where they were found. Time spent on these walks varied but was particularly long with ten of the respondents, seven villagers and three healers. In one case all species used by the respondent were collected, while with the others specific species were sought and collected for identification. As noted by Cunningham (2001) and others, repeat visits and field-walks are especially

valuable, and these clearly enhanced the amount and quality of information gathered, as respondents recalled additional species and discussed harvesting techniques, availability and change.

Detailed notes were taken during all interviews and information gaps were amended through additional visits and cross-checking (Cunningham 2001). Interviews were analysed both individually as personal narratives, and comparatively looking for similarities and differences—and causes of both. Information was organised into different themes (see below), and initial analysis was done within each theme. Thereafter data were analysed across themes, e.g. use of species in relation to perceptions of abundance and change, to strengthen the validity of findings and to gain a more holistic understanding. Since harvesting in protected areas was officially prohibited the honesty of answers concerning collection areas and commercial trade can be queried. Naturally, we cannot guarantee that all responses were fully truthful, but for two reasons we feel sure of the general validity of the findings. First, we had worked for several years in the area, had established good relationships within the community, had previously conducted research on even more sensitive issues, such as illegal hunting, and it was well-known that we had no affiliation to the conservation organisation. Second, it was always made clear that respondents would remain anonymous, they were never pressed for answers, and questions concerning collection areas, trade and protected areas did not seem to worry anyone.

Of course, there is a risk of misinterpretation of data, in spite of cross-checking with different data sources and with the literature. As noted by Hutchings *et al.* (1996), Cunningham (2001: 46–47) and others, it is common for several Zulu names to refer to one scientifically classified plant species and vice versa. Therefore all species lists provided by respondents were checked and the spelling of Zulu names was made uniform, according to Diederichs (2001). When possible several specimens of a plant described by the same Zulu name were collected with different respondents, and as many specimens as possible were identified at the Durban Herbarium. Zulu medicine is linked to a complex belief system, and thus descriptions are full of cultural codes that a researcher may miss. The study focuses on physical aspects of health problems, but when spiritual and mythical beliefs are mentioned they are treated as an integral part of the holistic Zulu perception of health and well-being.

Terminology

Indigenous medicine is used to describe local health care, including treatment by healers and non-trained people. *Indigenous healer* (or *healer*) refers to people living and working in the community who have received specialized training in indigenous medicine, and includes both herbalists (*nyanga*) and diviners (*sangoma*). *Villagers*, or *lay people*, denotes people in the community who had no special training in medicine apart from what they had learnt at home. *Western health care* is used when referring to treatment by western-trained professionals and the use of western pharmaceuticals. The Zulu term *isifo* can be translated as 'a disease', and is determined through a combination of symptoms and perceived cause. *Isifo* here refers to all physical, psychological and social problems mentioned by respondents. Indigenous medicine to treat *isifos* is called *muthi* in Zulu, and when prepared and administered by villagers is here termed *household remedy*. The outcome of any investigation will depend partly on how the data are ordered and on the analytical approach used. Here the *isifo*—and specifically the perceived cause of the *isifo*—is the starting point for exploring medical knowledge and strategies.

Study Area

The study area comprises the north-western part of the Mkuze wetlands on the coastal plain of KwaZulu-Natal, and more specifically the community of Mnqobokazi (Fig. 1). According to written and oral history Mnqobokazi was established over 200 years ago (Bryant 1929; Dahlberg 2005). During the twentieth century the community gradually lost access to much of their land as the colonial and apartheid governments demarcated areas for white farmers, and game- and forest reserves (Dahlberg 2005). Today the iSimangaliso Wetland Park, a World Natural Heritage Site established in 2000, borders the community to the east and north, while two game reserves lie directly west of the communal lands. Rainfall is concentrated to the summer months between November and March, with an annual average of about 600 mm, although variations within and between years are large (Ellery *et al.* 2003). The Mkuze wetland has been recognised for its high biodiversity and grasslands, papyrus swamps and other wetland types are intermingled with open and forested drylands to form a mosaic of habitats (ibid.).

The communal land of Mnqobokazi is confined to the western side of the Mkuze River, and the population of about 8,000 people (Statistics South Africa 2001) lives in scattered homesteads. Until recently the area was considered remote and of little interest to the government, but over the last decade national and local authorities have invested in development. A tarmac road has been constructed, and telephone, electricity and water tanks are now available to some. However, living standards are low and the majority still collect water from the river and pans, and many lack proper sanitation facilities (Trygger 2003).

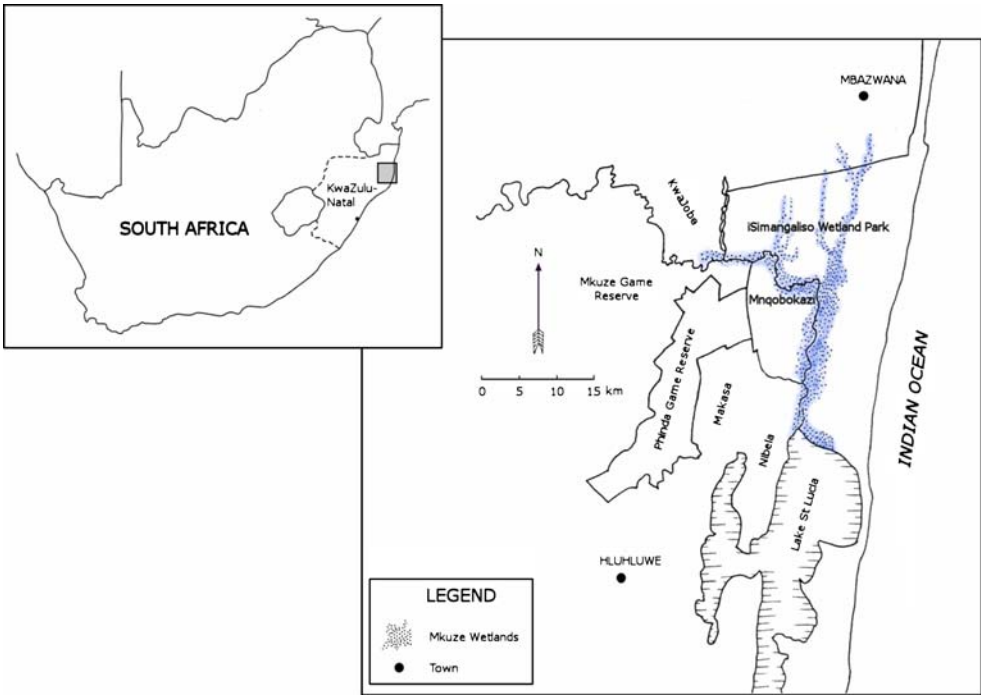

Fig. 1 Map of the study area with neighbouring communities and protected areas

Educational standards are low, unemployment rates high, and very few formal jobs are available within the community (Statistics South Africa 1996, 2001). Most households have access to some cash income through informal jobs, migratory work, pensions and child grants, but reliance on subsistence agriculture and wild produce is still high (Trygger 2003). People collect a wide variety of natural produce, such as firewood, poles, reeds, wild vegetables and medicinal plants. The community is allowed to access the Wetland Park to collect certain permitted natural resources, while others, such as game, are prohibited although still accessed by some (Dahlberg 2005). Formal written permission from the conservation authorities is needed to collect medicinal plants here and is intended mainly for indigenous healers. The other neighbouring protected areas are fenced, trespassers risk being fined and resource collection is very restricted.

According to government statistics, health standards are in desperate need of improvement in Mnqobokazi as in the region as a whole (Trygger 2003). Most alarming are the data on HIV/AIDS, where an estimated 39.1% of attendants at antenatal clinics in KwaZulu-Natal in 2006 were infected (South Africa HIV and AIDS Statistics 2007). In the study area ca. 86% of the pregnant women tested at the local clinic were infected in 1999 (Andrén 2001), and this had increased to 90% in 2002 (J. Nxumalo, personal communication). In KwaZulu-Natal HIV/AIDS, tuberculosis (TB), pneumonia and influenza were among the main causes of death in the adult black population, while for children it was intestinal infections, influenza, pneumonia and malnutrition (Ngwane and Hirschowitz 1998). Statistics for the whole province showed that 86% of the African households made use of western health care facilities, although this differed between urban and rural areas (ibid.). A western clinic opened in Mnqobokazi in 1994 and the primary health care services offered here were free of charge. Patients with more serious problems were referred to the hospital, which was situated far away and charged for services. The clinic was open five days a week, had a permanent nursing staff, was visited by a doctor once a week and cooperated with Community Health Workers (L. Manukuza, personal communication). The latter were local people who had received training by NGOs to disseminate information on diseases such as HIV/AIDS and malaria. Statistics on indigenous health care were not available, but according to informants there were many indigenous healers in the study area, their numbers were increasing and some also had a high reputation outside the community. The cost of consulting a healer varied depending on the nature of the illness and the renown of the healer. Consultation fees were usually low, about 20R (US$2), while treatment fees varied from a few rand for minor ailments to as much as 1,500R (US$150) for serious problems.

Medical Knowledge and Practices in Mnqobokazi

First we describe how diseases are categorized and why people utilize different health care systems. We then turn to health problems often treated with medicinal plants within the household, i.e. natural *isifos,* and how medicinal plants are used. This is related to issues of sustainability

and information on availability and change. Finally the dynamics of indigenous knowledge are further explored in relation to the transmission of knowledge.

Choice of Health Care System

Decisions about what health care option to choose depended primarily on individual knowledge of indigenous medicine and on experience of coupling symptoms to cause, i.e. on the specific *isifo*. These can be grouped into three main categories: lack of good health due to physical (natural) causes, due to witchcraft (magical causes), or due to the ancestors (spiritual causes). Usually respondents used household remedies made of locally available medicinal plants as a first alternative to treat everyday ailments *not* caused by witchcraft or the ancestors—i.e. natural *isifos*. These could also be treated with western medicine, while magical and spiritual *isifos* were treated by diviners and herbalists. The opinion of the majority (80%) of villagers interviewed, independent of age, education, occupation, wealth, gender and length of stay in the area, was that all these medical options could be beneficial—depending on the specific *isifo*. Natural *isifos* usually had physical symptoms such as fever, coughing, and pain/ache, and all respondents who were asked claimed that the household remedies they applied against ordinary natural *isifos* were very effective. The head nurse at the local clinic to some extent concurred with this: "From my own experience and patients testimony, it is clear that some health conditions can be treated effectively with household remedies." However, in her opinion these were not used extensively except perhaps among the older generation—an opinion contradicted by the findings of this study.

Both villagers and healers stated that there were some natural *isifos* that necessitated western medicines, such as malaria, TB, diabetes, cholera and high blood pressure. One reason given was that, "… [these] modern diseases call for modern medicine." Explanations of 'modern' diseases varied, with diabetes described as being, "…caused by modern food…," and a perceived increase in cases of high blood pressure caused by, "…people [buying] ready-made food which is made with chemicals." One respondent said that malaria, "…is a new disease. I have only heard about it in recent years. Before, there was no such thing as mosquitoes biting and people getting sick [from this]. When I was a child, people could have a fever, but not from malaria. I don't know where it came from. The hospital can treat malaria." This view may have been due to recent information campaigns by Community Health Workers about causes and treatment of malaria. The clinic had spread information also about other health hazards, and this may have increased awareness and trust in their capacity, although people did not always believe what was said. For example, the clinic had warned people against drinking the water from the pans and the canal, and one respondent commented, "We used to drink [this] water and did not get sick. Now people get sick even if they don't drink this water." For certain problems respondents expressed a stronger belief in the curing capacity of western medicine. One man involved in a car accident and another who needed stitches turned to the clinic because they did not trust an indigenous healer to treat these types of injuries effectively. Among the *isifo* that were treated both with western and indigenous medicine was HIV/AIDS. The head nurse and some of the interviewed healers were of the opinion that both alternatives could have a positive impact on the symptoms of HIV/AIDS, while none of the respondents asked about this thought either had the power to cure it. *Isifos* caused by magic necessitated treatment by a healer, although villagers had some knowledge of how to prepare charms, e.g. to bring luck or ward off black magic. Some healers commented that western doctors would be able to treat the effects of black magic if they learnt how to mix the proper *muthi*, since this did not involve communication with the ancestors. An *isifo* caused by the ancestral spirits could only be cured by a *sangoma* since communication with the dead was necessary to reveal the cause and proper treatment. However, not everyone could consult a healer since, "[they charge] high prices, and poor people can not afford this."

In theory it was thus clear which health care option was best for a certain *isifo*, but in reality it was not that simple, since the cause of an ailment was often not initially known. That is, the same symptoms could have natural *or* spiritual *or* magical causes, i.e. be different *isifos*. Health care options were therefore tried one by one until health was restored, and the order chosen—and the reasons why—differed between individuals and specific situations. According to respondents the most common sequence was to initially assume the illness was a natural *isifo* and start by treating the physical symptoms with household remedies or with pharmaceuticals from the clinic. If the *isifo* persisted, professional help from an indigenous healer was sought in case of spiritual or magical causes, and if he/she also failed a western doctor might be consulted. For example, one respondent described that she had experienced pain inside the body and consulted a *sangoma*, who referred her to a *nyanga*. The *nyanga* could not cure her and she then turned to the clinic, where they diagnosed TB and were able to treat her successfully. However, the opposite sequence could also occur, possibly because treatment at the clinic was free of charge as opposed to consultation and treatment by a healer. A woman described how people sought help at the clinic for chest complaints and were told they had TB. If the treatment did not help they would turn to a *nyanga*, when it might be discovered that the patient really had *idliso*—an *isifo* caused by witchcraft—

against which western medicines are ineffective. Several healers said that there are two kinds of TB and that they could cure the one caused by *idliso*. A patient could also undergo western and indigenous treatment simultaneously. One woman said she tried to 'strengthen' the medicines from the clinic with the herbs she knew. Respondents described many instances of how difficult it could be to know whether symptoms were caused by natural, magical or spiritual *isifos* (see Trygger 2003 for additional examples). In sum, most respondents were positive about all the available health care options, and described household remedies as both effective and commonly used to treat less serious natural *isifos*.

However, certain local church groups did not allow treatment by indigenous healers since they may use *muthi* (medicine) made from creatures of the spirit world associated with black magic, e.g. the *utokoloshe*. Local churches also opposed specific treatments such as skin incisions, because of the risks with HIV/AIDS. Most churches allowed the use of household remedies and/or western health care, although a few opposed all medical treatment on the grounds that God cures diseases and solves problems. However, interviews showed that although these rules were strict in theory, they were often negotiable in practice and respondents described how they reconciled their religious beliefs with their medical needs. For example, a healer stated that during a dream he had made a personal agreement with God to continue his practice while remaining an active church member. A woman explained that her church had previously prohibited all use of indigenous medicine, but had since lifted the prohibition because there had been such an increase in diseases. Several respondents explained that if you broke church rules concerning the use of indigenous medicine, you were welcomed back after paying a small symbolic fine. This fine did not deter anyone, but allowed the local churches to uphold the rules.

The Treatment of Natural *Isifos*

Medicines prepared by villagers were made from a variety of plants, and only very rarely were parts of animals included, a common practice among healers. Sixteen of the 19 villagers interviewed collected and used plants to prepare medical remedies (*muthi*) mainly to treat natural *isifos*. Of all physical symptoms mentioned in the study 87% where due to natural causes, while the remaining 13% had spiritual or magical causes. As shown in Table 1, the list of physical symptoms due to natural *isifos* that could be treated at home was quite extensive, as was the knowledge of different remedies. The most common ailments were pains, colds and coughs, children's diseases, stomach problems and impureness. In the category "pains," backache was the most frequently mentioned, and diarrhoea was the most common among stomach problems. Outside wounds and *isilonda* (a wound or sore inside the spine treated from the anus) were also treated with household remedies. Ailments in children were usually treated at home, and the majority of the women knew how to cure one or more children *isifos*, while the four male respondents had no such knowledge. Health problems common in children included a running stomach, flu, constipation, stomachache, general weakness, and some ailments not easily translated into English. Six of the women knew at least one remedy for *umphezulu* (when a baby's feces contained green threads). The head nurse knew of this *isifo* and claimed it was always treated at home and never seen at the clinic. Other children's *isifos* usually treated with household remedies were *idlambi*, when a baby could not retain food, *ipuleti*, when a child developed sores around the neck and arms, and *mankabeni*, when a child had a sore in the navel. For other ailments the decision whether the first option would be household remedies or to consult the clinic or a healer varied.

Table 1 The type of conditions treated with household remedies, and generally described as due to natural causes

Ailment
Asthma
Bad appetite
Children's diseases
Colds and coughs
Fainting
Impureness
Isilonda (a wound or sore inside the spine)
Kidney problems
Outside wounds
Pains
Piles
Pregnancy and giving birth
Skin problems
Stomach problems
Other physical ailments

Source: The table includes data provided by the 16 ordinary people who used medicinal plants

Plant Species Used—in Relation to Symptoms, Remedies, and User Groups

The 16 villagers (of the 19 interviewed) who had knowledge about medicinal plants provided information on 96 different species. Two of these respondents acted as aides to their husband, a local healer, thus having more extensive knowledge and 29 of the species were mentioned by them only. It should be noted that only species named by

respondents were recorded, although some claimed to use additional plants but did not know their names. For the total group of 19 interviewed villagers the average known species was 12 (range 0–59), and seven (SE±5.4) for the 17 remaining when the healer's wives were excluded. If those three who claimed no knowledge of medicinal plants were also excluded, the average of species mentioned was eight (SE±4.8). For all these 'groups' the averages were higher if only women were included. Of the 96 plant species mentioned by villagers, 49 were collected for scientific identification. Twenty-eight species were identified at the Durban Herbarium, and 21 by comparing the Zulu name, growth form and properties with information in Pooley (1997, 1998). These 49 species belonged to 29 different plant families. Villagers made use of some exotic species, such as *Eucalyptus* spp. (gum tree) and *Psidium guajava* (*umgwava*). The former has been planted for commercial purposes in vast areas of KwaZulu-Natal, while the latter has become naturalised along the coast. In addition to these another four exotics were used. Four of the interviewed healers were asked to list all the species they used, and in addition to those mentioned by villagers a further 80 species were described, bringing the total of described medicinal plants to 176 (Trygger 2003).

Generally, a respondent made use of a certain species only for one specific ailment, but the same species was sometimes used by others to treat other ailments. For example, the shrub *Lippia javanica* (*umsuzwane*) was used by ten villagers and two healers, and between them it was used to treat headache, backache, flu in adults and children, kidney problems, fever and cough, as well as to make charms that "…promote bravery." The same or very similar symptoms were often treated with different species by different people, and it was also common for one person to know of several remedies—based on different plant species—for the same *isifo*. For example, a total of 35 different species were used to treat pains in various parts of the body, and one woman described four different remedies for the children's *isifo* called *umphezulu*. As explained by the wife of a healer, "There is never only one plant species that can be used to treat a certain disease. If you can't find one, you will look for another one." However, in some cases people stated that if they could not find a certain species growing wild they would buy it.

A few species were more generally associated with a specific symptom or problem and were used by several respondents for the same *isifo*. The shrub *Tetradenia riparia* (*ibozane*) was used by five people to treat coughs, while three people used the tree *Phoenix reclinata* (*isundu*) for aches and pain, and the shrub *Tephrosia kraussiana* (*ukhombokhulu*) was used by three people to treat children's diseases. However, of the plant species mentioned, most (119, i.e. 68%) were used by only one respondent, and

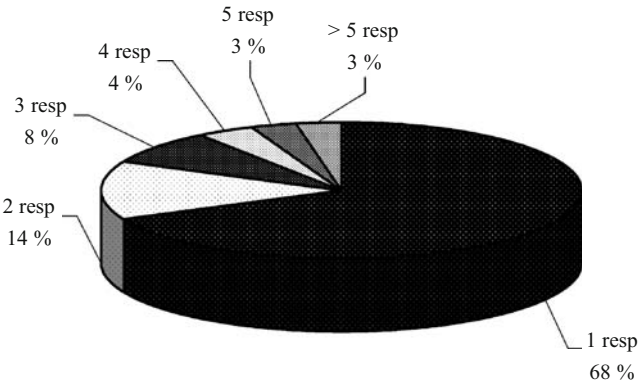

Fig. 2 Percentage of plant species that had one, two, three, four, five, and more than five users

only 3% of the species mentioned were used by more than five respondents (Fig. 2). This was surprising, especially since generally respondents had access to similar environments, habitats and species. Of the 57 species that were used by more than one person, 70% were used by both villagers and healers, although some were more commonly used by one of these groups. The species *Lippia javanica* (*umsuzwane*) was used by the highest number of respondents (12) and ten people used *Eucalyptus* spp. to treat headache, flu, cough and fever. The latter was one of the few species commonly used by villagers but not at all by the healers, as was the creeper *Krauseola mosambicina* (*isihlaza*) which was used by eight villagers.

Over 90% of the remedies described by villagers contained only one plant species. In some cases two species were combined, but seldom more. For example, four villagers said they mixed the strong smelling leaves of *Eucalyptus spp* (gum tree) and the shrub *Lippia javanica* (*umsuzwane*) to treat flu and headache. According to respondents lay people did not have the knowledge to mix more complex medicines, and *muthi* made of several species was stronger and should be administered by someone experienced. As described by the wife of a healer, "When [it consists of] a mix of different species, the medicine gets stronger. If someone is very ill, maybe he is not treated with the strongest medicine because he is too sick to handle it. Instead he is treated with a medium strong medicine. If someone is fit enough, he can be treated with the strongest medicine." This woman also stated that "…some species are stronger than other species." The strength of a medicine was a consideration when treating children, and a sick child could be treated with the same—but diluted—*muthi* used for adults. In other cases, especially for the treatment of babies, species not used for adults were administered, such as *Tephrosia kraussiana* (*ukhombokhulu*), and the tree *Kigelia africana* (*umvongothi*), which was used by four respondents to treat *umphezulu*. In other cases a species, e.g. the shrub

Lippia javanica, was used by some to treat children's diseases and by others for completely different symptoms in adults.

Growth Forms and Plant Parts Used

To further explore local knowledge of medicinal plants, and to get an indication of the sustainability of local use, information on growth forms (tree, shrub/woody herb, creeper/epiphyte, grass and water plant) and plant parts used was collected for 160 species. Trees and shrubs were the growth forms most commonly mentioned by both villagers and healers, although healers mentioned shrubs more than villagers (47% versus 34% of all growth forms). The opposite was true for trees, which constituted 38% of the growth forms mentioned by healers and 47% for villagers. Creepers were mentioned quite seldom (between 13% and 16%), grasses even less (between 2% and 3%), and only one respondent mentioned a water plant, the water lily (*Nymphea nouchali* or *uzeleba*). These percentages are based on categorizing all species mentioned by growth form as well as by user group, and thus does not show how frequently certain growth forms were used.

Respondents where asked what plant parts they harvested from the different species and this resulted in information on 322 instances of use (from 160 species). Table 2 and Fig. 3 show what parts were used for the remedies described in the study, but since information on how often specific remedies were administered was not included this only gives an idea of most frequent use. Plant parts used were divided into categories as shown in Table 2,

Table 2 Plant parts used by ordinary people and healers

Plant part used	Tree (%)	Shrub (%)	Creeper (%)	Grass (%)	Water plant (%)
Bark	30		3		
Underground parts	34	62	32	33	50
Leaves	21	22	20		50
Stem	2	1	16		
Branch	4	3	3		
Fruit	5	1			
Whole plant with underground parts		7	20	34	
Whole plant without underground parts		4			
Other	4		6	33	
Total	100	100	100	100	100

Source: The table includes data provided by 16 ordinary people and four indigenous healers. Parts used were noted for each species. Data on 322 plant parts (for 160 species) are shown by percentage for each growth form

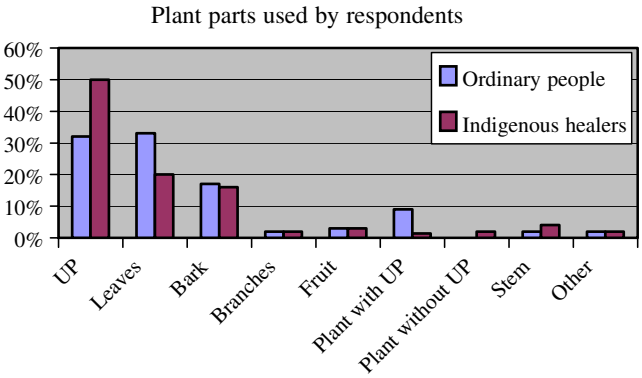

Fig. 3 The plant parts used by respondents. The graph shows what fraction of all plant parts used by ordinary people and indigenous healers, respectively, were under-ground parts (*UP*), leaves, bark, branches, fruit, whole plants (with and without underground parts), stems, and other parts

which illustrates distribution between growth forms. Roots, tubers and bulbs were all included in the category 'underground parts', while the category 'other' includes thorns, sap, flowers, and wood—which were used very seldom. For trees it was most common to use the roots, followed by bark and leaves. The use of shrubs involved the harvesting of roots to an even higher degree, followed by the use of the whole plant, and more occasionally only fruits or branches. For creepers the underground parts were used most frequently, followed by the leaves, the whole plant and stems. There were some significant differences between user groups in that it was more common for healers to use the underground parts of plants, while use of leaves was more common among villagers (Fig. 3).

Over 90% of all remedies described by villagers contained only one part of a plant, e.g. roots or leaves, while in a few cases different parts of one species were combined in the same remedy. For example ground leaves and thorns of the tree *Azima tetracantha* (*ingungumela*) were mixed to promote vomiting in children; the leaves and twigs of the shrub *Lippia javanica* (*umsuzwane*) were mixed to treat flu in children, while the roots and twigs were mixed to cure headache. In some cases different parts of one species may be used for different ailments, although people generally used a certain species only for one type of ailment. One woman used the leaves of the small tree *Gymnosporia heterophylla* (*isihlangwe*) to treat a running stomach, and the roots to treat *izinkulumo* (i.e. an *isifo* inflicted by the ancestors to punish a family member for causing dissent in the household). In the few cases where several villagers mentioned the same species they usually made use of the same part. Ten people used the gum tree (*Eucalyptus* spp.), and they all used only the leaves. The five people who mentioned the tree *Syzygium cordatum* (*umdoni*) all used

only the bark. There were a few exceptions to this, for example three people said they used the small tree *Brachylaena discolour* (*iphahla*), but they all used different parts.

Availability of Medicinal Plants and Change in Abundance

The majority of species used were said to be locally common, "… [they] grow everywhere". The collection trips corroborated information from interviews, since respondents knew exactly where to find specific species and seldom had to walk far to find what they wanted. The plants were generally found either in the respondent's homestead or in the immediate surroundings, and of the 28 species collected for identification all but one grew within 400 m of the homestead. No botanical survey was undertaken, but familiarity with the study area and a superficial survey indicated that most species used were indeed common. Villagers claimed that with a few exceptions they could collect as much plant material as they needed all year round. They usually harvested only the amount needed for the moment and did not store medicinal plants for future use.

The vast majority of species mentioned by villagers were claimed to be collected within the communal area, and this was corroborated by evidence from field walks and descriptions of collection sites. There were exceptions, and according to the three respondents who used it, the shrub *impepho* (probably a *Helichrysum* sp.) could only be found within the protected area, and one woman bought it because it grew so far from her homestead. The two people who used the tree *Schotia brachypetala* (*uvovovo*) claimed it had always been scarce on the communal side of the Mkuze River, but common within the protected area. Lay people stated they seldom collected plants in the neighbouring protected areas, while healers did so more often. A reason for this was that species from far away were preferred to treat serious ailments because patients put more trust in species they did not recognise. Two of the healers had grown up inside the protected area, and although forced out in the 1970s they still knew where to find useful species there. None of the respondents showed any reluctance to discuss the harvesting of plants in the Wetland Park and those who said they sometimes did collect there displayed no fear of repercussions.

Among both villagers and healers it was common to cultivate one or more species because they could only be found far away, or were frequently used, or had to be fresh when used, or they were planted as protection against witchcraft. However, lack of local availability was often contradicted by other villagers. The cultivated species mentioned most often was *Tetradenia riparia* (*ibozane*), used by five villagers and one healer, and while two claimed it did not grow wild in the area, one said that it did. An *Aloe* species (*inhlaba*) was cultivated by two villagers and one healer, and one of them said it could not be found locally, while another claimed it grew in the communal area but was rare. Another cultivated species was the woody herb *Vernonia adoensis* (*inyathelo*). Two respondents said it could only be found in the protected area ("…it was planted there by my father before the forced removals"), while a third claimed it was common on communal land. Additional cultivated species were *Adenia gummifera* (*uphindamshaye*) said to grow in waterlogged places in the Wetland Park, and the protected species *Urginea delagoensis* (*umahlanganisa*) said to grow in dark clay soil in the Wetland Park and in communal areas north of Mnqobokazi. One woman said she cultivated *Kigelia africana* (*umvongothi*) because it could not be found in the communal area, although three other respondents collected it near their homes and described it as common.

Thus, opinions often differed concerning availability of certain species, as did perceptions concerning change in abundance. Some respondents had noticed a decline in a few species, but these statements were usually contradicted by others. Six people provided information on the shrub *Senecio serratuloides* (*unsukumbili*), and one said it had disappeared from communal land because of cattle grazing, while the others claimed it could still be found but disagreed about where and about how common it was. Three respondents said the shrub *Tephrosia kraussiana* (*ukhombokhulu*) had become scarcer, while a fourth had not noticed any change. Those who described a decline had different explanations—"People come to collect it to sell," "It disappeared when the land was cleared for the cultivation of cotton," and "It has been over-harvested by mothers who use it to treat their children." Four respondents commented on the abundance of the shrub *Gnidia capitata* (*isidikili*). Three said it was common on communal land, but one added, "…it is declining because people collect a lot," and the fourth said "… I have not seen it here for over nine years. It was used up by *uchitha* [vendors who sell muthi]."

Trade in medicinal plants has been shown to affect abundance of popular species in KwaZulu-Natal (Cunningham 1991; Mander 1998), but in Mnqobokazi this was not perceived as a problem. Only one of the respondents, a healer, was engaged in more large-scale commercial harvesting, and although none of the respondents could name anyone else who was, people were aware that it occurred. A healer explained that harvesting for sale was done by people without other sources of income, and he did not blame them since "…everybody has to make a living." People from neighbouring communities were known to collect plants in Mnqobokazi, but respondents did not regard this as a

problem. The interviewed conservation officer, who had worked in the Wetland Park for 5 months, claimed harvesting of medicinal plants was not a problem in this part of the protected area, whereas it was further north. His impression was that harvesting was not increasing in the study area, and he estimated that there were about ten people from Mnqobokazi—mainly women—who harvested plants on a commercial basis. They collected both from communal land and within the Wetland Park, and there were also some people from other areas who paid villagers to direct them to favoured species. The conservation officer was aware that local healers considered it their right to collect plants in the Wetland Park and seldom bothered to acquire a permit, but since they collected only small quantities the guards usually let them off with a warning. The one respondent who did engage in the urban trade was a *nyanga* who collected plants to sell in Durban and Johannesburg to support her family. She travelled to the city once a year and it took her a couple of months to sell her wares. She earned between 500 and 1,000R (ca. US$50–100) per trip, and the species differed depending on what was selling well. Respondents exclaimed that it was impossible to trade on a large scale within the community since people collected what they needed, but that small-scale bartering of plants and remedies occurred. Concerning potential involvement in the urban trade, respondents stated either that it entailed too much work, or that they may be interested if they got specific requests. Healers sometimes traded ingredients and recipes with other healers, partly for economic gain.

Transmission of Indigenous Medical Knowledge

Among the villagers interviewed, the women had more knowledge of indigenous medicine than the men. As a male respondent remarked, "The woman usually knows more species than the husband. Even if the husband knows [certain species], he will send his wife to collect the plants". Four of the six men interviewed had some knowledge of medicinal plants they used themselves, but on average the women knew of twice as many species as the men. It was the women who took care of sick family members, and it was only the women who knew how to treat ailments in children. Both boys and girls participated in the collection of plants and were allowed to be present when *muthi* was prepared and administered. However, as they grew older sons were often obliged to perform chores outside the homestead, such as herding cattle, while daughters spent more time at home in the company of women and had more opportunity to learn. Also, it was the women and older girls who took care of the sick children, and young women acquired much of their knowledge of plants and remedies after they had their first child. Respondents emphasised the importance of teaching the children about household remedies: "… [then they will] know what to do if they fall sick even if I pass away," "…some diseases can not be cured by the clinic," and, "…if the children learn about medicinal plants they do not have to depend on expensive professional treatments." In the group interview most of the 17 pupils said they knew some household remedies and that this was useful knowledge. However, a few older respondents expressed concern that the younger generation did not have time and/or interest to learn about medicinal plants due to their "…modern lifestyle," and because "… they have a lot of other things to do than to learn about the plants."

Knowledge was also shared with people outside the household, and women exchanged experiences about useful plants with neighbours and/or close friends. In general, healers were described as being reluctant to share knowledge with anyone—even a relative—who was not an apprentice. However, three villagers, one man and two women, had learnt medical knowledge from indigenous healers related to them by birth or marriage. The women were married to the same *nyanga* and explained that they were "…like the doctor's nurses. We watch and learn." They had knowledge of how to use animal parts and how to treat some serious health conditions, such as stroke, madness and *idliso* caused by black magic. Also, in the case of minor ailments a healer would sometimes tell a patient what species to collect and how to prepare the *muthi* needed. Healers received much of their knowledge from the ancestors through dreams, as did a few lay people. One man described how his grandmother communicated with her dead husband, a *nyanga*, who through her taught the respondent how to make medicines from snakes. A woman said she learnt about species from her ancestors, who told her exactly where to find them. She could not explain why a certain plant part was efficient for a certain ailment, she just knew.

Indigenous medical knowledge is dynamic and for various reasons established practices may be abandoned and species forgotten. An older woman said she used to know many species, but now that she was too old to collect plants, she used less and had forgotten much of her previous knowledge. Another woman said, "The knowledge about medicinal plants is important… [but] it is difficult to remember all species," and that therefore "…it is important that everybody helps each other to remember." A man described how as a child his mother had taught him the uses of many species, but now it was his wife who collected plants and treated the sick and so he had forgotten much. While knowledge was lost, new knowledge was acquired and applied because it was found useful due to, e.g. environmental changes and new health problems. Some species used by respondents were exotics and *Eucalyptus* spp. had become one of the most commonly used medicinal plants.

Discussion

Knowledge and Use of Medicinal Plants

Although the number of respondents was small and information was gathered only in one community, an impressive number of medicinal plants was recorded, indicating the extent of local knowledge and the importance of this resource. The 14 villagers who had some knowledge of medicinal plants, and were not related to a healer provided information on 67 species, and when data from four indigenous healers and their spouses were added the number rose to 176. Here, as also noted in other studies, the numbers are most likely understated, partly because healers are unlikely to share all their knowledge and partly because households used different species. To compare the present findings with other studies is not straightforward since objectives, area covered, and sample sizes differ, and because most studies are not clear whether information was obtained from a healer or a lay person. Bhat and Jacobs (1995) recorded 26 species in a study from rural Transkei. Research on child care in the same region mentions 53 species (Tyiso and Bhat 1998), while a study from Eastern Cape recorded 38 species used specifically to treat wounds (Grierson and Afolayan 1999). Hutchings (1989) is one of the few that differentiates between respondent groups and she describes the use of 26 species, of which ten were mentioned by villagers. Rothwell's study (1998) is the one most similar to the present research, and she recorded 78 species from a mixed group of villagers and healers. The numbers presented in these studies only include species scientifically identified, while numbers recorded from Mnqobokazi include all species described and named. However, the notable difference in numbers adds strength to the view put forward by Dold and Cocks (2000: 468): "Almost no recognition has been given to the non-specialist healer. Villagers growing up in rural communities learn to recognize and use medicinal plants out of necessity." Tyiso and Bhat (1998: 97) state that in their sample knowledge of plants and recipes was "limited to a number of families," whereas in the present study most households had some knowledge of indigenous treatments.

With a few exceptions, studies on indigenous medicine in South Africa view ordinary people primarily as consumers of medical care, rather than active agents. This perception is reinforced through reference to historical studies that describe indigenous medicine as a specialist activity practiced by herbalists and diviners (Cunningham 1988a; Botha *et al*. 2007). Instead, as shown in the present study, the knowledge and practices of laymen are central to local health care. Although this has been largely ignored in research specifically on indigenous medicine, it has been recognised in research on the overall use and value of natural resources in rural South Africa. Recent studies have provided quantitative evidence from several provinces that corroborates the data from Mnqobokazi concerning how important access to medicinal plants for home consumption is to villagers (Dovie *et al*. 2002; Twine *et al*. 2003; Shackleton and Shackleton 2004). In KwaJobe, a community neighbouring Mnqobokazi, Shackleton *et al*. (2002) found that all households randomly surveyed collected medicinal plants. This was a higher proportion than found elsewhere and explained by "…the remoteness and relatively underdeveloped nature of KwaJobe and the reasonably good access to and availability of [resources]" (ibid.: 136).

It has been stated that indigenous medicine is highly species-specific (Cunningham 1991), and that the use of substitute species indicates that the preferred species has become scarce due to overexploitation (Cunningham 1988b; Mander 1998), a conclusion quoted in subsequent studies (Botha *et al*. 2007). However, Hutchings (1989: 228) notes that "usage of related groups of plants for similar ailments is recorded in the literature" and also provides several own examples. Data from Mnqobokazi showed that many different species were used for the same ailments, and that these often belonged to different plant families. Indigenous healers in Mnqobokazi said that treatment of some *isifos* required specific species, while everyday ailments could equally well be treated with several different ones. Our study showed that the use of plant species depended not only on knowledge, medical effectiveness and general availability, but also on relative ease of access. Rothwell (1998: 85) observed that villagers "…seem to know a bit about the plants found in their immediate surroundings… [although they only] make use of a few of them." The present study found that people collected the majority of plants they use close to the homestead, knew a great deal about the plants in their surroundings, and used this knowledge extensively and flexibly. When a desired species was not found relatively quickly a substitute- or alternative-species growing within easy access would often be used instead, and respondents described a few different species considered effective for the same symptom or ailment. This is one example of how indigenous knowledge is intrinsically linked to the lived reality, i.e. familiarity with many medicinal plants is a strength in the continuous negotiation on how to divide available time among different livelihood needs. When an alternative species was not available, people would buy or cultivate what was needed. Thus, indigenous medicine involves *both* treatments that are species-specific and those that are not, and substitute species should here rather be termed 'alternative species' and not assumed to indicate a general decline of a presumed 'preferred' species.

Among villagers in Mnqobokazi, knowledge and use of medicinal plants was greater for women than men. Other studies have concluded that it is the old women who have the most knowledge of plants and household remedies (Rothwell 1998; Dold and Cocks 2000), while some simply assumed this and only targeted the elderly in their interviews (Bhat and Jacobs 1995; Tyiso and Bhat 1998). In Mnqobokazi it was the middle-aged women who were the most knowledgeable, while several of the more elderly claimed to have forgotten previously held knowledge. The youths interviewed knew of some species and remedies, were generally positive about the use of indigenous medicine and described it as important for personal well-being. Dold and Cocks (2000) also document that children and youths had first-hand knowledge about medicinal plants and remedies. Adults in Rothwell's (1998) study claimed that the young were rejecting traditional medicine in favour of western alternatives, while in Mnqobokazi parents and grandparents were more concerned that youth today had less time to learn about indigenous medicine and therefore would become less self-reliant. Knowledge is transferred within and between generations, and indigenous medical knowledge is found among a large portion of the rural population. The dynamic nature of indigenous knowledge is widely recognised, e.g. through the incorporation of exotic species, remedies, substances and even ritualistic behaviour from other cultures into the 'indigenous' (Cocks and Dold 2000; Dold and Cocks 2000). Most studies describe the adaptable nature of the collective, but it is important also to understand how knowledge, practices and strategies change at an individual level. Knowledge is shared among households, and 'old' knowledge will be new to someone else.

Abundance, Change and Sustainability

The results indicate that the majority of species used by villagers in Mnqobokazi were locally common and could be found all year round. However, descriptions of availability were at times contradictory. For example, claims that a specific species could only be found in the neighbouring protected area were refuted by others stating it was common on communal lands. Only for a few species had a change in abundance been observed by some respondents—and then always a decline—while others described the same species as common. Such contradictions are not surprising and are explained by two important aspects of local knowledge of natural resources. First, people generally use what is reasonably easy to access, since time spent on one resource reduces time needed for other—equally important—necessities of life (Dahlberg 2005). Second, it is often assumed that rural people are experts on resources over vast areas, whereas in reality they usually possess detailed knowledge only of those parts of a landscape they routinely access and use (Dahlberg and Blaikie 1999; Neumann 2005). Perceptions of availability and change reflect how people move in the landscape, and information claimed to be generally applicable for a wider area cannot be treated as facts. A decline in certain species may have occurred at a larger scale, and most likely had in specific locales, and a botanical survey would be a relevant complement to the present study. However, the information that most species used today were those that respondents had learned of as children lends strength to other indications of relatively low levels of change in abundance.

Studies of medicinal plant material traded in the province of KwaZulu-Natal have concluded that the magnitude of harvested material poses a threat to certain species (Cunningham 1988b; Mander 1998). In some areas, popular species were no longer available on communal lands, and instead were collected from private farms and protected areas. Unsustainable exploitation is serious, but it is important to be aware that practices differ between localities. Respondents in a study from Eastern Cape had not observed a decline in abundance, and none of the species they mentioned were found on lists of threatened species (Matsiliza and Barker 2001), as was also the case in the present study apart from one species cultivated by a healer. Most of the species used in the study area that were scientifically identified (43 of 49) were commonly traded in South Africa (Diederichs 2001), and were thus popular in Mnqobokazi as well as elsewhere. In spite of this people could still easily find most species in the quantities they needed. Considering the high biodiversity of the area, the level of poverty in Mnqobokazi, and the relatively easy access to the indigenous medicine market in Durban, it was surprising that so little evidence of commercial harvesting was found. Only one of the respondents was involved in the urban trade, and none knew of anyone else who harvested plants on a large scale. There was no reason to doubt respondents' honesty since such trade was not a sensitive issue. The conservation officer knew of some local women and healers who collected plants in the Wetland Park, but did not view this as a problem since amounts were small. Also, healers were aware of the value of using precautionary harvesting techniques, as also noted by Matsiliza and Barker (2001) for their study area. Villagers stated they hardly ever collected medicinal plants from the protected area, since they could find what they needed closer to home.

The sustainability of extraction depends partly on what growth forms and plant parts are collected (Cunningham 1988b). In Mnqobokazi trees and shrubs (or woody herbs) were most commonly used, followed by creepers, while grasses and water plants were hardly ever collected. This corresponds with what Rothwell (1998) found in Tugela

Valley, although there the use of trees was even more prevalent. Concerning plant parts used, our results partly conform to those reported by Rothwell (1998: 82) and Mander (1998: Fig 5.3). It should be noted that the latter study uses data collected from urban markets. In the three studies underground parts were the most commonly used (>50% of all parts), while differences were found for other plant parts. Mander (1998) reports a higher use of bark as compared to our study, ca. 30% as compared to ca. 15%, while the use of leaves and stems was much higher in our study, ca. 25% as compared to 9% in Mander (1998). The figures from Mnqobokazi above refer to the combined use by healers and villagers. However, one interesting difference between the two groups was that healers used more underground parts while villagers used more leaves. One reason for this could be that different parts of a plant result in *muthi* of different strength, as has been described by Rothwell (1998: 82): "…the powers of medicinal plants increase in strength, from its leaves down to its roots…," and that stronger medicines are more commonly used by healers. In their study on plants used to treat wounds, Grierson and Afolayan (1999) found that leaves were used most frequently (68%), followed by bark (19%) and underground parts (13%). Since wounds were often treated with household remedies, these results can be linked to the relatively high use of leaves by households in Mnqobokazi. The harvesting of roots and bark generally has the most negative effect on plant populations, although this varies depending on species and technique used. It is therefore worrying that indigenous health care depends on these parts to such a large extent (Mander 1998; Cunningham 2001). However, it is important to note that lay people seem to collect less of the ecologically sensitive parts as compared to healers and commercial dealers.

In discussions about risks of overexploitation and the need for conservation measures it is vital to keep the use and needs of rural households in mind. Access to natural resources, including medicinal plants, is essential to sustain rural livelihoods in South Africa, especially of the poor and vulnerable (Shackleton and Shackleton 2004). Reduced access would also result in loss of knowledge and a depletion of cultural values. Studies have furthermore shown that the use of medicinal plants may act to protect plant populations since people maintain a recognition of their value (Brown 1995, Srivastava *et al.* 1996). Studying medicinal plant use in Ghana, Brown (1995) concluded that the knowledge and practices of rural communities should be used as an asset when developing strategies to enhance sustainable use of resources. Also, in South Africa, it has been argued that government policies should focus on ensuring the sustainable use of natural resources through the development of appropriate management strategies (Shackleton *et al.* 2002). Thus, there are numerous reasons for flexible and varied measures to maintain sustainable plant populations, where use and development at times may be a better solution than strict conservation. This has also been stressed in synthesis analysis on connections between local resource use, indigenous knowledge, governance and conservation (Berkes and Turner 2006), where it is further argued that multilevel governance systems are better suited than top-down structures to foster flexibility, adaptability and learning.

Health Care Options and Strategies

It has been stated that an important reason for the high use of indigenous medicine in rural areas is the lack of available Western health care (Mander 1998; Cunningham 1988a). However, even in urban areas where western health care is more accessible indigenous medicine is still extensively used (Matsiliza and Barker 2001). Tyiso and Bhat (1998) and Cunningham (1989) suggest that formal education significantly reduces the use of indigenous health care, while other studies have found no such link (Marshall 1998; Cocks and Dold 2000). Tyiso and Bhat (1998) describe a preference for indigenous medicine among the elderly as compared to younger age groups, but no such differentiation was found in Mnqobokazi. Here, choice of health care did not depend primarily on such socioeconomic factors as education, wealth, age and gender, as also concluded by others (cf. Marshall 1998; Mander 1998; Cocks and Dold 2000; Cocks and Møller 2002). Instead, respondents in Mnqobokazi revealed a positive attitude, and a practical reliance on *all* existing health care options. The indigenous and western health care systems worked side by side—although distinctly separate. No evidence of official effort to improve cooperation between them was found, although it should be noted that the attitude of the professionals—nurses and indigenous healers—was one of mutual respect. Government strategies to improve cooperation would thus quite possibly be welcomed, and that such efforts are urgently needed has been described elsewhere (Cocks and Dold 2000; Taylor *et al.* 2001; El Ansari *et al.* 2002).

Common ailments were often treated with household remedies as a first choice, as recorded also by Hutchings (1989), and respondents claimed these were effective. Cocks and Dold (2000) concluded that self-medication with indigenous medicines was much more prevalent in urban areas than previously described. They found that household remedies were not only used for ailments with natural causes, but also for problems considered to have magical or spiritual linkages, as we did also. If household remedies did not work, people would seek advice either at the clinic or from an indigenous healer. For problems thought to be caused by the ancestors (spiritual) the help of a *sangoma* would be sought, whereas a *nyanga* could deal

with magical causes. This sequence of decisions on how to act describes the general tendency. However, exceptions were numerous, and the most important 'pattern' found was that people made decisions based on their common sense. When faced with a health problem people would make use of their overall knowledge and experience in relation to their particular livelihood situation, and the health care option considered most optimal was chosen. Thus, strategies differ for individuals, households, the health problem faced, prior experiences and between unique situations in place and time. Studies from urban areas hint at similar patterns—as well as variations—in how people make decisions to solve health problems (Cocks and Dold 2000; Cocks and Møller 2002).

Concluding Remarks

Access to medicinal plants as a locally occurring natural resource, is here shown to be important for the livelihoods of rural households. In South Africa, and in the province of KwaZulu-Natal specifically, unsustainable harvesting of medicinal plants has been described as a threat to biodiversity values. However, regulations that place restrictions on access to areas or species may cause unnecessary hardships to more vulnerable groups. It is important to recognise that extraction may vary between areas, and that harvesting by local people is likely to be less detrimental than that done by outsiders aiming for commercial gain. Household strategies are varied, flexible and adaptable, and people make use of several health care options. The development of policies to improve cooperation between the western and indigenous health care sectors are definitely needed, and should include further studies on why and how people utilise different avenues to maintain good health. Knowledge of medicinal plants was transmitted to the younger generation, but changes in lifestyle mean that knowledge may gradually be lost. In the dynamic transformation of indigenous knowledge some is always lost as new is added. However, it is important to explore whether local knowledge of medicinal plants is diminishing—and if so what the causes and consequences might be.

Acknowledgements The research was made possible through funding by the Swedish Agency for International Development Cooperation/The Department for Research Cooperation (Sida/SAREC), the Swedish Research Council, SSAG, and Geografiska Förbundet. We wish to thank the people of Mnqobokazi who welcomed us, and who generously shared their time and knowledge with us. We are especially grateful to Samuel Ngwane, who sadly passed away in June 2008. We want to thank Pilisiwe Nhlenyama, Fish Nhlenyama and Shinga Mthethwa for their help and enthusiasm. We are also indebted to Wille Östberg, Charlie Shackleton and two anonymous reviewers for insightful comments on earlier versions of the paper. The interpretation of facts and views expressed in this paper are those of the authors alone.

References

Andrén, H. (2001). Wetland resources in the rainbow nation—a pot of gold or a lot of problems? Masters thesis, Department of Human Geography, Stockholm University.

Bhat, R. B., and Jacobs, T. V. (1995). Traditional Herbal Medicine in Transkei. Journal of Ethnopharmacology 48: 7–12.

Berkes, F., and Turner, N. J. (2006). Knowledge, Learning and the Evolution of Conservation Practice for Socio-Ecological System Resilience. Human Ecology 34(4): 479–494.

Botha, J., Witkowski, E. D. T. F., and Shackleton, C. M. (2007). Factors Influencing Prices of Medicinal Plants Traded in the Lowveld, South Africa. International Journal of Sustainable Development and World Ecology 14(5): 450–469.

Brown, K. (1995). Medicinal plants, indigenous medicine and conservation of biodiversity in Ghana. In Swanson, T. (ed.), Intellectual Property Rights and Biodiversity Conservation. an Interdisciplinary Analysis of the Values of Medicinal Plants. Cambridge University Press, Cambridge, pp. 201–231.

Bryant, A. T. (1929). Olden Times in Zululand and Natal: Containing Earlier Political History of the Eastern-Nguni Clans. Longmans, Green & Co., London.

Campbell, B. M. S., and Luckert, M. K. (eds.) (2002). Uncovering the Hidden Harvest: Valuation Methods for Woodland and Forest Resources. Earthscan, London.

Cocks, M., and Dold, A. (2000). The Role of 'African Chemists' in the Health Care System of the Eastern Cape Province of South Africa. Social Science & Medicine 51: 1505–1515.

Cocks, M., and Møller, V. (2002). Use of Indigenous and Indigenised Medicines to Enhance Personal Well-Being: A South African Case Study. Social Science and Medicine 54: 387–397.

Cunningham, A. (1988a). Over-Exploitation of Medicinal Plants in Natal/Kwazulu: Root Causes. Veld & Flora 74: 85–87.

Cunningham, A. (1988b). An investigation of the herbal medicine trade in Natal/KwaZulu. Investigational Report No 29. Institute of Natural Resources, University of Natal, Pietermaritzburg.

Cunningham, A. (1989). Herbal Medicine Trade. A Hidden Economy. Indicator SA 6: 51–54.

Cunningham, A. (1991). The herbal medicine trade: resource depletion and environmental management for a "hidden economy". In Preston-Whyte, E., and Rogerson, C. (eds.), South Africa's Informal Economy. Oxford University Press, Cape Town, pp. 196–206.

Cunningham, A. B. (2001). Applied Ethnobotany. People, Wild Plant Use and Conservation. Earthscan Publications, London.

Dahlberg, A. C. (2005). Local Resource Use, Nature Conservation and Tourism in Mkuze Wetlands, South Africa: A Complex Weave of Dependence and Conflict. Danish Journal of Geography 105(1): 43–55.

Dahlberg, A. C., and Blaikie, P. M. (1999). Changes in Landscape or in Interpretation? Reflections Based on the Environmental and Socioeconomic History of a Village in NE Botswana. Environment and History 5(2): 127–174.

Dahlberg, A. C., Ellery, W., Garland, G., Neal, M., Barnes, K., Koaleli, M., and Schoultz, A. (1999). Multidisciplinary Environmental Research Done in the Mkuze Wetland, Maputaland. South African Wetlands 10: 20–22.

Dauskardt, R. (1991). 'Urban herbalism': the restructuring of informal survival in Johannesburg. In Preston-Whyte, E., and Rogerson, C. (eds.), South Africa's Informal Economy. Oxford University Press, Cape Town.

Diederichs, N. (2001). Dictionary of Popularly Traded Plants in South Africa. Institute of Natural Resources, Scottsville.

Dold, A. P., and Cocks, M. L. (2000). The Medicinal Use of Some Weeds, Problem and Alien Plants in the Grahamstown and

Peddie Districts of the Eastern Cape, South Africa. South African Journal of Science 96: 467–473.
Dovie, D. B. K., Shackleton, C. M., and Witkowski, E. T. F. (2002). Direct-Use Values of Woodland Resources Consumed and Traded in a South African Village. International Journal of Sustainable Development and World Ecology 9: 269–283.
El Ansari, W., Philips, C. J., and Zwi, A. B. (2002). Narrowing the Gap Between Academic Professional Wisdom and Community Lay Knowledge: Perceptions from Partnerships. Public Health 116: 151–159.
Ellery, W. N., Dahlberg, A. C., Strydom, R., Neal, M. J., and Jackson, J. (2003). Diversion of Water Flow from a Floodplain Wetland Stream: An Analysis of Geomorphological Setting and Hydrological and Ecological Consequences. Journal of Environmental Management 68: 51–71.
Grenier, L. (1998). Working with Indigenous Knowledge. International Development Research Centre, Ottawa.
Grierson, D. S., and Afolayan, A. J. (1999). An Ethnobotanical Study of Plants Used for the Treatment of Wounds in the Eastern Cape, South Africa. Journal of Ethnopharmacology 67: 327–332.
Hutchings, A. (1989). Observations on Plant Usage in Xhosa and Zulu Medicine. Bothalia 19(2): 225–235.
Hutchings, A., Scott, A. H., Lewis, G., and Cunningham, A. B. (1996). Zulu Medicinal Plants. An Inventory. University of Natal Press, Pietermaritzburg.
Joubert, P. H., Sebata, P. D. B., and van Reenen, O. R. (1984). Self-Medication in a Developing Community. South African Medical Journal 65: 129–131.
Koziell, I., and Saunders, J., (eds.) (2001). Living of Biodiversity: Exploring Livelihoods and Biodiversity. IIED, London.
Mander, M. (1998). Marketing of indigenous medicinal plants in South Africa. A case study in KwaZulu-Natal. Report, FAO.
Marshall, N. T. (1998). Searching for a Cure: Conservation of Medicinal Wildlife Resources in East and Southern Africa. TRAFFIC International, Cambridge, UK.
Matsiliza, B., and Barker, N. P. (2001). A Preliminary Survey of Plants Used in Traditional Medicine in the Grahamstown Area. South African Journal of Botany 67: 177–182.
McIntosh, I. (2002). Defining Oneself, and Being Defined as, Indigenous. Anthropology Today 18(3): 23–25.
McNeely, J. (1992). Nature and Culture: Conservation Needs Them Both. Nature & Resources 28: 37–43.
Neumann, R. P. (2005). Making Political Ecology. Hodder Education, London.
Ngubane, H. (1977). Body and Mind in Zulu Medicine. Academic, London.
Ngwane, A., and Hirschowitz, R. (1998). Living in KwaZulu-Natal. Selected findings of the 1995 October household report. Publication, Central Statistics, Pretoria.
Pooley, E. (1997). The Complete Field Guide to Trees of Natal, Zululand & Transkei. Natal Flora Publications Trust, Durban.
Pooley, E. (1998). A Field Guide to Wild Flowers. KawZulu-Natal and the Eastern Region. Natal Flora Publications Trust, Durban.
Rothwell, A. F. (1998). The role of indigenous knowledge in sustainable development—a case study of medicinal plant use in the upper Tugela valley. Masters thesis, Department of Geographical and Environmental Sciences, University of Natal, Durban.
Shackleton, C. M., and Shackleton, S. E. (2004). Use of woodland resources for direct householc provisioning. In Lawes, M. J., Eeley, H. A. C., Shackleton, C. M., and Geach, B. G. S. (eds.), Indigenous Forests and Woodlands in South Africa. Policy, People and Practice. University of KwaZulu-Natal Press, Scottsville, pp. 195–225.
Shackleton, S. E., Shackleton, C. M., Netshiluvhi, T. R., Geach, B. S., Ballance, A., and Fairbanks, D. H. K. (2002). Use Patterns and Value of Savanna Resources in Three Rural Villages in South Africa. Economic Botany 56(2): 130–146.
Sillitoe, P., and Bicker, A. (2004). Introduction. Hunting for theory, gathering ideology. In Bicker, A., Sillitoe, P., and Pottier, J. (eds.), Development and Local Knowledge. New Approaches to Issues in Natural Resource Management, Conservation and Agriculture. Routledge, London, pp. 1–18.
South Africa HIV & AIDS Statistics (2007). Online http://www.avert.org/safricastats.htm.
Srivastava, J., Lambert, J., and Vietmeyer, N. (1996). Medicinal plants. An expanding role in development. World Bank Technical Paper No 320, Washington.
Statistics South Africa (1996). Census data for 1996. Government of South Africa. Online: http://www.statssa.gov.za/ (Publication date: 1 June 1998).
Statistics South Africa (2001). Census data for 2001. Government of South Africa. Online: http://www.statssa.gov.za/ (Publication date:2 June 2003).
Taylor, J. L. S., Rabe, T., McGaw, L. J., Jäger, A. K., and van Staden, J. (2001). Towards the Scientific Validation of Traditional Medicinal Plants. Plant Growth Regulation 34: 23–37.
Trygger, S. (2003). Local extraction and use of medicinal plants. A case study from Mkuze Wetlands, South Africa. SLU Communications, Minor Field Studies No 257, Swedish University of Agricultural Sciences, Uppsala.
Twine, W., Moshe, D., Netshiluvhi, T., and Siphugu, V. (2003). Consumption and Direct-Use Values of Savanna Bio-Resources Used by Rural Households in Mametja, a Semi-Arid Area of Limpopo Province, South Africa. South African Journal of Science 99: 467–473.
Tyiso, S., and Bhat, R. B. (1998). Medicinal Plants Used for Child Welfare in the Transkei Region Of the Eastern Cape (South Africa). Journal of Applied Botany 72: 92–98.
van Wyk, B.-E., and Gericke, N. (2000). People's Plants. A Guide to Useful Plants of Southern Africa. Briza, Pretoria.
WHO (2002). Traditional Medicine Strategy 2002–2005, World Health Organization, WHO/EDM/TRM/2002.1, Geneva, p 7.