



## ISIHLAMBEZO: UTILIZATION PATTERNS AND POTENTIAL HEALTH EFFECTS OF PREGNANCY-RELATED TRADITIONAL HERBAL MEDICINE

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**Abstract**—*Isihlambezo* is a herbal decoction used by many Zulu women in South Africa as a preventative health tonic during pregnancy. Though the practice is cited by ethnographers and medical practitioners, few studies have focused on specific elements of *isihlambezo* use and preparation. Moreover, though some evidence exists suggesting negative effects of its ingestion, the maternal–fetal health impact and toxicity of *isihlambezo* have not been adequately studied. We examined two aspects of this traditional antenatal health practice: (1) the potential impact of urbanization and access to Western clinic-based care on popularity and utilization patterns of *isihlambezo*, and (2) the potential maternal–fetal health effects of its use. Interviews were conducted among rural and urban women in clinic and non-clinic settings regarding socio-behavioral aspects of *isihlambezo* use. The pharmacology of certain plant ingredients of *isihlambezo* was investigated through laboratory assays, literature review, and interviews with traditional healers. There were significant differences by area of interview in nearly all aspects of *isihlambezo* use examined. Though *isihlambezo* was most popular among urbanites and clinic non-attenders, it was considered an important antenatal health care alternative by the majority of women surveyed. Mixing traditional and clinic-based antenatal care was also strongly advocated. Pharmacological analysis suggested the possibility of both therapeutic and harmful consequences of *isihlambezo*. It was suggested that the following factors might contribute the popularity of *isihlambezo* among urban women: high cost and inferior quality of clinic care, use of *isihlambezo* as a means of adapting to urbanization-related stress, and socio-cultural transition. © 1997 Elsevier Science Ltd. All rights reserved

**Key words**—herbal medicine, maternal–fetal health, pregnancy, South Africa

### INTRODUCTION

The traditional use of pregnancy-related herbal medicines has been chronicled throughout the world—in Australia [1, 2], China and Japan [3], India [4], Melanesia [5], Hawaii [6], North America [7–9] and South America [10]. In the U.S. and Europe, there is recently renewed interest in the therapeutic properties of herbal remedies used as alternatives to biomedical care during pregnancy and childbirth [11–14].

Information regarding herbal remedies used during pregnancy has been documented in a number of sub-Saharan countries in Africa. In Nigeria, Okonofua *et al.* [15] investigated the potential connection between tetanus during pregnancy and the use of vaginal herbs. Familusi and Dawodu [16] examined the prevalence of neonatal jaundice among households using traditional herbal medicine in Ibadan, Nigeria. A higher rate of severe jaundice was revealed among those families using various types of herbal remedies for infants than those not engaging in such practices. However, the differences were not significant.

Mbura *et al.* [17] surveyed pregnancy-related herbal medicine use among rural and urban antenatal clinic attenders in Tanzania. More urbanites (43.4%) than rural women (40.2%) used herbal medicines while pregnant. The most often cited reasons for use of herbal medicines were protection from evil spirits, as an alternative to failed modern treatment, and belief that herbal remedies were more effective than Western antenatal care.

Chhabra and Mahunnah [18] conducted a survey of medicinal plants used by the Hayas of Tanzania's Kagera region. Many plants used pertained to fertility-related complaints and neonatal ailments. Pharmacological analysis revealed active therapeutic components of most plants studied. Other work focused on herbal medicine use during pregnancy and childbirth has been conducted in Ghana [19], Sierra Leone [20], Zaire [7] and Zimbabwe [21, 22].

In South Africa, research focused specifically on pregnancy-related herbal medicines is scanty. It is briefly mentioned in certain ethnographies of the Zulu people [23–25]. Brindley [25] discusses herbal medicines used during pregnancy and labor in her

work on traditional Zulu birthing practices. Chalmers [26] surveys traditional pregnancy and childbirthing practices among several ethnic groups in South Africa. The impact of modernization and Westernization on such customs is also examined. Finally, Gumede [27] provides a brief review of traditional Zulu obstetrical practices, including a recipe for the pregnancy tonic *isihlambezo*.

Outside the social sciences, interest in traditional pregnancy-related herbal remedies comes from the disciplines of medicine, chemistry, pharmacology, and botany. A few short articles have been published in South African medical and health journals by physicians examining the potential maternal-fetal health risks of traditional herbal medicines [28–30]. The chemical properties and potential toxicity of certain plants known to be used during pregnancy have been examined. *Callilepis laureola* (common Zulu name *impila*) has received particular attention due to its extreme toxicity [31–34]. Such chemical studies focused upon *C. laureola* have resulted in its being banned by the KwaZulu-Natal Provincial Department of Health [35].

Veale *et al.* [36, 37] and Kaido *et al.* [38] have recently begun examining the pharmacological properties of indigenous plants common in traditional pregnancy-related remedies. Hutchings has produced several botanical inventories of medicinal plants among the Zulu, Xhosa, and Sotho [39–43]. Two of these [41, 42] specifically address the ethnomedical uses (including procreation) of toxic plants.

#### FOCUS

We studied traditional pregnancy-related herbal medicine use among the Zulu people of South Africa for three reasons. First, we sought to collect descriptive information on the preparation and prescription of a common antenatal medicine known in Zulu as *isihlambezo*. Although *isihlambezo* is often remarked upon in the literature concerning traditional antenatal practices of Zulu women, little is known about its actual production and administration.

Second, we examined the acceptability of traditional medicine\* as an alternative (or additional) form of antenatal care to biomedicine. We explored the potential impact of urbanization and access to Western clinic-based care on women's attitudes toward *isihlambezo* use. In discussing with rural and urban women their antenatal health care choices, we sought answers to the following questions: has traditional antenatal medicine lost popularity with urbanization, how effective do women find herbal

medicine in comparison with Western antenatal care, and are women willing to mix the two types of antenatal care regimens?

Finally, we concentrated on *isihlambezo* due to current debates in the South African health care community surrounding the maternal-fetal health effects of traditional herbal preparations. Traditional healers ascribe a number of maternal-fetal health benefits to *isihlambezo* [25–27]. Nonetheless, its use is routinely and even vehemently discouraged among South African health professionals [44–47]. Clinicians often implicate herbal remedies in pregnancy-related complications such as fetal meconium passage and reduced infant birth weight [28–30, 48]. Despite such claims, supporting data are inconclusive. No well-controlled studies have been undertaken to clarify this argument.

#### Relevance

Examination of the utilization patterns and health consequences of pregnancy-related traditional medicine is significant for diverse reasons. Such work is pertinent from a medical anthropology perspective. Examination of a health condition (in this case pregnancy) through the medicines used in its maintenance or treatment, the therapeutic value attached to those medicines, and even terminology connected with them is a window into the ideology of a culture. Ethnomedical studies are a powerful means toward a clearer understanding of both the medical system itself and the socio-cultural context within which it is contained [49–66].

An important focus of ethnomedical studies is the accommodation of indigenous (non-Western) therapeutic systems in societies characterized by urbanization and modernization. In this study, our concern was specifically health care decision-making by users or patients, rather than with the role of healers in this process.† There is certainly evidence to suggest that urbanization [74, 75, 79] and the presence of or access to biomedicine [53, 55, 76] do not forestall use of traditional medicine. Thus, the question arises as to how users make therapeutic choices.

One determinant of treatment type is the perceived etiology of a disorder [26, 50, 51, 53–55, 62–64, 78]. Often this takes the form of parallel utilization (picking and choosing on a case-by-case basis) of traditional and Western health care systems according to disease causation (see [53], pp. 215–16, for an exception).

Another means of reconciling differences between medical systems is through what can be referred to as “cultural reinterpretation” [57, 58]. In this process, newly introduced elements are interpreted and used according to pre-existing cultural rules. Regarding medical pluralism in Africa, cultural reinterpretation has been described in connection with reproductive health practices [58] and the use of Western medicines, pharmaceuticals, and other pro-

\*The terms “traditional medicine”, “herbal medicine”, and “herbal remedies” are used synonymously in this text.

†For references in this regard specific to the African context, the reader is referred to [26, 48, 53, 62, 64, 67–73].

ducts in traditional medical practices [57, 60, 66]. The potential health risks of such behaviors have also been addressed.

Other work has interpreted the persistence of traditional systems alongside Western medicine as adaptive mechanisms or stabilizing factors in the face of social change [74, 75]. In Latin America, Press describes traditional ("folk") medicine as open and flexible, and more accommodating of social mobility and change than Western medicine [74] (p. 72), a sentiment reiterated by Feierman [59] (p. 76). This is due in part to the notion that traditional medicine has a more holistic approach than biomedicine, emphasizing social and environmental factors in the etiology and treatment of illness and disease.

Particularly among newly urbanized individuals, utilization of traditional medicine in conjunction with biomedicine is seen as ameliorating the stress of acculturation, a means of maintaining group identity and cultural cohesion, and as an affordable health care alternative.\* In South Africa's urban townships, Longmore [75] and du Toit [79] echo this interpretation.

What becomes clear is that individuals' health care choices and perceptions of efficacy are strongly shaped by pragmatic, cost-benefit criteria [55, 78, 80, 81].† Inadequacies in either system can be overcome by what MacCormack refers to as "doctor shopping" [81] (p. 156) and Heap and Ramphela describe as "rational decisions appropriate to [dire economic] circumstances" [78] (p. 124). Finally, Anyinam [77] cautions that recent changes in traditional African therapeutic systems may have rendered them less efficacious than conventional ethnomedical wisdom suggests.

In keeping with a focus on medical pluralism and health care decision-making, traditional medicine must be examined for its potential health impact. If reason exists to be concerned regarding the negative effects of herbal remedies, both practitioners and users must be made aware of such risks. Alternatively, therapeutic aspects of such practices are also crucial to emphasize. Recent works by Etkin [82-87] and others [40, 41, 88-93] highlight the need for closer examination of the pharmacological and nutritional benefits of traditional plant-based medicines. Moreover, evidence supporting the positive aspects of traditional herbal medicines is a crucial step toward alleviating pervasive Western medical biases against their use.

These matters are especially relevant in the South African context. South Africa is in the midst of tre-

mendous cultural and demographic transition [94]. Traditional lifeways are undergoing rapid cultural adaptation to new—usually urban or peri-urban—environments [26, 78, 79, 95-99]. Rural-urban differences in antenatal practices can be interpreted as urbanization-related lifestyle changes, with the potential to influence the health status of a sizeable proportion of the country's inhabitants.

Ethnomedical studies are timely with regard to the current health care transition taking place in South Africa. The new government's National Health Plan places particular emphasis on improvement of Primary Health Care (PHC) services, reduction of maternal morbidity and mortality, and improvement of neonatal outcomes [100]. Thus, during this period of restructuring in health care provision, such information has potentially significant implications for the content, quality, and perhaps even the cost of antenatal PHC services in South Africa.

#### KWAZULU/NATAL, SOUTH AFRICA

KwaZulu/Natal is one of South Africa's nine provinces. It is situated in the eastern portion of the country, with an area of 91,481 km<sup>2</sup> and an extensive Indian Ocean coastline. It contains 21% of South Africa's population, or 8.5 million people [101]. Moreover, the entire population of the province lives on less than 10% of its land. KwaZulu/Natal's official urbanization level is 38%. If peri-urban squatter settlements are included, some estimates place this figure as high as 78% [101].

KwaZulu/Natal is the traditional home of the Zulu-speaking people of South Africa. Of the eleven languages with official status, Zulu is the most widespread; 21.6% of the country's population speak it [102]. This research was carried out among Zulu women and traditional healers in four areas of the province. We worked with women in two large, well-established townships of Durban, the major urban center in the province. The urban clinic-based section of the study was conducted in the main primary health care facility (the "poly-clinic") for one of the townships. Urban non-clinic interviews were undertaken among township women in their homes and at a large local marketplace.

We also undertook fieldwork in two rural areas. Our rural clinic-based surveys were carried out at a primary health care clinic 80 km south of Durban. The catchment for this facility includes rural, poverty-stricken areas of the province. The final research site was a small community, and its outlying areas were situated in the foothills of the southern Drakensberg Mountain range.

#### ISHLAMBEZO

The term *isihlambezo* (from the Zulu verb *ukuhlambeza*, to wash ceremonially for protection or to

\*See Anyinam [77] and Heap and Ramphela [78] for a differing perspective on the seeming cost-effectiveness of traditional medicine.

†See discussion of Barth's theory of social change with relation to health care decision-making in Warren [55] (p. 76).

Table 1. Frequently used herbal ingredients of *isihlambezo*<sup>a</sup>

Latin name	Zulu name
<i>Agapanthus africanus</i> (L.) Hoffmg.	ubani
<i>Asclepias fruticosa</i> L.	ishinga
<i>Callilepis laureola</i> L.	impila
<i>Clivia miniata</i> (Lindl.) Regel	umayimi
<i>Combretum erythrophyllum</i> <sup>b</sup> (Burch.) Sond.	umdubu
<i>Crinum</i> sp.	umduze
<i>Gunnera perpensa</i> L.	ugobo
<i>Pentstemon prunelloides</i> <sup>c</sup> (Klotzsch ex Eckl. and Zeyh.) Walp.	icishamlilo
<i>Rhoicissus tridentata</i> <sup>d</sup> (L.f.) Wild and Drum	isinwazi
<i>Scadoxus puniceus</i> (L.) Friis and Nordal	umphompho
<i>Typha capensis</i> <sup>e</sup> (Rohrb.) N.E. Br	ibhuma
<i>Vernonia neocorymbosa</i> Hilliard	uhlunguhlungu

<sup>a</sup>Sources: [27, 37 and 105].

<sup>b</sup>Elsewhere cited as *C. kraussii* [106].

<sup>c</sup>Elsewhere cited as *P. variabilis* Harv. [88].

<sup>d</sup>Subspecies *cuneifolia* (Eckl. & Zeyh.) N. R. Urton = *Cissus cuneifolia* Eckl. & Zeyh. [107].

<sup>e</sup>*T. latifolia* subspecies.

purify [103]) refers to various liquid herbal mixtures taken by Zulu women in order to promote a favorable course of pregnancy and facilitate quick uncomplicated labor. It is prescribed by traditional healers such as herbalists (*izangoma*), diviners (*izinyanga*), and faith healers (*imithandazo*) as a tonic to be drunk daily from mid-pregnancy until and including delivery [23–27, 29, 104].\* *Isihlambezo* is also occasionally prescribed as a vaginal douche during pregnancy.

Many plants are used as components of the *isihlambezo* decoction [37, 43]. There is considerable regional and individual variation regarding its ingredients [25, 27, 105]. Table 1 shows some of the more frequently cited plant constituents of *isihlambezo* in the literature on herbal medicine use in the KwaZulu–Natal region and their common Zulu names.

Additional materials occasionally added to *isihlambezo* include fish heads, lizard or snake skin [27, 108], dried hyrax urine [109],† mercury [111], and clay or sand [26].

\*It has been suggested (Hirst, pers. comm, 1996) that *isihlambezo* was originally a decoction of leaves and roots midwives massaged onto the pregnant woman's abdomen and lower back during labor to ease delivery. Preparation and prescription of *isihlambezo* were apparently the exclusive domain of midwives, until the practice was usurped by traditional healers in the mid to late 19th Century.

†The hyrax (*Heterohyrax*), or dassie, is a small rodent-like animal, native to Africa and extreme southwestern Asia [110].

‡We had difficulty obtaining information regarding the contents of *imbelekisane*, as it appears to be a medicine feared by healers and users due to its potency. However, several informants noted that a principal ingredient of the mixture is mercury.

There are several other distinct types of procreation-related herbal medicines. *Imbelekisane*, *inembe*, and *imbiza* are often discussed in relation to—and confused with—*isihlambezo* [24, 25, 27, 28, 88]. To clarify such misconceptions, these terms can be more clearly defined:

- (1) *imbelekisane*‡—a herbal medicine used in extreme cases of prolonged and difficult labor; administered as a drink or occasionally an enema;
- (2) *inembe*—a potent labor-inducing herbal mixture often used as an abortifacient. Frequently cited plant ingredients include *Triumfetta rhomboidea* (Jacq.) [88, 105], *Gunnera perpensa* L., *Rhoicissus tridentata* subsp. *cunefolia* and *Cyphostemma natalitium* (Szyzyl.) J.v.d. Merwe [43]. Several herbalist informants noted that they refuse to use *inembe* due to its potential toxicity; and
- (3) *imbiza*—a general term for a class of purgative medicines which effect internal cleansing [51, 66, 88]; administered as a drink, an emetic, or vaginal douche. It is often prescribed as a blood purifier, for chest complaints, scrofula, and for women's fertility problems [51, 66, 88, 107, 112]. *Imbiza* is said to facilitate pregnancy by preparing the uterus to accept a fetus. It is viewed by some healers as the first step in a cleansing process culminating with pregnancy and the prescription of *isihlambezo* [112]. Its ingredients and prescription are, however, distinct from *isihlambezo*.

**Toxicity and health impact of *isihlambezo*** The potential health impact and toxicity of *isihlambezo* and related herbal remedies have not been substantially investigated. Mitri *et al.* [29] found fetal meconium passage was more common in women who had recently taken *isihlambezo*. Meconium-stained amniotic fluid is associated with perinatal asphyxia and the meconium aspiration syndrome (MAS). MAS is a leading cause of morbidity and mortality in newborn infants [113–115]. Morris and Mdlalose [30] offer preliminary evidence suggesting a relationship between *isihlambezo* use and low birth weight.

Larsen *et al.* [28] tested an *imbelekisane* infusion used by Zulu traditional birth attendants to treat prolonged labor on isolated rat uterus, and found it caused uterine hypertonia. In the former Transkei region, ingestion of large quantities of *imbelekisane* has been implicated in several cases of unexplained fetal death resulting from premature labor [109]. Cunningham [106] and Hutchings [40–42] list several toxic plants used during pregnancy by the Zulu and Xhosa, of which four are known to have caused fatal human poisoning and eight are regarded as potentially dangerous. A number of these plants can be included in *isihlambezo* and *imbelekisane*. Their

use may have serious negative consequences to maternal–fetal health, as several are known to contain hepatotoxins [42], steroidal saponins, toxic alkaloids, and cardiac glycosides [39].

Similar cases of toxicity have been reported elsewhere in Africa. Bullough [116] analyzed the causes of maternal deaths in central Malawi during 1977. The toxic effect of herbal medicines was diagnosed in a significant number of cases. Mbura *et al.* [17] reported cases of ruptured uteri and hepato–renal failure due to herbal medicine use by pregnant women in Tanzania.

#### Aim and hypotheses

The aims of this research were to investigate differences in knowledge, attitudes and use patterns of *isihlambezo* among four groups of women: rural dwellers, urbanites, clinic attenders, and clinic non-attenders. The possible maternal–fetal health impact of *isihlambezo* ingestion was also examined from a pharmacological perspective. Three hypotheses were tested:

- (1) significant differences exist between rural and urban women in (1) the popularity and perceived importance of *isihlambezo* and (2) use patterns (mixing traditional and Western treatment regimes) surrounding *isihlambezo*;
- (2) significant differences exist between clinic and non-clinic-based women in (1) the popularity and perceived importance of *isihlambezo* and (2) use patterns surrounding *isihlambezo*; and
- (3) *isihlambezo* decoctions have properties potentially harmful to maternal–fetal well-being.

#### METHODOLOGY

A survey was undertaken during nine months' fieldwork in rural and urban areas of KwaZulu/Natal. Between December 1993 and August 1994, structured questionnaires and in-depth interviews were carried out with women and traditional healers.

A total of 218 structured questionnaires were administered to pregnant and non-pregnant women between the ages of 15 and 70 years. Parity ranged

from 0 to 11. Interview sessions took place in clinic and non-clinic settings in rural and urban areas.

Finally, structured open-ended interviews were conducted with 45 traditional healers (*izangoma*, *izinyanga*, *imithandazo*) in rural and urban locales. Voucher specimens of plants identified by healers as *isihlambezo* components were not collected. All work was conducted in Zulu through the aid of a female translator.

The pharmacology of certain *isihlambezo* components was investigated on isolated smooth muscle preparations [36, 38]. Individual plant samples were obtained from local healers and herbalist shops. Voucher specimens were not collected. Finally, a literature survey was conducted on the therapeutic uses of specific plants to clarify the possible rationale for their inclusion in *isihlambezo* decoctions.

#### RESULTS

##### Terminology

In the common usage of the term, nearly any medicine taken during pregnancy might be referred to as *isihlambezo*. For example, a number of herbalist shops ("Zulu chemists") in the Durban area stock a commercially bottled medicine called "ishlambeza", advertised as ensuring a healthy course of pregnancy. The components of this mixture are vitamin B12 and iron supplements. In the rural clinic where a portion of this research was undertaken, nurses often referred to antenatal iron supplements as *isihlambezo*.

##### Therapeutic indications

*Isihlambezo* was said to confer numerous beneficial effects on both mother and fetus. The diverse reasons provided by women for its use are listed in Table 2. The most often cited reasons for *isihlambezo* use were that it provided for quick and painless delivery, drained excess body water (edema), reduced vaginal discharge or wetness, reduced placental size, and provided spiritual cleansing or protection from evil forces.

Table 2. Therapeutic indications of *isihlambezo* use

Maternal impact	Fetal impact	Labor and post-partum impact
General maternal health	Reduction of placenta size <sup>a</sup>	Facilitation of quick & painless delivery
Relief of edema <sup>a</sup>	Stimulation of fetal growth & movement	Hastening of prolonged labor
Relief of vaginal wetness <sup>ab</sup>	Loosening of fetus from uterine wall	Prevention of breech presentation
Prevention of backache	Prevention of miscarriage	Prevention of Caesarian delivery
Cleans womb/stomach	Prevention of premature delivery	Decreased vernix at delivery
Prevention of STDs		Decreased liquor at delivery
Relief of constipation		Prevention of post-partum healing
Spiritual cleansing <sup>a</sup>		

Note: List based on 218 questionnaire responses.

<sup>a</sup>Most often cited therapeutic indications of *isihlambezo* use.

<sup>b</sup>Vaginal mucus secretion is considered an indicator of internal bodily dirt and a sign of female promiscuity.

Preparation and prescription

*Isihlambezo* was generally prepared by boiling the plant materials in water for approximately 30–40 minutes to produce a decoction. The decoction was then strained to obtain the medicine. The liquid might or might not be diluted before administration, depending on individual practices of the healer.

Many herbalists distinguished between an early and a late form of *isihlambezo*—both with distinct ingredients. The primary function of the former was cleansing and preparation of the womb for carrying the fetus. It was drunk for the first month following the woman's initial visit to the healer—even if this occurred well into the second trimester of pregnancy. The later version served as a maternal–fetal strengthening and protective tonic. It was taken during subsequent months of pregnancy until—and sometime even during—labor and delivery. Either form of *isihlambezo* could be used as an enema.

Most practitioners made individual *isihlambezo* prescriptions to order, though it was common for a patient to be given the plant material only and instructed on how to prepare it at home. The ingredients for an *isihlambezo* prescription might also be obtained from a Zulu chemist. In many cases—particularly with unmarried teenage gravidas—the pregnant woman's mother or other female relative might obtain and administer the *isihlambezo*.

Over a dozen distinct *isihlambezo* recipes were collected from healers. One reason for such wide variation in *isihlambezo* ingredients stemmed from the fact that recipes were often tailored to individual problems. For specific complaints, the herbalist could add an extra component to the basic mix.

*Isihlambezo* was generally sold in 1 liter bottles. Dosage ranged from a few tablespoons taken three times daily to one cup a day. In cases of prolonged labor or other delivery-related complications, *isihlambezo* could be orally administered in a more concentrated form.

Socio-behavioral segment

Questionnaire results were reported in four groupings: rural vs urban, clinic vs non-clinic, four-way comparison, and overall. Chi-square analysis was employed to explore the relationship between

Table 3. Acceptability of mixing traditional and Western antenatal care regimens: rural vs urban respondents

	Rural	Urban	Overall sample
Yes	81.0%	93.0%	87.0%
No	19.0%	7.0%	13.0%
Total	100.0%	100.0%	100.0%

Notes: Sample size  $n = 218$ ; chi-square analysis  $P = 0.01$ . The original question was phrased: "During pregnancy is it acceptable to go to a traditional healer or use *isihlambezo* AND attend antenatal clinic at the same time?"

Table 4. Most effective antenatal care regimen: rural vs urban respondents

	Rural	Urban	Overall sample
Western	46.0%	27.0%	37.0%
Traditional	5.3%	10.7%	7.8%
Both types	36.3%	57.4%	46.4%
No opinion	12.4%	4.9%	8.8%
Total	100.0%	100.0%	100.0%

Notes: Sample size  $n = 218$ ; chi-square analysis  $P = 0.001$ . The original question was phrased: "Which kinds of medicines do you think are most effective in keeping a woman and her baby healthy during pregnancy?"

attitudes toward herbal medicine use and area of interview.

*Rural–urban comparison.* The results of questions probing mixing of Western and traditional herbal medicine are shown in Table 3. Urban women were more likely (93%) than rural women (81%) to mixing *isihlambezo* with Western antenatal care ( $P = 0.01$ ).

Regarding the perceived most effective antenatal treatment (Table 4), twice as many (10.7%) urbanites chose traditional medicines. Significantly more urban (57.4%) than rural women (36.3%) found both traditional and Western antenatal treatment equally effective ( $P = 0.001$ ). Nonetheless, even among rural women, less than half (46%) favored exclusive use of Western antenatal care.

A similar trend was apparent in preferred type of practitioner for treatment of a serious pregnancy-related problem (Table 5). Though the majority of women in both groups favored Western practitioners, more than twice as many urbanites (9.9%) as rural women (4.4%) preferred traditional healers ( $P = 0.02$ ).

Table 5. Preferred type of practitioner for treatment of pregnancy problems: rural vs urban respondents

	Rural	Urban	Overall sample
Western	90.3%	83.2%	86.9%
Traditional	4.4%	9.9%	7.0%
Either type	5.3%	6.9%	6.1%
Total	100.0%	100.0%	100.0%

Notes: Sample size  $n = 218$ ; chi-square analysis  $P = 0.02$ . The original question was phrased: "Which would you feel least self-conscious about visiting for a pregnancy-related problem, a clinic/doctor or a traditional practitioner (*isangoma*, *inyanga*, *umthandazo*)?"

Table 6. Reaction if told to stop using *isihlambezo*: rural vs urban respondents

	Rural	Urban	Overall sample
Yes	59.7%	57.2%	58.5%
No	36.8%	37.9%	37.3%
Don't know	3.5%	4.9%	4.2%
Total	100.0%	100.0%	100.0%

Notes: Sample size  $n = 218$ ; chi-square analysis  $P = 0.86$ . The original question was phrased: "If you were told by a nurse or a doctor that *isihlambezo* is harmful, would you stop using it?"

Table 7. Acceptability of mixing traditional and Western antenatal care regimens: clinic vs non-clinic attenders

	Clinic	Non-clinic	Overall sample
Yes	79.4%	94.2%	87.0%
No	20.6%	5.8%	13.0%
Total	100.0%	100.0%	100.0%

Notes: Sample size  $n = 218$ ; chi-square analysis  $P = 0.002$ . The original question was phrased: "During pregnancy is it acceptable to a traditional healer to use *isihlambezo* AND attend antenatal clinic at the same time?"

Table 8. Most effective antenatal care regimen: clinic vs non-clinic attenders

	Clinic	Non-clinic	Overall sample
Western	43.2%	30.5%	37.0%
Traditional	1.8%	14.3%	7.8%
Both types	42.4%	50.5%	46.4%
No opinion	12.6%	4.7%	8.8%
Total	100.0%	100.0%	100.0%

Notes: Sample size  $n = 218$ ; chi-square analysis  $P = 0.001$ . The original question was phrased: "Which kinds of medicines do you think are more effective in keeping a woman and her baby healthy during pregnancy?"

Table 9. Preferred type of practitioner for treatment of pregnancy problems: clinic vs non-clinic attenders

	Clinic	Non-clinic	Overall sample
Western	95.5%	77.9%	86.9%
Traditional	2.7%	11.5%	7.0%
Either type	1.8%	10.6%	6.1%
Total	100.0%	100.0%	100.0%

Notes: Sample size  $n = 218$ ; chi-square analysis  $P = 0.001$ . The original question was phrased: "Which would you feel least self-conscious about visiting for a pregnancy-related problem, a clinic/doctor or a traditional practitioner (*isangoma*, *inyanga*, *umthandazo*)?"

Table 10. Reaction if told to stop using *isihlambezo*: clinic vs non-clinic respondents

	Clinic	Non-clinic	Overall sample
Yes	75.9%	40.0%	58.5%
No	20.5%	55.2%	37.3%
Don't know	3.6%	4.8%	4.2%
Total	100.0%	100.0%	100.0%

Notes: Sample size  $n = 218$ ; chi-square analysis  $P = 0.000$ . The original question was phrased: "If you were told by a nurse or a doctor that *isihlambezo* is harmful, would you stop using it?"

There were no significant differences in responses to a question addressing discontinuation of *isihlambezo* if advised to do so by a clinician (Table 6;  $P = 0.86$ ). Though most women would stop, over 35% of the overall sample would continue the practice despite warnings regarding potential ill effects.

**Clinic-non-clinic comparison.** In this comparison all differences in questionnaire responses were highly significant ( $P = 0.01-0.000$ ). Tables 7-10

provide the relevant information. Although clinic attenders were more reluctant than non-attenders to mix *isihlambezo* and antenatal clinic care, nearly 80% of these women advocated the practice (Table 7). Results of the perceived most effective antenatal care regimen are shown in Table 8. The proportion of women who found *both* traditional and Western forms of care effective was high in both groups—42.4% clinic attenders, 50.5% non-attenders.

Nearly all clinic attenders preferred a Western medical practitioner for treatment of a serious pregnancy-related problem (95.5%). Over four times as many (11.5%) clinic non-attenders as attenders (2.7%) preferred traditional practitioners (Table 9). Less than half (40%) of non-attenders would stop using *isihlambezo* during pregnancy if told to do so by a clinician (Table 10).

**Comparison.** When questionnaire data were examined using a four-way comparison (rural, urban, clinic attender, clinic non-attender), differences in all responses were highly significant ( $P = 0.000$ ). Rural clinic non-attenders (98%), urban clinic non-attenders (90.4%), and urban clinic attenders (95.8%) strongly advocated mixing traditional and Western antenatal care. Sixty-three percent of rural clinic attenders found this practice acceptable.

Urban non-attenders were most likely (19.2%) to perceive traditional practices as the best form of antenatal care (other groups 1.7-9.4%) and to prefer (15.4%) treatment by a traditional practitioner for a serious pregnancy-related problem (other subgroups 1.6%-7.7%). Urban clinic attenders (82.4%) were most likely to find both forms of antenatal care equally effective (other groups 8.3-67.9%).

All subgroups favored Western over traditional care in cases of serious pregnancy-related complications. Finally, more than twice as many clinic non-attenders in both rural and urban areas (54.7% and 55.8%, respectively) as clinic attenders (rural = 21%, urban = 19.6%) would persist in using *isihlambezo* after being warned about its potential harmful effects.

**Overall group responses.** When asked if *isihlambezo* was frequently used among women in their communities, 93.6% of respondents answered that it was a popular practice. Nearly 90% felt *isihlambezo* was an important and helpful part of self-care during pregnancy.\*

A high proportion of women interviewed (87%) favored mixing *isihlambezo* and clinic-based antenatal treatment. Nearly half (46.6%) felt both traditional and Western antenatal care are equally effective in ensuring a successful course of pregnancy.

When women were asked if they would stop using *isihlambezo*, 37% said they would continue using it regardless of clinicians' warnings. A strong bias toward Western medicine was apparent only when women were faced with a major pregnancy-

\*These questions were not analyzed by subgroups.

Table 11. *Isihlambezo* plants: cited therapeutic properties

Ailment	Therapeutic plant
Edema	<i>Ruta graveolens</i> L.
Indigestion	<i>Typho capensis</i> (Rohrb.) N.E.Br. <i>Gunnera perpensa</i> , L. <i>R. graveolens</i> <i>Dioscorea dregeana</i> (Kunth) Dur. and Schinz
Constipation	<i>Callilepis laureola</i> DC., <i>Combretum erythrophyllum</i> (Burch.) Sond., <i>Agapanthus africanus</i> (L.) Hoffmg., <i>Eucomis comosa</i> (Houtt.) Wehrh.,  <i>Gnidia kraussiana</i> (Meisn.), <i>Cyrtanthus obliquus</i> (L.f.) Ait.
Infection	<i>G. perpensa</i> , <i>Pentania prunelloides</i> (Klotzsch ex Eckl. Zeyh. Walp.), <i>Clivia miniata</i> (Lindl.) Regel

Sources: [88, 43, 105, 109 and 117–120].

related complication. Here, 87% said they preferred treatment from a biomedical practitioner.

Pharmacological properties

*Literature review.* Analysis of the relevant literature revealed several ingredients of *isihlambezo* could be related to the treatment of minor ailments commonly occurring during pregnancy [11, 12, 43]. Table 11 provides relevant examples. Plants reportedly used specifically for their uterotonic activity, i.e. to induce or augment labor, expel the placenta and/or prevent post-partum hemorrhage are listed in Table 12.

*Ethnopharmacological interviews.* Herbalists (*izinyanga*; *n* = 11, 24.4%), diviners (*izangoma*; *n* = 25, 55.6%), and faith healers (*imithandazo*; *n* = 9, 20%) were interviewed. Table 13 shows specific plants cited by traditional healers as those most frequently used in treatment of specific pregnancy-related ailments. Results for responses to two questions are presented. The column labeled “therapeutic choice” provides results of a question asking healers to name the specific plant(s) used in treatment of a given pregnancy-related ailment. For example, the practitioner would be asked which

Table 12. *Isihlambezo* plants: cited uterotonic activity

Plant name
<i>Agapanthus africanus</i> <i>Callilepis laureola</i> <i>Clivia miniata</i> <i>Gladiolus sericeo-villosus</i> Hook. f. <i>Grewia occidentalis</i> L. <i>Gunnera perpensa</i> <i>Pentania prunelloides</i> <i>Plantago major</i> L. <i>Rhoicissus tridentata</i> subsp. <i>cuneifolia</i> <i>Typha capensis</i> <i>Vernonia neocorymbosa</i> Hilliard

Note: Activity includes induction or augmentation of labor, expulsion of the placenta, and prevention of post-partum hemorrhage.

Sources: [24, 25, 43, 104, 119].

Table 13. Plants cited by healers as frequently used for treatment of common pregnancy-related ailments

Ailment	Plant	Therapeutic choice <sup>a</sup>	Popularity <sup>b</sup>
Edema	<i>T. capensis</i>	53%	89%
Indigestion	<i>C. laureola</i> <i>D. dregeana</i>	32% 21.4%	42.8% 48.6%
Constipation	<i>A. africanus</i> <i>C. laureola</i> <i>G. perpensa</i>	— 14% 34%	26% 37% —
Infection	<i>P. prunelloides</i>	—	86%
High blood pressure	<i>R. cuneifolia</i>	20%	67%
Post-partum healing	<i>G. perpensa</i> <i>C. miniata</i>	86% —	66% 29%

<sup>a</sup>The question was asked regarding which plant was used for a specific ailment. For example, “Which plant(s) do you use to treat indigestion during pregnancy?”

<sup>b</sup>This column contains percentages for response category “very often or always” when healers were asked how often specific plants were prescribed for a given pregnancy-related ailment. For example, “How often do you use *impila* to treat pregnancy-related constipation?”

plant(s) were used to treat constipation in a pregnant woman.

The column labeled “popularity” contains results for a multiple choice question regarding the frequency with which particular plants were used for a specific complaint. For example, the healer would be asked how frequently *impila* might be used in treatment of pregnancy-related constipation. The percentages shown are the frequency with which the response category “always or very often” was chosen for a given plant.

Healers also noted certain plants as effective in inducing and aiding prolonged labor. *Agapanthus*, *Clivia*, *Combretum*, *Gunnera* and *Pentania* were by far the most popular treatment for prolonged labor. Oral administration of mercury (*isikidi*), *imbeleki-sane* (ingredients not specified), and *imbiza* (ingredients not specified) by enema to induce labor were also frequently indicated.

*Laboratory assays.* In isolated organ experiments, a decoction of *Clivia miniata* leaves was found to stimulate the tonicity and frequency of uterine contractions and augment the effects of oxytocin on the isolated rat uterus. *Clivia* interacted with more than one receptor system in both the ileum and the uterus, one being the muscarinic cholinergic receptor. It acted as a competitive antagonist on serotonergic receptors in the uterus in a manner similar to ergometrine [36].

Decoctions of *Agapanthus africanus*, *Gunnera perpensa*, and *Pentania prunelloides* all exhibited direct uterotonic activity and augmented the response to oxytocin and acetylcholine on the isolated rat uterus [38].

DISCUSSION

Terminology

The distinction between the herbal medicine-related terms described here is important for several



reasons. First, as noted above, certain of these medicines—such as *imbelekisane* and *inembe*—are considered dangerous, and are avoided by members of the traditional healer community. For those preparing and prescribing herbal remedies, there is a very clear distinction between *isihlambezo* and other classes of pregnancy-related medicines. Second, researchers and clinicians often equate or confuse *isihlambezo* with unsafe decoctions such as *imbelekisane*, giving the former a potentially undeserved bad reputation.

Terminology surrounding *isihlambezo* also reveals its popularity among Zulu women. That a distortion of the word *isihlambezo* is used as a pharmaceutical marketing tactic for commercial antenatal supplements demonstrates its popular appeal. The adoption by nurses of the term *isihlambezo* to refer to antenatal vitamin and iron supplements is also a reflection of its central role among pregnant women in the community. Nurses find this an effective means of stressing the importance of regular consumption of these medications during pregnancy [47].

#### Socio-behavioral segment

Several trends emerge regarding the popularity and use patterns of *isihlambezo* among the women surveyed. It is apparent that, regardless of residence or access to Western antenatal care, herbal medicine use is a significant component of black South African women's pregnancy-related practices. Mixing of traditional herbal and Western antenatal care does not pose a conflict; most women encourage it.

Interestingly, *isihlambezo* and other forms of traditional antenatal care were most forcefully advocated by urbanites (often including clinic attenders) and clinic non-attenders. Urban and clinic non-attending women were most likely to mix traditional and Western antenatal care regimens, and to find traditional antenatal care equally as effective or better than biomedical services. Rural dwellers—particularly clinic attenders—were much more conservative. These women were consistently the

least amenable to *isihlambezo* use or other forms of traditional antenatal care.

Despite clinic attender biases toward certain aspects of Western antenatal care, these women also demonstrated considerable enthusiasm for *isihlambezo*. For example, nearly 80% of clinic attenders advocated mixing of traditional herbal and Western antenatal care (Table 7). Over 40% of these women found *isihlambezo* and Western antenatal medicines equally effective (Table 8); and 20% would use *isihlambezo* despite admonitions of health care providers (Table 10). Among urban clinic attenders, 95% advocated mixing *isihlambezo* and biomedicine, and nearly as many (82.4%) felt both types of care equally useful during pregnancy (no tables).

One issue we sought to address in this study was the impact of urbanization and biomedicine on the popularity of pregnancy-related herbal medicine use. That urban women were the greatest enthusiasts of *isihlambezo* and traditional antenatal care is significant in this respect. It appears urban lifestyle has done little to weaken—or has perhaps even strengthened—the appeal of traditional practices like *isihlambezo* as an antenatal health care choice. This trend has also been found in several other studies examining traditional medicine use in an urban context [17, 74, 75, 78, 79].

We offer several potential reasons for urban women's interest in *isihlambezo* as an antenatal care alternative. Two contributing factors might be high cost and perceived inferior quality of clinic-based care. At the time this research was undertaken, antenatal clinic charges ranged from R8 to R13 for each repeat visit—exclusive of delivery fees.\*,† The average cost of a bottle of *isihlambezo* (lasting over a month) recorded in this study was R11.50.‡,§ Moreover, South African urban clinics and delivery facilities tend to be more expensive than rural ones. This may serve as at least partial explanation for the observed weaker support of *isihlambezo* among rural clinic attenders.

Cost as a factor in health care decision-making has been emphasized elsewhere [55, 77, 78]. In addition, a study conducted by one of us (CV) on health care utilization among black women (in the same venues as this research) revealed financial constraints as the most often cited reason for late initiation of antenatal care [121].¶

Poor quality of antenatal services may also contribute to urban women's strong interest in traditional antenatal care. Urban clinics are chronically overloaded and understaffed. At the urban facility where this study was conducted, clinic attenders were routinely forced to arrive several hours before the clinic opened in order to ensure being admitted for that day's roster. In addition, clinic attenders waited long hours under severely crowded conditions to be examined. Among hostel dwellers in Cape Town, Heap and Ramphela note long waits and risk of loss of paid work time as

\*This is the equivalent of U.S.\$2.20–3.50 (U.S.\$1 = 3.65Rands).

†On 1 June 1994, the South African government declared antenatal care services free of charge. This went into effect after the data collection phase of this study had been completed.

‡R11.50 = U.S.\$3.20.

§Note that after 28 gestational weeks, women are asked to return for antenatal visits (and must pay) twice monthly. After 34 weeks, they return weekly.

¶At the time this research was undertaken, antenatal health services in South Africa were not free. On 1 June 1994, all government based antenatal services were made free of charge.

factors in decisions to avoid Western medical care [78] (p. 122).

Antenatal clinic attenders often complain of nurses' negative attitudes and rough demeanor [121]. This has been corroborated in urban clinic studies in the United States [122] and elsewhere in South Africa [17, 123]. Studies among teenage antenatal clinic attenders in Ghana [124] and Nigeria [125] have suggested poor treatment by staff as a deterrent to early initiation of antenatal care. It may be that factors such as prohibitive cost and poor quality of antenatal services make traditional antenatal care a more attractive option for black South African women.

Finally, urban women's adherence to traditional antenatal care may help them cope with the stress of urban lifestyle and changing environment. For black South African women in particular, the need for such strategies has been heightened in recent years. In many ways, black women have been most acutely affected by the socio-cultural, economic and politico-legal changes in South Africa during the last decade.\* Using *isihlambezo* may be a way of preserving both organic and spiritual purity in the face of change.† Similar "cultural adaptations" have been described among rapidly urbanizing groups in South Africa [75, 79] and elsewhere [74].

A caveat to these results is that no information was collected regarding length of residence in the place of interview, education level, or household decision-making. Black women are members of the most mobile and migratory segment of South Africa's population. Recently urbanized women's attitudes toward traditional medicine may not be representative of their more well-entrenched urban counterparts. Education can also affect women's health care decisions. Though we have no specific information on educational attainment among these women, community-based reproductive health surveys in two areas where this work was undertaken show little difference in education level [121]. Finally, it is well known that health care decisions do not necessarily reflect individual choice only [53, 59].

### Health impact

The pharmacological analyses undertaken here reveal mixed evidence regarding the maternal-fetal health effects of *isihlambezo* use. There is certainly reason to support its potential therapeutic proper-

ties. For example, the literature review revealed many plant ingredients likely to be effective in treatment of minor ailments common during pregnancy and childbirth (Table 11).

Interviews with traditional healers strongly corroborated findings in the literature. A comparison of Tables 11 and 13 demonstrates the striking parallels between plants cited in the pharmacological literature and those named by traditional healers in the treatment of certain pregnancy-related complaints. Most plants with therapeutic properties documented as effective against particular ailments were also specified by healers in the handling of the same problems. The plant *Gunnera perpensa* (*ugobo*) serves as a good example of such "cross-referencing".

*Gunnera* was both broadly cited in the pharmacological literature and often indicated by healers in facilitation of post-partum healing (86%). Healers' common prescription of *ugobo* as a post-partum vaginal douche is possibly related to its efficiency as a uterotonic agent in preventing post-partum hemorrhage. Vaginal administration could result in rapid systemic absorption via the vaginal mucosa.

Recent chemical studies suggest potentially significant nutritive value of certain *isihlambezo* plant ingredients, such as *Rhoicissus* and *Typha*. The former has a high sugar content, and the latter may be rich in the essential fatty acid linoleic acid [126]. Herbal remedies are often rich in the essential minerals (calcium, magnesium, iron, potassium) and vitamins (vitamin C and vitamin B) [118, 127], which are components of antenatal supplements commonly prescribed for pregnant women. This aspect of herbal medicine research deserves close attention in future studies. It may have important ramifications for women's health care and health status in developing countries, as well as add legitimacy to traditional healing in the eyes of the biomedical community.

Alternatively, there is reason to consider the possible negative maternal-fetal health effects of *isihlambezo*. Several common ingredients—*Rhoicissus*, *Combretum*, *Callilepis*, and *Asclepias*—are known for their toxic properties when ingested by humans [37, 42, 116, 119]. *Asclepias* has been shown to contain cardiac glycosides [119], and *Callilepis* was an often cited healers' remedy for maternal indigestion (32%) and constipation (14%). The apparently common practice of prescribing mercury to induce and augment labor is also of great concern.

Interviews with traditional healers showed that many uterotonic plants are used throughout the course of pregnancy either as components of *isihlambezo* itself or as treatment for pregnancy-related ailments.‡ Thus, timing of administration and dosage of certain herbal medicines are additional factors to be considered in assessing their health impact. For example, *Gunnera* may be curative in the post-partum recuperative period, but injurious during pregnancy. Other uterotonic plants—such as *Typha*—could prove beneficial in the appropriate

\*During the course of this study, an elderly woman told us, "Before all the changes (began), life was easy. Everyone knew where they stood. Now, everything that was up is down, and what was down is up".

†Note that in addition to organic health benefits, spiritual cleansing was one of the most often cited reasons for *isihlambezo* use (Table 2).

‡Such plants include: *Agapanthus*, *Callilepis*, *Clivia*, *Gunnera*, *Pentstemon*, *Rhoicissus* and *Typha*.

dosage and concentration as a remedy for edema or as a dietary supplement. Used inappropriately, it could lead to abortion or premature labor. Such herbal remedies may also prove less risky and equally as therapeutic when administered to non-pregnant individuals. Finally, it is unclear as to how combining several plants to produce the *isihlambezo* decoction might influence their individual pharmacological properties.

### CONCLUSION

On analysis of the data presented here, it was found that the first two hypotheses set out in the introduction were supported. There were significant differences by area of interview in perceived popularity and utilization patterns of *isihlambezo*. However, perhaps the more relevant message to be conveyed by these results was the continuing importance of pregnancy-related herbal remedies despite factors such as urban residence and access to and use of Western antenatal care.

The third hypothesis—addressing the potential maternal-fetal health impact of *isihlambezo* use—was more difficult to accept or reject. Pharmacological analysis, literature review, and herbalist interviews strongly suggested the possibility of *both* therapeutic and harmful consequences of *isihlambezo* use.

It appears that the health impact of herbal medicines is highly dependent on *how* (i.e. amount, concentration and antagonistic or synergistic action of combined ingredients) and *when* (stage of pregnancy) they are used. Nevertheless, the same can be said of Western medicine, in which the *how* and *when* of preparation, prescription, and ingestion determine whether the treatment is ultimately helpful or harmful.

### Plant research variables

Finally, in undertaking ethnopharmacological research related to the health consequences of *isihlambezo* or any other traditional herbal remedy, several factors must be considered which may influence toxicity and thus the pharmacologically active principles in the plant ingredients. These include:

- (1) regional variation in plants used for medicinal purposes;
- (2) variation in plant material (i.e. stage of plant development, availability, seasonality, climate, soil);
- (3) variation in individual healers' recipes; and
- (4) inappropriate preparation and prescription of herbal medicines by improperly trained traditional practitioners.

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### REFERENCES

1. Talaj, S. and Czechowicz, A. (1988) Are herbal remedies safe? Letter to the Editor. *Medical Journal of Australia* **148**, 102.
2. Talaj, S. and Czechowicz, A. (1990) Hazardous herbal remedies are still on the market. Letter to the Editor. *Medical Journal of Australia* **153**, 302.
3. Usuki, S., Kubota, S. and Usuki, Y. (1989) Treatment with hachimijogan, a non-ergot Chinese herbal medicine, in two hyperprolactinemic infertile women. *Acta Obstetrics and Gynecology of Scandinavia* **68**, 475–478.
4. Saha, J. C. and Kasinathan, S. (1961) Ecobolic properties of Indian medicinal plants: Pt. II. *Indian Journal of Medical Resources* **49**(6), 1094–1098.
5. Bourdy, G. and Walter, A. (1992) Maternity and medicinal plants in Vanuatu: I. The cycle of reproduction. *Journal of Ethnopharmacology* **37**, 179–196.
6. Meltzer, D. (ed.) (1976) *Birth*. Ballantine, New York.
7. Lewis, W. and Elvin-Lewis, M. (1977) *Medical Botany*. Wiley, New York.
8. Conway, G. and Slocumb, J. (1979) Plants used as abortifacients and emmenagogues by Spanish New Mexicans. *Journal of Ethnopharmacology* **1**, 241–261.
9. Campanella, K., Korbin, J. and Acheson, L. (1993) Pregnancy and childbirth among the Amish. *Social Science & Medicine* **36**(3), 333–342.
10. Plotkin, M. (1993) *Tales of a Shaman's Apprentice*. Viking, New York.
11. Bunce, K. (1987) The use of herbs in midwifery. *Journal of Nurse-Midwifery* **32**(4), 255–259.
12. Ehudin-Pagano, E., Paluzzi, P., Ivory, L. and McCartney, M. (1987) The use of herbs in nurse-midwifery practice. *Journal of Nurse-Midwifery* **32**(4), 260–262.
13. Sakala, C. (1988) Content of care by independent midwives: assistance with pain in labor and birth. *Social Science & Medicine* **26**(11), 1141–1158.
14. Swinnerton, T. (1991) Alternative remedies during labour. *Nursing Times* **87**(9), 64–65.
15. Okonofua, F., Esen, U. and Bamgbose, J. (1990) Fatal maternal tetanus following premature rupture of membranes and retained dead fetus. *Tropical Geography in Medicine* **42**, 166–167.
16. Familusi, J. and Dawodu, A. (1985) A survey of neonatal jaundice in association with household drugs and chemicals in Nigeria. *Annals of Tropical Paediatrics* **5**, 219–222.
17. Mbura, J., Mgaya, H. and Heggenhougen, H. (1985) The use of oral herbal medicine by women attending antenatal clinics in urban and rural Tanga District in Tanzania. *East African Medical Journal* **62**(8), 540–551.
18. Chhabra, S. C. and Mahunnah, R. L. A. (1994) Plants used in traditional medicine by Hayas of the Kagera region of Tanzania. *Economic Botany* **48**(2), 121–129.
19. Ebin, V. (1982) Interpretations of infertility: the Aowin people of south-west Ghana. In *Ethnography of Fertility and Birth*, ed. C. P. MacCormack, pp. 141–159. Academic Press, London.

20. MacCormack, C. P. (1982) Health, fertility and birth in Moyamba District, Sierra Leone. In *Ethnography of Fertility and Birth*, ed. C. P. MacCormack, pp. 115–138. Academic Press, London.
21. Gelfand, M. (1964) *Diet and Tradition in an African Culture*. Longman, London.
22. Mutambirwa, J. (1985) Pregnancy, childbirth, mother and child care among the indigenous people of Zimbabwe. *International Journal of Gynaecology and Obstetrics* **23**, 275–285.
23. Krige, E. J. (1957) *The Social System of the Zulus*. Shuter and Shooter, Pietermaritzburg.
24. Bryant, A. T. (1966) *Zulu Medicine and Medicine-Men*. Struik, Cape Town.
25. Brindley, M. (1985) Old women in Zulu culture—the old woman and childbirth. *South African Journal of Ethnology* **8**(3), 98–108.
26. Chalmers, B. (1990) *African Childbirth in Transition*. Berev, River Club.
27. Gumedé, M. V. (1978) Traditional Zulu practitioners and obstetric medicine. *South African Medical Journal* **53**, 823–825.
28. Larsen, J., Msane, C. and Mohnke, M. (1983) The fate of women who deliver at home in rural KwaZulu. *South African Medical Journal* **63**, 543–545.
29. Mitri, F., Hofmeyer, G. and Van Gelderen, C. (1987) Meconium during labour—self-medication and other associations. *South African Medical Journal* **71**, 431–433.
30. Morris, G. and Mdilose, B. (1991) The use of *isihlambezo* in the upper Tugela Region. *South African Family Practice* **10**(5), 169–173.
31. Wainright, J., Schonland, M. M. and Candy, H. A. (1977) Toxicity of *Callilepis laureola*. *South African Medical Journal* **52**, 313–315.
32. Candy, H. A., Pegel, K., Brookes, K. B. and Rodwell, M. (1978) The occurrence of atractyloside in *Callilepis laureola*. *Phytochemistry* **17**, 1681–1682.
33. Brookes, K. B., Candy, H. A. and Pegel, K. (1983) Atractylosides in *Callilepis laureola*. *South African Journal of Chemistry* **36**, 65.
34. Brookes, K. B., Candy, H. and Pegel, K. (1985) Two thymol derivatives from *Callilepis laureola*. *Planta Medica* **51**, 32.
35. Brookes, K. B. (1995) Personal communication.
36. Veale, D. J. H., Oliver, D., Arangies, N. and Furman, K. (1989) Preliminary isolated organ studies using aqueous extract of *Clivia miniata* leaves. *Journal of Ethnopharmacology* **27**, 341–346.
37. Veale, D. J. H., Furman, K. and Oliver, D. (1992) South African traditional herbal medicines used during pregnancy and childbirth. *Journal of Ethnopharmacology* **36**, 185–191.
38. Kaido, T., Veale, D. J. H., Havlik, I. and Rama, D. B. K. (1995) The preliminary screening of plants used as traditional herbal remedies during pregnancy and labour. *Journal of Ethnopharmacology*, in press.
39. Hutchings, A. (1989) A survey and analysis of traditional medicinal plants as used by Zulu, Xhosa, and Sotho. *Bothalia* **19**(1), 111–123.
40. Hutchings, A. (1989) Observations on plant usage in Xhosa and Zulu medicine. *Bothalia* **19**(1), 225–235.
41. Hutchings, A. and Terblanche, S. E. (1989) Observations on the use of some known and suspected toxic Liliiflorae in Zulu and Xhosa medicine. *South African Medical Journal* **75**(2), 62–69.
42. Hutchings, A. (1990) Acute poisoning in Zulu and Xhosa traditional medicine. *Ethnopharmacologie: Sources, Methodes, Objectifs* 22–25 March, 123–132.
43. Hutchings *et al.* (1996) *Zulu Medicinal Plants: An Inventory*. University of Natal Press, Pietermaritzburg.
44. Bodenstein, J. W. (1977) Toxicity of traditional herbal remedies. *South African Medical Journal* **52**, 790.
45. Moodley, T. R. (1988) Worm bolus and herbal toxins masquerading as abruptio placentae. *South African Medical Journal* **74**, 472.
46. Seedat, Y. K. and Nathoo, B. C. (1993) Acute renal failure in blacks and Indians in South Africa—comparison after 10 years. *Nephron* **64**, 198–201.
47. Mncube, Q. (1994) Personal communication.
48. Larsen, J., Msane, C. and Mohnke, M. (1983) The Zulu traditional birth attendant. *South African Medical Journal* **63**, 540–542.
49. Krige, J. D. (1944) The magical thought-patterns of the Bantu in relation to health services. *African Studies* **3**(1), 1–13.
50. Lieban, R. (1977) The field of medical anthropology. In *Culture, Disease, and Healing*, ed. D. Landy, pp. 13–31. MacMillan, New York.
51. Ngubane, H. (1977) *Body and Mind in Zulu Medicine*. Academic Press, London.
52. Foster, G. and Anderson, B. (eds) (1978) *Medical Anthropology*. Westview, San Francisco.
53. Janzen, J. M. (1978) *The Quest for Therapy—Medical Pluralism in Lower Zaire*. University of California Press, Berkeley.
54. Kleinman, A. (1978) Concepts and a model for the comparison of medical systems as cultural systems. *Social Science & Medicine* **12**, 85–93.
55. Warren, D. M. (1978) The interpretation of change in a Ghanaian ethnomedical study. *Human Organization* **37**(1), 73–77.
56. Ngubane, H. (1981) Aspects of clinical practice and traditional organization of indigenous healers in South Africa. *Social Science & Medicine* **15**, 361–365.
57. Bledsoe, C. and Goubaud, M. (1985) The reinterpretation of western pharmaceuticals among the Mende of Sierra Leone. *Social Science & Medicine* **21**(3), 275–282.
58. Bledsoe, C. (1978) Side-stepping the post-partum sex taboo: Mende cultural perceptions of tinned milk in Sierra Leone. In *The Cultural Roots of African Fertility Regimes, Proceedings of the IFE Conference*, 25 February–1 March.
59. Feierman, S. (1985) Struggles for control: the social roots of health and healing in modern Africa. *African Studies Review* **28**(2/3), 73–146.
60. Etkin, N., Ross, P. and Muazzamu, I. (1990) The indigenization of pharmaceuticals: therapeutic transitions in rural Hausaland. *Social Science & Medicine* **30**(3), 919–928.
61. Heggenhougen, K. and Draper, A. (1990) *Medical Anthropology and Primary Health Care*. London School of Hygiene and Tropical Medicine, London.
62. Green, E. (1992) Sexually transmitted disease, ethnomedicine and health policy in Africa. *Social Science & Medicine* **35**(2), 121–130.
63. Green, E. (1992) The anthropology of sexually transmitted disease in Liberia. *Social Science & Medicine* **35**(12), 1457–1468.
64. Green, E. (1994) *AIDS and STDs in Africa—Bridging the Gap between Traditional Healing and Modern Medicine*. Westview, San Francisco.
65. LeClerc-Madlala, S. (1992) Anthropology and epidemiology: lessons from a history. Paper presented at the Association for Anthropologists in Southern Africa, Annual Conference, University of Natal.
66. Anonymous (1994) Zulu health, cultural meanings, and the reinterpretation of western pharmaceuticals. Paper presented at the Association for Anthropologists in Southern Africa, Annual Conference, University of Natal.

67. Ademuwagun, Z. A., Ayoade, J. A. A., Harrison, I. E. and Warren, D. M. (eds) *African Therapeutic Systems*. Cross Roads, Waltham.
68. Green, E. and Makhubu, L. (1984) Traditional healers in Swaziland: toward improved cooperation between the traditional and modern sectors. *Social Science & Medicine* **18**(12), 1071–1079.
69. Fyfe, C. (ed.) (1986) *African Medicine in the Modern World*. Proceedings of African Medicine in the Modern World Conference held at the University of Edinburgh, 10–11 December.
70. Last, M. and Chavunduka, G. L. (eds) (1986) *The Professionalisation of African Medicine*. Manchester University Press, Manchester.
71. Gort, E. (1989) Changing traditional medicine in rural Swaziland: the effects of the global system. *Social Science & Medicine* **29**(9), 1099–1104.
72. Feerman, E. K. (1981) Alternative medical services in rural Tanzania: a physician's view. *Social Science & Medicine* **15**, 399–404.
73. Haram, L. (1991) Tswana medicine in interaction with biomedicine. *Social Science & Medicine* **33**(2), 167–175.
74. Press, I. (1978) Urban folk medicine: a functional overview. *American Anthropologist* **80**, 71–84.
75. Longmore, L. (1959) *The Dispossessed—A Study of the Sex-Life of Bantu Women in and Around Johannesburg*. Cape, London.
76. Edwards, S. (1986) Traditional and modern medicine in South Africa: a research study. *Social Science & Medicine* **22**(11), 1273–1276.
77. Anyinam, C. (1987) Availability, accessibility, acceptability, and adaptability: four attributes of African ethno-medicine. *Social Science & Medicine* **25**(7), 803–811.
78. Heap, M. and Ramphela, M. (1991) The quest for wholeness: health care strategies among the residents of council-built hostels in Cape Town. *Social Science & Medicine* **32**(2), 117–126.
79. Du Toit, B. (1971) The isangoma: an adaptive agent among urban Zulu. *Anthropological Quarterly* **44**(2), 51–65.
80. Barth, F. (1967) On the study of social change. *American Anthropologist* **69**(6), 661–669.
81. MacCormack, C. P. (1986) The articulation of western and traditional systems of health care. In *The Professionalisation of African Medicine*, eds M. Last and G. L. Chavunduka, pp. 151–163. Manchester University Press, Manchester.
82. Etkin, N. (1986) Multidisciplinary perspectives in the interpretation of plants used in indigenous medicine and diet. In *Plants in Indigenous Medicine and Diet—Biobehavioral Approaches*, ed. N. Etkin, pp. 2–30. Redgrave, Bedford Hills.
83. Etkin, N. (1988) Ethnopharmacology: biobehavioral approaches in the anthropological study of indigenous medicines. *Annual Review of Anthropology* **17**, 23–42.
84. Etkin, N. (1990) Ethnopharmacology: biological and behavioral perspectives in the study of indigenous medicines. In *Medical Anthropology*, eds M. Johnson and S. Sargent, pp. 149–158. Praeger, New York.
85. Etkin, N. (ed.) (1994) *Eating on the Wild Side—The Pharmacologic, Ecologic, and Social Implications of Using Noncultigens*. University of Arizona Press, Tuscon.
86. Etkin, N. and Ross, P. J. (1982) Food as medicine and medicine as food—an adaptive framework for the interpretation of plant utilization among the Hausa of northern Nigeria. *Social Science & Medicine* **16**, 1559–1573.
87. Etkin, N. and Ross, P. J. (1991) Should we set a place for diet in ethnopharmacology? *Journal of Ethnopharmacology* **32**, 25–36.
88. Pujol, J. (1990) *Natur' Africa*. Jean Pujol Natural Healers' Foundation, Durban.
89. Akendengue, B. (1992) Medicinal plants used by the Fang traditional healers in Equatorial Guinea. *Journal of Ethnopharmacology* **37**, 165–173.
90. Iwu, M. (1986) Empirical investigations of dietary plants used in Igbo ethnomedicine. In *Plants in Indigenous Medicine and Diet—Biobehavioral Approaches*, ed. N. Etkin, pp. 131–150. Redgrave, Bedford Hills.
91. Sowoforwa, A. (1993) Recent trends in research into African medicinal plants. *Journal of Ethnopharmacology* **38**, 209–214.
92. Cox, P. A. (1994) Wild plants as food and medicine in Polynesia. In *Eating on the Wild Side—The Pharmacologic, Ecologic, and Social Implications of Using Noncultigens*, ed. N. Etkin, pp. 102–113. University of Arizona Press, Tuscon.
93. Dufour, D. L. and Wilson, W. M. (1994) Characteristics of “wild” plant foods used by indigenous populations in Amazonia. In *Eating on the Wild Side—The Pharmacologic, Ecologic, and Social Implications of Using Noncultigens*, ed. N. Etkin, pp. 114–142. University of Arizona Press, Tuscon.
94. Van der Merwe, D. (1988) A geographical profile of the South African population as a basis for epidemiological cancer research. *South African Medical Journal* **74**, 513–518.
95. Vilakazi, A. (1965) *Zulu Transformations*. University of Natal Press, Pietermaritzburg.
96. Du Toit, B. (1968) Continuity and African urbanization. In *Urban Anthropology—Research Perspectives and Strategies*, Southern Anthropological Society Proceedings, No. 2, ed. E. Eddy. University of Georgia Press, Athens.
97. Colson, E. (1970) Family change in contemporary Africa. In *Black Africa—Its Peoples and Cultures Today*, ed. J. Middleton, pp. 152–158. MacMillan, Toronto.
98. Mayer, P. (1971) *Townsmen or Tribesmen: Conservatism and the Process of Urbanization in a South African City*. Oxford University Press, London.
99. Pauw, B. A. (1971) *The Second Generation*. Oxford University Press, Cape Town.
100. Shisana, O. (1994) Opening Address, 13th Annual Conference of the Epidemiological Society of Southern Africa, Bloemfontein, RSA, 28–30 September.
101. Development Bank of Southern Africa (1994) *South Africa's Nine Provinces: A Human Development Profile*. Development Bank of Southern Africa, Johannesburg.
102. South African Institute of Race Relations (1993) *Race Relations Survey 1992/93*. South African Institute of Race Relations, Johannesburg.
103. Doke, C. M., Malcolm, D. M., Sikakana, J. M. and Vilakazi, B. W. (1990) *English-Zulu Zulu-English Dictionary*. Witwatersrand, Johannesburg.
104. Gerstner, J. (1941) Preliminary checklist of Zulu names of plants with short notes. *Bantu Studies* **15**, 277–383.
105. Gumed, M. V. (1990) *Traditional Healers*. Skotaville, Braamfontein.
106. Cunningham, A. B. (1988) *An Investigation of the Herbal Medicine Trade in Natal/Kwazulu*. INR investigational report No. 29, Pietermaritzburg.
107. Hutchings, A. (1995) Personal communication.
108. Berglund, A. (1976) *Zulu Thought-Patterns and Symbolism*. Phillip, Cape Town.

109. Broster, J. A. (1981) *Amagqirha—Religion, Magic and Medicine in the Transkei*. Via Afrika, Cape Town.
110. McHenry, R. (ed.) (1990) *Encyclopaedia Britannica Micropaedia In-Depth*. Encyclopaedia Britannica, Chicago.
111. Varga, C. A. (1994) Unpublished Ph.D. results.
112. Ngcobo, S. (1994) Personal communication.
113. Usta, I., Mercer, B. and Sibai, B. (1995) Risk factors for meconium aspiration syndrome. *Obstetrics and Gynecology* **86**(2), 230–234.
114. Adhikari, M. and Gouws, E. (1995) Meconium aspiration in South Africa. *South African Medical Journal* **85**(9), 891–893.
115. Houlihon, M. Knuppel, R. A. (1995) Meconium-stained amniotic fluid: current controversies. *Journal of Reproductive Medicine* **39**, 888–898.
116. Bullough, C. (1981) Analysis of maternal death in the central region of Malawi. *East African Medical Journal* **58**, 25–37.
117. Gelfand, M. (1985) *The Traditional Medical Practitioner in Zimbabwe*. Mambo, Harare.
118. Fluck, H., Jaspersen-Schib, R. and Rowson, J. M. (1971) *Medicinal Plants and Their Uses*. Foulsham, London.
119. Watt, J. M. and Breyer-Brandwijk, M. J. (1962) *The Medicinal and Poisonous Plants of Southern and Eastern Africa*. Livingstone, London.
120. Van den Berghe, D. A., Ieven, M., Merlens, F. and Vlietnick, A. J. (1978) Screening of higher plants for biological activities: antiviral activity. *Journal of Natural Products* **41**(5), 463–471.
121. Varga, C. A. (1994) Unpublished Ph.D. results.
122. Lazarus, E. (1990) Falling through the cracks: contradictions and barriers to care in a prenatal clinic. *Medical Anthropology* **12**, 169–187.
123. Westaway, M. (1995) Determining the quality of antenatal care for black pregnant women. Paper presented at the Inaugural Conference Quality in Health Care, 5–6 April, Gallagher Estates, Midrand, South Africa.
124. Huntington, D., Lettenmaier, C. and Obeng-Quaidoo, I. (1990) User's perspective of counseling training in Ghana: the "mystery client" trial. *Studies in Family Planning* **21**(3), 171–177.
125. Olaniyan, M. (1992) Why are we so blessed? Unpublished manuscript, Northwestern University.
126. Brookes, K. B. (1994) Unpublished results.
127. Raidoo, D. (1994) Personal communication.