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Practices of Traditional Birth Attendants in Machakos District, Kenya

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ABSTRACT

Ethnopharmacological relevance: The aim of the study was to document TBAs practices as well as the indigenous herbal remedies they use to manage pre, intra and post partum complications in a rural Kenyan community.

Materials and Methods: A cross sectional study was conducted on practicing TBAs and their clients living in the study area. Data was collected using structured questionnaires and interviews. Focused group discussions were held with the TBAs to supplement the interviews and questionnaire survey.

Results: Two hundred TBAs and 20 clients were interviewed. The majority of the TBAs were females 75% of them having attended to over 200 pregnant women over a period of 5 years and above compared to only 6% of the males. A total of 10 pregnancy related complications and symptoms including threatened abortion, labor complications, post partum hemorrhage and retained after birth were recorded. Fifty five plant species most of them belonging to *Euphorbiaceae* family were identified for the management of the complications.

Conclusion: Traditional Birth Attendants still have a role to play in assisting pregnant women in rural communities. Their knowledge on herbal medicines is equally important and should be preserved for posterity.

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1. Introduction

Poor reproductive health accounts for up to 18% of the global burden of disease and 32% of the total burden of disease for women of reproductive age (WHO, 2006). According to the report, maternal related conditions contribute the largest share and are actually the number one cause of death, followed by malaria and HIV/AIDS in developing countries.

Traditional Birth Attendants (TBAs) are important community own-resource persons who are routinely consulted by pregnant women throughout the course of gestation especially in rural parts of developing countries. Inadequate health care coverage by trained personnel, inadequate reproductive health skills among health care providers, long distances to health facilities and cultural beliefs are some of the contributing factors that have kept TBAs in business. In Machakos District of Kenya, the doctor/patient ratio stands at 1:62,325 indicating a serious shortage of health staff. Maternal mortality in Kenya is still unacceptably high at 590 per every 100,000 live birth according to the National Health Sector Strategic Plan-II of 2005–2010, due to pregnancy and child birth related complications.

The Kenya National Health Sector is striving to address this problem through the implementation of the Strategic Plan-II which recognizes the role played by traditional healthcare providers such as TBAs. Indigenous knowledge is an integral part of life in rural third world communities. Rather than ignore it, this knowledge should be explored, strengthened through research and scientific evidence, documented and disseminated especially to healthcare providers so that they can become informed about the actual properties of herbs used during pregnancy (Astin, 1998).

Literature shows that herbal remedy use during pregnancy is common in developing and even developed countries. An Australian survey of three hundred women attending antenatal clinic suggested that 12% had taken herbal medicine during their pregnancy (Pastore, 2000) while in the USA, a survey of 200 pregnant women demonstrated that 15% used home remedies (ginger, chamomile, and cola) in an attempt to relieve morning sickness (Pastore, 2000). According to WHO estimates, 80% of rural poor in developing countries rely solely on herbal medicine as their only form of remedy for a variety of health issues. Supporting evidence has been presented by several other authors (Kamatenesi-Mugisha and Bukenya-Ziraba, 2002; Sandhya et al., 2006; Shukla et al., 2008). Steenkamp (2003), furthermore, suggested that this broad use of traditional medicine could be attributable to accessibility and affordability of the herbs. In these rural communities, sick persons will consult regular physicians only as a last resort

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(Kamatenesi-Mugisha and Oryem-Origa, 2007). For pregnancy related conditions, the herbs are widely administered to women by TBAs during and after pregnancy (Kokwaro and John, 1998). In Nigeria, a survey conducted on 1200 pregnant women demonstrated that 12% used native herbs (Gharoro and Igbafe, 2000). A similar survey in South Africa showed that out of 229 pregnant women interviewed 55% had used herbal medicine during pregnancy (Mabina et al., 1997). Steenkamp (2003) indicated that at least 156 plant species were used by black South African women as remedies for a variety of gynecological conditions and disorders. Majority of the plants were used for the enhancement of fertility, as abortifacients, antiabortifacients and contraceptives. For example, studies in South Africa showed that decoctions of *Agapanthus africanus*, *Clivia miniata* and several other herbal remedies were used as oxytocic agents in traditional herbal medicines in order to induce or augment labor (Veale et al., 1992; Varga and Veale, 1997; Veale et al., 2000). Interviews of traditional healers by Varga and Veale (1997) revealed that *Agapanthus africanus* was one of five plants used most often to treat prolonged labor in rural and urban Kwa Zulu Natal. Other studies showed that leaves of *Ficus exasperata* were used by traditional healers in some parts of Africa (Burundi and Nigeria) as oxytocic to facilitate labor and hasten the expulsion of the placenta in cows and humans, and as abortifacients (Baerts and Lehmann, 1991; Ijeh and Ukwani, 2007; Bafur et al., 2009). In rural western Uganda, close to 80% of pregnant women deliver at home helped by traditional birth attendants, mothers in law, mothers and friends (Kamatenesi-Mugisha, 2002; Kamatenesi-Mugisha and Oryem-Origa, 2007). Traditional healers by their nature do not keep records and most of the knowledge they have is passed on verbally from generation to generation (Giday et al., 2010). There is need therefore not only to capture and archive this knowledge but also to undertake scientific studies that provide credible evidence for the claims as to the therapeutic efficacy of such herbs as claimed by the traditional healers (Sofowora, 1993). The objective of the study was to document TBAs interventions and medicinal herbs used for the management of pregnancy related symptoms and complications in Machakos District, Kenya.

2. Methodology

2.1. Study area description

The research was carried out in Kyevaluki and Kathiani sub locations of Machakos District in Eastern Kenya. According to the population and housing census report 2009; the district has a population of about 1,098,584 people. The district is reported to have a high number of practicing TBA and a significant proportion of women still deliver their babies at home.

2.2. Target population and study design

This was a cross-sectional study of TBAs. The target population was practicing TBAs (men and women) who live in the study area. Systematic random sampling method was used to identify 200 TBAs as participants for the survey. TBAs' clients were women who had a home birth at least three months prior to the interview.

2.3. Data collection

A cross sectional study of all willing and practicing TBA residing in the study area was carried out by a team comprising of local translators, a botanist and the research team. Participants were asked to give signed informed consent before participating in the study.

The objectives of the study were clearly stated and participation was strictly on a voluntary basis. Quantitative and qualitative

data collection methods were applied. Structured questionnaires were administered to the TBAs and their clients, while focused group discussions were conducted to allow for detailed exploration of knowledge and practices of individuals about pre, intra and post partum complication management. The questionnaires were designed to be responsive to the objectives of the study. Interviews with informants were conducted in Kamba language assisted by local translators, and responses were recorded in English. A pilot study was conducted to test the appropriateness of the research tools by the research team, and necessary revisions were incorporated accordingly.

The TBAs study variables included age, marital status, number of children, education levels, number of years in practice and women attended to, how the TBAs acquired the reproductive health skills and the interventions used to manage pre, intra and post partum complications. The study variables for 'TBA clients' included age, marital status, number of children, education levels, reasons for TBAs consultation during and after pregnancy, post natal clinic attendance, distance to the nearest health facility, access to transport means and source of psychosocial support during labor.

The questionnaires also provided information on plant species, part used, route of administration, pre, intra and post partum complication managed, method of preparation, dose levels, duration of herbal administration and whether the remedy was administered as a concoction or decoctions. Specimens were collected for the reported medicinal plants and identified by a taxonomist. Voucher specimens were deposited at the University of Nairobi herbarium.

3. Results

3.1. TBA data

3.1.1. Female TBA demographic data

A total of 200 TBAs were interviewed, their demographic data is presented in Tables 1 and 2. All the TBAs were over 40 years of age with the majority being between 40 and 60 years. One hundred and sixty eight of the TBAs (84%) were females. Table 1 gives the data on female TBAs and shows that the majority (63%) of them were married with 114 (67.8%) having 4–6 children. 56 (33.3%) were single and 6 (3.7%) widowed as shown in Table 1. One hundred of the female TBAs (59.5%) had never attended school whereas the rest had post primary level of education. One hundred and ten female TBAs (65.5%) had been in practice for over 5 years during which time one hundred and twenty six of them (75%) had attended to over 200 pregnant women. One hundred and fifteen female TBAs (68.5%) had acquired their reproductive health skills through family inheritance whereas 36 (21.4%) had been trained by practicing TBAs. Seventeen (10.1%) TBAs claimed to have acquired the skills through divine intervention.

3.1.2. Male TBA demographic data

Table 2 shows male TBAs demographic data. A total of 32 male TBAs were interviewed. The majority of them were aged 40–60 years with none being above 70 years old. Twenty two (68.8%) were married, whereas 8 (25%) were widowed with twenty four of them (75%) having 4–6 children. Two (5.2%) were single. All male TBAs had either primary level of education (43.7%) or had completed secondary school (56.3%). Twenty two of the male TBAs (68.8%) had been in practice for over 5 years while ten (31.3%) had been in practice for 1–5 years. Thirty (93.8%) male TBAs had attended to over 51 pregnant women with two (6.2%) of them having seen over 200 women. Twenty three (71.9%) had acquired the reproductive health skills through family inheritance (vertically from older generation to young ones) while 9 (28.1%) had acquired their knowledge through divine intervention. None had been taught by a practicing TBA.

Table 1
Female TBA demographic data. Total number of female TBAs interviewed was 168.

Female	Married	Single	Widowed	Age groups				
				40–50 years	51–60 years	61–70 years	Over 70 years	
168	106 (63%)	56 (33.3%)	6 (3.7%)	57 (33.9%)	49 (29.2%)	40 (23.8%)	22 (13.1%)	
Number of children			Education levels			Number of women attended to		
1–3	4–6	7–9	Never attended school	Primary level of education	Completed secondary school	<50	51–100	>200
50 (29.8%)	114 (67.8%)	4 (2.4%)	100 (59.5%)	66 (39.2%)	2 (1.3%)	26 (38.2%)	16 (9.5%)	126 (52.3%)
Number of years in practice				How the TBAs acquired reproductive health skills				
<1	1–5	>5	>10	Through family inheritance	Trained by TBA	Acquired through divine intervention		
18 (10.7%)	40 (23.8%)	80 (47.7%)	30 (17.8%)	115 (68.5%)	36 (21.4%)	17 (10.1%)		

Table 2
Male TBA demographic data. A total of 32 male TBAs were interviewed.

Male	Married	Single	Widowed	Age groups				
				40–50 years	51–60 years	61–70 years	Over 70 years	
32	22 (68.8%)	2 (6.3%)	8 (25%)	17 (53.1%)	11 (34.4%)	4 (12.5%)	None	
Number of children			Education levels			Number of women attended to		
1–3	4–6	7–9	Never attended school	Primary level education	Completed secondary school	<50	51–100	>200
4 (12.5%)	24 (75%)	4 (12.5%)	None	14 (43.8%)	18 (56.3%)	None	30 (93.8%)	2 (6.3%)
Number of years in practice				How the TBAs acquired reproductive health skills				
<1	1–5	>5	>10	Through family inheritance	Trained by TBA	Acquired through divine intervention		
None	10 (31.3%)	14 (43.8%)	8 (25%)	23 (71.9%)	None	9 (28.1%)		

3.2. Pregnancy complications handled by TBAs

Fig. 1 shows a comparison of the percentage number of TBAs who managed pregnancy complications using herbal remedy against those who referred cases to hospital. Pregnancy and post partum conditions managed were delayed labor, protracted labor, post partum haemorrhage, retained afterbirth, prevention of first and second trimester abortion, nausea and vomiting, pregnancy edema and anaemia. For almost all cases of pregnancy and post partum complications, significant numbers of TBAs used herbal remedy compared to those who referred cases to hospital. However a significantly higher percentage of TBAs referred cases of nausea and vomiting to hospital compared to those who administered herbal remedy as shown in Fig. 1. For the management of

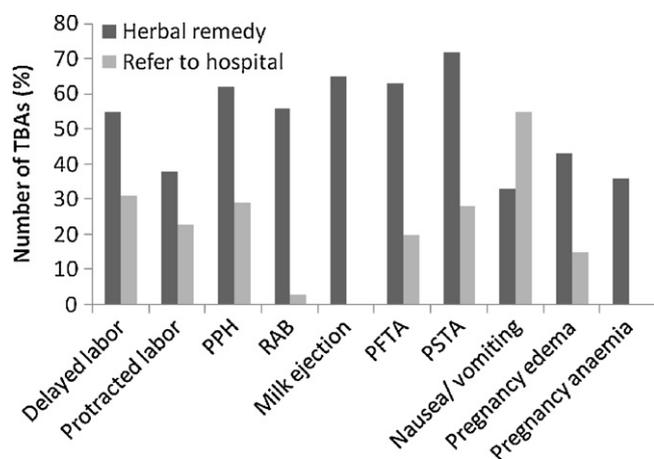


Fig. 1. A comparison between herbal remedy and hospital referrals in the management of pregnancy and post partum complications.

post partum milk ejection and pregnancy anaemia none of the TBAs referred patients to hospitals.

3.3. Interventions used by TBAs for the management of pregnancy and post pregnancy complications

Table 3 shows the interventions used by TBAs for the management of pregnancy complications. TBAs used several interventions such as herbal remedy, hospital referrals, abdominal massage and nutritional advice, for the management of pregnancy and post partum complications. The majority of TBAs used herbal remedies for the management of pregnancy and post pregnancy complications except for nausea and vomiting (Table 3).

For post term pregnancy, one hundred and ten TBAs (55%) used herbal remedy, 62 (31%) referred patients to hospital whereas 28 (14%) used divine intervention. For protracted labor, 72 (36%) administered herbal remedy, 46 (23%) referred patients to hospital, 40 (20%) administered herbs and massaged the lower abdomen, 32 (16%) prayed for the patient whereas 6 (3%) massaged the lower abdomen. Herbal remedy was used to manage post partum haemorrhage by 124 (62%) TBAs, 58 (29%) referred patients to hospital whereas 18 (9%) claim they had never handled post partum haemorrhage cases. For the management of retained after birth; 112 (56%) TBAs used herbs, 64 (32%) removed the placenta manually, 12 (6%) massaged the lower abdomen whereas 6 (3%) referred patients to hospital. One hundred and thirty TBAs (65%) administered herbal remedy to initiate milk ejection, 64 (32%) had never handled such patients whereas 6 (3%) advised their patients on adequate nutritional intake. To prevent first trimester abortion, 126 (63%) administered herbs, 40 (20%) referred their patients to hospital whereas 34 (17%) massaged the lower abdomen. During the second and third trimester, threatened miscarriages were managed through the administration of herbs by 144 (72%) TBAs whereas 56 (28%) referred cases to hospital. For the management of nausea and

Table 3
Interventions used by TBAs for the management of pregnancy complications. Total number of TBAs interviewed was 200.

Pregnancy complication	Herbs	Divine intervention	Refer to hospital	Lower abdomen massage	Herbs and massage	Removed manually	Nutritional advice	Never handled case
Delayed labor	55%	14%	31%	NIL	NIL	NIL	NIL	NIL
Protracted labor	36%	16%	23%	3%	20%	NIL	NIL	NIL
PPH	62%	NIL	29%	NIL	NIL	NIL	NIL	9%
RAB	56%	NIL	3%	6%	NIL	32%	NIL	NIL
Milk ejection	65%	NIL	NIL	NIL	NIL	NIL	3%	32%
PFTA	63%	NIL	20%	17%	NIL	NIL	NIL	NIL
PSTA	72%	NIL	28%	NIL	NIL	NIL	NIL	NIL
Nausea and vomiting	33%	NIL	55%	NIL	NIL	NIL	NIL	12%
Pregnancy edema	43%	NIL	15%	7%	NIL	NIL	4%	31%
Pregnancy anaemia	36%	NIL	NIL	NIL	NIL	NIL	64%	NIL

Key: PPH – post partum haemorrhage, RAB – retained after birth, PFTA – prevention of first trimester abortion and PSTA – prevention of second and third trimester abortion.

vomiting, 110 (55%) referred patients to hospitals, 66 (33%) administered herbal remedy whereas 24 (12%) had never handled such patients. Pregnancy edema was managed with herbs by 86 (43%) TBAs, while 62 (31%) did not handle such patients. Thirty (15%) TBAs referred edema patients to hospitals, while 14 (7%) massaged the affected area and 8 (4%) advised their patients on nutritional intake. One hundred and twenty eight (64%) TBAs managed pregnancy anaemia by advising their patients on the importance of balanced diet as compared to 72 (36%) who administered herbal remedy.

3.4. Client demographic data

A total of 20 clients were interviewed. Their demographic data in absolute numbers and percentages is presented in Table 4. Twelve (60%) were married, 5 (25%) single and 3 (15%) were widowed. Nearly all the clients were below age 35 years with significant number of them (40%) being between 26 and 30 years of age. Eleven of them (55%) had just delivered their first baby while the rest had more than one child. Only one client (5%) was illiterate, 15 (75%) had completed primary level of education, 3 (15%) had completed secondary education while 1 (5%) had attended college. During the course of gestation, 7 (35%) clients had consulted TBAs due to vaginal bleeding, 5 (25%) due to dizziness, 3 (15%) due to lower abdominal pain and 5 (25%) due to post term pregnancy. All the clients took their babies to health centres for post natal checkups with 8 (40%) of them taking the babies four weeks after delivery, 7 (35%) two weeks after delivery and 5 (25%) soon after delivery. During labor 14 (70%) reported having received psychosocial support from TBAs, 5 (25%) received support from relatives while 1 (5%) had no external support. Ten clients (50%) cited long distance to hospital as an impediment to health service access. Eight (40%) had to walk for 1 h before accessing a health facility whereas only 2 (10%) had to walk for thirty minutes. Three (15%) clients could access public

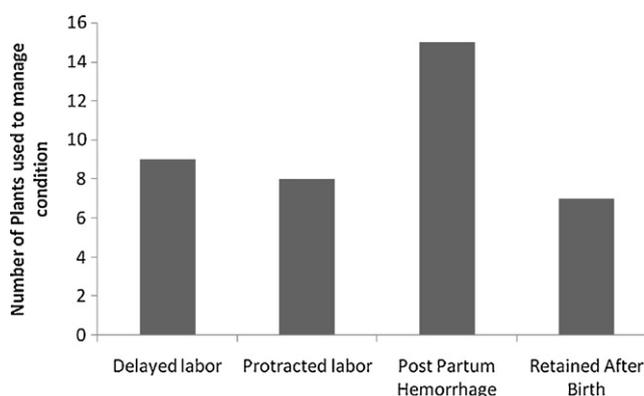


Fig. 3. The distribution of plants used for the management of labor and related complications.

means of transport all the time whereas 17 (85%) could only access transport means during daytime as shown in Table 4.

3.5. Medicinal plants

Fifty five plant species belonging to 31 families were identified (Table 5). Plant species belonging to *Euphorbiaceae* family were most commonly mentioned followed by *Lamiaceae*, *Compositae*, *Asteraceae*, *Fabaceae* and *Rutaceae* as shown in Fig. 2. Herbal remedies were mostly prepared as decoctions and concoctions. Water extracts were prepared just before use or before steam bath. Fig. 3 shows the distribution of plants used for the management of protracted labor and related complications. Nine plant species were identified for the induction of labor in post term pregnancies, 8 plant species for the augmentation of labor in protracted cases, 15 for the management of post partum haemorrhage, 7 for the management of retained placenta. Several plants were mentioned for the management of abortion. Out of the 55 identified plants, 29 were used for the prevention of either first trimester abortion (7 plants) or second and third trimester abortion (7 plants) or both (15 plants). Three plants were used to initiate milk let down, 24 plants were identified for the management of morning sickness, 19 for the management of pregnancy edema and 7 for the management of pregnancy associated anaemia (Table 5). The most common plant part used was the root (66%), followed by the leaf (20%), the stem (5%) and whole plant (9%). As expected, the most frequent route of administration as cited by the TBAs was oral at 83%, followed by topical application at 13% and nasal application at 4%.

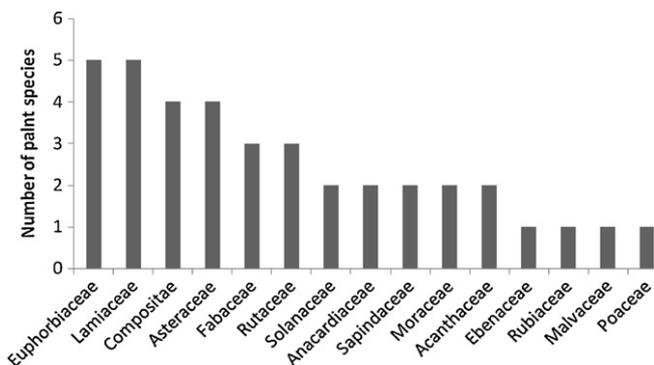


Fig. 2. Frequency of medicinal plant families in Machakos District, Kenya.

4. Discussion

Machakos District in Kenya has many practicing traditional birth attendants who rely on herbal remedies to assist their clients

Table 4

Client's demographic data and the reasons for TBA consultations. Total number of 20 clients were interviewed.

Married		Single		Widowed		Age group in years			
First baby		More than one baby		Education levels					
12 (60%)	5 (25%)	3 (15%)	16–20 4 (20%)	21–25 5 (25%)	26–30 8 (40%)	31–35 2 (10%)	36–40 1 (5%)		
11 (55%)	9 (45%)	1 (5%)	Never attended school		Completed primary education		Completed secondary education	Attended college	
Reasons for TBA consultation				Post natal clinic attendance					
Dizziness	Delayed labor	Vaginal bleeding	Lower abdominal pain		Immediately post partum	2 weeks post partum	4 weeks post partum		
5 (25%)	5 (25%)	7 (35%)	3 (15%)		5 (25%)	7 (35%)	8 (40%)		
Psychosocial support during home birth/delivery			Distance to nearest health facility			Access to public transport			
Helped by TBA		Helped by relatives		Helped oneself	2 h walk	1 h walk	30 min walk	Day time only	All the time
14 (70%)	5 (25%)	1 (5%)	10 (50%)	8 (40%)	2 (10%)	17 (85%)	3 (15%)		

(Machakos District Strategic Plan, 2005–2010). The present study revealed that the majority of practicing TBAs were females although quite a few (16%) of them were males. TBAs also enjoyed respect from members of the community not just because of their practice but also due to their age, most were between the ages 40 and 60 years (considered elderly citizens). More than half of them had practiced for more than five years, 64% of them having attended to more than two hundred pregnant women during the course of their practice. However, it is interesting to note that only 2 of the male TBAs have attended to more than 200 clients. Despite the general low level of education especially for female TBAs, all TBAs exhibited sound hygienic practices during herbal preparation. This is in agreement with what has been reported previously by Okello and Ssegawa (2007). Pregnant mothers tended to trust and consult the TBAs all the time due to their proximity and accessibility within the community. The TBAs on their part, according to this study managed pregnancy complications during the entire gestation period even in the absence of complications. TBAs monitored labor, supervised the actual parturition and visited both mother and infant during the immediate post partum period. This additional psychosocial support provided by TBAs during labor and the immediate post partum period is not available in health centres. It is this close relationship between the TBAs and her/his patients that is cherished by many rural women and explains their continued existence. Long distances to hospital and unreliable public transport system collectively contributed to 55% of the mothers opting to deliver at home despite the risks involved. A good number of mothers (35%) also claimed they could not afford the finances involved in hospital deliveries. This corroborates the findings of Barton and Wamai (1994) regarding the constraints that drive pregnant women in the rural areas to consult TBAs. Chuang et al. (2009) on the other hand, reported that in China, primipara and presence of chronic illnesses were some of the factors that led to herbal medicine consumption by pregnant women, especially young women aged 24–30 years, regardless of their generally high levels of education. This is in contrast to the results shown in this study, where most of the clients had low levels of education. In this study therefore, presence of readily available and affordable TBA services, provision of psychosocial support by TBAs during labor, and long distances to hospitals were all contributing factors to herbal medicine consumption by pregnant women. TBAs were consulted due to known complications like threatened abortion, delayed and protracted labor as well as lower abdominal pain, but they were also consulted due to normal pregnancy symptoms like dizziness, nausea and vomiting. All pregnancies that had exceeded 40 weeks were considered as cases of delayed labor. Most TBAs used herbal reme-

lies to initiate labor in these cases; however 31% immediately referred such patients to hospital. It is worth noting that most of those who referred patients to hospital had some level of education (completed either primary or both primary and secondary education). This perhaps enabled them appreciate the risks involved in administering herbs to pregnant mothers especially with a complication like delayed labor. Interestingly enough, a small number of TBAs relied on divine intervention (prayers to ancestors) to help them handle patients with delayed labor. The number of species reported to be used for the management of delayed labor were relatively few, indicating probably that the condition is rare within the community as reported also by Kamatenesi-Mugisha and Oryem-Origa (2007). A significant number of TBAs explained protracted labor as being due either to witchcraft or the pregnant woman having offended her mother-in-law. Despite this, several of them managed the complications with herbs while others referred cases to hospital.

Post partum haemorrhage (PPH) is on the other hand the single leading cause of maternal mortality and morbidity in developing countries and a concern even in developed countries (WHO, 2003). More than half of all maternal deaths occur within 24 h of delivery, mostly from excessive bleeding. Active management of the third stage of labor has been proven to reduce the incidence of PPH and involves interventions designed to facilitate the delivery of the placenta (afterbirth) by increasing uterine contractions and preventing PPH by averting uterine atony. In health centres PPH management is through administration of uterotonic agents, controlled umbilical cord traction and abdominal massage. In this study some of the TBAs reported abdominal massage as one of their methods for management of PPH. Taken that the number of species of plants used for the management of a condition is an indication of its frequency in the community, then PPH is the most common parturition related complication in this study as well as a leading cause of mortality. Unfortunately TBAs rarely use gloves while helping mothers during parturition. This is a dangerous practice as it is a contributing factor in HIV/AIDS transmission from mother to TBAs and vice versa. The TBAs could handle more than one pregnant woman routinely and could therefore transmit the virus from client to client. It is therefore important for national health professionals to advocate for skilled care at birth regardless of who is providing health care; educate the public on the need for adequate prevention and treatment of post-partum haemorrhage; incorporate active management of third stage of labor into the curricula for all skilled birth attendants. It is also imperative to train TBAs on dangers involved in the transmission of HIV/AIDS and other sexually transmitted diseases (STDs) during parturition and the importance

Table 5
Medicinal plants used in the management of pre, intra and post partum complications in Machakos District, Kenya.

Family/species/voucher specimen no.	Vernacular name	Plant part used	Route of administration	Dose	Condition managed
Euphorbiaceae/ <i>Ricinus communis</i> L. (CK001)	Mwaiki (Kamba)	R	O	300–600 ml once	DL, PL, RAB PPH
Ebenaceae/ <i>Euclea divinorum</i> Hiern (CK 018)	Mukinyai (Kamba)	L, R	O	young root chewed Clean the root, then chew	DL, PL, PPH, RAB
Lamiaceae/ <i>Ocimum Americanum</i> L. (CK033)	Mutaa (Kamba)	WP, L	O, T	75–300 ml added to bathing water	DL, PL, PPH, FTA, V, PE STA
Solanaceae/ <i>Solanum incunum</i> L. (CK 043)	Ngondu (Kamba)	R, L, WP	O, T	150–300 ml added to bathing water	DL, FTA, V STA
Rubiaceae/ <i>Pentads parvifolia</i> (CK035)	Kamumeti (Kamba)	R	O, N	Lick and sniff powder	V
Euphorbiaceae/ <i>Securinea virosa</i> (Roxb.) Baill (CK040)	Mukuulu (Kamba)	R	O	20–150 ml	V
Lamiaceae/ <i>Leonotis nepetifolia</i> (L.) R.Br. (CK 031)	Mulo (Kamba)	R	O	150 ml	V
Polygonaceae/ <i>Rumex usambarensis</i> (Engl.) Damm. (CK 039)	Kyuvi (Kamba)	R	O	5 ml	V
Euphorbiaceae/ <i>Euphorbia scheffleri</i> Pax (CK 020)	Kilembwa (Kamba)	S	O	Lick powder	V
Anacardiaceae/ <i>Lansea schweinfurthii</i> Engl. (CK 030)	Kithoona (Kamba)	R, B	O	10 g in any drink or in 300 ml of water	PA, V
Sapindaceae/ <i>Zanha Africana</i> (Radlk.) Exell (CK 054)	Mukolekya (Kamba)	R	O	15 g in 300 ml water	PE
Fabaceae/ <i>Erythrina abyssinica</i> Lam. Ex DC. (CK 017)	Kivuti (Kamba)	L, B	O	300 ml	PE, PA
Moraceae/ <i>Ficus sur</i> Forsk. (CK 022)	Mukuyu (Kamba)	B	O	300 ml	PE
Fabaceae/ <i>Acacia nilotica</i> (L.) Willd. Ex Delile (CK 002)	Musemei (Kamba)	B	O	5 g in 1.2 l of water	PE
Loganiaceae/ <i>Strychnos henningsii</i> Gilg. (CK 046)	Muteta (Kamba)	L	O, T	20–300 ml powder smear	DL, FTA, STA, V, PE, PA, PPH
Rutaceae/ <i>Clausena anisata</i> (Willd.) Hook. f. ex Benth (CK 012)	Muthiwa (Kamba)	L, R	O	Chew roots or 300 ml	DL, PL, RAB, PPH
Rutaceae/ <i>Zanthoxylum chalybeum</i> Engl. (CK 055)	Mukenea (Kamba)	R, L	O	Lick powder 150 ml	DL, FTA, V, PE
Malvaceae/ <i>Sida tenuicarpa</i> Vollesen K (CK 042)	Muemanzou (Kamba)	WP	O	150–300 ml	DL, PL, PE
Euphorbiaceae/ <i>Tragia brevipes</i> Pax (CK 024)	Kinyeelya (Kamba)	R	O	Chew roots	DL, PL
Fabaceae/ <i>Acacia tortollis</i> (Forsk.) Hayne (CK 003)	Mulaa (Kamba)	R	T	Apply on abdomen	PL
Umbelliferae/ <i>Steganotaenia araliaceae</i> Hochst (CK 045)	Muvuuvui (Kamba)	L, S, R	O	75–300 ml	PL, RAB
Acanthaceae/ <i>Barleria eranthemoides</i> R.Br. (CK 008)	Thangila (Kamba)	WP	O, T	5 g in 10 ml water powder applied	V, PPH
Verbenaceae/ <i>Lippia javanica</i> (Burm.f.) (CK 032)	Muthieti (Kamba)	R, S	T	Smear powder	PPH
Rutaceae/ <i>Fagaropsis hildebrandtii</i> (Engl.) Milne-Redh (CK 021)	Muvindavindi (Kamba)	R	O	150–300 ml	PPH, MLD, FTA, STA, V, PA
Euphorbiaceae/ <i>Croton macrostachyus</i> Hochst. ex Delile (CK 013)	Mukandu (Kamba)	L	O	300 ml	PPH
Sapindaceae/ <i>Pappea capensis</i> Eckl. & Zeyh. (CK034)	Muva (Kamba)	B	O	300 ml	PPH
Compositae/ <i>Aspilia mossambicensis</i> (Oliv.) Wild (CK 007)	Muti (Kamba)	L, R, WP, B	O	150–300 ml	PPH, FTA, STA, V, PE
Lamiaceae, <i>Hoslundia opposita</i> Vahl (CK 027)	Musovi (Kamba)	L, WP	O	20–150 ml	PPH, FTA, V
Lamiaceae, <i>Fuerstia Africana</i> T.C.E.Fr. (CK 025)	Kalaku (Kamba)	L, R	O	150–300 ml	PPH, FTA, STA, PA, PE
Asteraceae, <i>Bidens pilosa</i> L. (CK 009)	Munzee (Kamba)	WP, L	O	150–300 ml	PPH, MLD, FTA, STA
Asteraceae, <i>Vernonia glabra</i> (Steetz) Vatke (CK 051)	Musavuni (Kamba)	L, WP, R	O	150–300 ml	PPH, FTA, STA
Solanaceae, <i>Withania somnifera</i> (L.) Dunal (CK 053)	Mwianzo (Kamba)	L	O	300 ml	RAB
Capparidaceae, <i>Boscia angustifolia</i> A. Rich (CK 010)	Mwenzenze (Kamba)	S, L	O	150 ml	RAB, FTA, V
Asphodelaceae, <i>Aloe secundiflora</i> Engl. (CK 004)	Kiluma (Kamba)	S, R, L	O	10–150 ml	RAB, STA, V
Apocynaceae, <i>Carissa edulis</i> Vahl. (CK 011)	Mukawa (Kamba)	R	O	150–300 ml	MLD, FTA, STA, V
Compositae, <i>Vernonia brachycalyx</i> O. Hoffm. (CK 050)	Mukutu (Kamba)	R	O	150–300 ml	FTA, STA, V
Compositae, <i>Vernonia lasiopus</i> O. Hoffm. (CK 052)	Muvatha (Kamba)	R	O	150–300 ml	FTA, STA, V
Leguminosae-Papilionoideae, <i>Stylosanthes fruticosa</i> (Retz.) Alston (CK 047)	Muinga (Kamba)	R, L	O	300 ml	FTA, PE
Amaranthaceae, <i>Amaranthus graecizans</i> L. (CK 005)	Vuyaa (Kamba)	WP	O	300 ml	FTA
Orchidaceae, <i>Eulophia petersii</i> Rchb.f. (CK 019)	Kiongoa (Kamba)	R	O	300 ml	FTA
Pedaliaceae, <i>Sesamum angustifolia</i> (Oliv.) Engl. (CK041)	Luta (Kamba)	L, R	O	150–300 ml	FTA, STA, V, PE, PA
Compositae, <i>Sphaeranthus bullatus</i> Mattf. (CK044)	Musonzoia (Kamba)	L, R	O	300 ml	FTA, STA, V, PE
Moraceae, <i>Ficus thonningii</i> Blume (CK023)	Kiumo (Kamba)	S, L	T	Tied over abdomen	FTA, STA
Hydnoraceae, <i>Hydnora abyssinica</i> A. Braun ex Schweinf. (CK028)	Kimela (Kamba)	R	O	5–15 g in 300 ml water	FTA, STA
Lamiaceae, <i>Plectranthus barbatus</i> Engl. (CK036)	Muvou (Kamba)	L, R	O	300 ml	FTA, V
Lamiaceae, <i>Plectranthus cylindraceus</i> Hochst. ex Berth (CK 037)	Kio (Kamba)	WP	T	5 g in 300 ml applied topically	STA
Parmeliaceae, <i>Usnea usneoides</i> (CK 049)	Mwii waivia (Kamba)	R	O	300 ml	STA
Cambretaceae, <i>Terminalia brownie</i> (CK048)	Muuku (Kamba)	R, L, S	O	150–300 ml	STA, PE, PA
Asteraceae, <i>Kleinia squirosa</i> (CK 029)	Kingendya-thenge (Kamba)	S	O	150 ml	STA, PE
Asparagaceae, <i>Asparagus buchmannii</i> (CK 006)	U'usya (Kamba)	L, R	O	150 ml	STA, PE
Poaceae, <i>Cynodon dactylon</i> (CK 015)	Ikoka grass (Kamba)	WP	T	Tied over abdomen	STA, V
Compositae, <i>Helichrysum glumaceum</i> (CK026)	Kilavyutia (Kamba)	R	O	10 g in 300 ml water	PE
Convovulaceae, <i>Cuscuta kilimanjari oliv</i> (CK 014)	Kawamama (Kamba)	B	O	10 g in 300 ml water	PE
Anacardiaceae, <i>Rhus natalensis</i> Kraus (CK038)	Mutheu (Kamba)	R	O, N	Lick and sniff powder	V

Key: R – root, S – stem, L – leaf, B – bark, WP – whole plant, O – oral, T – topical, DL – delayed labor, PL – protracted labor, MLD – milk letdown, RAB – retained after birth, PPH – post partum haemorrhage, FTA – prevention of first trimester abortion, STA – prevention of second and third trimester abortion, V – vomiting, PE – pregnancy edema and PA – pregnancy anaemia.

of referrals in order to reduce maternal and child mortality. The use of any substance including herbs during the first trimester is inadvisable and most herbalists would not disagree (Huxtable, 1992). However the results of this study indicate that several pregnant women with signs of threatened abortion readily use herbal remedies, a finding similar to what was reported by Chuang et al. (2005, 2007). A large number of plants were identified for its treatment indicating that the condition is relatively common within the community. Considering that prevalence of infertility could be linked to previous abortion(s), patients who have undergone abortions or miscarriages in the hands of TBAs and/or through use of herbs could have their future reproductive function compromised by secondary infertility. Further research is definitely needed in this area. First trimester nausea and vomiting is one of the commonest pregnancy related symptoms and its persistence could lead to further complications like anaemia, as most mothers feed poorly during this period. The large number of medicinal plants used for the management of nausea and vomiting, as well as pregnancy edema does confirm that these complications are also common within the community.

Most countries with frequent usage of ethnomedical treatments have many traditional healers who prepare and administer these herbal remedies or provide preparation instructions to local populations (Kaido et al., 1997). Traditional healers including TBAs often proclaim the safety and efficacy of their herbs. However, scientific evidence is needed before advocating for general use of herbs particularly during pregnancy as this is a very delicate period prone to disruption by a variety of factors. The development of medicinal herbs however has always been hampered by the secrecy that surrounds their use and the reluctance of the traditional healers to divulge their secrets and knowledge (Kaido et al., 1997). Because of this lack of information, many clients of traditional healers do not have a scientific basis for using traditional herbs but rather resort to herbs as a consequence of their beliefs, possibly superstitious beliefs. This has in turn generated a lot of mistrust and suspicion among potential users. In this study for instance, some TBA reported having acquired their powers through divine intervention. Moreover all plants obtained in this study were harvested from the wilderness probably to conserve the knowledge within a small cycle of traditional practitioners and thus further the secrecy.

However, it is believed that traditional practitioners could be of great advantage to their communities if they were organized and encouraged to use only efficacious and safe herbal remedies while discouraging the use of ineffective and potentially toxic remedies (Kaido et al., 1997). Identification and documentation of such medicinal plants is the first step, followed by scientific investigations to evaluate their efficacy. This information can then be passed on to both the healers and users in a way that will promote both the safe use and conservation of such plants for future generations. A key goal of Kenya's vision 2030, as well as Millennium Development Goals involves the supply of adequate health care for all. In Kenya's case, this can be achieved faster by mainstreaming traditional healthcare practices into the national healthcare systems. This is also in agreement with what has been suggested by Kaido et al. (1997). The commonest plant part used was the root; thereby wasting the rest of the plant. It is recommended that scientific evaluation of the other plant parts (stem, leaves and fruits) should be undertaken to check for pharmacological activity. Such pharmacological evaluation should aim at showing not only the presence or absence of similar active ingredients but also comparative concentration of the ingredients in the other plant parts. The information so obtained should then be used to educate the traditional practitioners to involve other plant parts in their practice as a way of minimizing on natural resource depletion. In general, herbal practitioners should also be encouraged to conserve the medicinal plants through cultivation and seed banking as much

as possible. Proper documentation of all the information and data gathered is not only for conservation purposes but also to allow for further investigations that will benefit the users and health care sector as a whole. Considering that a large number of women in rural Kenya still deliver at home (National Health Sector Strategic Plan-II, 2005–2010) any additional scientific data that adds value to, and proves efficacy of these herbal remedies will go a long way in driving the health sector forward.

Our findings also confirm what is typical of most traditional practices that they tend to be passed on from generation to generation with practically no documentation. It is important to note that most TBAs (69%) acquire their knowledge from practicing family members and only a small number (18%) tend to learn from other practicing TBAs. This indicates a cultural practice being passed down from parents to children and within the community.

5. Conclusions

The study has documented TBA practices in the management of pregnancy complications in Machakos District of Kenya. Considering that TBA practices are not unique to Machakos District, or to Kenya, it is recommended that the health sector undertake to equip TBAs with health skills if they are to continue practicing. It is also imperative to encourage mothers to have skilled birth attendants during delivery in order to reduce maternal and child death. Of equal importance is the need for more research on the medicinal plants administered to pregnant women in order to acquire and establish scientific evidence that supports the possible benefits or determine the detrimental effects of such herbal remedies. There is need therefore for researchers to collaborate with traditional birth attendants and other herbal practitioners, national pharmaceutical regulatory agencies, policy makers and donors to ensure continued support for herbal medicine research.

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