

Survey of Traditional Birth Attendants in Sagbama and Southern Ijaw Local Government Areas of Bayelsa State



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Abstract

The indigenous people of Ijaw in Southern Nigeria are endowed with a deep culture of Traditional birth attendance, and they make use of medicinal plants in their practice to assist in ante- and post-natal cares. It is therefore imperative to document their rich knowledge to avoid its extinction. The work was performed with the aim of identifying and documenting the botanicals employed by the traditional birth attendants in some Ijaw tribes of Bayelsa State. The study was carried out by employing semi-structured questionnaires amidst personal interviews which were administered to forty-five traditional birth attendants (TBAs) between April and August 2019 to obtain information. Thirty-six medicinal plant species belonging to thirty-five genera within twenty-four families were mentioned by the TBAs mostly for labour induction (22.04%). Female fertility (14.47%) threatened abortion (13.49%) and foetal development (10.20%) were treated with *Ageratum conyzoides* (L.) L. (Compositae), *Vernonia amygdalina* Delile (Compositae), *Bryophyllum pinnatum* (Lam.) Oken and Acanthaceae, respectively making the Compositae the most important family. Of these, *V. amygdalina* was the most cited plant by the TBAs with frequency index (FI) of 44.44, while *B. pinnatum* ranked the next with FI=40.00. The survey provides an authentic data from TBAs for documentation which will be helpful for researchers in drug development as well as preserving the cultural heritage towards increasing the health manpower of the country.

Keywords: Ethnobotany; Herbal medicine; Ijaw; Traditional birth attendants

Abbreviations: TBAs: Traditional Birth Attendants; LGA: Local Government Area

Introduction

Throughout most African histories, traditional birth attendants (TBAs) play a major role in childbirth. Their roles vary from culture to culture attending to most of the child births in rural communities of emerging economies, despite having no formal training. They may be referred to as traditional midwives, community midwives or lady midwives, rendering assistance to expectant women during labour as well as in delivery with skills learnt by apprenticeship or personal experience rather than by formal training. In simple terms, they are pregnancy and childbirth care providers [1,2], who are highly utilized in rural communities despite the advances in modern health care. They are mostly elderly women; equipped with proven birthing skills and are accorded high esteem in the communities where they are

resident. They assist greatly in the prompt care of newly born babies and other post-partum cares [3,4]. Although training them is important, they do not require a specific professional requisite such as certificate [1] but are only considered as personal care givers who attend to requests for services. However, motherhood is a criterion or barometer to be qualified as a TBA by clients in most communities. Many TBAs are herbalists or other forms of traditional healers who attend to much of the maternal primary healthcare in many emerging economies as well as playing some defined health roles in a few advanced countries [5]. One of their advantages is engendering improvement in the outcomes of health due to their accessibility [6] as well as the relationship they share with their neighbors, especially those who can't access or afford modern medical care [7]. Their responsibilities include

prenatal care apart from the aforementioned birth attendance, post-partum care and care for the new born babies [1]. Most of them, however, usually may not provide any kind of antenatal care but are only invited to attend to labour and childbirth, which include cutting of umbilical cord and disposal of placenta [8]. Sometimes, they are a link between the rural areas and the modern health care system and most often choose to accompany women in labour to the hospital for childbirth. In summary, they are a part of the socio-cultural fabric of various communities and so, enjoy a wide spread social, cultural and religious acceptance [9]. A report indicated that they are responsible for approximately three-quarter of deliveries in Nigeria and this is expected to be more in the rural parts of the country [10]. In some Northern States of Nigeria, women have their delivery either with TBAs alone or in the company of their relatives [11]. Since majority of them are illiterates and shorn of formal training, the way some of them attend to deliveries may pose a risk to the health and survival of both mothers and babies [4]. Some of these practices arising from their lack of formal education include poor environmental sanitary conditions lack of knowledge of prevention of mother-to-child HIV transmission and ignorance [12]. These may lead to high maternal morbidity and mortality rate. But despite these disadvantages, TBAs are accepted by the community and remain the first point of contact for many during pregnancy and child birth.

Traditional birth attendants are highly utilized in rural communities in many developing countries, in spite of the advances in the field of medicine. Some studies reported that patronage of TBAs is as a result of inaccessibility to quality modern health system, lack of skilled birth attendants, education level and clients' poverty level [13] and that these have caused some of them to engage in dangerous delivery practices that contribute to high mortality rate [14-16]. Despite this drawback associated with TBAs, they can still play important roles in combating maternal deaths if properly trained and incorporated into the health care system of the country. The World Health Organization has advocated for their training since the 1970s as a strategy to reduce the maternal and neonatal mortality and morbidity during home deliveries [17]. Many countries across the continents as well as non-governmental agencies have initiated efforts geared towards training TBAs in basic and emergency obstetrics care, family planning and other maternal health topics so that they are able to attend effectively to women in labour and to refer them immediately to hospitals when complications develop. This is opined to fortify the bridge linking orthodox system of health delivery services to the rural areas, which will also enhance the opportunity for good health outcomes for mothers and children [18]. This training will also serve as a tool of reaching interior rural dwellers with quality health care services in developing countries, hence, trying to decrease mortality and morbidity [19]. When trained, TBAs can carry out low-risk roles in their environment stimulating huge impact on the health of mothers and children. An example is the role of trained TBAs in the administration of

misoprostol to women immediately after child birth in some rural communities of a few African countries for prevention of post-partum haemorrhage [11,20]. Although TBAs have not been successful in tackling complications in obstetric, training them in referral system will help them recognize dangerous symptoms in pregnancy in time and take their patients to the hospital, thus acting as a quick intervention to safeguard public health [21-24]. Recognition of TBAs, collaboration with/and their involvement in clinic duties will strengthen the referral system and communication and will eventually reduce maternal and neonatal mortality and morbidity. The interest in plant medicine has not dwindled as more plants are re-emerging as a significant source of new pharmaceuticals, and scientists have realized that the study of ethnomedicine which accommodates these plants can provide solutions to the enormous challenges faced in the search for health improvement and this is where the contributions of ethnobotanists are imperative [25]. The survey therefore is aimed to identify as well as document the plants utilized by TBAs among the Ijaw tribes of Sagbama and Southern Ijaw Local Government of Bayelsa State.

Methodology

Study area

Bayelsa is a state in the Niger Delta region of Nigeria having the capital in Yenagoa. The state is geographically located within latitude 4°15' North and latitude 5°23' South. It also lies within longitudes 5°22', West and 6°45' East. Comprising of eight local government areas, the neighbouring states include Rivers, Delta, and Lagos States (Figure 1).

The vegetation is characterised by mangrove forest and in the north, it has a thick forest with arable lands for cultivation. The study was executed purposively in two towns each within Sagbama (Sagbama, Ogobiri) and Southern Ijaw (Amassoma, Oporoma) Local Government Areas. Sagbama Local Government Area (LGA) in the Bayelsa West Senatorial District, has its headquarter situated in Sagbama town with some of its part lying within the Bayelsa National Forest. It comprises an area of 945 km² and a population of 187,146 at the 2006 census. Southern Ijaw LGA, on the other hand, has its headquarter domiciled in Oporoma town. The area has a coastline of approximately 60 km on the Bight of Benin.

Study population

A total of forty-five Traditional birth attendants (TBAs) were surveyed using a semi-structured questionnaire which was designed to obtain information on plants used in their profession. Every participant was selected purposefully on the basis of their experience in line with the study objectives.

Data collection

Routine field peregrinations were made from April to August 2019 to the study location. Informants were forty-five recognised Traditional birth attendants (TBAs) in their various communities. These TBAs were the ones recognized and recommended by

the communities. The procedures utilized involved the use of semi structured questionnaire amidst liberal interviews of these informants. The interview was carried out by the authors. The questionnaire was divided into four sections; Section A contained Demographic information, section B contained information on the practice of TBA (how knowledge was acquired, years of training, how clients got to know them, collaboration and issue of referral. Section C had to do with techniques such as method of diagnosis, if they manipulate body organs and if plants are used or not) while section D was information on plants employed which included the name of plant, uses by TBAs, method of preparation, administration, and conservation status. Informal conversation arising from this method on site was established after informal

consent was obtained. A competent guide who evinced profound understanding of the culture and language was also recruited. A comprehensive information on the local names, parts of plants employed, and preparation methods were recorded, and plants cited were immediately collected after which their identification and authentication were done by Dr. A.T Oladele of the Department of Forestry and Wildlife Management University of Port Harcourt, Nigeria. Voucher number for each plant species was also given at the instant of deposit of the plant samples at the herbarium of the Department of Pharmacognosy and Herbal Medicine, Faculty of Pharmacy, Niger Delta University, Nigeria. "The Plant List, 2013" was also employed for further taxonomic confirmation.

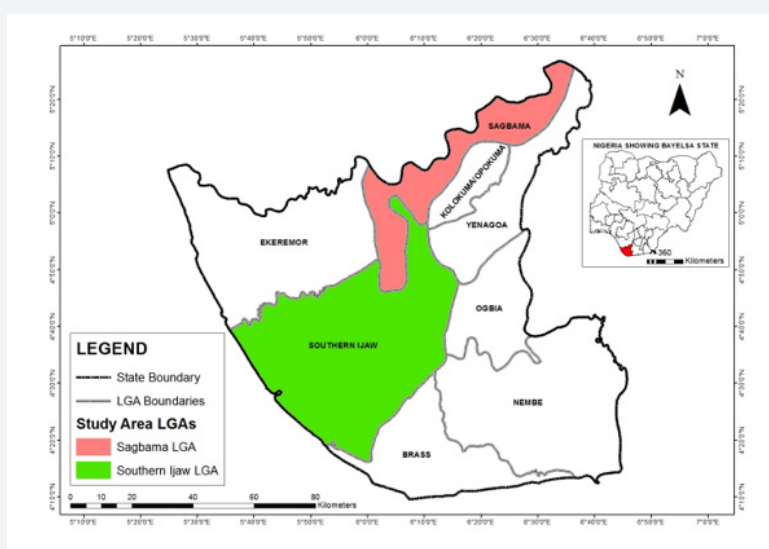


Figure 1: Map of Bayelsa state showing the study areas.

Data analysis

The following ethnobotanical analytic tools were employed

Frequency index (FI): This is expressed by determining the percentage of frequency of citations for one botanical species by respondents [26] and calculated as

$$FI = \frac{\text{number of respondents that cited the species}}{\text{sum of all respondents}} \times 100$$

Familial Use value

The level of significance of a plant family is determined by its familial use value [26] which is obtained by the sum of the number of species cited in each family for various categories of uses.

Informant consensus

The level of significance of each species for a definite use is obtained by evaluating its respondents' consensus [26], which is obtainable directly from the sum of informants that mentioned the species.

Results

Demographical characteristics of the traditional birth attendants

More than nine-tenth (93%) of TBAs are married which is comparable to a related study in which the majority were married [27]. About 61% of them are within the age range 41-60 years (Table 1), while only 11% are below. Almost 70% of them had a formal education with a chunk of them holding secondary school certificates (46.4%) (Table 1).

Practice of traditional birth attendants

Almost half (45.8%) of the traditional birth attendants (TBAs) claimed to receive their knowledge as a gift from God, while approximately 17% only responded that they received it through an informal training. Most of those who were trained (75%) spent 11-20 years to be properly equipped (Table 2). Most of the TBAs (87.5%) refer complicated cases to the hospitals for better treatment (Table 2).

Table 1: Demographical characteristics of the traditional birth attendants in Sagbama and Southern Ijaw LGAs of Bayelsa State.

Demography	Percentages		
	20-40	41-60	61-80
Age (years)	10.7	60.7	28.6
Sex	Male	Female	
	0	100	
Religion	Christianity	Islam	Traditional worshipper
	90	0	10
Marital status	Married	Single	Widow/widower
	96	4	30.7
Education	Secondary	Primary	None
	46.4	21.4	32.2

Table 2: Practice of traditional birth attendants in Sagbama and Southern Ijaw LGAs of Bayelsa State.

Practice	Percentage				
	Training	Inheritance	God's Gift	Inheritance/Learnt	Inheritance/God's Gift
Knowledge	16.7	12.5	45.8	8.3	16.7
Years of Training	10-Jan	20-Nov			
	25	75			
Getting patients	Other patients	Patients' friends/families	Advertisement	All	
	21.4	64.3	0	0	
Collaboration with midwives	Yes	No			
	16.7	83.3			
Referral of complicated cases	Yes	No			
	87.5	12.5			

Techniques employed by the traditional birth attendants

70% of them are able to manipulate body organs with their hands (Table 3). Approximately 96% employ the use of plants in their practice (Table 3).

Hands (46.4%) are mostly employed by TBAs and almost

Table 3: Techniques employed by the traditional birth attendants in Sagbama and Southern Ijaw LGAs of Bayelsa State

Techniques	Percentage			
	Hand/ Physical Observation	Palpitation	Mystical Means	Hand/ Physical Observation Palpitation/
Method of diagnosis	46.4	10.7	7.1	39.3
	Yes	No		
Manipulation of organs	66.7	33.3		
	Yes	No		
Use of plant	95.7	4.3		

Plants employed by traditional birth attendants

The survey reported 36 plant species belonging to 24 plant families (of which about three quarter are herbs) (Table 4 & 5, Figure 2) which are employed by the TBAs among the Ijaw tribe in

Southern Ijaw and Sagbama LGAs of Bayelsa State. The prevalent plant families were Compositae, Piperaceae and Acanthaceae eliciting familial use values of 4, 3 and 3, and percentage frequency values of 15.63 9.36, 9.36, respectively (Table 5).

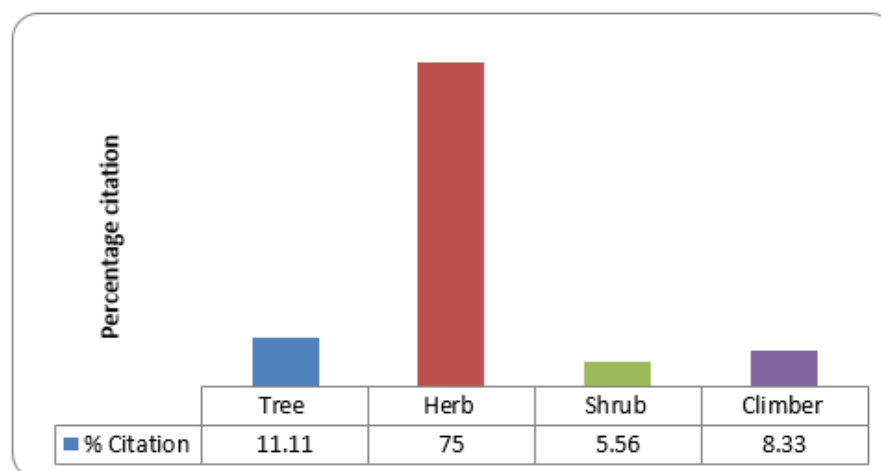


Figure 2: Plant forms used by the traditional birth attendants in Sagbama and Southern Ijaw LGAs of Bayelsa State.

Table 4: Medicinal plants cited by the traditional birth attendants in Sagbama and Southern Ijaw LGAs of Bayelsa State.

Family	Botanical Name	Common Name	Local Name	Plant Habit	Uses	Voucher Number	Part	Method of Preparation	Administration	Conservation Status	FI	Reported Ethnomedicinal Uses
Acanthaceae	<i>Acanthus montanus</i> (Nees) T. Anderson	False thistle, Leopard's Tongue	Konoweimimi	Herb	Sperm count increase. Foetal development	NDUP 200	L	Chew, cook with mud fish and plantain	Oral	A	35.56	Dysmenorrhoea, Nigeria [28] Threatened abortion, False labour [29] Cameroon
	<i>Asystasia gangetica</i> (L.) T. Anderson	Chinese violet, coromandel or creeping foxglove.	Ndouzhabu	Herb	Urethra discharge	NDUP 201	W	Infusion	Oral	A	13.33	No report
	<i>Alternanthera sessilis</i> (L.) R.Br. ex DC.	sessile joyweed, dwarf copper-leaf	Ayapede	Herb	Labour induction	NDUP 202	L	Cook with fish + Unripe plantain	Oral	A	17.78	No report
Amaranthaceae	<i>Amaranthus spinosus</i> L.	spiny amaranth, spiny pigweed, prickly amaranth or thorny amaranth	Green plant	Herb	Post-partum haemorrhage	NDUP 203	L	Squeeze leaf to extract juice	Oral	A	6.67	Increase in prolactin level and breast milk production in post-partum mothers. [30] induction of abortion India [31]

	<i>Cyathula achyranthoides</i> (Kunth) Moq.	Pega pega	Oberi	Herb	Threatened abortion	NDUP 204	S	Chew 7 seeds	Oral	A	13.33	No report
Anacardiaceae	<i>Spondias mombin</i> L.	hog plum	Iginiyan	Tree	Male circumcision, post-partum haemorrhage	NDUP 205	L/S	Squeeze and apply, heat	Topical Sit bath	A	26.67	Oxytocic activity [32]. Nigeria. Child-birth aid, post-partum infection, contraceptive activity [33] Nigeria
Annonaceae	<i>Xylopia aethiopica</i> (Dunal) A. Rich	Ethiopian pepper	Angi	Climber	Threatened abortion	NDUP 206	Fr	Add bark of Ceiba pentandra and soak in alcohol	Oral	LA	11.11	Oxytocic. [34] Nigeria.
Bignoniaceae	<i>Newbouldia laevis</i> P. Beauv.	Tree of life, Fertility tree	Orusa	Tree	female infertility	NDUP 207	L	7 leaves cooked with native soup	Oral	LA	6.67	Pro-fertility [35]
Caricaceae	<i>Carica papaya</i> L.	Pawpaw, papaya	Popou	Herb	Labour contraction	NDUP 208	L	Squeeze leaves with Aframomum melegueta seeds	Oral	A	11.11	Uterus contraction [36] India. Oxytocic effect. [37] Nigeria.
Cleomaceae	<i>Cleome rutidosperma</i> D.C.	Spider plant	Agbalala	Herb	Foetal development	NDUP	L	Squeeze leaves and apply	Vagina	A	13.33	No report
Commelinaceae	<i>Commelina diffusa</i> Burm.f.	Day-flower, small blue flower	Ekpise, Ikpise	Herb	Female infertility	NDUP 209	Fl	Oil from flower + 1 house fly + 1 seed of Aframomum melegueta seed	Penis	A	20.00	No report

Compositae	<i>Aspilia africana</i> (Pers.) C.D.Adams	haemorrhage plant	Younkore	Herb	Management of Pregnancy, Postpartum Haemorrhage, female infertility	NDUP 210	L	Squeeze and insert in female + 3 pieces of native chalk	Vagina Oral	A	35.56	Contraceptive effect. [38]
	<i>Ageratum conyzoides</i> (L.) L.	billy goat weed	Furotuoru	Herb	Labour induction	NDUP 211	L	Squeeze leaf + salt	Oral	A	40.00	Navel pain in children [39]
	<i>Melanthera scandens</i> (Schumacher & Thonn.) Roberty		Opoh	Herb	female infertility	NDUP 212	L	Infusion	Sit bath	A	6.67	No report
	<i>Spilanthes abyssinica</i> Sch.Bip. ex A.Rich.		Kala awou Igina	Herb	Labour induction	NDUP 213	Fl	7 flowers + Aframomum melegueta seeds	Oral	A	17.77	No report
	<i>Vernonia amygdalina</i> Delile	Bitter leaf	Kiri-olubo	Shrub	Menstrual pain, female infertility	NDUP 214	L	Squeeze leaf, filter + salt Squeeze	Oral Vagina	A	44.44	Fertility enhancing [40] Placenta expulsion, postpartum uterine contraction, lactation induction and postpartum haemorrhage [41] Malawi & Uganda.
Convolvulaceae	<i>Ipomoea batatas</i> (L.) Lam.	Sweet potatoe	kpokodokun	Shrub	Labour induction		L	Leaf + native soup	Topical	S	6.45	Prolactin and milk production postpartum mothers. [42] Indonesia
Crassulaceae	<i>Bryophyllum pinnatum</i> (Lam.) Oken	life plant, air plant, maternity plant, love plant, miracle leaf, cathedral bells, mother of thousands, leaf of resurrection plant	Oke-beri	Herb	Irregular menstruation, threatened abortion, healing of navel in newborn	NDUP 215	L	Leaf + oil + salt + potash	Oral	A	38.71	restlessness in labour [43] detachment of the umbilical cord [44]

Cucurbitaceae	<i>Telfairia occidentalis</i> Hook.f.	fluted gourd, fluted pumpkin	orgu	Herb	Anaemia in pregnancy	NDUP 216	L	Squeeze leaf + tomato paste	Oral	A	38.71	Anaemia Pregnant Women. [45] Nigeria
Euphorbiaceae	<i>Alchornea cordata</i> Benth.	Christmas Bush	Ibubufuro	Herb	Sperm count Increase	NDUP 217	L	Infusion	Oral	A	2.22	No report
Lamiaceae	<i>Ocimum gratissimum</i> L.	Scent leaf	Furo kana	Herb	Dysmenorrhoea	NDUP 218	L	Squeeze leaves	Vagina	A	12.9	Oxytocic Effect [34] Nigeria.
Leguminosae	<i>Senna occidentalis</i> (L.) Link	Negro coffee, Septicweed, Coffee-senna,	Zuru-zuru, opuru, oweikeme	Herb	Hardening of stomach in pregnancy, Dysmenorrhoea	NDUP 219	F	1 Kernel seed + 7 fruits	Tie on the stomach Oral	A	12.9	To ease labour [46] Sub-Saharan Africa
	<i>Stylosanthes fruticosa</i> (Retz.) Alston	African stylo	Ologbo toru	Herb	Female infertility	NDUP 220	L	Leaf + 7 Aframomum melegueta seeds soaked in alcohol	Tie on the stomach Oral	A	19.35	No report
Malvaceae	<i>Sida acuta</i> Burm.f.	English hornbeam leaved Sida; broom weed	Apian	Herb	Labour induction	NDUP 221	L	Squeeze-leaves	Oral	A	22.58	Aids labour [47] Nigeria
	<i>Ceiba pentandra</i> (L.) Gaertn.	Silk Cotton Tree, True kapok tree, White silk cotton tree, Kapok tree, White cotton	Aseisagba	Tree	Foetal development Sperm count Increase	NDUP 222	L B	Squeeze leaves with palm wine + native chalk, Soak bark in alcohol	Topical	S	12.9	None but contraceptive activity validated [48] Indonesia.
Meliaceae	<i>Entandrophragma cylindricum</i> (Sprague) Sprague	Sapele Mahogany	Kowon	Tree	Labour induction	NDUP 223	R	Grind, squeeze + native spice and soak in water or alcohol	Oral	S	12.9	No report

Piperaceae	<i>Peperomia pellucida</i> (L.) Kunth.	Shiny bush Silver bush	Owour-abagha, Ofoni-buo	Herb	High blood pressure in pregnancy	NDUP 224	L	Decoction	Oral	A	9.68	No report
	<i>Piper guineense</i> Schumach. & Thonn.	Ethiopian pepper African pepper	Aziza	Climber	Dysmenorrhoea, Threatened abortion Proper positioning of foetus	NDUP 225	Se'L	Grind seeds Cook leaves or soak in water Squeeze leaves	Oral Vagina	A	29.03	Female infertility and aphrodisiac [49]
	<i>Piper umbellatum</i> L.	Cow-foot leaf	Otubari	Herb	Female infertility	NDUP 226	L	Cook with unripe plantain	Oral	LA	4.44	No report
Phyllanthaceae	<i>Phyllanthus amarus</i> Schumach. & Thonn.	gale of the wind, stone-breaker, or seed-under-leaf	Tonk bein	Herb	Foetal development	NDUP 227	L	Squeeze leaves	Oral	A	22.58	Sterility and childbirth aid [50] Nigeria. Improves libido and fertility in man [51]
Poaceae Portulacaceae	<i>Chloris pilosa</i> Schumach. & Thonn.	Wire grass	Angolo tuo	Herb	Post partu haemorrhage	NDUP 228	R	Wash and insert	Vaginal	A	9.68	No report
	<i>Portulaca oleracea</i> L.	duckweed, little hogweed, or parsley	Ayapede oke-beri	Herb	Threatened abortion	NDUP 229	L	Eat leaf, soak leaf in alcohol	Oral	A	12.9	Abnormal uterine bleeding [52]
Solanaceae	<i>Physalis angulata</i> L.	Ground cherry	Gilori, Kpori-kpori	Herb	Irregular menstruation, motion sickness	NDUP 230	L	Infusion	Oral	LA	19.35	Pro fertility, male [53] Nigeria Postpartum haemorrhage, aches, infection [54].
Urticaceae	<i>Laportea ovalifolia</i> (Schumach. & Thonn.) Chew		Ambe	Herb	Cutting placenta, labour induction	NDUP 231	L	Cook + drink with water, Infusion	Oral	S	9.68	No report
	<i>Musanga cecropioides</i> R.Br. ex Tedlie	Umbrella tree	Akpowie	Herb	Threatened abortion	NDUP 232	L	Infusion	Oral	A	13.33	Oxytocic Effect [55] Nigeria.
Vitaceae	<i>Cissus aralioides</i> (Welw. ex Baker) Planch.	Five fingers	soranbrag-basa	Climber	Labour induction	NDUP 233	L	Squeeze leaf to wash stomach	Topical	A	16.13	None but decrease circulating oestrogen level observed [56] Nigeria.

Table 5: Plant families utilised by the traditional birth attendants in Sagbama and Southern Ijaw LGAs of Bayelsa State.

S/NO.	Family	Number of species	% Frequency	Familial Use value
1	Acanthaceae	3	9.36	3
2	Amaranthaceae	2	6.25	2
3	Anacardiaceae	1	3.13	1
4	Annonaceae	1	3.13	1
5	Bignoniaceae	1	3.13	1
6	Caricaceae	1	3.13	1
7	Cleomaceae	1	3.13	1
8	Convolvulaceae	1	3.13	1
9	Commelinaceae	1	3.13	1
10	Compositae	5	15.6	5
11	Crassulaceae	1	3.13	1
12	Cucurbitaceae	1	3.13	1
13	Euphorbiaceae	1	3.13	1
14	Lamiaceae	1	3.13	1
15	Leguminosae	2	6.25	2
16	Malvaceae	2	6.25	2
17	Meliaceae	1	3.13	1
18	Piperaceae	3	9.36	3
19	Phyllanthaceae	1	3.13	1
20	Poaceae	1	3.13	1
21	Portulacaceae	1	3.13	1
22	Solanaceae	1	3.13	1
23	Urticaceae	2	6.25	2
24	Vitaceae	1	3.13	1

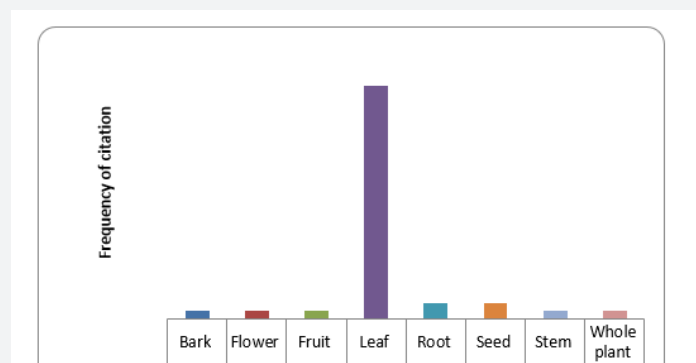


Figure 3: Plant parts utilised by the traditional birth attendants in Sagbama and Southern Ijaw LGAs of Bayelsa State.

The frequency index (FI) revealed that the prevalent plant species cited by the TBAs were *V. amygdalina* (FI, 44.44) followed by *A. conyzoides* (L.) L. (Compositae), ((FI, 40.00) *Bryophyllum pinnatum* (Lam.) Oken, *Crassulaceae*, *Telfairia occidentalis* Hook.f. (Cucurbitaceae) with FI, 38.71 and *Acanthus montanus* (Nees) *T.*

Anderson (Acanthaceae) and *Aspilia africana* (Pers.) C.D. Adams (Compositae) with FI, 35.56 (Table 4). This shows that 50% of the prevalent plant species falls within the Compositae family which still emphasizes its importance in the TBA profession. Leaf (76.92%) was the most widely employed plant part (Figure 3).

Conditions treated by Traditional Birth Attendants

The prevalent conditions managed by the TBAs include induction of labour (22.04%), followed by female infertility (14.47), threatened abortion (13.49%) and foetus development (10.20) among others (Table 6). This is similar to a survey carried out in Malawi and Mexico where safe delivery and solutions to some child complications are the goals of training TBAs [57,58]. The most cited medicinal plants for female infertility were *V. amygdalina* (25%), *Stylosanthes fruticosa* (Retz.) Alston (Leguminosae) (20.45%) and *Commelina diffusa* Burm.f. (Commelinaceae) (20.45%). *Bryophyllum pinnatum* which was the most cited for threatened abortion (26.67%) out of a

total six plants has also been reported to be useful in managing restlessness in labour safe herb in pregnancy [43]. Next to this is *P. guineense* (23.33%) which has been found to be a pro-fertility and an aphrodisiac agent in male [49]. *Acanthus montanus* (34.48%) and *Phyllanthus amarus* Schumach. & Thonn. (Phyllanthaceae (34.48%) were the most cited for foetal development. *Acanthus montanus* was earlier reported to treat threatened abortion [28,29] and this lends credence to its use for the purpose of foetal development in this study, while *P. amarus* has been reported in ethnomedicine for sterility, childbirth aid for improving libido [50,51]. Oral (63.64%) administration followed by topical (13.64), and vagina (11.36) were commonly employed (Figure 4).

Table 6: Importance of medicinal plants on some conditions treated by the traditional birth attendants in Sagbama and Southern Ijaw LGAs of Bayelsa State.

S/No.	Ailments	Plant	No. of Citation	% Citation of Plants within Specific Ailment	Total Number of Citations	% Citation for Ailments
1	Anaemia during pregnancy	<i>Telfairia occidentalis</i> Hook.f.	18	100	18	5.92
2	Contraction in hard labour	<i>Carica papaya</i> L.	5	100	5	1.64
3	Cutting of placenta	<i>Laportea ovalifolia</i> (Schumach. & Thonn.) Chew	5	100	5	1.64
4	Dysmennorrhoea	<i>Vernonia amygdalina</i> Delile	9	45.00	20	6.57
		<i>Ocimum gratissimum</i> L.	6	30.00		
		<i>Senna occidentalis</i> (L.) Link	5	25.00		
5	Foetal development	<i>Acanthus montanus</i> (Nees) T. Anderson	11	34.48	31	10.20
		<i>Phyllanthus amarus</i> Schumach. & Thonn.	11	34.48		
		<i>Cleome rutidosperma</i> D.C.	6	19.35		
		<i>Ceiba pentandra</i> (L.) Gaertn.	3	9.68		
6	Healing of navel in new born	<i>Bryophyllum pinnatum</i> (Lam.) Oken	3	100	3	0.97
7	High blood pressure during pregnancy/ labour	<i>Peperomia pellucida</i> (L.) Kunth.	5	100	5	1.64

8	Labour induction	<i>Ageratum conyzoides</i> (L.) L.	18	26.87	67	22.04
		<i>Sida acuta</i> Burm.f.	11	18.03		
		<i>Alternanthera sessilis</i> (L.) R.Br. ex DC.	8	13.11		
		<i>Cissus aralioides</i> (Welw. ex Baker) Planch.	8	13.11		
		<i>Spilanthes abyssinica</i> Sch.Bip. ex A.Rich.	8	13.11		
		<i>Entandrophragma cylindri- cum</i> (Sprague) Sprague	6	9.83		
		<i>Ipomoea batatas</i> (L.) Lam.	3	4.92		
9	Female infertility	<i>Vernonia amygdalina</i> Delile	11	25	44	14.47
		<i>Stylosanthes fruticosa</i> (Retz.) Alston	9	20.45		
		<i>Commelina diffusa</i> Burm.f.	9	20.45		
		<i>Aspilia africana</i> (Pers.) C.D.Adams	6	13.64		
		<i>Melanthera scandens</i> (Schum- ach. & Thonn.) Roberty	3	6.82		
		<i>Newbouldia laevis</i> P. Beauv.	3	6.82		
		<i>Piper guineense</i> Schumach. & Thonn.	3	6.82		
10	Sperm count increase	<i>Acanthus montanus</i> (Nees) T. Anderson	5	62.5	8	2.63
		<i>Ceiba pentandra</i> (L.) Gaertn.	2	25.00		
		<i>Alchornea cordata</i> Benth.	1	12.5		
11	Irregular menstruation	<i>Physalis angulata</i> L.	3	50.00	6	1.97
		<i>Bryophyllum pinnatum</i> (Lam.) Oken	3	50.00		
12	Management of pregnancy	<i>Aspilia africana</i> (Pers.) C.D.Adams	2	100.00	2	0.66
13	Male circumcision	<i>Spondias mombin</i> L.	6	100.00	6	1.97
14	Morning sickness	<i>Physalis angulata</i> L.	6	100.00	6	1.97
15	Positioning of foetus	<i>Piper guineense</i> Schumach. & Thonn.	3	60.00	5	1.64
		<i>Piper unbellatum</i> L.	2	40.00		
16	Post-partum haemorrhage	<i>Aspilia africana</i> (Pers.) C.D.Adams	8	33.33	24	7.89
		<i>Spondias mombin</i> L.	8	33.33		
		<i>Chloris pilosa</i> Schumach. & Thonn.	5	20.83		
		<i>Amaranthus spinosus</i> L.	3	12.5		

17	Soft stomach during pregnancy	<i>Senna occidentalis</i> (L.) Link	2	100.00	2	0.66
18	Threatened abortion	<i>Bryophyllum pinnatum</i> (Lam.) Oken	12	26.67	41	13.49
		<i>Piper guineense</i> Schumach. & Thonn.	11	23.33		
		<i>Musanga cecropioides</i> R.Br. ex Tedlie	6	13.33		
		<i>Portulaca oleracea</i> L.	6	13.33		
		<i>Cyathula achyranthoides</i> (Kunth) Moq.	6	13.33		
		<i>Xylopi aethiopica</i> (Dunal) A. Rich	5	10.00		
19	Urethra discharge	<i>Asystasia gangetica</i> (L.) T.Anderson	6	100.00	6	1.97
Total			304		304	

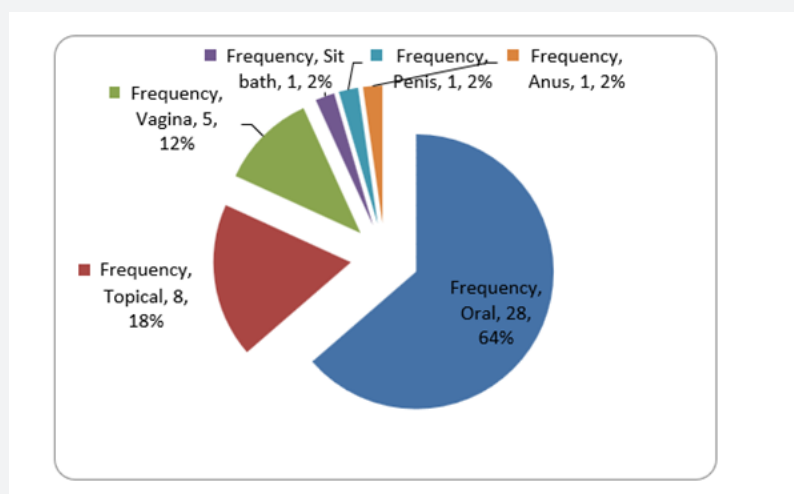


Figure 4: Route of Administration employed by the traditional birth attendants in Sagbama and Southern Ijaw LGAs of Bayelsa State.

Discussion

The gap in age tends to be a threat to the future of TBA practice as the younger generations appear to demonstrate increasing apathy [57,58] towards acquiring such vital knowledge. Most of the younger generations are not interested in acquiring the knowledge probably because it smacks off obsolete and social backwardness. The extant knowledge is mostly restricted to the older generation who serves as an embodiment of deep wisdom and rich experience of nature acquired over time [59]. This result is in contrast with a reported work where massagers held degrees up to Ph.D. in massaging therapy [60]. There is an increasing need for our traditional medicine practitioners to be properly trained formally, which in turn will advance their practice, earning the respect and confidence of their clients as well as the society at large.

The result of this study is at variance to an earlier report on ethnozoological study involving TMPs of Bayelsa State, where the majority of the informants inherited it from their fore fathers [61]. This connotes that TBAs' practice is mainly given to the informant as a gift which explains why they cherish the gift and are always willing to use it for the betterment of mankind. Most of them also see this as a trade secret and are not willing to divulge the knowledge of the practice to others, but this may spell danger to the future of this practice in Nigeria. Urgent attention is needed to arrest this situation especially by the Government by recognizing the practice and the practitioner as well as organizing formal training for them as it occurred in New Zealand for the massagers [60]. Since approximately 90% of the TBAs refer complicated cases to hospitals, it is a plus to health care system because instead of pretending that they can treat all ailments associated with childbirth, it will benefit the patients if what can't

be handled by them is referred to the modern hospitals. Because of this important role they play in the society, there is an urgent need to integrate this form of traditional medicine practitioners (TBAs) into with the mainstream practice so as to benefit the populace; there is also a need for formal training especially on hygiene and referral cases so as to enlighten the remaining TBAs who are yet to practice referral system. The fact that almost all of them employ the use of plants in their practice underpins the therapeutic importance of plant in human health and its acceptability rate in ethnomedicine [62]. The family Compositae previously known as Asteraceae and popularly referred to as the aster, daisy, composite, or sunflower family, is one of the vast and widely distributed flowering plant families. It consists of 1600 genera and 24,000 species. Some plants in this family such as *Bidens pilosa* L. and *V. amygdalina* Delile have been reported to have uterotonic property as well as myometrial smooth muscle cell contractility [63,64]. Compositae has also been cited as the most prevalent family in a survey of plants for family planning purpose [65] as well as for other ailments [66,67]. Likewise, *Piper guineense* Schumach. & Thonn. and *Justicia insularis* T. Anders in the Piperaceae and Acanthaceae families have also been reported to elicit uterine muscle contraction and induce ovarian folliculogenesis, respectively [68,69]. The use of Compositae family is therefore important in the practice of TBA profession.

Aqueous extract of *V. amygdalina* was reported to exhibit an increased uterine contraction in rats [70,71], and has been suggested to be a good candidate for oxytocic activity [72]. In a similar study, its aqueous extract showed uterine contraction amplitude that was similar to ergometrine which justifies its labour induction capacity and invariably its use by TBAs. The importance of utilising leaves over the other plant parts for drug preparation cannot be over emphasized as these custom aids conservation given their high regeneration capacity compared to other parts such as the roots and barks whose overutilization can lead to the death of the entire plant. The leaves can also be found throughout the year unlike flowers, fruits and seeds which are seasonal. The use of leaves will therefore guarantee sustainable supply of the plant drugs. This phenomenon reflected in earlier reports of similar studies [66,73]. The utilization of leaves may have contributed to the conservation status of these plants as more than three-quarter of them are still in abundance, with about a tenth each either less abundant or scarce (Figure 3). Among the plants cited for induction of labour, *A. conyzoides* was the most important having been cited the most (26.87%), followed by *Sida acuta* Burm.f (Malvaceae) (18.03%). These two plants have been previously reported for uterine contraction [39,47]. Others like *Spilanthes abyssinica* Sch.Bip. ex A. Rich (Compositae) (13.11%) and *Entandrophragma cylindricum* (Sprague) Sprague (Meliaceae) have no similar or related reports on them. None of the seven plants mentioned for female infertility has earlier been reported for the purpose, except for *P. guineense* which has pro-

fertility effect in male [49]. Oral route of administration does not need the expertise of a trained health care practitioner nor likely to cause any form of complications. This can be administered by self-devoid of supervision by TBAs [74]. A similar observation was made in an earlier report [75].

Therapeutic activities of medicinal plants are dependent on their chemical constituents. Even if a plant possesses a good activity, its toxicity level must be assessed before it can be a good candidate for drug development. Generally, from the frequency index (FI) the most important plants were *V. amygdalina*, *A. conyzoides*, *B. pinnatum*, *T. occidentalis* and *A. montanus* and *A. africana* should show some margins of safety before they can be recommended for use. Many chemical constituents such as epivernodalol, vernodalol, vernoniosides A4, B2, B3, D and E, vernomydin and vernodalol have been isolated from *V. amygdalina* [76]. Several studies have reported the relative safety of the plant, for instance, no clinical signs, toxicity, or adverse effects nor any morphological alterations in liver and kidney were observed but the concomitant use of the plant with antidiabetic drugs must be discouraged. Also, it should be discouraged in early pregnancy so as to avoid abortion. However, it is a good option in medical abortion when the safety of the mother is threatened in pregnancy [77]. *A. conyzoides* extracts at 500 and 1000 mg/kg was reported to induce liver, kidney and haematological disorders probably as a result of the presence of pyrrolizidine alkaloids contained in the plant [78]. These alkaloids include lycopsamine, dihydrolycopsamine, acetyl-lycopsamine and their N-oxides [79] and are known hepatotoxins and tumorigens. Other constituents include 5,6,7,8,3',4',5' -heptamethoxyflavone, and 5,6,7,8,3' -pentamethoxy-4'-5'-methylenedioxyflavone [80]. Therefore, doses lower than 500mg/kg should be encouraged. The LD₅₀ of *B. pinnatum* being above 5g/kg is an indication of possible safety which is 130 times more than most recommended daily doses for adults [81]. kaempferol rhamnosides such as kaempferitrin, kaempferol 3-O- α -L-(2-acetyl) rhamnopyranoside-7-O- α -L-rhamnopyranoside, afzelin and α -rhamnoisorobin are among the compounds that have been isolated from the plant [82]. Studies have shown that the leaf extract of *T. occidentalis* is relatively non-toxic on acute and sub-chronic exposures at low to moderate doses but could be harmful to the testes with prolonged oral exposure at high doses (2000mg/kg) [83]. Kaempferol-3-O-rutinoside, kaempferol [84], α - and β - amyryns have been isolated from this plant [85]. The leaves of *A. montanus* was reported to have the likelihood of exhibiting renal and hepatic impairment with high dosages (400-800 mg/kg) [86]. Some of the chemical constituents present in it include syringic acid, acanmontanoside, decaffeoylverbascoside, verbascoside, isoverbascoside, leucosceptoside A, and ebracteatoside B [87]. The lethal dose (LD₅₀) of *A. africana* was reported to be 6.6 g/Kg body weight which suggests that it can be said to be relatively safe. However, in long term administration, dosages of \geq 500mg/kg may be toxic

[88]. Chemical constituents present in this plant include squalene [89], 3 β -O-[α -rhamnopyranosyl-(1 \rightarrow 6)- β -glucopyranosyl-(1 \rightarrow 3)-ursan-12-ene, 3 β -Hydroxyolean-12-ene and 3 β -acetoxyolean-12-ene [90], Summarily, these plants are relatively safe and can serve as important leads in drug discovery.

Conclusion

This work showcased the major contribution of the TBAs to maternal care especially through childbirth and labour induction. A number of plants cited by the TBAs are not only used locally but globally. The ethnomedicinal claims of some of them have been verified experimentally, while a lot more of them still require verification. There is no doubt that useful lead(s) in drug discovery can evolve from them.

Sagbama and Southern Ijaw Local Government Areas of Bayelsa State

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Competing Interest

The authors declare that they have no conflicts of interest.

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