“The medicine from behind”: The frequent use of enemas in western African traditional medicine

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ABSTRACT

Ethnopharmacological relevance: Purgative enemas form an integral part of African traditional medicine. Besides possible benefits, serious health risks of rectal herbal therapy have been described in literature. To design appropriate health education programs, it is essential to understand traditional herbal practices and local perceptions of health and illness. Little is known about the herbal ingredients of enemas in Sub-Saharan Africa and consumers’ personal reasons to use them.

Aim of the study: To analyze the importance of enema use with regard to plant species used and illnesses treated in West and Central Africa, to understand the local health beliefs that underlie frequent enema use and to evaluate which recipes and practices could be beneficial or harmful.

Materials and methods: We extracted data from 266 ethnobotanical questionnaires on medicinal (in particular women’s health and childcare) and ritual plant use in Ghana, Benin and Gabon. Plants mentioned during interviews were vouchered and identified in herbaria. Health issues treated by means of enemas were ranked according to the number of plant species used for a specific illness. We compared our results with findings of medical research on benefits and risks of enema use in Sub-Saharan Africa.

Results: We recorded ca. 213 different plant species used in hundreds of recipes for rectal insertions, mostly in Ghana and Gabon. Stomachache, abdominal pain, female infertility and birth facilitation were treated with the highest number of plants species. Cleansing the intestines of young children to promote their health by getting rid of ‘dirt’, instead of treating constipation, was an important cultural practice that required the rectal application of herbal medicine, as well as other cultural bound health issues like stimulating children to walk at an early age. Tradition, the bitter taste of herbal medicine and the rapid effect of enemas were frequently mentioned reasons for enema use.

Discussion and conclusions: Literature indicates that although enemas can help to improve the hygienic conditions of a household with young infants, frequent enema use can pose serious risks like direct toxicity caused by harmful ingredients, mechanical injury and infections. In Africa, enemas containing herbal medicine are common methods of administering herbal medicine for a variety of diseases, rather than just medicinal treatments for constipation as previously thought. Health professionals should be aware of the extent of, and motivation behind enema use to develop culturally appropriate education programs, especially targeted at vulnerable groups such as elderly people, parents of young infants and pregnant women.

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1. Introduction

Purgative enemas form an integral part of African traditional medicine. The rectal insertion of herbal extracts have been reported among different ethnic groups by anthropologists, ethnographers and medical researchers (e.g., Dunn et al., 1991; Gottlieb, 2004; Harley, 1941; Labouret, 1925; Lagercrantz, 1939). The practice of administering medicine from behind is also vividly portrayed in West and Central African sculpture (De Smet, 1992a, 1992b). Data on the prevalence of enema usage have been published in particular for South Africa, where regular enema use was reported by 63% of black hospital patients in Johannesburg (Segal...
et al., 1979) and traditional medicine was administered rectally to 89% of the babies under three months of age in a study carried out in KwaZulu-Natal (Bland et al., 2004). Besides possible benefits of traditional enemas, such as the effective cleansing of the bowels or an alternative to oral medicine (De Smet, 1983), serious health risks of this rectal drug therapy have been described in the medical literature. Possible adverse effects include direct toxicity caused by poisonous ingredients, injury of the rectal wall, infections and dehydration (Dunn et al., 1991; Moore and Moore, 1998; Saltzman et al., 2012; Savage and Hutchings, 1987; Savage, 1982; Segal et al., 1979; Van der Horst, 1964).

For the design of appropriate health education intervention programs, it is essential to understand emic perceptions of health and illness. Traditional beliefs and domestic practices may inhibit education campaigns and influence mortality rates, especially when they concern vulnerable groups like pregnant women and young infants (Cleland and van Ginneken, 1988; Pitts et al., 1996; Towns and van Andel, 2014; Towns et al., 2014a). Health professionals in Africa need to be aware of the extent of enema use, frequently used (herbal and synthetic) ingredients and consumers’ motivations for the administration of herbal medicines through rectal infusions, so that effective health messages can be targeted at mothers and other caregivers (Bland et al., 2004; Savage, 1982).

In spite of the concerns raised by medical researchers on the toxicity of traditional enemas, little is known about their herbal ingredients and consumers’ personal reasons to use them. In their otherwise detailed account of non-prescribed medications given to South African infants (Bland et al., 2004: 121) describe the organic constituents as ‘Traditional Zulu medicines [which] contain many ingredients including herbs and animal extracts [..] bought from local street traders or obtained from traditional healers’, without further specification of the species involved. Although mostly self-administered, herbal enemas in South Africa are apparently often obtained from (and prepared by) others, who do not often divulge their constituents to either consumers or researchers (Dunn et al., 1991; Savage, 1982).

Here we present an overview of the plant species used as ingredients for enemas in Ghana, Benin and Gabon. Our research questions were the following: (1) what plant species are used in enemas?; (2) for which illnesses are they used?; and (3) what is the motivation of herbal medicine consumers to use this application method?

Using data from general ethnobotanical inventories and market surveys on medicinal and ritual plant use in the three African countries, we aim to understand the local health beliefs that underlie frequent enema use in West and Central Africa. We compared our results with findings of medical research on enema use in Sub-Saharan Africa to evaluate which recipes and practices encountered during our research could be beneficial or harmful. This insight can help medical professionals to improve their public health education and discourage harmful cultural practices without rejecting beneficial traditional knowledge and practices.

2. Methods and Materials

Data were collected during general ethnobotanical inventories in the framework of the Leiden University research program ‘Plant use from the Motherland: linking Afro-Caribbean and West-African Ethnobotany’. This research was carried out in Ghana, Benin and Gabon and focused on medicinal plants in trade, and plant used for women’s health, child care and rituals. Data were drawn from semi-structured interviews held with rural and urban women, medicinal herb vendors and traditional healers of both sexes in southern Ghana (2010), south and central Benin (2011) and throughout Gabon (2012). The questionnaires focused on general medicinal plant use with regard to women’s health (13 people interviewed in Ghana, 42 in Benin and 39 in Gabon), child care (Benin: 43, Gabon: 39), and plants used for ritual purposes or traditional religion (Ghana: 17, Benin: 35, Gabon: 38). The questionnaires on women’s health and child care included free-listing questions on the most frequent health conditions among women and children for which medicinal plants were used and specific questions on prevalent diseases such as post-partum infections among women and diarrhea among children (Towns, 2014). Questionnaires on ritual plant use included free-listing questions on the most common rituals for which people used plants and specific questions on magic plant use (Quiroz, 2015). Respondents were selected by snowball sampling. Local interpreters were hired to translate local languages into French or English when needed. Interviews were only held after we carefully explained the nature and the objective of our research and obtaining prior informed consent from our informants, who received a small remuneration to compensate for their time.

Directly after the completion of each questionnaire, we accompanied our informants into the field to make voucher collections of the plants mentioned during the interview, using standard botanical methods. After successfully pairing vernacular plant names to corresponding vouchers for later identification, we only made additional collections of repeated species when in doubt. Plants cited by market vendors were purchased directly on their stalls. We obtained the necessary permits for research, plant collection and export of specimens from the relevant governmental bodies of each country. Duplicates of collected specimens were identified and deposited at the Ghana Herbarium (GC) at Legon, the Herbarium National du Bénin (BEN) in Abomey Calavi, and the Herbarium National du Gabon (LBV) in Libreville. A full set of specimens was deposited at Naturalis Biodiversity Center (L). Scientific and author names were updated by using The Plant List (www.thepantlist.org). Vernacular names mentioned during interviews for which we could not collect voucher specimens because the specific plants were absent, were matched when possible with scientific names by means of literature (Akoëgninou et al., 2006; Burkhill, 1985–2010; Irvine, 1961; Raponda-Walker and Sillans, 1961).

The quantitative results of the market surveys in each of the three countries have been published (Van Andel et al., 2012; Quiroz et al., 2014; Towns et al., 2014a), as well as the outcomes of our research on medicinal plant use for women’s health (Towns and van Andel, 2014; Towns, 2014; Van Onselen, 2011) and child care (Towns et al., 2014a). Outcomes of the interviews with traditional healers are published by Myren (2011), Quiroz and Van Andel (2015) and Quiroz (2015). In this paper, we will focus on traditional enema use mentioned by our informants during the interviews in the above-mentioned publications. Data concerning the use of herbal enemas, plant species involved, diseases treated and personal motivations to use enemas were extracted from the questionnaires, organized in Excel tables and analyzed quantitatively.

3. Results

3.1. Enema devices

Until recently, enemas in Ghana were administered by means of a long-necked cultivar of the bottle gourd, Lagenaria siceraria (Fig. 1A). The local name for this type of gourd, bentua in the Ghanaian Twi language, also means ‘enema’. Gourds with long, straight necks were likely specifically domesticated for their rectal use (Burkhill, 1985). The gourd was filled with liquid medicine by a hole in the broad part of the calabash, after which the neck of the gourd was inserted for rectal administration.
The gourd was inserted into the rectum. The liquid percolates into the bowel by another hole in the apex of the neck of the gourd, see also De Smet (1992a). Nowadays, most people use rubber bulb-style syringes (Fig. 1B–D), which are squeezed to siphon herbal mixture and squeezed again to empty its contents into the rectum. The devices are sold in large quantities on open air markets and packaged formally and sold in modern pharmacies in large African cities.

Our Ghanaian informants reported that elder people still used the gourd bentua, because it was cheaper (ca. 0.14 US$ per gourd) than the rubber one and prevented air from entering the bowels, which could lead to flatulence. Younger people preferred the flexible rubber devices, as they were easier to handle, although they acknowledged the side effects of intestinal gas. After administering the enema, known by our francophone African respondents as lavement or purge, the patient ‘needs to shake his waist and then everything comes out’, referring to the emptying of the bowels.

### 3.2. Herbal ingredients of enemas

In total we recorded ca. 213 different plant species that were used in enemas in the three countries combined, of which 26 could not be identified to family level due to a lack of botanical specimens or good quality voucher material. Only 30 species were used in two or more countries. In the Appendix, all plants used in enemas are listed with their scientific names, family, used plant parts, vernacular names, and associated illnesses and health conditions. Well-represented plant families in enema recipes included Leguminosae (18 species), Euphorbiaceae (12 spp.), Malvaceae (11 spp.), Apocynaceae (8 spp.), Compositae and Lamiaceae (both 7 spp.). Most plants were boiled in tap water together, strained, and the lukewarm mixture was then siphoned into enema devices for insertion. Many enema recipes were mixtures and frequently contained ginger (Zingiber officinale) and red pepper (Capsicum annuum), combined with one or more additional species (Fig. 2).

In Ghana and Gabon, enemas were more frequently mentioned than in Benin, with many more cited plant species (Table 1). Generally, enemas were more often used to apply herbal medicine for women’s health and childcare than for ritual healing ceremonies. Most recipes for enemas were mentioned during interviews with rural women. In Benin, only 14% of the respondents mentioned recipes for rectal insertion concerning women’s health or infant care; this figure dropped to 1% when ritual medicine was concerned. Most of these recipes were recorded among Tchá-speaking people near Banté in Central Benin, suggesting that enemas are only locally popular. This forms a sharp contrast with southern Ghana, where enema use was mentioned in all interviews on women’s health by people of different ethnic origin.

Black soap made from ashes of burnt leaves and kernels of the African oil palm (Elaeis guineensis), was a common ingredient in all three countries. Apart from herbal substances, by far the main ingredient of enema recipes, Ghanaian enema recipes occasionally contained crushed synthetic camphor, potash (made from cocoa pod ashes) and mouse excrement, while a few Gabonese preparations included biting ants, living fish and forest animal parts.

| Country | Nr. of species | Nr. of respondents (%) | Nr. of respondents (%)
<table>
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<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women’s health/child care</td>
<td>Ritual uses</td>
<td></td>
</tr>
<tr>
<td>Ghana</td>
<td>115 (3 unidentified)</td>
<td>13 (100)</td>
<td>7 (41)</td>
</tr>
<tr>
<td>Benin</td>
<td>10 (0 unidentified)</td>
<td>12 (14)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Gabon</td>
<td>117 (23 unidentified)</td>
<td>57 (73)</td>
<td>12 (32)</td>
</tr>
</tbody>
</table>

Fig. 1. Different types of enema devices in Western Africa: (A) Long-necked cultivar of Lagenaria siceraria (Ghana); B. Rubber bulb syringe with removable nozzle (Ghana); C. Package of flexible PVC ear syringe (Gabon); D. PVC ear syringe, known in Gabon as poire traditionelle. Pictures: C.A. van der Hoeven.

Fig. 2. Comic painting, sold at the craft market in Libreville, Gabon, depicting doctor Koffi who offers treatments against AIDS with enemas. When the patient asks him whether he is sure about his ‘vaccin’, he replies: ‘no virus escapes from red pepper’. The two onlookers contemplate: ‘abstinence seems better for us’. Picture by C. van der Hoeven.
et al., 2014a). Another CBD treated with enemas was residential gynecological abnormality similar in description to uterine fibroids, a severe twist to the bowel loop that causes obstruction, abdominal swelling and pain, a condition that can be relieved by administering an enema (Leeuwen, 1985). The common argument that enemas are an effective measure to combat constipation (De Smet, 1992b) is disputable. Regular enemas may not provide additional benefit to oral laxative medicines administered to children with chronic and severe constipation, according to a randomized controlled trial completed in the Netherlands (Bongers et al., 2009). Since the number of plants used for a certain ailment can be considered as a proxy for the relative importance of this ailment to herbal medicine consumers (Van Andel et al., 2014; Heinrich et al., 1998), we can conclude that in our study area, constipation is not a major health problem treated with enemas, although more plants are used for this condition in Ghana than in Benin or Gabon. In South Africa, perceived constipation was the most commonly given reason for enema administration to babies in the study done by Bland et al. (2004). Although 46% of infants in the study of were given enemas for this reason, it was unlikely that the majority of them were clinically constipated, especially as all of them were receiving some breast milk. The researchers thought it more likely that caregivers erroneously perceived that the baby was constipated if stools had not been passed for one or two days.

### 3.3 Illnesses treated by means of enemas

Table 2 lists the most frequently cited illnesses and other health issues for which enemas were cited, based on the number of plant species reported. There are striking differences in the health issues for which people use rectal therapies between the three countries. Pain in the stomach and other parts of the abdomen was most cited by Ghanaians, as well as facilitate childbirth and to treat sexually transmitted infections. Gabonese participants also frequently listed stomachache as a reason to give an enema, but regular intestinal cleanses was the most imported health issue treated with rectal medicine, followed by several cultural bound diseases (CBD). The main CBD was not considered an illnesses but a highly esteemed health condition: the ability of children to walk early, also an important issue in Ghanaian traditional medicine, is seen as a sign that a child is developing normally and gaining independence, which will enable the mother to rest (Towns et al., 2014a; Vossen et al., 2014). The main symptom of the CBD fesse rouge was a red, irritated bottom caused by sitting in the dirt, microbes, or heat entering the child's body through the anus. Treatments included applying herbal ointments and herbal enemas (Towns et al., 2014a). The CBD la rate was characterized by a tender, swollen left side of the body and a skinny overall physical build, which resembled the symptoms of sickle-cell disease (enlarged spleen), a common yet neglected illness in sub-Saharan Africa (Grosse et al., 2011; Towns et al., 2014a). Another CBD treated with enemas was ‘zchaw’, a gynecological abnormality similar in description to uterine fibroids and cysts (Towns, 2014). In Gabon, a total of 50 plant species (which is 43% of the total number of species used in enemas in that country) were used for cultural bound diseases. If we consider the traditional view that regular intestinal cleansing is a healthy practice also as a cultural bound health issue, the proportion of species used for CBDs would rise to 62%. The few enema recipes reported in Benin also concerned the intestinal cleansing of young children.

Relatively few informants reported enema remedies to treat constipation. While intestinal cleansing was frequently treated with rectal medicine, including a variety of plants, these applications were not often associated with obstructed bowels. The latter were mostly treated with laxative plant decoctions that were taken orally (Towns, 2014).

### 3.4 Motivation for enema use

When we asked our Ghanaian respondents why they chose to apply enemas rather than other application methods, the most common response was: "We use enemas because it is our tradition”. Another frequently heard explanation was that the herbs were too bitter or too poisonous to drink, and therefore rectal application was preferred. Especially young children were reported to be reluctant to drink bitter herbal teas. In these cases enemas were seen as an alternative to oral intake of herbal medicine. Some respondents used enemas to purge their children to ensure regular defecation. Less often cited motivations included that enemas worked faster than oral or topical medicine, improved the patient’s appetite, and also served to prevent diseases. Several informants interviewed on ritual plants use remarked that people who do not produce bodily secretory products (notably sweat, but also urine and feces) are likely to be sorcerers. The fear of parents that their offspring might be accused of sorcery could also be a reason for the frequent administration of enemas to children. In Gabon, the same herbal decoction was sometimes applied both orally and rectally to treat the same ailment. When enemas were given for health promotion, such as the strengthening of pregnant women in Ghana, they were administered twice daily. In Gabon, mothers gave their newborns enemas to cleanse their meconium, the first stool before they started to digest breast milk. The majority of the people we interviewed had access to regional health care facilities.

### 4. Discussion

#### 4.1 Perceived or real constipation?

Our data suggest that the popularity of rectally administered medicine, herbal ingredients, ailments treated with enemas, and emic motivation to administer them differ among ethnic groups and geographical regions in Africa. According to Van der Geest (2003, 1998), enemas are popular in Ghana because constipation is prevalent. Due to their fiber-rich diet, Ghanaians often suffer from sigmoid volvulus, a severely twisted bowel loop that causes obstruction, abdominal swelling and pain, a condition that can be relieved by administering an enema (Leeuwen, 1985). The common argument that enemas are an effective measure to combat constipation (De Smet, 1992b) is disputable. Regular enemas may not provide additional benefit to oral laxative medicines administered to children with chronic and severe constipation, according to a randomized controlled trial completed in the Netherlands (Bongers et al., 2009). Since the number of plants used for a certain ailment can be considered as a proxy for the relative importance of this ailment to herbal medicine consumers (Van Andel et al., 2014; Heinrich et al., 1998), we can conclude that in our study area, constipation is not a major health problem treated with enemas, although more plants are used for this condition in Ghana than in Benin or Gabon. In South Africa, perceived constipation was the most commonly given reason for enema administration to babies in the study done by Bland et al. (2004). Although 46% of infants in the study of were given enemas for this reason, it was unlikely that the majority of them were clinically constipated, especially as all of them were receiving some breast milk. The researchers thought it more likely that caregivers erroneously perceived that the baby was constipated if stools had not been passed for one or two days.

### Table 2

<table>
<thead>
<tr>
<th>Diseases</th>
<th>Total</th>
<th>Ghana</th>
<th>Benin</th>
<th>Gabon</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>nr of spp.</td>
<td># spp (%)</td>
<td># spp (%)</td>
<td># spp (%)</td>
</tr>
<tr>
<td>Stomachache, abdominal pain</td>
<td>31</td>
<td>24 (21)</td>
<td>0 (0)</td>
<td>16 (14)</td>
</tr>
<tr>
<td>Intestinal cleanse</td>
<td>28</td>
<td>2 (2)</td>
<td>8 (80)</td>
<td>21 (18)</td>
</tr>
<tr>
<td>Female infertility</td>
<td>28</td>
<td>14 (12)</td>
<td>0 (0)</td>
<td>14 (12)</td>
</tr>
<tr>
<td>Birth facilitation</td>
<td>26</td>
<td>16 (14)</td>
<td>0 (0)</td>
<td>11 (9)</td>
</tr>
<tr>
<td>CBD stimulate children to walk early</td>
<td>23</td>
<td>13 (11)</td>
<td>1 (10)</td>
<td>9 (8)</td>
</tr>
<tr>
<td>Painful menstruation</td>
<td>21</td>
<td>7 (6)</td>
<td>0 (0)</td>
<td>16 (14)</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>20</td>
<td>5 (4)</td>
<td>0 (0)</td>
<td>15 (13)</td>
</tr>
<tr>
<td>CBD la rate</td>
<td>20</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>16 (14)</td>
</tr>
<tr>
<td>CBD fesse rouge</td>
<td>18</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>19 (16)</td>
</tr>
<tr>
<td>Strengthening pregnant women and fetus</td>
<td>17</td>
<td>12 (10)</td>
<td>0 (0)</td>
<td>8 (6)</td>
</tr>
<tr>
<td>Sexually transmitted infections (STIs)</td>
<td>16</td>
<td>16 (14)</td>
<td>0 (0)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Fever, convulsions</td>
<td>15</td>
<td>12 (10)</td>
<td>2 (20)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Abortion</td>
<td>14</td>
<td>11 (13)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Impotence, aphrodisiac</td>
<td>14</td>
<td>14 (12)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Intestinal worms</td>
<td>11</td>
<td>2 (2)</td>
<td>0 (0)</td>
<td>10 (8)</td>
</tr>
<tr>
<td>Meconium removal</td>
<td>10</td>
<td>0 (0)</td>
<td>2 (20)</td>
<td>7 (6)</td>
</tr>
<tr>
<td>Pregnancy problems</td>
<td>9</td>
<td>10 (9)</td>
<td>0 (0)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Constipation</td>
<td>8</td>
<td>7 (6)</td>
<td>1 (10)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Induce menstruation</td>
<td>7</td>
<td>7 (6)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>
4.2. Cleansing the bowels to remove ‘dirt’

In Ghana, a regular movement of the bowels is not only seen as a sign of good health, but also as a condition for it (Van der Geest, 2003). According to Van der Horst (1964), African parents have a deep-rooted fear that their children are being poisoned by their intestinal contents, so enemas are seen as a weekly health routine from infancy to old age. When children fail to pass a stool every day, an enema is given as a corrective measure (De Smet, 1992b). ‘Cleaning the baby out’ by intestinal washes is believed to cool the child down and protect it by purging harmful evil influences. The idea that regular purges promote the health of children, prevent childhood diseases, give strength, and aid growth (Abbiw, 1990), was also prevalent among the respondents of our study. Health perception among in Ghana is belly-oriented (van der Geest, 2003). Most illnesses are believed to originate from inside the abdomen, when dirt that stays a long time in the bowels starts to ferment and heat, affecting the blood and spreading throughout the body, breaking out as piles, ulcers and skin rashes (Osie, 1978). The frequent use of enemas throughout sub-Saharan Africa suggests that such beliefs are prevalent in many African cultures.

Mothers in our study gave herbal enemas to their newborn babies in order to go to work in the daytime, or to provide extra time for housework. In rural communities, where diapers and cleaning agents are unavailable or unaffordable, enemas are an effective method to improve the hygienic conditions of the household by ensuring that young children defecate on a predictable schedule (Gottlieb, 2004). Mothers wanted to prevent their babies from passing their stool when they were with the babysitter, as the latter did not want to clean up feces and mothers needed the babysitter in order to go to work in the field. However, none of our respondents mentioned the use of enemas to make their children defecate on a predictable schedule.

4.3. Potential benefits of enema use

In rural communities, where diapers and cleaning agents are unavailable or unaffordable, enemas are an effective method to improve the hygienic conditions of the household by ensuring that young children defecate on a predictable moment. In this way, mothers can avoid having their children covered in their own dirt and becoming infected by gastrointestinal microbes. Early toilet training among children is essential under such conditions (Gottlieb, 2004). According to De Smet (1983), rectal administration can also be a useful alternative to oral dosing for systemic drugs, since various agents are known to reach effective plasma levels when given rectally, as they are not metabolized in the gastric pathway. When patients are vomiting, oral fluids are also harder to administer than enemas. Enemas containing essential oils may reduce bacterial pathogens in the intestines, as they have shown to do so in vitro in swine intestinal tract (Si et al., 2006). Several species of Lamiaeaeae and Zingiberaceae, known to contain many essential oils, were reported by our informants to be used in enemas. Unfortunately, positive aspects of traditional practices, such as increasing the intake of wild vegetables by pregnant women and young mothers in childbed, are being jeopardized by administering them through enemas. Several of these wild greens could have substantial benefits, as long as they are used as food additives, which are also a common practice in West and Central Africa. The same accounts for the most of the other herbal medicines: oral administration may be a little less effective and taste bad, but it is by all means a safer method of applying medicine.

4.4. Potential risks of enema use

Several medical researchers have criticized enema use as highly dangerous and potentially lethal traditional practices (Segal et al., 1979) that sometimes causes preventable deaths (Bland et al., 2004). Although little work has investigated the potential harmful effects of herbal enemas in western Africa specifically (De Smet, 1992b), research from South Africa highlights several of the common risks associated with enema use. These risks can be subdivided into several categories: toxic ingredients, mechanical injury, dehydration and microbial infection.

Direct toxicity can occur when poisonous plants are used as enema ingredients. The toxic Apocynaceae vine Periploca nigriscens used in enemas has caused several deaths in Nigeria, probably due to strophanthin-based cardiac glucosides (De Smet, 1992b). Ghanaian respondents in our study also mentioned using this species in rectal medicines to induce menstruation or provoke abortion. The white exudate of the related species P. calophylla was included in enema mixtures against back ache, river blindness and diarrhea (see Appendix). According to De Smet (1983), a few grams of tobacco applied in an enema could be enough to cause a fatal reaction. Nicotine enemas were reported as the (possibly accidental) cause of death of patients poisoned by traditional medicine in South Africa (Stewart et al., 1999). Still, tobacco leaves were given in enemas to pregnant women to strengthen the fetus in Gabon. Sometimes our informants warned for strong side effects of enema ingredients: the bark of Piptadeniustrum africanum, known to be very toxic (Jufack Tafokou, 2008), was used to treat waist pain and impotence. Pregnant women were warned not to take this medicine because of its severe laxative effect, which could lead to an abortion. Apart from being toxic, some enema ingredients could also be painful, such as the frequently added ginger roots and red peppers.

The rapid urbanization in sub-Saharan Africa has resulted in the incorporation of harmful chemical substances in enemas, in particular potassium dichromates. These chemical components could lead to acute renal failure, hepatocellular dysfunction and gastrointestinal hemorrhage (Dunn et al., 1991). Although herbs were the main ingredients mentioned in our study, chemical agents like soap, moth balls and even animal parts were added to the enema mixtures. Naphthalene, the main ingredient in moth balls, was reported as a potential dangerous ingredient in South African traditional medicine (Stewart et al., 1999). Still, hospital mortality as a cause of rectally administered home remedies in South Africa was higher in those receiving herbal (43%) rather than chemical (21%) enemas (Moore and Moore, 1998).

Mechanical injury of the rectal wall and anal fissures were reported among enema users in South Africa, resulting in pain and constipation, for which even more enemas were given. In South Africa, Moore and Moore (1998) even defined an ‘enema syndrome’, when hospital admission was prompted by sudden, marked clinical deterioration following enema administration, resulting in respiratory distress, abdominal distension, hypotonia and loss of consciousness. Perforation of the rectum, leading to massive rectal and gastrointestinal bleeding was reported by Dunn et al. (1991) and Segal et al. (1979). In the most severe cases of enema-induced colitis, complete necrosis of the bowel wall causes it to be foul-smelling and apparently gangrenous (Segal et al., 1979). Electrolyte disturbances may be caused by water enemas (Coovadia and Wittenberg, 1998), while enemas given to treat diarrhea and dysentery (as was also reported in our study) could accelerate the dehydration process (Saltzman et al., 2012; Savage and Hutchings, 1987; Savage, 1982).

Finally, microbial infections, such as pathogenic bacteria, protozoa and worm (eggs) can be introduced in intestines using dirty enema devices (De Smet, 1992b). If blood remains are left inside
enema devices without proper cleansing, infections such as HIV can be spread. In a study in KwaZulu-Natal, 17% of the respondents had reused enema equipment without sterilization in the previous three months (Peltzer and Mngqundaniso, 2008). The colonic and renal complications following tribal enemas, although severe, are uncommon given the predicted frequency of enema administration in the South African black population (Dunn et al., 1991). Poisoning or the experience of severe side effects as a result of traditional medicine use, however, is often left unreported in developing countries (Van Andel et al., 2014). The lack of resources reserved by governments for forensic investigation, coupled with the shortage of methods for the detection of herbal toxins, has meant that there have been few studies of the extent of poisoning with traditional medicine (Stewart et al., 1999). The authors urge for a concerted effort to enlarge forensic and toxicological databases to include methods for the detection of traditional remedies from Africa, Asia and South America.

4.5. Strengths and weaknesses of this study

Our research shows that a large number of plant species is used for enemas in West and Central Africa, for a variety of diseases. Enemas are seen as an alternative to oral medicine, rather than as a treatment for constipation, as was previously thought. The emic motivations to use rectal medicine reported by our informants are important aspects to keep in mind when assessing the actual risks of enema use in a certain community. In ethnobotanical studies like ours, informants are not examined medically. We have no direct information on actual beneficial or aversive effects, other than self-reported by our informants. We did not collect data on the prevalence of enema use among randomly selected people or on the frequency of enema use by individual patients. Ethnobotanists should seek cooperation with medical researchers in Africa to study the effect on enemas on people’s health from a multi-disciplinary perspective. If this is no option, ethnobotanical research on enema use should make use of the tools developed by Rodrigues and Barnes (2013) for the collection of data concerning adverse effects associated with herbal medicines.

4.6. Health education

Although local biomedical practitioners are conscious of the potentially harmful aspects of herbal enema use, the challenge of preventing harmful cultural practices remains (Dunn et al., 1991). Health professionals need to be aware of the extent of, and reasons for the administration of enemas, especially among vulnerable groups such as elderly people, young infants and pregnant women. Only then effective health messages can be targeted at mothers and caregivers (Bland et al., 2004; Towns, 2014). Education should focus on the use of breast milk (and particularly in colostrum) in helping to ‘clean’ the bowel of meconium and protect the baby from illnesses. Mothers need reassurance about the normal pattern of stooling in the breastfed baby which varies considerably from one weekly to defecation after each feed (Bland et al., 2004). They also should be informed that intestinal cramps occurring in newborns are usually self-resolving and receive explanation on how to comfort their babies without an enema (WHO/UNICEF, 1993). Medical staff interviewed by (Towns, 2014) in urban hospitals in Benin and Gabon were aware of the frequent use of plant-based medicine among their patients, but restricting national policies on advising on medicinal plant use limited the amount of information practitioners were able to share with their patients and discouraged patients to discuss plant use practices with their doctors. Mothers who are concerned about their infant’s welfare should be encouraged to seek help from health professionals who empathize with their concerns, do not criticize them, give clear and consistent explanations about their infants’ problems, and reassure about perceived difficulties which do not require medical treatment (Bland et al., 2004). Traditional practices with positive aspects should be highlighted in education programs. For example, the habit of supplying extra amounts of wild vegetables to strengthen pregnant women and young mothers should be encouraged by stimulating people to add the wild greens to food, also a common practice. Only in this way, health programs can effectively promote positive, and discourage harmful, cultural practices (Dunn et al., 1991).

5. Conclusions

With ca. 213 different plant species used in hundreds of recipes for rectal insertions to treat a wide variety of ailments, we can conclude that enemas are widely used in Ghana and Gabon, but to a much lesser extent in Benin. Stomachache, abdominal pain, female infertility and birth facilitation were self-reported illnesses treated with the highest number of plants species. Cleansing the intestines of young children to promote their health by getting rid of ‘dirt’, instead of treating constipation, was an important cultural bound health practice that required the rectal application of herbal medicine. Other cultural practices that included enemas were the stimulation of young children to walk at an early age and local disease concepts like ‘la rate’ and ‘fesse rouge’. Frequently mentioned emic motivations for applying enemas rather than oral decoctions were tradition, their rapid effect and the bitter taste of herbal medicine. In Africa, enemas containing herbal medicine are a common method of administering herbal medicine for a variety of diseases, rather than just medicinal treatments for constipation as previously suggested. Although ensuring that young children defecate on a predictable moment is an effective method to improve the hygienic conditions of the rural African household, the potential risks of frequent enema use are manifold. Direct toxicity caused by harmful vegetable or chemical ingredients, mechanical injury caused by enema devices and microbial and viral infections have been reported among enema users, in particular for South Africa. Health professionals should be aware of the extent of, and motivation behind enema use to develop culturally appropriate education programs, especially targeted at vulnerable groups such as elderly people, young infants and pregnant women.

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Appendix A. Supplementary material

Supplementary data associated with this article can be found in the online version at http://dx.doi.org/10.1016/j.jep.2015.06.040.

References
