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## **Extent of Use of Aloe vera Locally Extracted Products for Management of Ailments in Communities of Kitagata Sub-county in Sheema District, Western Uganda**

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### **Abstract**

*Aloe vera* is widely used locally in communities in Uganda as a medicinal plant. It is said to contain various nutrient substances and vitamins that have curative properties. It is said to heal a variety of diseases in various communities. However the extent of use of this potential medicinal plant in Uganda and the various ailments for which it is used and the treatment outcomes are not clearly established and documented. In this cross-sectional study, carried out in August 2012 in Kitagata sub-county in Sheema district in western Uganda, data was collected from 131 randomly selected adult respondents using an interviewer administered semi-structured questionnaire. Key informants interviews and focused group discussions were also carried out with purposively selected participants.

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Data were collected on social demographic characteristics, practices and beliefs about Aloe vera. The data were analyzed using Excel version 2007 and Epi\_Info software. To get the proportion of the community that use Aloe vera, the number of respondents that use aloe vera was expressed as a percentage of the total number of respondents. It was found out that all the respondents (100%) know aloe vera plant, 96.1% think that it can cure and 84.7% have ever used it. 90.9% of the respondents believe that Aloe vera is effective in curing ailments. 82.9% of these strongly believe in Aloe vera's effectiveness. The diseases reported included malaria (31%), wounds (23%), abdominal pains (16%) and skin diseases (9%) among others. It was significantly noted that all the participants who had ever used Aloe vera still believe in it. 92.0% respondents reported that they can recommend aloe vera to a friend or relative. Only one participant strongly disagrees that Aloe vera has any curative properties and has never used it.

**Keywords:** Aloe vera; medicinal plant; Ailment; *Vernonia amygdalina* (Omubirizi); Kitagata; Uganda

## 1. Introduction

Traditional and Herbal medicines have been in use for many centuries by a substantial proportion of the population. They also continue to be increasingly used in every country around the world in some capacity [1]. In much of the developing world, 70–95% of the population relies on these traditional medicines for primary care [2,3]. In developing countries, plants are the main source of medicines for treatment of various illnesses [4]. A substantial number of drugs on the market are also got from plants and the use of plant products for pharmaceutical purpose is on a rise [5]. According to World Health Organization, medicinal plants would be the best source for obtaining a variety of drugs. Regulatory status and the associated terminology vary widely among the different countries [2,6]. Among the various plants that have been commonly and widely used for several decades for its reported medicinal properties is *Aloe vera* [7,8,9].

*Aloe vera* is a perennial, drought resisting, succulent plant from the Aloe family (400 different species) with its origin in African continent. It has stiff green, lance-shaped leaves containing clear gel in a central mucilaginous pulp. Its thick leaves contain the water supply for the plant to survive long periods of drought [10]. The leaves have a high capacity of retaining water also in very warm dry climates and it can survive very harsh circumstances. When a leaf is cut, an orange-yellow sap drains from the cut end. When the green skin of a leaf is removed a clear mucilaginous substance appears that contains water and the ingredient to retain the water in the leaf. The gel is said to contain 99.3% of water, the remaining 0.7% is made up of solids, with carbohydrates constituting a large component [10,11,12].

*Aloe vera* plant is said to contain different nutrients including, minerals, sugars, phenolic compounds, lignin, saponins, sterol and amino acid. It is also reported to contain many vitamins like the important antioxidant vitamin A, C and F. Vitamin B1, B2, and B3, choline and folic acid are also present. A trace of vitamin B12 is also present [7]. Vitamin B complex and C are reported to play an important role in reducing stress and inflammation. *Aloe vera* is also reported to contain enzymes such as

amylase, lipase and carboxypeptidase. It is also said to have antiviral, antibiotic and antifungal ingredients. Aloe gel is also believed to stimulate the body's immune system [8,11,13]

*Aloe vera* said to have powerful purgative effects, potent antimicrobial agents and powerful analgesic effects [14,15]. *Aloe vera* is also said to contain saponins which are soapy substances in the gel and that are general cleansers, have antiseptic and anti-carcinogenic properties [13]. It is reported that *Aloe vera* also contains Campesterol, F2 Sitosterol, Lupeol and an aspirin like compound that possesses anti-inflammatory and anti-bacterial properties [7,14,15,16].

The bioactive compounds from *Aloe vera* are claimed to be very effective in treatment of various ailments, such as burns, allergic reactions, rheumatoid arthritis, rheumatic fever, acid indigestion, ulcers, diabetes, skin diseases, dysentery, diarrhea, piles and inflammatory conditions of the digestive system and other internal organs, including the stomach, small intestine, liver, kidney, and pancreas. [16,17,18].

*Aloe vera* is commonly grown and used in most parts of Uganda and East Africa. The plant is widely used as a medicinal plant by a number of communities in Uganda [5].

It is used in various ways, as full therapy or adjunct therapy [8]. *Aloe vera* products are used as over-the-counter (OTC) medications, as self-medication or self-care, as home remedies, or as dietary supplements, health foods, functional foods, and many others. Despite this long term native use of this medicinal or potentially toxic plant, the extent of use in terms of number on of people that use it and ways in which they use it is not clearly documented. [6,19]. The proportion of the population that benefits from this plant or that is exposed to its toxic effects is not known. This study therefore seeks to determine the extent of use of *Aloe vera* plant locally for management of ailments in communities in Sheema District in Western Uganda [20,21,22].

## **2. Methodology**

This cross sectional study was conducted in Kitagata Sub-county, found in Sheema District in Western part of Uganda. Sheema district has a population of 220,300 people with 42,259 households and an average household size of 5.213 people. It covers an area of about 708 Km<sup>2</sup> [21].

Kitagata sub-county lies about 365 km from the capital city Kampala and accommodates the district hospital (Kitagata hospital), and one of the oldest hospitals in the region. It has a population of 20,404 which is about 9.26% of the District population. This is distributed as 48.3% males and 51.7% females [20,21,22].

The sub-county has 5 parishes with 61 villages. All the 5 parishes were covered during this study and the respondents were from 33 (54.09%) of the villages [21].

The participants were community members of Kitagata sub-county of at least 18 years of age. These

were selected using systematic random sampling [23]. Also some sellers and promoters of Aloe vera products as well as some community opinion leaders were involved in Key Informant Interviews and Focused Group Discussions in order to acquire more information. The used sample was 131 people.

With the help of a botanist *Aloe vera* plant was identified and described by different locally known names.

The data was managed and analyzed using Epi-Info, Excel 2007 and Micro soft Access 2007. Qualitative data was analyzed basing on the sub themes and specific questions asked. Each question was analyzed according to the number of respondents to that particular question [23,24].

The major area of interest in the quantitative data was the proportion of respondents that had used aloe vera and the various opinions the users had on its effectiveness. This data was then summarized and presented in figures, tables and graphs. Of major interest in qualitative data was the latest time of aloe vera use by the respondent. All the questionnaires were coded.

Ethical approval for the study was obtained from Makerere University College of health sciences Research and Ethics committee. Care was taken to maintain confidentiality and to ensure that all those who participated did so voluntarily and gave written informed consent.

Personal identifiers were eliminated and collected data was kept in a password protected computer to which only research team members had access.

### 3. Results

We interviewed 131 randomly selected respondents from Kitagata sub-county. 99.2% of these were Banyankole while 0.8 % were Baganda by tribe. The Respondents were of various age groups, marital status, education levels, religions and occupations as show below. There was no significant correlation between these social demographic characteristics and aloe vera use.

Table 1. Social demographic characteristics of the participants

| Marital status (%) | Education levels (%) | Religion (%)     | Occupation (%) |             |      |               |      |
|--------------------|----------------------|------------------|----------------|-------------|------|---------------|------|
| Single             | 14.2                 | Never            | 27.4           | Protestant  | 58.7 | Civil servant | 4.1  |
| Married/Cohabiting | 67.7                 | Lower Primary    | 8.9            | Catholic    | 28.1 | Self employed | 33.3 |
| Widowed            | 15.7                 | Higher Primary   | 37.1           | Moslem      | 8.3  | Peasant       | 43.1 |
| Separated          | 1.6                  | Lower Secondary  | 14.5           | Pentecostal | 5.1  | House wife    | 14.6 |
|                    |                      | Higher Secondary | 3.2            |             |      | None          | 4.9  |
|                    |                      | Tertiary         | 8.9            |             |      |               |      |

All the respondents interviewed (100%) reported that they knew aloe vera plant. 60.4% of these have known it for at least 10 years. They reported to have come to know aloe vera through various ways as follows;

Table 2. How respondents got to know aloe vera

| <i>How did you come to know aloe vera?</i> | Frequency | Percentage (%) |
|--|-----------|----------------|
| Friend/Relative/Peer                       | 109       | 84.5           |
| Promoters                                  | 5         | 3.9            |
| Radio                                      | 13        | 10.1           |
| Seminar/meeting                            | 1         | 0.8            |
| Others                                     | 1         | 0.8            |

Table 3. When respondents came to know aloe vera

| <i>When did you know about Aloe vera?</i> | Frequency | Percentage (%) |
|---|-----------|----------------|
| 1 year ago                                | 19        | 15.1           |
| 5 years ago                               | 31        | 24.6           |
| 10 years ago                              | 21        | 16.7           |
| more than 10 years ago                    | 55        | 43.7           |

The respondents were then further asked whether they have ever used aloe vera or not. Of the respondents to this question, 84.7% (102) reported to have ever used Aloe vera while 15.7% (19) reported to have never used it. (10 participants declined to give response to this question)

96.1% of the respondents think that aloe vera can cure illness while 3.9% do not know whether aloe vera can cure any illness. Of the respondents that think that Aloe vera can cure illnesses, 82.9% strongly believe and 13.8% somehow believe in aloe vera’s effectiveness in curing illness. 92.0% of the respondents who believe in aloe vera’s effectiveness can also recommend it to a relative or friend.

Table 4. Respondents’ thoughts about aloe vera’s curative ability

| <i>Do you think Aloe vera can cure any illnesses?</i> | Frequency | Percentage (%) |
|---|-----------|----------------|
| Yes   | 124       | 96.1           |
| No  | 0         | 0.0            |
| I do not know   | 5         | 3.9            |

Table 5. Respondents’ beliefs about aloe vera’s effectiveness in curing illnesses

| <i>Do you think Aloe vera can cure any illnesses?</i> | <i>Do you believe that aloe vera is very effective in curing ailments?</i> |                        |                         |                          | TOTAL      |
|---|--|------------------------|-------------------------|--------------------------|------------|
|   | <i>I do not know</i>   | <i>Somehow believe</i> | <i>strongly believe</i> | <i>strongly disagree</i> |            |
| <i>I do not know</i>                                  | 2  | 1                      | 0                       | 0                        | 3          |
| <i>Yes</i>  | 3  | 17                     | 102                     | 1                        | 123        |
| <b>TOTAL</b>  | <b>5</b>   | <b>18</b>              | <b>102</b>              | <b>1</b>                 | <b>126</b> |

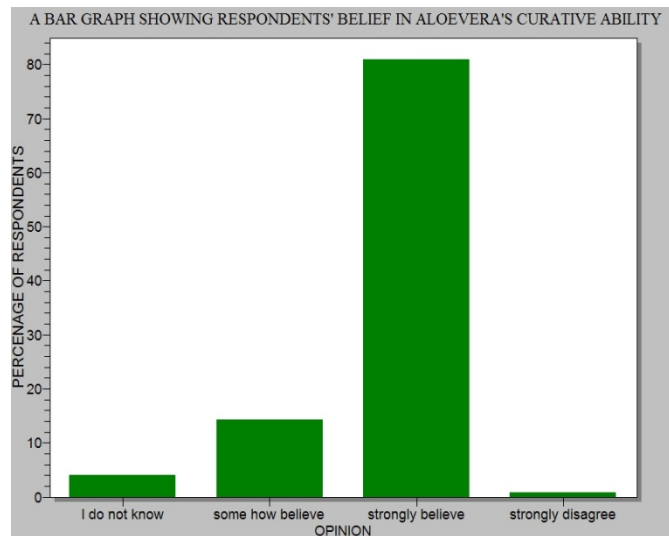


Fig. 1. Respondents' beliefs about aloe vera's effectiveness in curing illnesses

According to the respondents, people use aloe vera to cure various illnesses in their communities which include malaria, wounds, abdominal problems, skin diseases, allergic reactions and other diseases.

Table 6. Illnesses for which aloe vera is used

| Code | Disease            | Frequency | Percentage (%) |
|------|--------------------|-----------|----------------|
| 1    | Malaria            | 93        | 31             |
| 2    | Wounds             | 69        | 23             |
| 3    | Abdominal problems | 48        | 16             |
| 4    | Skin problems      | 28        | 9              |
| 5    | Yellow fever       | 16        | 5              |
| 6    | Allergy            | 8         | 3              |
| 7    | Syphilis           | 5         | 2              |
| 8    | Other diseases     | 29        | 10             |
| 9    | Other uses         | 4         | 1              |

**Note;**

Abdominal problems reported included; Abdominal pains (24), ulcers (09), intestinal worms (09), loss of appetite (02), typhoid (02), constipation (01) and diarrhea (01). Other diseases reported included high blood pressure (04), eye problems (03), diabetes (02), joint pains and fractures (02), chest pain (02), dizziness (01), bad odor (01) and obesity (01).

Aloe vera was also reported to be capable of performing other functions which included curing some diseases in poultry, being used in washing or as a skin cosmetic.

People use aloe vera as juice extracts, sap exudates or pulp extracts. Some prepare it into solutions for drinking (85.4%) or apply it directly to the skin surface or wounds (9.8%).

It is either used alone (96.7%) or mixed with other herbs (3.3%) or other substances like honey, skin jellies, or food items. Some people reported using it as a salad.

However there was some failure in treatment in some cases that was reported by some respondents.

Table 7. Effectiveness of aloe vera according to respondents' experience

| <i>Have you ever used Aloe vera to cure any illness but it failed?</i> | Frequency | Percent age (%) |
|--|-----------|-----------------|
| Yes  | 24        | 19.2            |
| No   | 101       | 80.8            |

Table 8. Treatment failure of aloe vera in various illnesses

| Disease            | Frequency of use | Frequency of failure | Percentage failure (%) |
|--------------------|------------------|----------------------|------------------------|
| Malaria            | 93               | 17                   | 18.3                   |
| Wounds             | 69               | 0                    | 0.0                    |
| Abdominal problems | 48               | 2                    | 4.2                    |
| Skin problems      | 28               | 0                    | 0.0                    |
| Yellow fever       | 16               | 1                    | 6.3                    |
| Allergy            | 8                | 0                    | 0.0                    |
| Syphilis           | 5                | 1                    | 20.0                   |
| Other diseases     | 29               | 4                    | 13.8                   |
| Other uses         | 4                | 0                    | 0.0                    |

According to the latest time of use, 73.8% of the respondents have used aloe vera in the past one year.

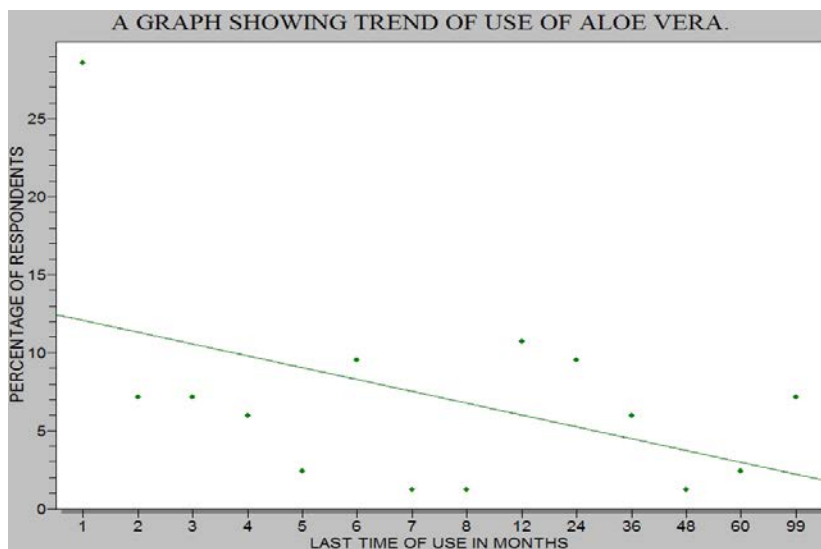


Fig. 2. Increasing trend of aloe vera use in community

56.7% reported to have aloe vera in their own gardens or plantations while 43.3% reported not to have it. Majority of those that did not have it reported that they get it from neighbors (71.7%), friends (17.0%), bush (9.4%) or other sources (1.9%).

60.3% of the respondents believe that aloe vera use is not associated with any problems. However 39.7% of the respondents who believe that there are some problems associated with Aloe vera use mainly reported diarrhea (9), bitter taste (7), dizziness (6), abdominal upsets (3) and body reactions (3) among others.

During focused group discussions and key informant interviews, we further established that aloe vera is the second commonly used medicinal plant among the people of Kitagata sub-county next to *Vernonia amygdalina* (commonly known as “omubirizi”). It is locally known as “rukaka”. It was reported that there are 2 types of aloe vera i.e small leaf and broad leaf that are commonly used. The narrow leaf was reported to treat most of the diseases while the broad leaf was mainly used for skin diseases, cosmetics and as a salad. However some respondents did not consider the different functions ascribed to those types. Most of the diseases mentioned above were categorically emphasized, with some giving their personal experiences and testimonies with particular emphasis on wounds, pimples, malaria, yellow fever, stomach ulcers, burns, relieving constipation and skin infections.

Interestingly, one of the participants who was a medical personnel strongly believes in its effectiveness in curing malaria and typhoid. She also believes that it is so effective in treating herpes zoster and believes that it can improve immunity of HIV patients.

Most of the participants ranked it 6-9 on a scale of 0 to 10 in terms of effectiveness. Some herbalists extract it locally to form shaving creams and skin jellies. Issues concerning dosages were highly controversial, with each individual having their own dosage considerations. However most participants unanimously agreed that aloe vera use could be dangerous to pregnant women and neonates.

It was also noted that religious beliefs could have some influence on use of herbs in general. For example Pentecostals consider use of herbs unacceptable. However other religious denominations did not significantly influence over the use of herbs.

It was noted that aloe vera use is independent of age group, sex, social-economic class or education level uses aloe vera more than the other.

#### **4. Discussion and Conclusions**

It was found out that age, sex, marital status, education levels and occupation do not significantly affect the use of aloe vera. These groups of people use aloe vera relatively to the same extent. The popularity of aloe vera is extremely high because all the respondents (100%) knew it and 60.4% have known it for at least 10 years. The transfer of knowledge about aloe vera is mainly traditional with 84.5% of the



respondents having got to know about it from friends or relatives. The popularity of aloe vera is growing with the media and promoters playing some part in transmission of knowledge.

A very big proportion of the community (96.1 %) thinks that aloe vera can cure illness and 84.7% of these have ever used. It is the second most commonly used herbal plant next to *Vernonia amygdalina*. All the respondents that have ever used aloe vera still believe in its effectiveness (i.e 82.9% strongly believe and 13.8% somehow believe) and 92.0% can still recommend it to a friend or relative. This implies that according to the respondents, the effectiveness of aloe vera is significantly high. Respondents who strongly disagree with aloe vera's effectiveness in curing illness have never used it. This might be partly due to lack of experience among these respondents. We also found out that people use aloe vera for various illnesses with varying degrees of effectiveness.

According to the findings, aloe vera could have some effectiveness in treating malaria, wounds, abdominal problems, skin diseases, allergic reactions and some other diseases. According to the respondents, the effectiveness of aloe vera is very high, for example 80.8% of the respondents who have ever used aloe vera have never noted failure in treatment while only 19.2% have had some failure. The highest degrees of effectiveness were reported with wounds followed by abdominal problems, malaria and then skin diseases. It was further emphasized in focused group discussions that aloe vera is particularly very effective on malaria, wounds and skin diseases especially pimples. This was backed up with personal testimonies and experiences.

Of the 69 participants who reported to have used aloe vera to treat wounds, no one reported failure. However the highest treatment failure rates were reported with syphilis and other diseases.

Aloe vera is frequently used in communities to cure some illnesses, for example 73.8% of respondents have used it in the past one year. The trend of use of aloe vera use is also growing, with about 12% of the people using it in the past one month compared to 2% in the past 8 years.

Aloe vera is easily and locally accessed by the people who need it, with the majority having it in their gardens (56.7%) or getting it from the neighbors (31.0%).

Most people (60.3%) believe that there are no problems associated with aloe vera use. However, some other people (39.7) reported diarrhea, bitter taste, dizziness and some allergic reactions. The reported potential diarrheal effect of aloe vera is also consistent with its reported ability to relieve constipation.

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## Appendix

### 1. Structured Questionnaire for Survey Respondents

#### A: Background information of the respondent

1. Age..... (In completed years)
2. Marital status:
  - a) Single
  - b) Married/cohabiting
  - c) Never married
  - d) Widowed
  - e) Separated
  - f) Divorced
3. Tribe.....
4. Village .....
5. Education level:
  - a) Never
  - b) lower primary (P1-P4)
  - c) Upper primary (P5-P7)
  - d) Tertiary
  - e) Ordinary level (S1-S4)
  - f) Higher Education (S5-S6)
  - g) Other (specify).....
6. Religion:
  - a) Catholic
  - b) Protestant
  - c) Muslim
  - d) Others (specify).....
7. Occupation:
  - a) Civil servant
  - b) Self employed
  - c) Peasant farmer
  - d) Housewife
  - e) None
  - f) Others (specify).....

#### B: Knowledge

1. Do you know of any herb/plant that is used for treating/managing any ailment/disease/sickness?

- a) Yes
- b) No (Go to question 3)

2. If yes which ones do you know (also accept local/traditional names)

- a) .....
- b).....
- c).....

3. Do you know *Aloe vera* plant (Rukaka, Ekigaji)?

- a) Yes
- b) No (go to Part C and replace aloe vera with “herbs”)

4. If yes, how did you come to know? (Multiple answers allowed)

- a) Friend/relative/peer
- b) News papers (specify).....
- c) Radio (specify)
- d) Promoters
- e) Others

5. Do you think *Aloe vera* can cure any ailments/sicknesses?

- a) Yes
- b) No
- c) I do not know

6. If yes, when did you know that?

- a) 1 year ago
- b) 5 years ago
- c) 10 years ago
- d) More than 10 years ago

7. If yes for Qn.5, which ailments/sicknesses can be treated by *Aloe vera*?

- a) .....
- b).....
- c).....

8. What are the different ways/forms in which *Aloe vera* plant or products are used to cure ailments?

- a) Juice extracts for drinking
  - b) Exudates/extracts applied on skin
  - c) Extracts applied on wounds
  - d) Extracts/products mixed with food
  - e) Mixed with other herbs
  - f) Others
- (specify).....

9. Have you ever used or prepared fresh/locally prepared *Aloe vera* extracts?

- a) Yes
- b) No

10. Have you used *Aloe vera* in the last one month?

- a) Yes
- b) No

11. Has someone in your home used *Aloe vera* in the past one month?

- a) Yes
- b) No

12. If yes for Qns. 15 & 16, what was the reason for using *Aloe vera* at that time?

- a) .....
- b) .....

13. If yes for Qns. 15 & 16, how much of *Aloe vera* was used and in which form?

.....

14. Do you have *Aloe vera* in your garden/plantation?

- a) Yes
- b) No

15. If no where do you get *Aloe vera* from if you need it?

- a) Neighbor
- b) Friend
- c) Bush
- b) Others (specify).....

**C: Questions on attitude/ beliefs**

1. Do you belief that *Aloe vera* is very effective in curing ailments?

- a) Strongly believe
- b) Somehow believe
- c) Strongly disagree

2. Would you advise a friend, relative or sibling to use *Aloe vera*?

- a) Yes
- b) No

Why? .....

5. Do you think there are some people in this community who do not use *Aloe vera* or its products at all?

- a) Yes
- b) No

6. Why do you think they do so?

.....

7. Are there any special advantages associated with *Aloe vera* use?

- a) .....
- b) .....

8. Have you ever used *Aloe vera* to cure any illness but it failed?

- a) Yes
- b) No

9. If yes for QN. 8, which illness was it? (Accept multiple answers)

.....

10. If yes for QN. 8, what did you do?

- a) .....
- b) .....

11. Are there any problems associated with *Aloe vera* use?

- a) Yes
- b) No

12. If yes, which ones?

- a) .....
- b) .....

13. Is there any thing you would like to let me know about *Aloe vera* that we have left out?

.....

2. **Focused group discussion and Key Informant Interview guide.**

1. Do you know herbal medicine? If yes, how did you know and what do you know about it?
2. What are the 5 commonly used herbs in this community?
3. Do you know *Aloe vera* plant? If yes, how did you know and what do you know about it?
4. How is *Aloe vera* used in this community? (Functions, forms, ways)
5. Do you believe that *Aloe vera* plant has some curative abilities or any other medical uses?
6. What are the illnesses that can be cured by *Aloe vera*?
7. Which people should take or should not take *Aloe vera* (neonate, children, pregnant women)
8. Which people commonly use *Aloe vera* in this community? (Women, men, children, adults, elderly, any why?)
9. How do you compare *Aloe vera* with alternative sources of treatment? (Accessibility, cost, effectiveness, adverse effects)
10. What do you think can be done to promote better use of *Aloe vera* and other herbal medicines? (Processing, dosages, concentration)