Plants used in the traditional treatment of female infertility in Kita, Mali

ABSTRACT

Aims: The aim of this study was to identify the plants used in the traditional treatment of female infertility in Kita, Mali.
Place and Duration of Study: The ethnobotanical investigation has been conducted in the town of Kita (Mali) from April to July, 2021. The data management and analysis were carried out at Faculty of Sciences and Techniques (FST), University of Sciences, Techniques and Technologies of Bamako (USTTB), Mali, between August 2021 and January 2023.
Methodology: Ethnobotanical survey was carried out using questionnaire addressed to the available people who gave their free consent.

Results: An ethnobotanical survey was carried out among fifty-two (52) people, including twenty (20) traditional practitioners, ten (10) herbalists, six (6) people who are both herbalists and traditional practitioners, and sixteen (16) housewives inside the town of Kita.The surveyrevealed 38 plant species belonged to 25 botanical families. The most represented families were Moraceae (28.94%), Sapotaceae (26.31%), Fabaceae (26.30%), Apocynaceae (21.05%).The most coveted plant species by the local populations to treat female infertility were *Ficus capensis* with 26.31%, *Vitellaria**paradoxa*with 23.68%, *Stereospermumkunthinum*with 21.05*%,* Leptadeniahastata with 21.05%. The leaves have been the most frequently used organs (43%). These plants were mostly used as decoctions (80%) and administered by oral route (89%). The commonly associated ailments with female infertility included stomachaches, painful menstruations and Toxoplasma gondii infections.
Conclusion:This survey has enabled us to gain a better understanding of the anti-fertility plants used in the town of Kita.

Keywords: Ethnobotanical survey, female infertility, Kita, Mali.

1. INTRODUCTION

Procreation has always been a vital objective for human beings and particularly for housewives. Nowadays, this procreation for women is seriously altered by environmental and social pressures (Ménézo et al., 2012). These pressures, if poorly managed, could lead to infertility in women. This concept of infertility can be defined as a woman's inability to conceive a pregnancy. It was estimated to affect between 8% and 12% of couples trough the world (Mélodie & Christine, 2018). Very high rates of female infertility have been recorded in in sub-Saharan Africa (Koman et al., 2019) 11.7% in Kayes, Mali (Diassana et al., 2023).
It is well known that the procreation always remains the fundamental reason for marriage in Africa As a result, the problems related to procreation negatively affect the life and well-

Comment [IM1]: Areas for Improvement:
- Jargon and Parallel Sentences:
  - Avoid phrases like "Nowadays, this procreation for women is seriously altered by environmental and social pressures." Instead, rephrase with simpler language, e.g., "Today, women's ability to have children can be significantly impacted by environmental and social factors."
  - Use active voice wherever possible, e.g., "Infertility is estimated to affect..." instead of "It was estimated to affect..."
- Definition of Infertility:
  - The current definition ("a woman's inability to conceive a pregnancy") is incomplete. Provide a more comprehensive definition from a reputable source like WHO or ACOG, including a timeframe (e.g., unable to conceive after 12 months of regular unprotected sex).
- Expand on Conclusion:
  - Briefly discuss the potential applications or implications of the identified plants, beyond just understanding their use. For example, could these plants lead to the development of new infertility treatments?

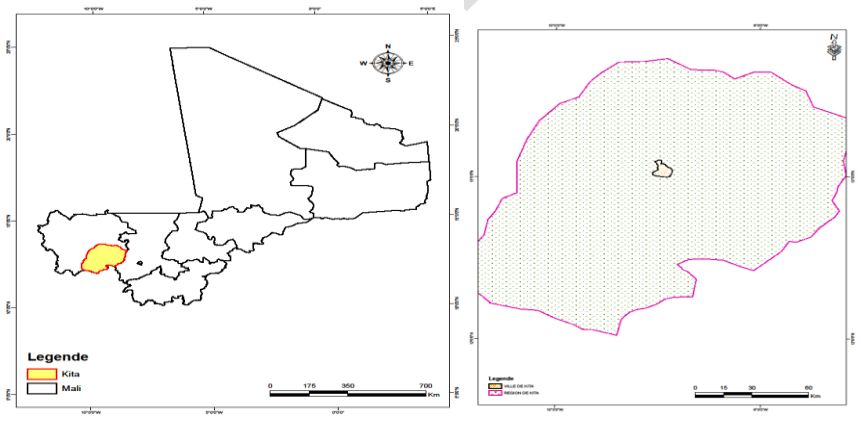
being of individuals, couples and families until they become a heavy burden on their socio-economic development (Houmenou et al., 2017). In Mali, marital infertility is a real social scourge, considered to be a specifically female concernin order to avoid to highlight the man's virility (Traore, 2010). Accused of infidelity and prostitution, infertile women are ridiculed in their homes.Faced to this calvary, they become an easy prey for fetishists and charlatans. (Tembely, 2008).

However, female infertility needs to be handled delicately, because it is often a divorce reason for couplesin Africa, and generate psychological disorders in the Western countries(Kouamé et al., 2012).. Its treatment in modern medicine is costly and sometimes presents many side effects (Koman et al., 2019).That's why the use of medicinal plants appears to be an appropriate alternative for resolving this infertility problem in the worldwide and singularly in Africa(Françoise et al., 2018). Indeed, studies have reported that the African flora in general, and Malian flora in particular, is made up of a large reserve of medicinal plants, occupying an important place in African pharmacopoeia (Togola et al., 2022).(Traoré et al., 2023). According to (Sanogo, 2010), traditional medicine offers effective and accessible options for the predominated pathologies in the local communities. It is also a national cultural heritage and a better way to connect people with their own history and culture.But, this common traditional practice for managing pathologies, like infertility, deserves to be framed by scientific research. That's why this study was initiated, with the aim of contributing to a better understanding and rational use of local plants used in the treatment of female infertility by the local populations of Kita in Mali.

2. MATERIAL AND METHODS

2.1 Study sites

The ethnobotanical survey was carried out in the region of Kita, located at 187 km from Bamako, Mali (Figure 1).



Comment [IM2]: Areas for Improvement:

- Specificity:
  - Specify the type of ethnobotanical survey conducted (e.g., semi-structured interviews, focus group discussions).
  - Explain how participants were recruited (e.g., snowball sampling, random sampling).
  - Clarify the sample size (total number of participants interviewed).
- Transparency:
  - Provide more details about the questionnaire contents, such as the types of questions used (open-ended, closed-ended) and if possiblethe specific information gathered on plant uses (parts used, preparations, dosages, etc.).

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Additional Suggestions:

- Consider mentioning any ethical approval processes undertaken for the study.

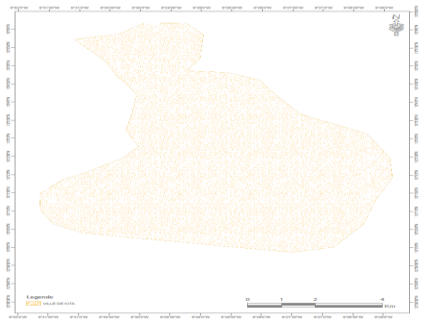

Figure 1. Map of Mali with survey site location

2.2 Data collection

The survey took place from April 03 to July 28, 2021 in the town of Kita. It concerned anyone with some knowledge of medicinal plants who was willing to answer the questionnaires. After obtaining the free verbal consent from each participant, a questionnaire form was addressedto them. Questions focused on the plants used to treat female infertility, the organs used, and methods of preparation and administration. In addition, the sociodemographic characteristics of the respondents were registered. Interviews were conducted in the locallanguage ''Bamanankan''. The species cited were identified through search engines and resource persons. The genera and specific diversities were estimated based on the formula used by(Togola et al., 2022).

Comment [IM3]: parts

2.3 Data analysis:

Excel version 2017® and SPSS Statistics 17 were used to analyze the data.

3. RESULTS AND DISCUSSION

3.1 RESULT

3.1.1 Socio-demographic characteristics of respondents

3.1.1.1 Distribution of respondents by gender

The Figure 2 shows therepartition of respondents by gender. Of the 52 people surveyed, 38 were female (73%) and 14 male (27%).

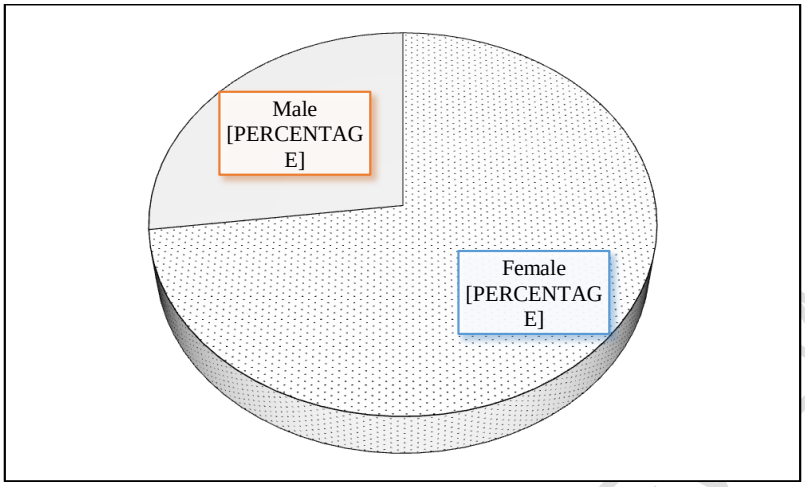

Figure 2.Distribution of respondents by gender

3.1.1.2 Distribution of respondents by age and profession

The **Table 1** shows the distribution of respondents by age and profession. A total of 52 people were interviewed, 20 of them were traditional practitioners, 10 herbalists, 6 both traditional practitioners and herbalists, and 16 housewives. The target population ranged in age from 20 to 80. The most represented age groups were [50-65[years with 35% about, followed by [50-65[with 33% about.

Comment [IM4]: more professional way, is to sum up the table contect not repeating everything what it is already shown in the table...For example :The survey participants came from diverse backgrounds, encompassing ages from 20 to 80. Traditional practitioners and herbalists formed the majority, representing nearly 50% of those interviewed. Housewives also constituted a significant group, reflecting the community's involvement in traditional knowledge. While younger individuals participated, the most frequent respondents fell within the [50-65] age range, highlighting the value placed on experience in managing female infertility locally.

Table 1. Distribution of respondents by age and profession

Age groups (years)	Number& Percentages	Professions	Number & Percentages
[20-35[	9 (17.31%)	Traditional healers	20 (38.46%)
[35-50[	17 (32.69%)	Herbalists	10 (19.23%)
[50-65[	18 (34.62%)	Traditional herbalists	6 (11.54%)
[65-80]	8 (15.38%)	Housewives	16 (30.77%)
Total	52 (100%)	Total	52 (100%)

Table 2. Normality test Shapiro-Wilk.

Characteristics	Statistic	degree of liberty	P-value
Gender of respondent	0.554	52	0.000
Profession of respondent	0.786	52	0.000
Age of respondent	0.882	52	0.000

*The test is considered to be significant if P-value <0, 05

The Shapiro-wilk normality test reveals an asymmetrical distribution (P= 0.000<0.05) of respondents by gender, profession and age.

3.1.2 Distribution of species by botanical family and morphological types

The **Figure 3** shows the listof botanicalfamilies registered and their frequencies. Twenty-five(25) families were identified. The most represented families were Moraceae, Fabaceae, Sapotaceae, Apocynaceaeand Bigoniaceaewith more than 21.05% as citation frequencies. These species are belonged to four (4) morphological groups as indicated in the Table 3. The shrubs (42.10%) followed by the trees (31.59%) were the most important morphological types used by the respondents.

Among the found 25 botanical families, the Table 4 reveals that the highest diversities index wereregisteredfrom the Fabaceae (Idg= 0.36) and Rubiaceae (Idg = 0.12). But the family of Moraceae was found with the biggest diversity index (Ids = 2).

Comment [IM5]: What do you mean by ldg? Remember you have to write clear like for general audience ..

Comment [IM6]: This sentence can be a bit tough to understand on its first read. Here are some ways to rephrase it for better clarity:

Option (Simplified):

"While 25 plant families were identified, Fabaceae and Rubiaceae showed the highest diversity in number of genera (Idg = 0.36 and 0.12, respectively). However, Moraceae had the highest diversity in number of species (Ids = 2)."

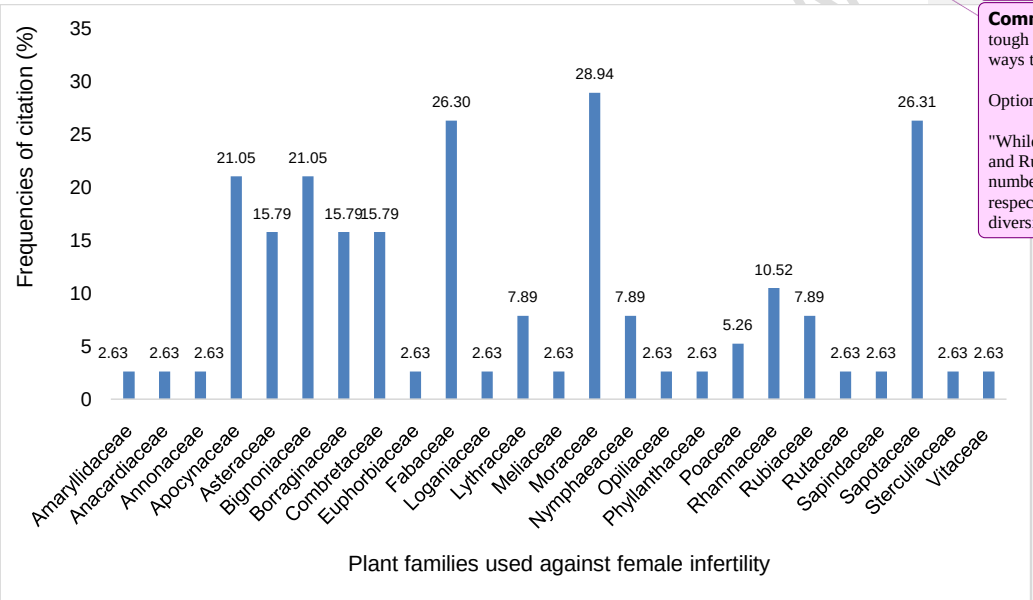

Figure 3. Distribution of species by botanical family

Table 3. Distribution of species according to morphological groups

Morphological types	Tree	Shrub	herbaceous	Liana	**Total**
Effectives	12	16	08	02	**38**
Frequencies (%)	31.59	42.10	21.05	5.26	**100**

Table 4. Index of genera and specific diversity

Botanical families	**Number of genera**	**Number of species**	**Idg**	**Ids**
Amaryllidaceae	1	1	0.04	1.00
Anacardiaceae	1	1	0.04	1.00

Annonaceae	1	1	0.04	1.00
Apocynaceae	1	1	0.04	1.00
Asteraceae	1	1	0.04	1.00
Bignoniaceae	1	1	0.04	1.00
Borraginaceae	1	1	0.04	1.00
Combretaceae	3	3	0.08	1.00
Euphorbiaceae	1	1	0.04	1.00
Fabaceae	7	7	0.36	1.00
Loganiaceae	1	1	0.04	1.00
Lythraceae	1	1	0.04	1.00
Meliaceae	1	1	0.04	1.00
Moraceae	1	2	0.04	2.00
Nymphaeaceae	1	1	0.04	1.00
Opiliaceae	1	1	0.04	1.00
Phyllanthaceae	1	1	0.04	1.00
Poaceae	2	2	0.08	1.00
Rhamnaceae	1	1	0.04	1.00
Rubiaceae	3	3	0.12	1.00
Rutaceae	1	1	0.04	1.00
Sapindaceae	1	1	0.04	1.00
Sapotaceae	2	2	0.08	1.00
Sterculiaceae	1	1	0.04	1.00
Vitaceae	1	1	0.04	1.00

*Idg: index of genera diversity; Ids: index of specific diversity

3.1.3 Plant organs used

The Figure 4 shows the plant parts used and their frequencies. Several parts were cited, including leaves, bark, fruit, roots, stems, sheaths, the whole plant and the young plant. The leaves are the most frequently used, with 43% of mentions.

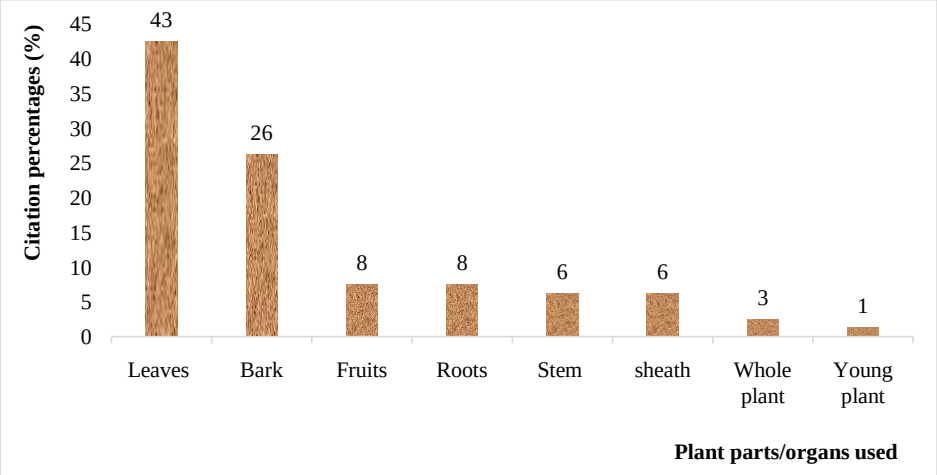

Figure 4. Frequencies of use of plant organs or parts

3.1.4 Preparation and administration modes

The Figure 5illustrates the different preparation methods and administration routes for the plant parts used.
Three main preparation methods were mentioned by respondents: decoction (80%), maceration(14%), spraying (5) and other methods (1%). These different recipes were administered by several routes, mainly byoral one (89%). Vaginal steaming was also noted.

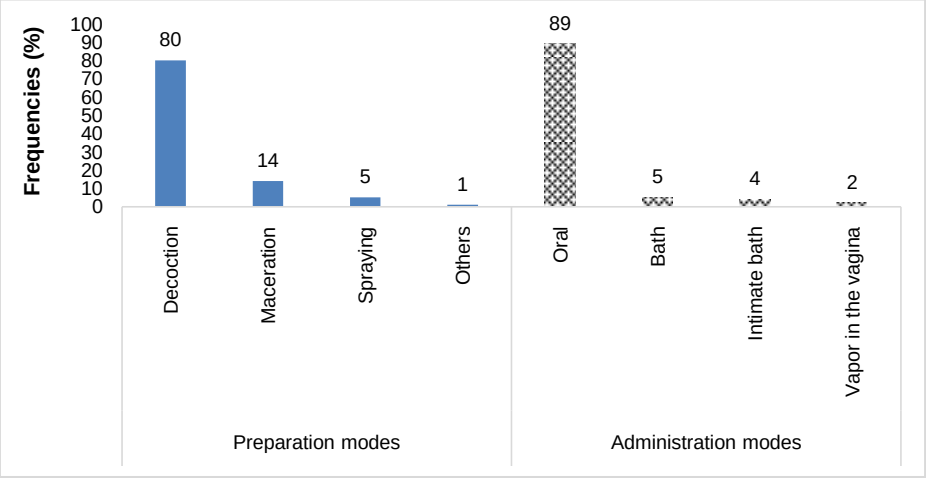

Figure 5. Preparation and Administration modes of plant organs/parts

3.1.5 Conditions favoringinfertility

Analysis of this Figure 6reveals that many ailments are known byrespondents as factors favoring female infertility. Among these, stomach aches were mentioned by 54% of respondents, painful menstruations by 17%, toxoplasmosis by 17%, other infections by 4%, fibroids by 3%, candidiasis by 3%, stopping menstruations by 1% and incessant menstruations by 1%.

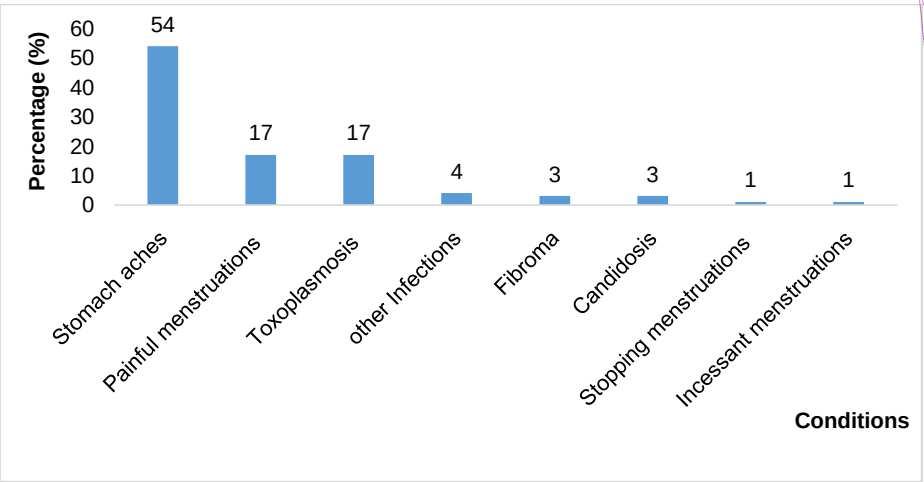

Figure 6. Conditions leading to infertility

3.1.6 Plant species surveyed

Analysis of Table 2 shows that a total of 38 different species belonging to 25 families used in the treatment of female infertility at Kita were recorded. *Ficus capensis* (26.31%), *Vitellariaparadoxa* (23.68%), *Leptadeniahastata* (21.05%) and *Stereospermumkunthinum* (21.05%) were the mostcoveted species.

Comment [IM7]: Please re-do it with a correct terminology

Comment [IM8]: Are you sure stomach aches? ...."stomach ache" might not be the most accurate term for pain related to female infertility. Pelvic pain is a much more comprehensive and respectful descriptor.

Comment [IM9]:

Comment [IM10]: dysmenorrhea

Comment [IM11]: Amenorrhoea

Comment [IM12]: mentioning "incessant menstruation" in thiscontextpresentssome challenges. It's an uncommonterm and might not convey the meaningaccurately to a professional audience. Here are some options for addressingthispoint:
1. More formalterm:Considerusing "heavymenstrualbleeding" or "metrorrhagia" as these are establishedmedicalterms for excessive and prolongedmenstrualbleeding.
2. Explain the term: If using "incessant menstruation" is crucial, brieflyexplainitsmeaning (e.g., "constant or continuousmenstrualbleeding") for clarity.
3. Combine options: You could mention both the local term and the formalequivalent for betterunderstanding. For example, "Respondentsalsomentioned incessant menstruation (1%) or heavymenstrualbleeding."

Comment [IM13]: More sound: The survey results shed light on the multifaceted understanding of female infertility within the local context. Respondents attributed infertility to a spectrum of factors, with pelvic pain (54%) topping the list. Reproductive health concerns, including dysmenorrhea (17%) and abnormal menstrual cycles, were also prominent. Notably, respondents recognized the potential impact of infectious diseases like toxoplasmosis (17%) and other infections (4%). Additionally, a range of gynecological conditions, including uterine fibroids (3%) and candidiasis (3%), were identified as potential contributing factors.

Table 5. List of plants: Families, organs used, preparation and administration methods and frequencies of use

N°	Families	Scientific names	Local names	Treated conditions	Parts used	Preparation mode	Mode of administration	Frequencies of citation (%)
1	Amaryllidaceae	*Allium ursinum*L.	Bakani-sabali	Fibroma	Whole plant	Decoction	Exposing the vagina to steam	2.63
2	Anacardiaceae	*Sclerocaryabirrea*(A.Rich.) Hochst	Gouna	Stomach aches	Barks	Decoction	Oral	2.63
3	Annonaceae	*Annona senegalensis*L.	Sounsoundiè	Stomach aches	Leaves	Spraying	Oral	2.63
4	Apocynaceae	*Leptadeniahastata*(Pers.) Decne	Sarafaté / zoyé	Stomach aches / Painful menstruation / incessant menstruation	Leaves	Decoction	Oral	21.05
5	Asteraceae	*Ecliptaprostrata*(L.) L.	Moussofing	Stomach aches /Infection/candidose/toxoplasmosis	Leaves	Decoction	Oral/bath	15.79
6	Bignoniaceae	*Stereospermumkunthinum*Cham.	Mogoyiri	Stomach ache / toxoplasmosis	Leaves / Barks	Decoction / Maceration / Spraying	Oral	21.05
7	Borraginaceae	*Heliotropium indicum*Linn.	Nonsikou	Stomach ache/toxoplasmosis	Leaves/whole plant	Decoction	Oral	15.79
8	Combretaceae	*Combretum nigricans* Lepr. ex Guill.&Perr	Dianbagatawoulè	Stomach aches	Roots	Decoction	Oral	2.63
9		*Guiera senegalensis* J.F.Gmel.	Koundiè	Painful menstruation	Leaves	Decoction	Oral/Bath	2.63
10		*Pteleopsissuberosa*Engl et Diels	Tèrèni	Stomach aches /candidosis	Barks	Decoction	Oral/Intimate bath	10.53
11	Euphorbiacea	*Euphorbia hirta*L.	Denbasidji	Infection	Leaves	Decoction	Oral	2.63

	e							
12	Fabaceae	*Acacia nilotica*L.	Bouana	Infection/Candidosis	Fruits	Decoction	Oral / Intimate bath	7.89
13		*Cassia occidentalis* L.	Balan-balan	Stomach aches	Roots	Maceration	Oral	2.63
14		*Dichrostachys glomerata*(Forssk.) Chiov	Triki	Stomach aches	Leaves	Decoction	Oral	2.63
15		*Erythrina senegalensis*A.DC.	Timitimini	Stomach aches	Leaves/Bark	Decoction	Oral	5.26
16		*Parkia biglobosa*(Jacq.) Benth.	Néré	Stomach aches	Barks	Maceration	Oral	2.63
17		*Pilostigmatonningii*(Schumah.) Milne-Redh	Niama	Toxoplasmosis	Leaf	Decoction	Oral	2.63
18		*Tamarindus indica*L.	N'tomi	Stomach aches	Leaf	Decoction	Oral	2.63
19	Loganiaceae	*Strychnos spinosa*Lam.	Kera	Stomach aches	Leaves	Decoction	Oral	2.63
20	Lythraceae	*Lawsoniainermis*L.	Diabi	Stomach aches	Leaves	Decoction/spraying	Oral	7.89
21	Meliaceae	*Trichiliaemetica Vahl*	soulafinsan	Stomach aches	Roots/Bark	Spraying	Oral	2.63
22	Moraceae	*Ficus capensis*Thumb	Seretoro	Stomach ache/toxoplasmosis	Leaves/Fruit/Bark	Decoction	Oral	26.31
23		*Ficus lecardii*Engl. &Diejs	Céré-diatkifaga	Stomach aches	Leaves	Decoction	Oral	2.63
24	Nymphaeaceae	*Nymphaea lotus*L.	Djilagokou	Painful menstruation /stomach ache	Leaves	Decoction	Oral	7.89
25	Opiliaceae	*Opiliaceltidifolia*(Guill. & Perr.) ENDL.	Koronkoii	Stomach aches	Leaves	Decoction	Oral/ bath	2.63

26	Phyllanthaceae	*Hymenocardiaacida*Tul.	Kalakari	Stomach aches	Leaves	Decoction	Oral	2.63
27	Poaceae	*Pennisetum clandestinum*Hochst. ex chov.	Sinkiri	Stomach aches	Whole plant	Decoction	Oral	2.63
28		*Vetiverianigritana*(Benth.) Stapf	komourouni	Stomach aches	Leaves	Decoction	Oral	2.63
29	Rhamnaceae	*Ziziphus mauritania*Lam.	N'tomono-missin	Painful menstruation	Barks	Decoction	Oral	10.52
30	Rubiaceae	*Gardenia erubescens*Stapf et Hutch	M'bouré muso	Stomach ache/ Painful menstruation	Mistletoe	Spraying	Oral	2.63
31		*Mitragynainermis*Korth.	Djoun	Painful menstruation	Fruits	Decoction	Oral	2.63
32		*Sarcocephalus latifolia*(Sm.) Bruce	Bati	Stomach aches	Leaves	Decoction	Oral	2.63
33	Rutaceae	*Citrus lemon*(L.) Burm.f.	Lemouroucoumouni	Stomach aches	Leaf	Decoction	Oral	2.63
34	Sapindaceae	*Paulinia pinnata*L.	Sokoni-nonfon	Toxoplasmosis	Leaves	Decoction	Oral	2.63
35	Sapotaceae	*Manilkara multinervis*Dub	Chi-sina	Stomach aches	Leaves/Bark	Spraying	Oral	2.63
36		*Vitellaria paradoxa*C.F.Gaertn.	Chi	Toxo/ Stomach ache	Bark / Mistletoe / Young plant	Decoction / Maceration / Spraying	Oral	23.68
37	Sterculiaceae	*Waltheria indica*L.	Dabada	Stopping menstruation	Leaves	Decoction	Oral	2.63
38	Vitaceae	*Cissus populnea*Guill & Perr	Goumban	Painful menstruation / stomach ache	Bark	Decoction	Oral	2.63

3.2 DISCUSSION

3.2.1 Socio-demographic data

The analysis of sociodemographic characteristics of 52 people surveyed show thatonly 14 were male gender(27%) against 38 females (73%) (Figure 2). The target population was made up of three occupational categories, of which 38% were traditional practitioners, 19% herbalists, 12% traditional practitioner-herbalists and 31% housewives. Respondents ranged in age from 20 to 80, with the majority between 35-65 age group(***Table 1***). Otherwise, the Khi^2 test shows that the tradional treatment are strongly dominant by the female among the respondents (P= 0.000<0.05). This activity is also dependent of the profession and age (P=value<0.05). These results are contrary to those of several authors(Françoise et al., 2018; Houmènou et al., 2018; c who have reported that the majority of respondents are male gender.

3.2.2 Medicinal plants used

Examination of the survey forms revealed 38 plant species (***Table***) belonged to 25 botanical families (Figure 3).The most frequently cited species was *Ficus capensis* with 26.31% followed by *Vitellaria paradoxa* (23.68%) (***Table***). The survey conducted by Diawara (2010) in two Bamako markets showed that the various Ficus species are frequently used in the treatment of dysmenorrhea in Mali, which is one of the best-known factors that can cause female infertility. Among these 38 plant species used to treat the female infertility, 28.94%of them were Moraceae, 26.30% were Fabaceae and Sapotaceae and 21.05% wereApocynaceae and Bigoniaceae. Furthermore, these species are belonged to four (4) morphological. The shrubs (42.10%) followed by the trees (31.59%) were the most important morphological forms used by the local populations of Kita.The same families and morphological groups have been reported by (Koman et al., 2019) in Dabakala's department in Ivory coast. In opposite, 48% of these found plant species were herbaceous against only 16% for shrubs. These differences could be linked to the geographical and climatic conditions of investigated areas.

The most frequently used organ was the leaf, with 43% of citations, followed by bark (26%), stems, and mistletoe (6%) each. (Figure 4). Ethnobotanical surveys conducted by Kemadji et al. (2022) and Koman et al. (2019) on plants used in female infertility have also reported high rates of leaf utilization; 35% and 46% respectively. This high use of leaves could be due to the availability and the ease of collection (Tuttolomondo et al., 2014).Furthermore, the literature have attributed this high use of leaves to their richness in bioactive compounds which are endowed with many pharmacological properties (Telefo et al., 2012; Togola et al., 2023)

Thanks to their pharmacological properties, thesebioactive compounds are responsible for their use in the treatment of female infertility (Kemadji et al., 2022).. The use of leaves must be encouraged as it represents no danger to plant regeneration and ensures the conservation of floristic richness (Savio et al., 2020).

These organs were prepared mainly as decoctions by the majority of local populations (80%) and generally administered orally (89%). These results corroborate those of many authors (Houmenou et al., 2017; Koman et al. (2019); Savio et al., 2020). According to Savio et al.

Comment [IM14]:

Potential Limitations, Biases, and Confounding not Mentioned in the Discussion:

SelectionBias:

- The sample size (52 participants) might be relatively small and might not fully represent the larger community. This could lead to biased results not generalizable to the entire population.
- The recruitment methods for selecting participants are not specified. If respondents were chosen through convenient sampling or relied on referrals from traditional healers, it could introduce bias towards individuals with specific beliefs or affiliations.

Information Bias:

- Recall bias may affect the accuracy of respondents' reported knowledge and practices related to female infertility. They might misremember or exaggerate certain aspects due to social desirability or other factors.
- The language used in the questionnaire and interviews could influence responses, leading to misunderstandings or biased interpretations of participants' knowledge.

ConfoundingVariables:

- The study focused on socio-demographic factors and plant usage but didn't explore other potential contributors to infertility, like environmental factors, socioeconomic status, or access to healthcare. These variables could confound the observed relationships between identified factors and infertility.
- The discussion mainly compares findings with other studies but doesn't account for potential geographical or cultural differences that might influence plant usage and beliefs about infertility.

Missing Discussion Points:

- The discussion doesn't address potential limitations of relying solely on self-reported data from respondents. Consider discussing the possibility of inaccurate information or incomplete knowledge that might not fully capture the local understanding of female infertility.
- The research's ethical considerations and how informed consent was obtained from participants could be briefly mentioned to enhance transparency.

Suggestions for Improvement:

- Briefly acknowledge the limitations mentioned above and discuss their potential impact on the findings.
- Consider suggesting future research directions to address these limitations and gain deeper insights into local understandings and practices related to female infertility.
- Emphasize the importance of further investigations to establish causal

...

(2020) this could be justified by the fact that decoction allows the most active principle to be collected and cancels out the toxic effect of certain recipes.The preference of oral route could be explained by the fact that the disease is linked to bacterial and fungal infections most often located in the deep organs (Koman et al., 2019); so to reach them, the biocompounds must transit through the digestive tract (Tra Bi et al., 2008).
As the treatment of female infertility is traditionally complex, local populations provided better management of factors that contribute to it. Among these factors favoring female infertility, they are stomach aches (54%), painful menstruation (17%) and toxoplasmosis (17%).

4. CONCLUSION

The data from this study show that the local population of Kita use a several plant species to treat female infertility and associated ailments (stomach aches, painful periods, Toxoplasma gondii infections...). Leaves and barks were the most prized parts of these plants. These organs or parts were mainly prepared as decoctions and administered orally. For a better valorization and a rational use ofthese species, it would be necessary to evaluate their phytochemical composition, toxicity and anti-fertility activities.

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Comment [IM15]: Correct terminology please

Comment [IM16]: Very weak conclusion...
Weaknesses and Missing Pieces in the Conclusion:
Weaknesses:
- Missing key findings: The conclusion doesn't summarize the main findings of the research, specifically related to socio-demographic factors, identified conditions related to infertility, and potential reasons for plant choices and preparations.
- Overly general: The statement about local uses of plants is true but lacks specific details about the variety of plants and their applications.
- Limited scope: The focus solely on phytochemical composition, toxicity, and anti-fertility activities overlooks other important aspects like cultural significance, traditional knowledge, and potential conservation concerns.

MissingPieces:
- Connecting findings to research objectives: Briefly highlight how the study findings contribute to your initial research goals and address the existing knowledge gap.
- Implications and applications: Discuss the potential benefits and applications of your research findings for stakeholders like traditional healers, healthcare professionals, policymakers, and the local community.
- Future research directions: Briefly mention potential areas for further investigation based on the limitations discovered or unanswered questions arising from your study.
- Concluding statement: Use a strong and conclusive sentence that summarizes the overall significance of your research and reinforces its contribution to the field.

Suggestions for Improvement:
- Revise the conclusion to succinctly summarize the key findings from all sections of your research.

...

Comment [IM17]: Example of more insightful conclusion:This studyexplored local knowledge and practices in managingfemaleinfertility in Kita. Participants revealed a diverse arsenal of 38 plantspecies, favoringleaves and barksprepared as decoctions and administeredorally. Notably, pelvic pain, dysmenorrhea, and toxoplasmosiswererecognized as potentialcontributors. Thesefindingsholdsignificant value. Furtherresearchshoulddelveinto the scientificpotential of these plants, whilerecognizing the importance of understandingtheir cultural significance, traditionalknowledgesystems, and ecologicalsustainability. This holisticapproach can benefitnumerous stakeholders – fromtraditionalhealerswho can enhancetheir practices to healthcareprofessionalswho can bettercommunicatewith patients

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