Herbal Medicines Journal **2023; 8(3):144-55**
DOI: 10.22087/hmj.v8i3.1083 **ISSN:** 2538-2144

Original Article

Exploration of the Frequency and Pattern of the Use of Herbal Medicines by Parents/Caregivers for Children Under 12 Years at the Kumasi South, Ghana

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Received: 15.01.2024; Accepted: 07.07.2024

Abstract

Background and Aim: Utilization of herbal medicines is on the rise worldwide, particularly in developing nations where it has a significant role in the health system. It is the major treatment for 60% of children with high fever caused by malaria. This study was to explore the frequency and pattern of herbal medicines utilization by children below twelve years.

Materials and Methods: The present study was conducted at the Kumasi South Hospital on children under 12 years from January 2023 to March 2023. The study is a hospital-based cross-sectional design involving 180 participants. Ethical approval with reference number (CHRPE/AP/796/23) was obtained for the study.

Results: A total of 180 patients were eligible for the study. There were 53.9% males and 46.1% females. About 30.62% of the children were under 1-year-old, 46.60% were 1-year-old, and 22.81% were 6-12 years old. The frequency of the use of herbal medicines was 77.78%. The percentages of caregivers were 29.10%, 49.50%, 7.50%, and 4.60% for fathers, mothers, grandparents, and individuals categorized as "others," respectively. Age distribution percentages were 23.50%, 30.90%, and 13.90% for individuals below 20, 30-39, and above 50 years, respectively. The diseases for which health care was being sought were respiratory tract infections (35.55%) and malaria (30.55%). The routes of administration were the oral, nasal, dermal, rectal and subcutaneous areas. Aqueous preparation was the most frequently used procedure. 75% of them were not aware of the FDA guidelines not to give herbs to children. Common side effects were allergic reactions, dizziness, vomiting and nausea. Justifications for using herbs was safety, effectiveness, cost-effectiveness, availability, and cultural beliefs. Moreover, no prescription was required to obtain them.

Conclusion: Herbal medicines are extensively used by children in Ghana. Therefore, an appropriate public health policy to improve their regulation is necessary.

Keywords: Herbal medicines, Side effects, Children, Frequency, Pattern

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Please cite this article as: Turkson BK, Brempomaa Ch, Micheal BK, Tetteh AE, Accam AT, Amponsah LK, et al. Exploration of the Frequency and Pattern of the Use of Herbal Medicines by Parents/Caregivers for Children Under 12 Years at Ghana. Herb. Med. J. 2023;8(3):144-55.

Introduction

The use of herbal medicines to diagnose, prevent or treat various diseases has a long history in many communities around the world. Every society has a long tradition of using plants as remedies for various health problems. The earliest references to the use of medicinal plants for treating diseases is found in the Ebers papyrus, Egyptian compilation of medical texts, which contains about 700 medicinal formulas. It dates back to the 16th century BC (1). Most of the population in Asia and Latin America continue to use traditional medicine. The use of herbal medicines accounts for about 40% of all healthcare in China. At the global level, up to 80% of the population in Africa and other developing countries use traditional medicine to meet their basic health needs (2). Moreover, herbal medicines are widely used by the general population in Ghana, and up to about 70% of the population utilize traditional medicines for their primary healthcare needs (3).

Currently, a significant portion of the world's population still prefers the use of herbal medicines due to their availability and affordability, which is closely tied to the prevailing beliefs and cultural practices of its users compared with mainstream modern medicines. Thus, scientists are actively interested in indigenous traditional remedies, which are usually made from plants (4). Therefore, due to the contribution coupled with the recognition of the use of herbal medicine worldwide, WHO launched the Traditional Medicine Strategy 2014-2023 (5). The goal of the strategy is to harness the potential contribution of Traditional and Complementary Medicine (T&CM) to health, wellness, and person-centered health care, and also to promote the safe and effective utilization of T&CM through the regulation of products, practices, and practitioners (5).

Globally, most parents and caregivers use herbal medicines when their children are sick. In Germany, it is estimated that the prevalence rate of the use of herbal medicines by children is about 85.5% (6). South Korea has a high range varying from 65.2% to 67.8% (7). In Turkey, the prevalence of the pediatric use of herbal drugs was 58.6% (8). In countries like Ghana, Mali, Zambia and Nigeria, it is the first line of treatment for more than 60% of children with high fever caused by malaria and other diseases (9). Moreover, herbal medicines are used to maintain children's health (10). While traditional medicine plays a beneficial role in maintaining children's well-being, it is essential to take proactive steps to encourage the responsible utilization of herbal remedies. This is necessary due to the potential risks associated with certain herbal medicines from a public health standpoint (11).

Utilization of medicines for preventive and curative purposes has become a habit for everyone, including children (12). Unlike adults, children are generally given medications under the supervision of their parents/caregivers (13). Medicines in general have the potential to cause harmful effects to the body. Thus, it is necessary to be cautious, especially if used by children. The use of herbal medicines by children has not been thoroughly studied. Moreover, there is a lack of scientific evidence regarding the risks related to the use of herbal medications by children. Children have smaller bodies compared with adults, and their immature systems may be especially susceptible to the impacts of dosage variations (10).

In Ghana, despite the widespread use of herbal medicines by children under 12 years in many communities, there is paucity of data to the best of our knowledge. Furthermore, there are restrictions on the use of herbal products in children (4). Moreover, the FDA of Ghana as part of its regulatory functions ensures that finished and marketed herbal products are marked not to be used by children under 12 years old (14). Hence, inadequate doses could result in the accumulation of metabolites in the body which may cause toxic effects (10,15). Although there are many herbal medications on the market, there is a lack of data on their use in children under the age of twelve. Moreover, there is not enough scientific evidence supporting the efficacy and safety of herbal medicines,

as well as the contamination of most herbal medications (16). Furthermore, since clinical trials of herbal medicines are not performed in children, they are used off-label (17). Thus, this study explored the utilization of herbal medicines by caregivers for children under 12 years at the Kumasi South Hospital and analyzed the predictive factors for the engagement in that behavior. We also aimed at gaining a more comprehensive understanding of the prevalence and pattern of the use of herbal medicines in children.

Materials and Methods

Study Design and Site

This research was a hospital-based descriptive cross-sectional study carried out using a quantitative approach. The study was undertaken on parents/guardian of children under twelve years. It was conducted at the pediatric ward of the Kumasi South Hospital (KSH), Ashanti region, Ghana. The Hospital was established in 1976, as an urban health center, and this status of the health center was later upgraded and subsequently changed to Kumasi South Hospital. In 2002, it was upgraded to the status of Ashanti Regional Hospital. It is the second largest hospital in the southern part of the Ashanti Region. This hospital has male and female wards, an emergency unit, and a maternity ward among others. More than ten thousand babies are born in the maternity ward a year. The Hospital has about one hundred and thirty-two beds with over seven hundred working staff. In 2022, it had a total of OPD attendance of 134,227 and a total of 24,303 antenatal clinic (ANC) attendance (18).

Target Population

The study population included parents/caregivers with children under 12 years who attended the Pediatric Ward at the Kumasi South Hospital.

Inclusion and Exclusion Criteria

Inclusion Criteria

- The use of herbal medicines for any reason in the past
- Children under 12 years admitted to the Kumasi South Hospital
- Consent given by parents/caregivers
- Willingness of parents/caregivers to take part in the study by answering the questions

Exclusion Criteria

- Refusal to take part in the study
- Absence of the parents/caregivers

Study Variables

Independent variables in the study were socio-demographic and economic factors of parents/caregivers of children under twelve years old, educational level, health service-related factors and community based factors that influenced the use of herbal medicines (HM), the length of illness of the children, and conditions for which herbal products were used for. The dependent variable was the use of herbal medicines in children under twelve years old in the past.

Study Population

Study population included children under 12 years accompanied by their parents or care givers. The data were collected from January 2023 to March 2023. The subjects were recruited randomly. Out of the total 337 people interviewed, the sample size for the study was one hundred and eighty (180).

Data Collection Tools

The data were collected using a self-administered semi-structured questionnaire and interviews. The main aspects of the data included socio-demographics characteristics of the participants, history of past and present use, and factors associated with the use of herbal medicines. Other major considerations included ensuring the correct phrasing and sequencing of questions. The study was explained to parents/caregivers, and only those who agreed to participate were recruited. The questionnaires were administered in person and in the ward where the children were on admission.

Data Analysis

The data were coded into Excel data sheets and were analyzed. The data were presented in the form of percentage, pie charts, tables, and bar charts. The appropriate test was performed depending on the sample size. The variables assessed were categorized into dependent and independent variables. Microsoft Excel was used for data analysis.

Ethical Clearance

An approval was obtained from the Committee of Human Research, Publications and Ethics (CHRPE/AP/796/23). A permission was obtained from the Kumasi South Hospital. Consent was obtained from all the participants after explaining the details to

potential participants using the language they understood well.

Results and Discussion

Socio-Demographic Characteristics of the Study Participants

A total of 337 caregivers whose children were on admission at the Kumasi South Hospital between January 2023 to March 2023 were interviewed. Out of this, 180 were eligible for the study. There were 97 (53.9%) males and 83 (46.1%) females. Approximately, 50% of the children were younger than 1-year-old. The males and females between the ages of 1-5 years were 36 (20.0%) and 48 (26.60%) persons, while they were 33(18.33%) and 8 (4.48%) for the ages of 6-12 years, respectively (Table 1a and Table 1b).

Table 1. (a) Gender Characteristics of the Children in the Study. (b) Age Distribution of the Children in the Study**.**

Gender	Frequency	%
Males	97	53.90
Females	83	46.10
Total	180	100

(b)

Age distribution	Frequency	%
Less than 1 year	55	30.62
1-5 years	84	46.60
6-12 years	41	22.81
Total	180	100

Demographic Characteristics of the Caregivers

The children included in the sample were accompanied by their guardians, other family members. All responses were obtained from these accompanying individuals. There were 74 males (41.1%) and 106 (58.9%) females. The breakdown of demographic data of parents or caregivers who were present with their children revealed that fathers, mothers, grandparents, and individuals categorized as "others" were 52 (29.10%), 90 (49.50%), 14 (7.50%) and 8 (4.60%) persons, respectively. The age distribution also indicated that 43 persons (23.50%) fell within the age group of less than 20 years, 55 (30.90%) caregivers were within the age range of 30-40 years, and 25 (13.90%) caregivers were aged above 50 years (Table 2).

Table 2. Socio-Demographic Data of the Caregivers Present in the Study**.**

Socio-Demographic Parameters of the Caregivers	Parameters	Frequency	%
Gender	Males	74	41.10
	Females	106	58.90
Caregiver Status (%)	Mother	73 (40.30)	13 (7.10)
	Father	38 (21.10)	12 (6.80)
	Grandparents	7 (4.00)	6 (3.40)
	Aunt	10 (5.60)	4 (2.20)
	Other(s)	6 (3.40)	1 (0.50)
Age Range of the Caregivers (%)	< 20	24 (13.20)	17 (9.40)
	20-29	19 (10.60)	6 (3.30)
	30-39	49 (27.30)	5 (2.80)
	40-49	22 (12.20)	5 (2.80)
	>50	20 (11.10)	3 (1.70)
Educational Background (%)	Informal	4 (2.30)	0 (0.00)
	Primary	79 (43.90)	25 (13.80)
	Secondary	44 (24.30)	6 (3.20)
	Tertiary	7 (3.90)	5 (3.00)
Employment Status (%)	Both parents	11 (6.30)	4 (2.10)
	Mother only	34 (18.90)	7 (4.10)
	Father only	10 (5.80)	11 (6.30)
	Unemployed	78 (43.40)	14 (7.50)

Clinical Characteristics of the Children

Clinical characteristics of the children refers to diseases they were diagnosed with and for which reason they were admitted. The disease distribution revealed that the most common diagnosed disease affecting the children was respiratory tract infection (64 cases equal to 35.55%), followed by malaria (55 cases equal to 30.55%), skin infections (20 cases equal to 11.11%), gastroenteritis (15 cases equal to 8.36%), malnutrition (10 cases equal to 5.55%), sickle cell anemia (9 cases equal to 5.0%%) and other diseases (7 cases equal to 3.88%) (Table 3).

Table 3. Diseases diagnosed in the children present in the study (N=180)**.**

Diagnosis	Frequency	%
Malaria	55	30.55
Respiratory infection	64	35.55
Gastroenteritis	15	8.36
Malnutrition	10	5.55
Skin infections	20	11.11
Sickle cell anemia	9	5.00
Others	7	3.88

Duration of the Illness

It was revealed that children of 125 (69.44%) caregivers had experienced the disease for less than 2 weeks, those of 34 (18.9%) caregivers had suffered from the diseases between 2-3 weeks, and finally children of 21 (11.67%) caregivers had experienced it for about 4 weeks (Table 4).

Table 4. Duration of the illness in the children present in the study.

Duration of disease	Frequency	%
< 2 weeks	125	69.44
2-3 weeks	34	18.90
4 weeks	21	11.67

The Use of Herbal Medicines

Of the total number enrolled, 140 (77.78%) persons had used herbal medicines, while 40 (22.2%) persons had not used herbal medicines (Figure 1).

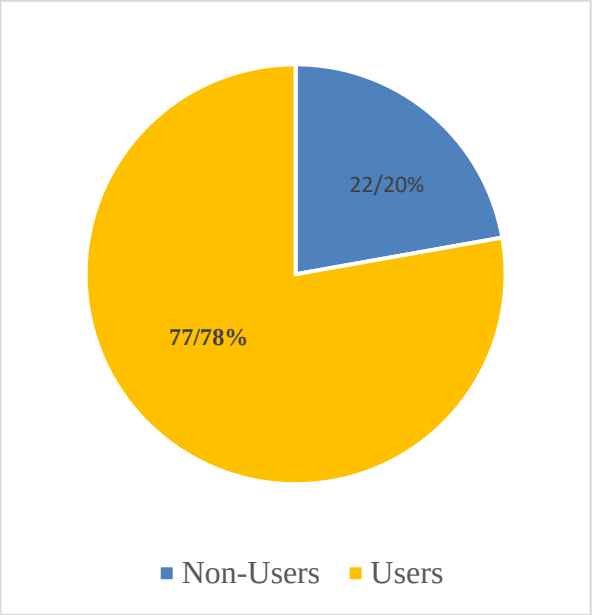

Figure 1. The use/usage of herbal medicines in the children present in the study.

The Relationship Between the Use of Herbal Medicines and the Caregiver

The socio-demographic data of the caregivers who administered herbal medicines to their children was compared with those who withheld herbal medicines to their children (Table 5).

Routes of Administration

Some of the most common routes of drug administration were through the oral, nasal, dermal, rectal and other routes, and inserting herbal materials into the vagina (Table 6).

Table 5. The socio-demographic data of the caregivers present in the study.

Socio-Demographic Parameters	The Use of Herbal Medicine Yes (%), No (%) N=140 (77.78), N=40 (22.2)
Age of the caregiver (Years)	
< 20	16 (8.98), 9 (5.0)
20-29	44 (24.3), 9 (5.2)
30-39	38 (21.2), 10 (5.6)
>40	42 (23.3), 12 (6.4)
Marital status	
Married	17.9, 17 (9.5)
Single	26.5, 11 (6.0)
Widow/widower	33.3, 8 (4.5)
Educational background	
Formal	30 (16.5), 10 (5.8)
Primary	44 (24.6), 12 (6.5)
Secondary	35 (19.4), 10 (5.5)
Tertiary	31 (17.3), 8 (4.4)
Relationship with the prescriber of herbal medicines	
Self	24(13.5) -
Parent	28(15.4) -
Grandparent	48(26.4) -
Neighbor	40(22.5) -

Table 6. The route of herbal medicine administration.

Route of Administration	Number of Care Providers	%
Oral	20	11.1
Dermal	53	29.4
Nasal	35	19.4
Rectal	61	33.8
Others (eye, ear, vaginal)	11	6.1

Dosage Forms of Medications

The dosage forms mostly used were liquid, poultice, enema, decoction, and infusion (Table 7).

Table 7. Dosage forms of herbal medicines.

Dosage forms	Number of care providers	%
Decoction	40	22.2
Infusion	35	19.4
Syrups	51	28.3
Poultice	30	16.6
Enema	15	8.3
Others	9	5.0

The Type of Traditional Medicines/Practices Used by the Children

Parents and caregivers utilized the following herbal medicine, massaging, bone setters, tooth extractors, and

other methods for their children (Figure 2).

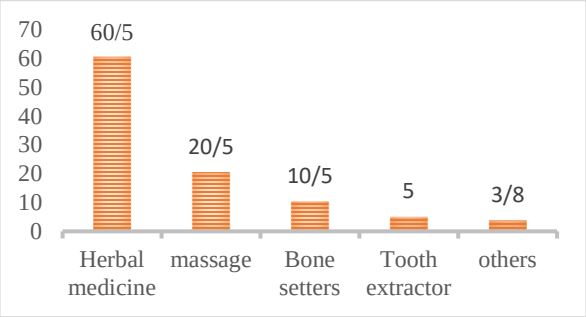

Figure 2. Some Types of Traditional Medicines Used by the Children.

Factors Contributing to the Use of Herbal Medicines by the Children

Of the total number 140 (77.78%) of respondents who used herbal medicines, the primary justifications for the utilization were lower cost and availability (69 cases equal to 49%), safety and effectiveness (35 cases equal to 25%), needing no prescription for purchasing herbal products (20 cases equal to 14%), and cultural beliefs (16 cases equal to 12%) (Figure 3).

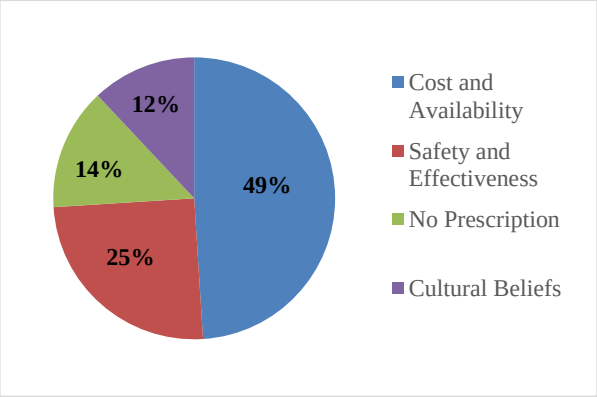

Figure 3. Reasons for using herbal medicines by the children present in the study.

Awareness about Guidelines of the FDA on the Use of Herbal Medicines by Children

With regard to the awareness about the guidelines of the FDA prohibiting the use of herbal products by children under 12 years, majority of the parents/caregivers (105 persons equal to 75%) were unaware, while 35 persons (25%) were aware of them (Figure 4).

Side Effects of the Use of Herbal Medicines

Side effects such as allergic reactions, dizziness, vomiting, and nausea were noted (Figure 5).

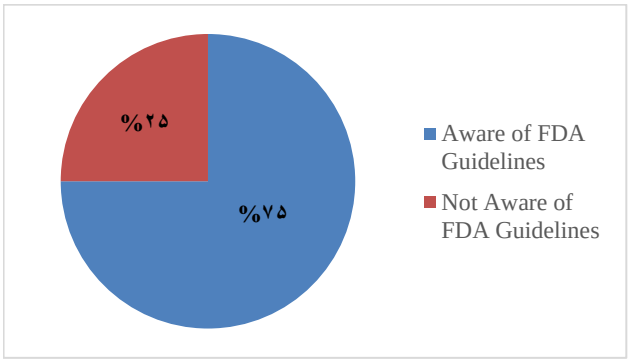

Figure 4. Caregivers' knowledge regarding the FDA guidelines on the use of herbal products by children.

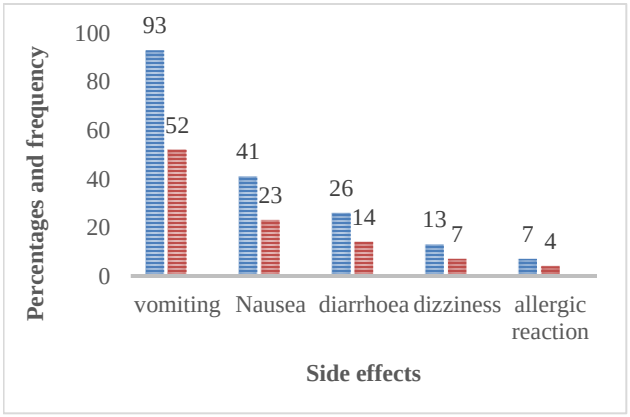

Figure 5. Side effects of herbal medicines reported regarding the children present in the study.

Common Plants Used in Children

Medicinal plants and the parts mostly used and reported to have worked effectively have been shown in Table 8.

Medicinal Plants, Parts, Combinations, Preparations, and Dosage Forms

Some medicinal plants parts, combinations dosage forms, and methods of preparations mostly used and reported to have worked effectively are as shown in Table 9.

Utilization of herbal medicines has witnessed a sharp rise in popularity among parents/caregivers seeking health care for their children (19). This phenomenon can be attributed to deeply ingrained cultural beliefs held by these parents, which emphasize the effectiveness of herbal treatments for childhood ailments and the maintenance of overall well-being.

The frequency of the use of herbal medicines by children under 12 years at Kumasi South Hospital was 77.78%. This prevalence rate is below a similar study in Kenya which recorded a prevalence of 89.4% (20). The figure is also higher than that of a similar study in

Table 8. Some medicinal plants used in treating diseases in children under 12 years**.**

Plant Name	Family	The Consumed Part
Psidium guajava	*Myrtaceae*	*Leaves*
Lantana camara	Rutaceae	Leaves
Rawolfia vomitoria	Apocynaceae	Root
Allium sativum	Liliaceae	Bulb
Ageratum conyzoides	Asteraceae	Leaves
Viscum album	Loranthaceae	Leaves
Solanum torvum	Solanaceae	Leaves
Bryophyllum pinnata	Crassulaceae	Leaves
Capsicum fratescens	Solanaceae	Fruits
Anthocleista nobilis	Loganiaceae	Leaves
Alchornea cordifolia	Euphorbiaceae	Leaves
Alstonia boonei	Apocynaceae	Leaves
Euphorbia hirta	Euphorbiaceae	Leaves
Vernonia amygdalina	Asteraceae	Leaves
Piper guineense	Piperaceae	Leaves
Emilia sonchifolia	Asteraceae	Leaves
Zanthoxylum zanthoxyloides	Rutaceae	Leaves
Zingiber officinale	Zingiberaceae	Rhizome
Aframmomum melegueta	Zingiberaceae	Seeds
Psidium guajava	Myrtaceae	Leaves
Heliotropium indicum	Boraginaceae	Leaves
Cola nitida	Sterculiaceae	Cotyledon
Cymbopogon citratus	Graminaceae	Leaves
Citrus aurantifolia	Rutaceae	Leaves
Justicia flava	Acanthaceae	Leaves
Datura metel	Solanaceae	Leaves
Cassia occidentalis	Caesalpinaceae	Seeds
Ocimum gratissimum	Labiatae	Leaves
Carica papaya	Caricaeae	Seeds
Phyllanthus fraternus	Euphorbiaceae	Whole plant
Scoparia dulcis	Scophulariaceae	Leaves
Chromolena odorata	Asteraceae	Leaves
Colcasia esculenta	Araceae	Leaves
Tetrapleura tetraptera	Fabaceae	Fruit
Bombax buonopozense	Malvaceae	Bark
Edipta prostrata	Asteraceae	Leaves
Morinda lucida	Rubiaceae	Leaves
Theobroma cacao	Sterculiaceae	Leaves
Ricinodendron heudelotii	Euphorbiaceae	Leaves
Anon muricata	Anonaceae	Leaves
Cnnabis sativum	Cannabaceae	Leaves
Nauclea latifolia	Rubiaceae	Leaves
Mormordica foetida	Apocynaceae	Stem bark
Zanthoxylum parvifolium	Rutaceae	Root
Clitoria ternatea	Fabaceae	Seeds
Persia Americana	Fabaceae	Leaves
Manihot esculenta	Euphorbiaceae	Leaves
Hibiscus vitifolius	Malvaceae	Leaves
Sporobolus pyramidalis	Poaceae	Leaves
Amaranthus spinosis	Amaranthaceae	Leaves
Pycnanthus angolensis	Myristaceae	Root
Lilium candidum	Liliaceae	Leaves
Sinapis alba	Brassicaceae	Seeds

Syzygium aromaticum	Myrtaceae	Dried fruit bud
Commelina diffusa	Commelinaceae	Leaves
Plantago ovata	Plantaceae	Leaves
Jatropha curcas	Euphorbiaceae	Leaves
Cymbopogon nardus	Poaceae	Leaves
Ricinus communis	Apocynaceae	Leaves
Ceda acuta	Liliaceae	Leaves
Butyrospermum parkii	Fabaceae	Fruits
Spatodia campanulata	Boraginaceae	Leaves
Citrus limon	Poaceae	Leaves

Table 9. Some medicinal plants, combinations, dosage forms, and methods of preparation used for treatment in children**.**

Indication	Plant combinations	Dosage form	Method of preparation
Headache	*Solanum torvum, Bryophyllum pinnata, Heliotropium indicum, Persia americana, Zanthoxylum parvifolium*	Decoction	About 500g of leaves are boiled in 2L of water for about 30min. Dosage is 20ml thrice daily after meals for seven days.
Malaria	*Justicia flava, Ocimum gratissimum, Alstonia boonei, Vernonia amygdalina, Momordica charantia*	Decoction	About 500g of leaves and stem bark of *Alstonia boonei* are boiled in 2L of water for about 30min. Dosage is 30ml thrice daily after meals for seven days.
Stomach disorders	*Amaranthus spinosis,Vernonia amygdalina,Plantago ovate,Cassia occidentalis, Emilia sonchifolia, Ageratum conyzoides*	Enema, decoction	About 1kg of the leaves of *Amaranthus spinosis* and *Carica papaya* is boiled with 3000ml of water. Dosage is 30ml thrice daily before meals.
Cough	*Zingiber offiicinale, Syzygium aromaticum, Theobroma cacao*	Decoction	About 500g of the rhizome of ginger, roots of *Theobroma cacao* and leaves of *Syzygium aromaticum* are boiled in 2500ml of water. Dosage is 45ml thrice daily after meals.
Skin rashes	*Phyllanthus fratesens, Aframmomum melegueta, Ocimum gratissimum, Jatropha curcas*	Poultice	About 500g of the fresh leaves of *Phyllanthus fraternus* and 300g of the seeds of *Aframmomum melegueta* are grinded and applied topically.
Asthma	*Euphorbia hirta, Hibiscus vitifolia, Zingiber officinale, Allium sativum*	Decoction	About 500g are grounded and boiled in 1500ml of water. Dosage is 45ml thrice daily before meals.
Measles	*Zanthoxylumm zanthoxyloides, Alstonia boone, Amaranthus spinosis, Butyrospermum parkii*	Poultice	About 500g of the leaves of *Alstonia boonei, Butyrospermum parki* and *Amaranthus spinosis* are grounded and applied on the skin.
Convulsion	*Viscum album and Allium sativum*	Decoction	About 500g is boiled in 1000ml of water. Dosage is 15ml thrice daily. This is mostly given to children between 4 to 6 years.
Epilepsy	*Ceda acuta, Anthocleista nobilis, Spatodia campanulata*	Decoction	About 500g of the leaves of *Ceda acuta*, and root of *Spatodia campanulata* is boiled. Dosage is 20ml twice daily before meals.
Respiratory distress syndrome	*Morida lucida, Vernonia amygdalina, Zingiber officinale, Mentha piperita*	Decoction	About 500g of the leaves of *Morinda lucida, Vernonia amygdalina* is mashed and about 500ml of honey is added. Dosage is 15ml thrice daily after meals.

South Africa which was 55% (21). Another study conducted in South Africa indicated that about 60% of caregivers provided their children with traditional medicines (22). In other studies, conducted about Europe, the prevalence rates of the use of herbal medicinal product were rather low, ranging from less than 0.5% in the last 7 days among children of 0–12 years old (23), and 3.9% in the last 12 months among children 0–17 years old in the USA (24), to 2.4% in the past 3 years among children of 0–13 years old in Italy

(25). The differences in the prevalence rates of the use of herbal medicines by children may be a result of differences in the pattern of disease, and its distribution affecting these regions coupled with the perception that herbs are safe, effective and accessible (26, 27). Out of the total population of 337, 180 participants met the inclusion and exclusion criteria. Out of the 180 children, there were 97 males representing 53.9% and 83 females representing 46.1%. The total number of children under 1-year-old was 55 representing 30.62%, while those between 1-5 years were 84 representing 46.60%, and those between 6-12 years were 41 representing 22.81% (Table 1). Moreover, the number of males for children less than age 1 was 28 (15.60%), those between the ages of 1 to 5 were 36 (20.00%), and finally children between the ages of 6 to 12 were 33 (18.33%). For females, those under 1-year-old were 27 (15.02%), children between the ages of 1 to 5 were 48 (26.60%), and those between the ages of 6 to 12 were 8 (4.48%) (Table 1). This outcome indicates that there were more males as compared with females, and possibly, more males than females took part in the study. Furthermore, children between the ages of 1 to 6 comprised the majority followed by children under 1-year-old. Children between the ages of 6 to 12 were the minority.

The parents/caregivers and other family members who accompanied the children to the hospital were 74 males representing 41.1% and 106 females representing 58.9%. It was revealed that out of the total number of parents/caregivers who accompanied their children to the hospital (180), 142 persons representing 78.60% were either fathers or mothers. This implies that most parents normally send their children to the hospital for their health care needs.

It was also revealed that parents/caregivers who accompanied their kids in the age ranges of younger than 20, 20-29, 30-39, 40-49, and above 50 were 43 (23.50%), 26 (14.40%), 55 (30.90%), 31 (17.30%) and 25 (13.90%) persons, respectively (Table 2). This is similar to a study where it was revealed that parents/caregivers who were 30 years or older were significantly using herbal medicines on their kids when compared with younger parents (28).

The educational background of parents/caregivers showed that 6 persons representing 3.50% had no education, 105 persons representing 58.40% had primary education, 53 persons representing 28.90% had secondary education, and 16 persons representing 9.2% had tertiary educational background (Table 2). This results indicates that the more educated individuals are more conscious of health issues affecting their children and will send their children to the hospital to maintain or improve their health. Therefore, the point at which the educated will use herbal medicine may be in mild to moderate disease states, and when orthodox medicines fail, especially in chronic illnesses. This outcome is similar to a study which revealed the significant effect of the level of parents' education on the need to send their kids to the hospital for their health care needs (29).

The employment status of parents/caregivers showed that 10.30% of both mothers and fathers were employed, while 24.30% of mothers and 13.10% of fathers considered alone were employed. However, 52.30% were unemployed. This association may influence the utilization of herbal medicine which is perceived to be safe and effective to the best of my knowledge.

The disease distribution revealed that the most common disease affecting the children was respiratory infection, followed by malaria, skin infections, gastroenteritis, malnutrition, and sickle cell anaemia. This outcome is similar to a study which revealed that the diseases mentioned above are very common among children under 12 years (30,31). Moreover, the duration of the disease was between one to four weeks.

The socio-demographic data of caregivers who administered herbal medicines to their children revealed that the age ranges of parents/caregivers less than 20, between 20-29, 30-39, and above 40 years were 8.98%, 24.3%, 21.20% and 23.3%. This implies that age has a direct impact on the use of herbal medicines. In terms of education, all the respondents were educated. Hence, educational status and accessibility to herbal medicines were predictors of the potential use of herbal medicines. This result is consistent with that of a similar study which indicated that the more educated a person was the more likely he was likely to take herbal medications (32,33).

With regard to knowledge and how the parent/caregivers obtained herbal medicines, it revealed that 13.5 of them had knowledge on the medicines used, 15.4 obtained them from their parents, 26.4 acquired

them from their grandparents, and 22.5% obtained them from neighbors. This implies that knowledge on the use of herbal medicines was acquired as a result of learning and continued interactions with their parents, grandparents and neighbors. This phenomenon is similar to the results of a study in Nigeria indicating that parents, grandparents, and neighbors were the sources of traditional knowledge which is passed on to their sons and daughters (34).

Rectal administration of herbs was the most common route of administration. This was followed by dermal, nasal, and oral routes. The most frequently used dosage forms were liquid, poultice, enema, decoction and infusion. Children of parents and caregivers utilized herbal medicines, massaging, bone setters, tooth extractors, and other methods.

The primary justifications for the utilization of herbal medicines in children were safety, effectiveness, accessibility, lower costs, availability, and cultural beliefs. Moreover, no prescription is required to purchase herbal products. This is in line with a similar research which reported the same findings (35,4).

Concerning the awareness about the guidelines of the FDA prohibiting the use of herbal products in children under 12 years, majority of the parents/caregivers were not aware. That is, only a few of them were aware. This is because these herbal products are not clinically trialed and scientifically tested, and may be potentially toxic to children. However, these parents insisted that they would still administer herbal medicines to their children due to their benefits. Therefore, the integration of herbal medical services with modern medicine, which is still at the pilot stage in Ghana, should be strengthened. This can be achieved through research and advocacy, ensuring that herbal medicine services are covered by the National Health Insurance Scheme. Furthermore, there should be a policy to ensure that the curriculum of all health training institutions has a course in traditional medicine coupled with the training of conventional health practitioners in herbal medicine (36). According to Tetteh *et al*. (37), awareness about the existence of herbal medicine units (HMU) in various hospitals is very poor. Therefore, HMUs are not relied upon for guidance on the use of herbal medicines. This is to ensure that parents who want to use herbal medicines for their children will obtain it from qualified personnel or quality facilities.

A total of 63 plants species belonging to 32 plant families, and the parts mostly used and reported to be safe efficient have been documented in Table 8. Out of the 32 families of the plants, members of the Euphorbiaceae, Asteraceae, Fabaceae and Apocynaceae were the most commonly used plants. In Ghana, it is well known that members of the aforementioned families are used in herbal medicines (38). It is commonly known that bioactivity of the members of these families are attributed to secondary metabolites such as alkaloids, tannins, and phenolics present in them. Moreover, some medicinal plants, combinations, dosage forms, and methods of preparation used for treatment in children were also revealed. The practice of combining medicinal plant parts (polyherbal products) for therapeutic purposes (39) is very common in Ghana.

One of the strengths of this study is the collection of data in a hospital from caregivers who have administered herbal medicines to their children prior to the hospital visit. The population size is representative of the community sample of a national health survey. The use of herbal medicinal products in this study was confirmed independently by experienced health care professionals and regulatory experts.

The weaknesses of the study concerns study children not on hospital admission. That is, those living in communities were not included. Caregivers may have a different pattern of herbal medicines use.

Conclusion

This study aimed to explore the use of herbal medicines for children under 12 years at the Kumasi South Hospital. In this study, the use of herbal medicines among children under twelve years was investigated for various social and demographic factors, including the gender and age of both children and caregivers, marital status, occupation, and education level. The following conclusive statements can be stated based on the results discussed above. The results have made it evidently clear that herbal medicines are extensively used. The rate of their use was 77.78% among the children under twelve years. Moreover, the socio-demographic profile indicated that age, educational background, occupation, and the marital status of parents/caregivers significantly

contributed to the use of herbal medicines among the children under twelve years at the Kumasi South Hospital. Furthermore, the most frequent conditions for which herbs were used included gastrointestinal and respiratory diseases coupled with vomiting as the most common side effect. The primary justifications for the utilization of herbal medicines were safety and effectiveness, cost-effectiveness and availability, and cultural beliefs. Moreover, no prescription was required to obtain them. The prevalence of the use of herbal medicines in children in Ghana is high, suggesting the necessity for an adequate public health policy to improve their regulation and also to provide the basis for integration into the healthcare system in Ghana.

Acknowledgment

The authors are indebted to the staff of the Department of Herbal Medicine, Kwame Nkrumah University of Science and Technology and the staff of the Kumasi South Hospital, Ghana.

Conflict of Interest

The authors declare that they have no conflict of interest.

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None

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