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HERBAL MANAGEMENT OF COVID -19 POST VACCINATION INFECTION IN IJEBU-ODE, NIGERIA

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ABSTRACT

Vaccination against SARS- Cov-2 is a leading strategy to change the course of the COVID-19 pandemic worldwide. In spite of the reported efficiencies of well-known vaccines against COVID-19, infection after vaccination still portends the danger of evolving virus variants with increased transmissibility. Though, it is reported that COVID-19 is usually milder if contracted after vaccination than in unvaccinated individuals, mortality remains high in hospitalized individuals. Data from the International Severe Acute Respiratory and Emerging Infection Consortium in the United Kingdom have shown a mortality of 27% more than 21 days after vaccination. Thus identifying reliable treatment for individual at risk of COVID-19 post vaccination infection becomes imperative. As attention is drawn to finding treatment for COVID-19 infection post vaccination, this present work focused on the documentation of 8 plants species belonging to 6 plant families presently deployed by selected herbalists in Ijebu Ode, Nigeria, to curtail COVID-19 post vaccination infections. Data collected from 118 herbalists through in-depth interviews revealed the plants parts used in the treatment, modes of their preparation and administration as well as claims of the herbalists on the curative efficiencies of the herbal remedies.

Keywords: Virus Variants, Transmissibility, Documentation, Herbalists

INTRODUCTION

Plants typically contain different phytochemicals, also known as secondary metabolites that may act individually, additively, or synergistically to improve health. Indeed, medicinal plants, unlike pharmacological drugs, commonly have several chemicals working together synergistically to produce a combined effect that surpasses the total activity of the individual constituents. The combined actions of these substances tend to increase the activity of the main medicinal constituent by speeding up or slowing down its assimilation in the body.

Secondary metabolites from plants have the capacity to increase the stability of the active compound(s) or phytochemicals, minimize the occurrence of adverse side effects, and have an additive, potentiating, or antagonistic effect. It has been postulated that the enormous diversity of chemical structures found in these plants are not waste products, but specialized secondary metabolites involved in the relationship of the organism with the environment. For example, attractions of pollinators, signal products, defensive substances against predators and parasites, or in resistance against pests and disease. A single plant may contain bitter substances that stimulates digestion and possess anti-inflammatory compounds that reduces swelling and pain., Phenolic compounds can act as an antioxidant and venotonics, antibacterial and antifungal. Tannins act as natural antibiotic., Diuretic substances enhances the elimination of waste products and toxins, while alkaloids enhance mood and give a sense of well-being [1-5].

In Africa, more than 50% of the population rely on traditional medicines for healthcare [6]. Around 70% of Nigerians depend on traditional medicines for their primary health challenges [7]. The use of herbal medicine in Nigeria is wide-spread owing to the spectra of floristic varieties and cultural plurality. The robust history of indigenous knowledge of herbs and the administration of plant parts as sources of traditional medicines in Nigeria hav been passed down from generation to generation via oral tradition [8]. It is important that the emerging indigenous knowledge on treatment of COVID – 19 post vaccination infections be interrogated and documented.

The corona virus disease 2019 (COVID - 19) is a communicable respiratory disease caused by SARS-CoV-2-, the virus that causes illness in people and make some people very ill. There are currently no proven treatments for COVID – 19 post vaccination infection although many countries are trialing existing drugs. In Nigeria, the efficiency of some traditional herbal remedies administered by some herbalist for COVID – 19 post vaccination infection is being tested.

For some people who are vaccinated and still get infected, there is a risk of transmission to others [9]. People who are immune-compromised may not always build adequate levels of protection after an initial 2 doses of primary MRNA COVID – 19 vaccine series [10]. People with underlying medical conditions are at increased risk of severe diseases. Also people with weakened immune system are at high risk of getting infected. Administration of medications that are likely to weaken the immune system may increase the vulnerability to infection even after full vaccination is referred to as breakthrough infection [11]. Because vaccines are not 100% effective, as the number of people who are fully vaccinated goes up, the number of break through infection will also increase. However, the risk of infection remains much higher for unvaccinated than vaccinated people [12].

In spite of the reported efficacies of accredited vaccines the possibility of still contracting COVID – 19 after vaccination portends dangers with the probability of the evolution of virus variants with increased transmissibility. Though COVID – 19 is usually milder if contracted after vaccination than in unvaccinated individuals, mortality remains high in hospitalized individuals. Data from the International Severe Acute Respiratory and Emerging Infection Consortium in the United Kingdom have shown a mortality of 27.0% more than 21 days after vaccination [13,14]. For an understanding of herbal management of COVID – 19 post vaccination infection in Ijebu Ode, Nigeria, both the etic and emic knowledge are indispensable.

It is important to document the traditional knowledge and practices of different cultures, as this can be a valuable source of information for future research and treatment of post-vaccination covid-19 infections. Most researchers focus on particular method of treatment, thus not comparing the various methodologies deployed in treating a particular ailment using indigenous practices. This research in addition to documenting a potential benefit of alternative medicine, is contributing to knowledge by delving into the spectrum of diversity of methods within the treatment regime.

RESEARCH METHODOLOGY

Study Area

Ijebu-Ode covers a land area of 192 km^2 (Figure 1). It is located on longitude $6^0 49^1 09^1$N and latitude $3^0 55^1 02^1$E at altitude 73 m above sea level. Over the course of the year, the temperature varies from 21.6 ^{0}C to 33.3 ^{0}C and is rarely below 18.3 ^{0}C or above 35.5 ^{0}C. Ijebu Ode, being in the tropics of Africa is home to plethora of plants that accumulate important secondary metabolites

through evolution as a natural means of surviving in a hostile environment [15]. It has been reported that Africa has some 216 million hectares of forest occupied by medicinal plants of different biodiversity [16]. In Ijebu Ode traditional healers prescribing medicinal plants are the most easily accessible and affordable health resources available.

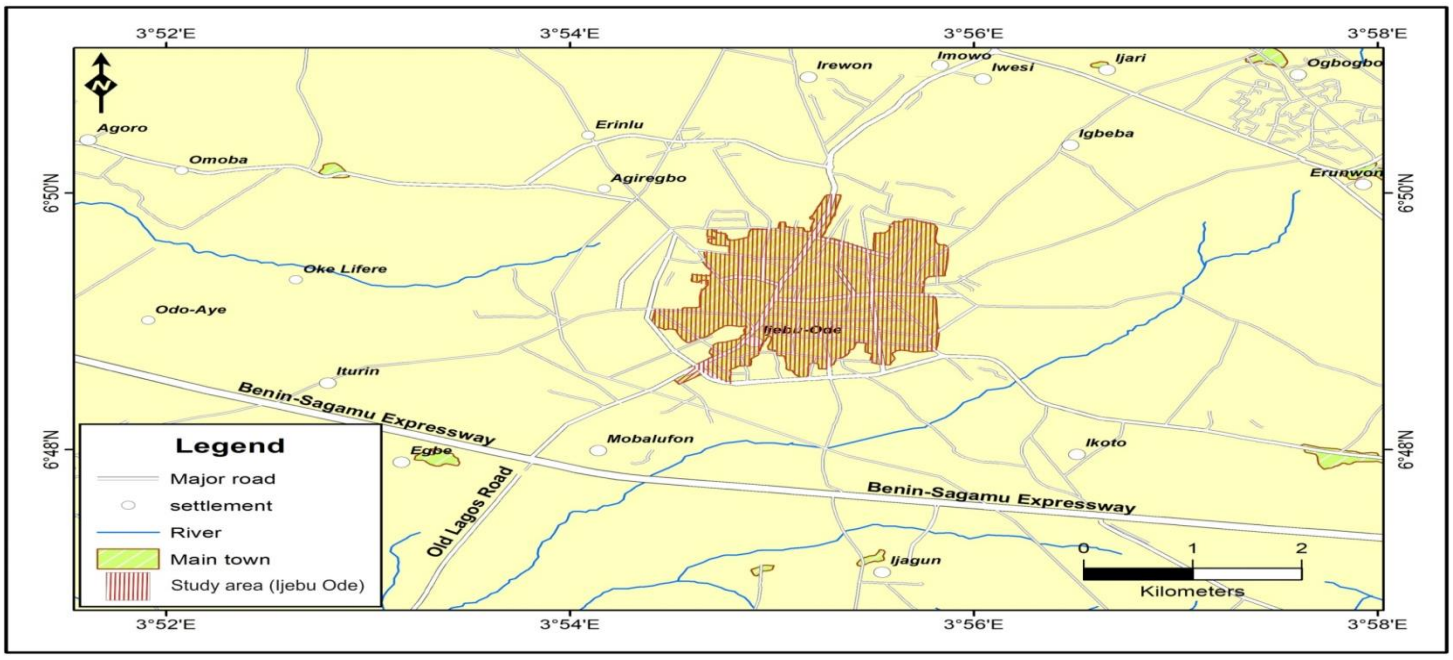

Figure 1: Map of the study area

Study Data and Collection

Data were collected from 118 herbalists (Table 1) through interviews using semi-structure questionnaire with pre-determined open-ended and direct questions [17]. The interviews were based on the plants part being used to treat COVID – 19 infections after vaccination, modes of preparation and administration of the herbal remedies. Herbalists were interviewed individually and the interviews were mostly conducted in their private spaces.

Table 1: Bio data on Herbalists interviewed

CATEGORIES	VARIABLES	NUMBER OF HERBALIST	PERCENTAGE (%)
Sex	Male	109	92
	Female	09	8
Religion	Christian	18	15
	Muslim	25	21
	African Traditional Religion	75	64
Level of Education	Informal Education	12	10
	Primary Education	28	24
	Secondary Education	31	26
	Post – Secondary Education	47	40
Age groups	20 – 29	10	9
	30 – 39	18	15
	40 – 49	28	24
	50 – 59	24	20
	60 – 69	33	28
	70 – 79	5	4
Years of practice	0 – 9	11	9
	10 – 19	19	16
	20 – 29	26	22
	30 – 39	29	25
	40 – 49	30	26
	50 – 59	3	2

Plants names were collated from the claims of herbalist as being effective against COVID – 19 post vaccination infection and researched by aligning local names with those found in literature.

Table 2. Plants parts used by herbalist in Ijebu Ode in the treatment of COVID – 19 post vaccination infection

HERBS	MODE OF PREPARATION AND ADMINISTRATION	CLAIMS OF HERBALIST ON TREATING COVID - 19 SYMPTOMS	REMARKS
1. Lemon grass *(Cymbopogon citratus)* *Local name: ogirisako* *Applicable Plant Parts*: Leaves *Family of Herbs* Poacene family of grasses  Plate 1: Lemon grass	Boiled in water to make decoction and orally administered	Relieves pain, boost immunity and act as diuretic	Administered by 70% of the herbalists in combination with other herbs in the treatment of COVID – 19 infection post vaccination

2. King of bitters *(Andropgraphis panicilata)* *Local name: Meje meje* **Applicable Plant Parts** Roots and whole plant **Family of Herbs** Acanthaceae  Plate 2: *Andropgraphis panicilata*	Aerial parts macerated and extracted in ethanol (Palm wine), administered orally	Relieves fever, chest pain, headaches and respiratory infection	Administered by 25% of Herbalist to treat COVID – 19 infection post vaccination
3. Sorghum *(Sorghum biolor)* *Local name: Okababa* **Applicable Plant Parts** Seeds and whole part **Family of Herbs** Poaceae family of grasses  Plate 3: Sorghum	Seeds are ground into paste, stems are cut in pieces and boiled to make decoction. Orally administered	Controls blood sugar and act as diuretic	Administered by 50% of the herbalists in combination with other herbs to treat COVID – 19 infection post vaccination

4. Garlic *(Allium sativium)* *Local name: Alubo sawere* **Applicable Plant Parts** Bulb **Family of Herbs** Amaryllidaceae  Plate 4: Garlic	Masticated, eating raw	Relieves fever, body pain, common cold.	Administered by 100% of the Herbalists in combination with other herbs to treat COVID – 19 infection post vaccination
5. Onion *(Allium cepa)* *Local name: Alubosa* **Applicable Plant Parts** Bulb **Family of Herbs** Amaryllidaceae  Plate 5: Onion	Eaten raw	Relieves fever, body pain, common cold. Promotes feeling of general wellness	Administered by 75% of Herbalist in treating COVID – 19 infection post vaccination

6. Ginger (*Zingiber offcinals)* *Local name: Ata ile* **Applicable Plant Parts** Rhizone roots **Family of Herbs** Zingiberceae  Plate 6: Ginger	Macerated and extracts taken orally	Fights common cold Flu and nauren	Administered by 100% of the Herbalist in combination with other herbs and sometimes inhalation of steam from its decoction with other herbs is administered
7. Bitter leaf *(Vernonian amydgalima)* *Local name: Ewuro* **Applicable Plant Parts** Leaf **Family of Herbs** Asteraceae  Plate 7: Bitter leaf	Macerated in water Extracts orally administered	Stops dysentery, diarrhea, vomiting and cleanses liver	Administered by 100% of Herbalist in treating COVID – 19 infection post vaccination
8. Emino Neem leaf *(Azadirachta indica)* *Local name: Dongoyaro* **Applicable Plant Parts** Bark tree Leaf **Family of Herbs** Mahogany  Plate 8: Emino Neem leaf	Bark is boiled, Taken orally. Leaves macerated and taken orally too.	Relieves fever, chest pain and cough	Administered by 100% of Herbalist in COVID – 19 infection post vaccination

In total 8 species of plants belonging to 6 plant families were collated. It is asserted that the herbs contain secondary metabolites such as alkaloids tannins, and phenolics responsible for their bio activity [18]. Species most commonly administered are *Zingiber officinals* (Ginger), *Allium satirum* (Garlic), *Azadirachta indica* (Neem) and *vernonia Amydgaline* (Bitter Leaf) and *Cymbopogon citratus* (Lemon grass)

Preparation and Administration

Harvested plants were utilized in preparation of the herbal medicine mainly in the form of decoctions. However, differences exist in the preparations of decoctions from herbalist to herbalist. The routes of administration of the remedies were mainly oral and sometimes steam inhalation through the nasal cavity into the lungs. The route of administration of the herbs could be related to the bio active agents of the plant extract. For instance, herbs whose bio active agents are alkaloids are easily assimilated orally while terpenoids are best administered through nasal routes [19]

RESULTS AND DISCUSSION

Herbs such as Blume *(Anchomanes differmis),* Lemon grass *(Cymbopogon Citratus),* and boundary tree *(New boudialeavis),* Brimstone tree *(Morinda lucida)* King of bitters (*Andropgraphis panicilata*), sorghum *(sorghum bicolor)* and Sponge gourd *(luffacylindrica)* have been deployed by the Forest Research Institute of Nigeria, Ibadan in the manufacture of poly herbal mixture [20] which is widely touted to treat symptoms of COVID – 19 infections.

These herbs are known for their antioxidant and anti – inflammatory properties as well as being natural cough suppressants and fever reducers [21].

Some of the herbalist interviewed opined that “people’s faith in medicinal herbs is indeed understandable in the context that there is still no consensus on the drugs that can really curtail and eliminate COVID – 19 post vaccination infection. The entire 118 herbalist emphasized that patients that presents any three combination of fever, chills, cough, fatigue, muscle or body aches, sore throat, loss of taste are requested to go for COVID-19 test even if they had received full vaccination. According to the herbalists, the result of such test revealed that at least one out of every 20 patients that had received the full vaccination often tested positive.

The hypothesis of the treatment is that if the cough, respiratory difficulties, aches, and fever could be treated by the herbs, then the infection could be curtailed. All the 118 herbalists insisted the need to deploy varieties of recipes and decoction to achieve efficacy. They claimed their herbal treatment restored 100% of cases of COVID-19 post vaccination infection in 3 days.

CONCLUSION

In this paper the researchers documented the indigenous herbs application in the treatment and management of COVID-19 post vaccination infection in Ijebu Ode, Nigeria. This documentation contributes primary data on the use of indigenous knowledge on medicinal plant in the treatment of COVID-19 post vaccination infection. Further studies on the extraction methods, safety and efficacy will be necessary to improve the effectiveness of the traditional recipes. Also, the perception of patients as regards the claims of the herbalist needs to be interrogated in order to put in perspective the ascribed efficacy of the treatment.

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