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A Study of the Use of Honey and Ethno-biological Components in Nigerian Trado-medical Practices

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Authors' contributions

This work was carried out in collaboration between all authors. Author AMA designed the study, performed the statistical analysis, wrote protocol and first draft of the manuscript and managed literature review. Authors YUO, SKB and AO managed the analysis of the study and further literature searches, review of the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Trado-medical practice variously referred to as ethno-medicine, folk medicine, native healing, and alternative medicine, is an ancient and culture-bound method of healing used against various diseases threatening human existence and survival. The aim of this study was to investigate the use of honey and other ethno-biological components in the treatment of different ailments in Kwara State, North central Nigeria. Structured questionnaire and interview schedule were used to collect information from 280 respondents (120 herb sellers and 160 trado-medical practitioners). The result revealed methods of remedies' preparation such as infusion, decoction, maceration, extraction, squeezing, soaking, shredding, grinding/pounding, and drying while the mode of use include: drinking, chewing, licking, eating, and topical application. It was also observed that 20 plants and 6 animal products distributed across 18 and 5 families respectively were being used in combination with honey for the treatment of arthritis, toothache, cold, chronic cough, stomach ulcer, diabetes, wounds, hypertension, low sperm count, ear defect, rheumatism, malaria and infertility among others. The knowledge of trado-medical

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practices elicited could serve as a basis for further drug discovery, pharmacological research and bio-prospecting.

Keywords: Treatment of ailments; honey; trado-medical; ethno-biological.

1. INTRODUCTION

The achievement of the Millennium Development Goals (MDG's) which aimed to halt the incidence of malaria and other major diseases such as HIV/AIDS could be aided by the support of current orthodox medicine with the exploits of trado-medical science and technology. It has also been argued in several literatures that there is the need to revitalize, sustain and firmly entrench the practice and value of indigenous knowledge in our modern society so as to preserve African medical history [1].

Globally, plant and animal products as well as honey, propolis and bee venom have been found useful in the treatment of different diseases. Propolis, for instance, is often called nature's penicillin and used in the pharmaceutical industries because of its effective antibacterial [2] antiviral, antiseptic and antifungal properties [3,4]. Bee wax is nutritious and medicinal [5] while bee venom, the main object that makes the honey bee dreadful contains eighteen powerful compounds all of which have potent healing properties, particularly against degenerative diseases like arthritis, rheumatism and multiple sclerosis [6]. Pawpaw leaves, garlic, orange juice, cow milk, local eggs, cod liver oil have been used for the treatment of arthritis, stomach ulcer, cough and diabetics[7,8].

Honey has a long history in traditional medical systems and was used by the ancient Greeks, Sumerians and Egyptians [9,10]. Hippocrates recommended honey and vinegar for pain, and a mixture of honey, water and other substances to treat acute fevers [11]. It has antibacterial, anti-inflammatory, antiulcer [12,13] and anti-fungal properties [14]. It is also used as an anti-diarrhea drug [15], treatment of wound infections [16,17] and post-radiotherapies mucosal trauma [18]. Honey increases antibody titre against T-dependent and T-independent antigens during primary and secondary immune responses and stimulates proliferation of B and T lymphocytes in cell cultures [19].

The African continent has a history with the use of plants and animal products for medicinal purposes. In some African countries, 90% of the population use medicinal plants and animal products as alternatives to orthodox medicines [20,21]. For instance, 80% of the population in Mali use traditional medicine as their only type of medicine [22]. Traditional medicine was the only source of health care in Nigeria in historical times until 1860s when orthodox medicine was introduced [23]. FAO [24] also observed that over 90% of Nigerians in rural areas and 40% in urban areas depend partly or wholly on trado-medical services. The traditional use of readily available plant and animal products for the treatment of ailments is particularly valuable to Africa due to the absence of health care facilities and paucity of health personnel in most of the rural settings [25-27].

In most parts of rural Nigeria, honey is usually part of the recipe for preparation of herbal mixtures where it serves as a preservative. It is however not uncommon to find that honey alone either serves as the prescription for the treatment of various ailments or as the main healing constituent in several herbal medicines. In South-west Nigeria, for instance, recent literature report has it that health conditions such as constipation, duodenal ulcer, toothache,

fatigue, infertility, indigestion and pile are cured through the use of honey alone for a period of time [28].

Other ailments such as bladder infections, arthritis, hair loss, bad breath and skin infections also have honey as one of the main constituent of the herbal medicine used for their treatment [29-31].

It is therefore important to document the use of honey and other ethno-biological components in different traditional settings for the treatment of various ailments. This will serve as a basis for further scientific study of these natural resources in order to develop new and improved drugs and remedies. There is paucity of this kind of information especially as regards North Central Nigeria. This study therefore investigates the use of honey and other ethno-biological components for the treatment of different ailments in Kwara State, North Central Nigeria.

2. Methodology

2.1.1 Study area

Kwara State belongs to the North Central geopolitical zone of Nigeria and it is divided into Kwara north, Kwara south and Kwara central zones (Fig. 1). All geo-zones of Kwara State are specially noted for aggressive farming activities especially in the production of staple food like rice, yam, yam flour, cassava and also in honey hunting and traditional beekeeping activities. Six local government areas: Oyun, Irepodun, Asa, Moro, Edu and Patigi were randomly selected for the study.



Fig. 1. Map of Kwara state showing the 16 LGAs including the study area
Source: (KWADP, 2008)

2.1.2 Data collection and analysis

The study was conducted between November 2010 and December 2012 in 6 local government areas across Kwara State, Nigeria. The data were collected through a well structured questionnaire and interview schedule. The questionnaires were interpreted to local languages for the participation of the unlettered subjects. The designed questionnaire

sought for social profile, nature of work, method of trado-medical practice, ethno-biological components used, method of application, dosage and ailments treated. Descriptive statistics were employed for the analysis of the data.

The sampling procedure was multistage random sampling. Six Local Government Areas (LGAs) were randomly selected from the list of sixteen LGAs in Kwara State (Fig. 1). Then four villages were randomly selected from each LGA to make a total of 24 villages. Five herb dispensers each were also randomly selected from each village to make a total of 120 herb sellers. Also, 160 trado-medical practitioners were selected in the 24 villages using proportional random sampling. The total number of respondents (120 herb sellers and 160 trado-medical practitioners) interviewed therefore added up to 280.

3. RESULTS

3.1 Social Profile of the Respondents

One hundred and fifty 150 (93.75%) of the trado-medical practitioners were males while 10 (6.25%) were females. All the 120 herb sellers were females and the bulk (70%) had antecedents of trado-medical family background. The majority of the trado-medical practitioners were within the age range of forty and fifty with mean value of 47, minimum value of 28 and maximum value of 72. Age range of 22 and 50 (mean of 38) years were also recorded among the 120 herb sellers. Trado-medical practitioners' educational level ranges from non formal education to tertiary education level. The mean education index was 2.8 (41.6 standard deviation) while those of herb dispensers were 2.1(mean) and 35.8 (standard deviation).The household size ranges from 1 to 12 persons, mean (7.8), standard deviation (31.0) for trado-medical respondents and maximum of 9 persons, 7.2(mean), standard deviation (20.3) per household for herb dispensers. For trado-medical practitioners subsidiary occupation includes honey hunting (44.4%), farming (15.6%) and herb collection (40%) while for herb dispensers it ranges from trading (20.8%), artisans (15.8%) and herb collection (63.4%) respectively (Table 1).

Table 1. Social-economic status of the respondents on trado-medical related practices

Distribution	Unit	Nature of Practitioner		Mean Value	Minimum value	Maximum value	Standard Deviation
Age	Years	a	n=160	47	28	72	6.05
		b	n= 120	38	22	50	31.6
Gender	Sex	a		160	1	160	Na
		b		120	1	120	Na
Level of Education	Years	a		2.8	0	15	41.6
		b		3.1	0	15	35.8
Household size	No of persons	a		7.8	1	12	31.0
		b		7.2	0	9	20.3
Subsidiary occupation				F	%	Cumulative Frequency	
		a	Hunter(honey)	71	44.4	−	
			Farming	25	15.6	96	
			Herb collection	64	40.0	160	
			Total	160	100	−	
		b	Trading	25	20.8	−	
			Artisans	19	15.8	44	
			Herb collection	76	63.4	120	
			Total	120	100	−	

Note: a – Trado-medical practitioner, b-Herb seller

3.2 Trado-medicinal Uses of Honey

A number of medi-cares were described by the respondents for the treatment of 15 different ailments in this study. The ailments included tooth ache, fatigue, arthritis, constipation, stomach ulcer, cough, diabetes, wound, rheumatism, hypertension, low sperm count, dysentery, ear defect and malaria. Honey was found to be the general component of all medicines in the study area. For diabetes pure *Apis mellifera* honey, crushed honey comb, and brown *Carica papaya* leaves are infused in warm water and half glass cup is taken twice daily. Three glass cups of shredded Kola nut's *Viscum album* and *Moringa oleifera* leaves, brown *Carica papaya* leaves and *Citrus limon* juice added to pure honey in warm water was prescribed for hypertensive patients (Table 2).

Table 2. Preparation and dosage of materials used for the treatment of various ailments

S/No	Ailments	Plants and animal parts used, preparation and dosage
1	Tooth ache	Two table spoons of pure honey and warm salted water gaggled and placed at spot.
2	General body pain (fatigue)	Pure honey, *Citrus aurantifolia* juice, *Gallus gallus* raw egg, boiled *Elaeis guineensis* leaves, the concoction is taken 3 table spoons at night.
3	Bone ache(arthritis)	pure honey and boiled brown *Carica papaya* leaves, 1 glass cup taken daily.
4	Stomach ulcer	Pure honey and fresh *Bos indicus* milk, dried grounded *Musa sapientum* peel paste taken half glass cup once a day.
5	Cough	Pure honey, *Allium sativum* juice and *Elaeis guineensis* oil 2 table spoons at night.
6	Diabetes	Pure honey of *Apis mellifera* and crushed *Apis mellifera* honey comb, warm water and brown *Carica papaya* leaves, half glass cup taken twice daily.
7	Wounds	Pure honey and mashed *Allium sativum*, *Gadus morhua* liver oil used as wound dressing.
8	Weak erection	Pure honey, brown *Carica papaya* leaves added to *Citrus lemon* juice, 1 glass cup taken daily.
9	Hypertension	Kola nut's *Viscum album*, *Moringa oleifera* leaves shredded in warm water and added to pure honey, brown *Carica papaya* leaves and *Citrus lemon* juice 3 glass cup taken daily.
10	Constipation	Pure honey, juice from seven *Citrus aurantifolia* fruits in warm water 2 glass cups taken as required.
11	Low sperm count	Powdered *Piper guineensis* leaves and extract from *Allium ascalonicum* bulbs added to honey, 2 table spoons taken twice daily.
12	Dysentery	Leaves of *Grewia flavescence* added to honey, 3 glass cups taken thrice a day.
13	Ear defect	Pure honey and *Ricinus communis* oil and *Gadus morhua* liver oil on cotton wool as dressing.
14	Rheumatism	Leaves of *Phaseolus vulgaris* added to honey and taken 3 times a day
15	Malaria/fever	Honey added to boiled leaf of *Cymbopogon citrates,* whole fruits of *Citrus aurantifolia,* unripe *Carica papaya* fruits and unripe *Ananas comosus. The concoction taken a glass in the morning and evening daily. Also* application of bee sting through live bee to joints of the body

Table 3. List of plants/parts used for the treatment of general ailments in Kwara state, Nigeria

S/No	Common name	Local name (Yoruba)	Preparation with honey	Scientific name	Family
1	Orange	Osan	Juice extracted mixed with honey and other components.	*Citrus aurantifolia*	Rutaceae
2	Garlic	*Ayu*	*Juice extracted and mixed with pure honey.*	*Allium sativum*	Alliaceae
3	Palm tree	*Igi ope*	*Leaves boiled with water and added to a glass cup of honey*	*Elaeis oleifera*	Arecaceae
3	Lemon	Osan wewe	Juice extracted mixed with honey.	*Citrus limon*	Rutaceae
4	Pawpaw	*Ibepe*	*Brown leaves boiled with water and added to a glass cup of honey.*	*Carica papaya*	Caricaceae
5	Banana	*Ogede*	*Dried grounded banana peel made into a paste with honey.*	*Musa sapientum*	Musaceae
6	Lime	Lemonu	Lemon juice is extracted and mixed with pure honey.	*Citrus aurantifolia*	Rutaceae
7	Mistletoe	Afomo	Leaves boiled with water and added to half glass cup of honey.	*Viscum album*	Viscaceae
8	Little hogweed	Awuje	Leaves boiled with water and concoction mixed with honey.	*Phaseolus vulgaris*	Papilionaceae
9	Okra	Ila	The slime is extracted by cutting edges off and soaked in cold water over night and added to 5 spoons of honey.	*Abelmoschus esculentus*	Malvaceae
10	Mint plant	Efirin	Leaves soaked in cold water over night and added to 5 spoons of honey.	*Ocimum gratissimum*	Lamiaceae
11	Pepper	*Ata*	*2 fruits mashed and little quantity mixed with honey.*	*Capsicum annuum*	Solanaceae
12	Onions	*Alubosa*	*Bulb mashed and extract added to honey*	*Allium cepa*	Alliaceae
13	African Teak	*Iroko*	Leaves boiled with water and concoction mixed with honey.	*Milicia exclesa*	Meliaceae
14	sweet gum	*Kakansela*	Leaves boiled with water and concoction mixed with honey.	*Paullinia pinnata*	Sapindaceae

Table 3 Continued……

15	Drum stick tree	*Ewe-igbale*	*Seeds dried, grounded and mixed with honey.*	*Moringa oleifera*	Moringaceae
16	Pineapple	*Ope-eyinbo*	*Juice extracted, mixed with honey.*	*Ananas comosus*	Bromeliaceae
17	Bitter kola	*Orogbo*	*Dried grounded fruits added to honey*	*Garcinia kola*	Guttiferae
18	Madunmaro, Utazi	*Madunmaro*	Leaves boiled with water and concoction mixed with honey.	*Gongronema latifolium*	Asclepiadaceae
19	Resurrection plant	*Abamoda*	*Leaves mashed to extract juice and mixed with honey.*	*Bryophyllum pinnatum*	Crassulaceae
20	Lemon grass	*Koriko-oba*	Leaves boiled with water and concoction mixed with honey.	*Cymbopogon Citrates*	Poaceae

Field survey, 2012

Table 4. The animal and animal products used for the treatment of different ailments in Kwara state, Nigeria

S/No	Common name	Scientific name	Preparation with honey	Family
1	Honeybee/ honey	*Apis mellifera* honey	Mixed with other ethno-biological components	Apidae
2	Bee comb	*Apis mellifera* comb	Crushed mixed with honey and other components.	Apidae
3	Bee sting	*Apis mellifera*	Live honey bee held to sting.	Apidae
3	Cow milk	*Bos Taurus*	A glass cup added to 5 spoons of honey.	Bovidae
4	Domestic fowl eggs	*Gallus gallus*	Albumen collected and mixed with 5 spoons of honey.	Phasianidae
5	Cod liver oil	*Gadus morhua*	Mixed with 5 spoons of honey.	Gadidae
6	Snail	*Archatina archatina*	Snail slime added to 5 spoons of honey.	Limacidae

Twenty (20) plants which included orange-*Citrus aurantifolia (osan(Yoruba),* Garlic-*(Allium sativum), ayu(Y),* pawpaw-*(Carica papaya) ibepe (Y),* mistletoe –*afomo(Y)-(Viscum album)-Viscaceae,* mint plant-*efirin(Y)-(Ocimum gratissimum)-Lamiaceae* and resurrection plant-*abamoda(Y)-(Bryophyllum pinnatum)-Crassulaceae* among others in combination with honey were frequently used for treatment. The 20 identified plants belong to 18 plant families; with Rutaceae having the highest (3) and Alliaceae (2) number of species representatives. The method of use for the treatments included drinking, chewing, licking, eating, and topical application. Method of remedy preparation include infusion, decoction, maceration, extraction, squeezing, soaking (in water), shredding, grinding/pounding, drying and pulverization into powder. Orange juice is extracted from the fruit, mixed with other plant components and added to honey, while palm leaves are boiled with water and added to a glass cup of honey (above Table 3).

Six (6) animals noted by the respondents include *Apis mellifera* family Apidae, *Bos taurus*-Bovidae; domestic fowl- *Gallus gallus-Phasianidae; Cod fish- Gadus morhua* Gadidae and Snail-*Archatina achatina*-Limacidae. The 6 identified animals cut across 5 animal families, which in combination with honey are prepared in different ways. A glass cup of *Bos taurus* milk is mixed with 5 spoons of honey and other plant materials to treat stomach ulcer (above Table 4).

4. DISCUSSION

Honey and other ethno-biological components are well employed by the people of Kwara State, Nigeria, for the treatment of different ailments. It is an ancient and culture-bound method of healing that people of the state have used to cope and deal with various diseases that have threatened their existence and survival [32].

The majority of the trado-medical practitioners in this study were within the age range of forty and fifty years. The herb dispensers' age ranged from 22 to 50 years. Both categories are within active age and this is expected to be an advantage as regards the nature of their endeavour. The herb dispensers search for and collect the required plants and animal products for sale to the trado-medical personnel or at times directly to the patients [33].

The mean education level index obtained for trado-medical practitioners (2.8) and herb dispensers (2.1) were low compared with education index for Nigeria by UNESCO. This low level of educational attainment by these people is bound to have a negative effect on standard preparation, effective dosage administration and healthy packaging of the products [34].

The household size ranges from 1 to 12 persons, mean (7.8) for trado-medical respondents and maximum of 9 persons, 7.2 (mean), per household for herb dispensers. Most of the trado-medical personnel and herb dispensers are confined to rural areas where the size of household are mostly high and important as labour force for farming and other related practices such as herb collection, preparation and application [35].

The results of this study revealed the dear need to harmonize traditional medicine practice with the orthodox practice rather than the bitter relationship existing between the two bodies. This is obvious not only for their supposed complementary roles but also for the fact that a greater number of people have trado-care as their only available healthcare service. Furthermore, the traditional approach often treats some ailments that have defiled modern medical practice [36].The mode of preparations and administration of the treatments varied

widely at the study area. Honey was the most frequently used part in the trado-medical remedies described. This study further shows the relationship between indigenous knowledge, ethno-medicinal practices and pharmacology. Honey and other honeybee products are used for a variety of medicinal and nutritional purposes [37-38].

In consonance with the results of this study, other reports have also shown the use of honey and other plant and animal products for the treatment of diseases such as arthritis, toothache, cold and chronic cough, stomach ulcer, diabetes, wounds, hypertension, low sperm count, ear defect, rheumatism, malaria and infertility [39-42]. Also honey is widely used in the treatment of ailments such as fever, wound infections and dysentery caused by agents as *Salmonella typhi, Staphylococcus aureus* and *Shigella dysentariae* [43-44]. Agbagwa and Frank-Peterside [45] reported high susceptibility of *S. aureus, P. aeruginosa, E. coli, Proteus mirablis* to honey obtained from Western, Sothern, Eastern and Northern Nigeria and effectively controls their diseases.

Our result also corroborates previous studies showing the use of honey in wound repairs [46]. Aside from infectious diseases treatment, honey is used as immunity system booster. This could be the reason why our study revealed the use of honey in combination with other plants to treat general body pain, weak erection and bone ache [47,48]. It has also been reported that honey is used to treat some allergies such as cough and ocular allergies [49] as used by some of the trado-medical practitioners in our study.

5. CONCLUSION

This study reports the use of honey in combination with medicinal plants and animal products in the treatment of several diseases. The common use of ethno-biological components in traditional healing process has its root in the indigenous beliefs and knowledge that are being passed from generation to generation in Africa and other indigenous human settlements. This demonstrates the common nature, dynamism and wide diffusion of trado-medical practice knowledge among indigenous human communities. The study has also shown the importance of documenting and preserving indigenous knowledge, cultural values and knowledge of trado-medical practices which could serve as a basis for further studies on bio-specting, drug discovery and pharmacological research.

ETHICAL CONSIDERATION

Informed consent were sought and obtained from each participant before they were enlisted for the study.

JUSTIFICATION

There is paucity of information on the use of honey and other ethno-biological components in trado-medical practices as regards North Central Nigeria particularly Kwara State.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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