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Role of Herbal Medicine in Oral and Dental Health; Ethnopharmacological Study of Medicinal Plants in Iraq/Baghdad

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ABSTRACT

Dental/Oral diseases are one of the major public health problems globally. The application of Herbal medicines for the manager of oral diseases are considered as an effective alternative to synthetic compound due to their lower side effect. The object of This study is a study of the traditional medicine role in dental health, based on active constituents in herbal medicines, which have been practiced by people. In this study, we sought to gather information from Bedouins in Baghdad region of Iraq about used herbs medicine in dental health. Depth interviews (unstructured interviews) are used to collect the data by asking face-to-face to the respondent. The research has been done in two stages, first one directed to traditional healers, folk practitioners, to know the most common used Herbal in dental health, and the second stage was directed to people. Our results shown that Syzygium aromaticum, Camellia sinensis, and Mentha shown the highest used value (UV) up to 0.90, and mostly used for treatment of Toothache, Canker sore and Oral ulcer, also they used them as a homemade mouth wash. Our studies also shown an increasing in demand of herbal medicine in Iraq day by day as an alternative method of oral/ dental diseases treatment due to economic reasons and its lower side effects in comparison with a synthetic compound.

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INTRODUCTION

Oral/dental health, nowadays considered as an inseparable part of a major public health problem, since it causes pain, discomfort, that effect on person's speech, ability to eat and selection of food, sleep, self-esteem, and confidence. All of the mentioned results of Oral /dental health problems, will effect the quality of life and well-being (Braimoh *et al.*, 2014; Macdougall, 2016).

In vision of the frequency of oral diseases, their impact on persons and society, and economic impact of addressing dental diseases, World Health Organization (WHO) estimates that oral diseases are the fourth-most costly diseases to treat in most industrialized countries (Listl *et al.*, 2015; Yousif and Alsamydai, 2019).

From ancient civilizations, Herbal extracts have been used in traditional medicine by humans (Al-Samydai *et al.*, 2019; Al-Mamoori *et al.*, 2019). From that point, The knowledge on traditional medical has been accumulated, in the treatment of different diseases (Al-Samydai *et al.*, 2018; Alsamydai and Jaber, 2018).

Ethnopharmacological studies are one of the tools that deal with the direct relationship of herbal

medicine and human to prevent and cure oral /dental diseases (Gupta *et al.*, 2015). Different oral/dental diseases have been addressed by herbal medicine as there is a large record of the use of herbal medicine in improving oral/dental health historically. There are many natural ways and herbs to treat oral/dental diseases like inflammation and infection, some of which even help in prevention. The most common traditional oral/dental health practice are dental caries, toothache, gingivitis, ulcerative gingivitis, mouth ulcers, swollen tonsil, oral thrush, tonsillitis and black tongue (Agbor and Naidoo, 2015). Due to that Herbal medicine demand has been increasing as an alternative way of addressing oral/dental diseases, nowadays especially on the developed country of the world, because of its lower side effects in comparing with a synthetic compound. Herbal medicine product in dental disease has a great potential, but it is challenging to determine the side effect and toxicity proper checking of herbal medicine and their product.

In the present study, we focus on the role of traditional medicine in dental health, based on active constituents in herbal medicines, which have been practiced by people

METHODOLOGY

Study Design

The research has been done in two stages, first one directed to traditional healers, folk practitioners, to know the most common used Herbal in dental health by people, and the second stage was directed to people. To know for what they are frequently used these plants.

The survey was conducted during February–August 2019. Interviews have been done in the streets of Bagdad capital of Iraq, by using the native language (Arabic). Each interviewer was aware of their right to reject giving an answer to any question, discontinue the interview at any moment, or to simply refuse the interview in total.

Study samples

The choice of the person informant to be interviewed was of a basic importance to the trustworthiness in gathering an information. We only selected people who utilized medicinal plants as part or all of their dental health therapeutic activity. In this interview, we have been requested a detailed information about gender, education level, as shown in Figure 1, then data about herbs used, in addition to their therapeutic uses and preparation, were collected. Each interviewer has been asked first about the dental problem he/she deals with, then which one of plant/s species is/are, has/have been used for management the particular dental problem.

The questionnaire addressed to each interviewer contained more than a few parts such as medicinal plants, education level, source and extent of his knowledge.

Questions were designed and an interview was done face to face at two stages; the first stage with 12 traditional healers, folk practitioners. The second stage was done by interviewing with 320 People.

Sample selecting has been done by using simple random sampling as sampling methods. A study has been done between February–August 2019 in Baghdad/Iraq.

Data analysis

Use value

The use-value of each plant species has been calculated as follows (Alzweiri *et al.*, 2011),

$$UV = \frac{\varepsilon U}{n}$$

where

UV: use-value of a species;

U: number of users per species;

n: total number of people.

The rang of this factor was from 0 to 1. A higher value, which was near to 1, indicates that the plant were, fairly, the most used by people.

Informant consensus factor (Fic)

alternatively, the Informant consensus factor was used to know the most common plant used in dental healthcare.

$$Fic = \frac{F}{T}$$

where

Fic: Informant consensus factor;

F: Frequency of each used throw species;

T: Total number of uses for all species.

Dependent value

The dependent value of each interviewer has been calculated as follows (Alzweiri *et al.*, 2011),

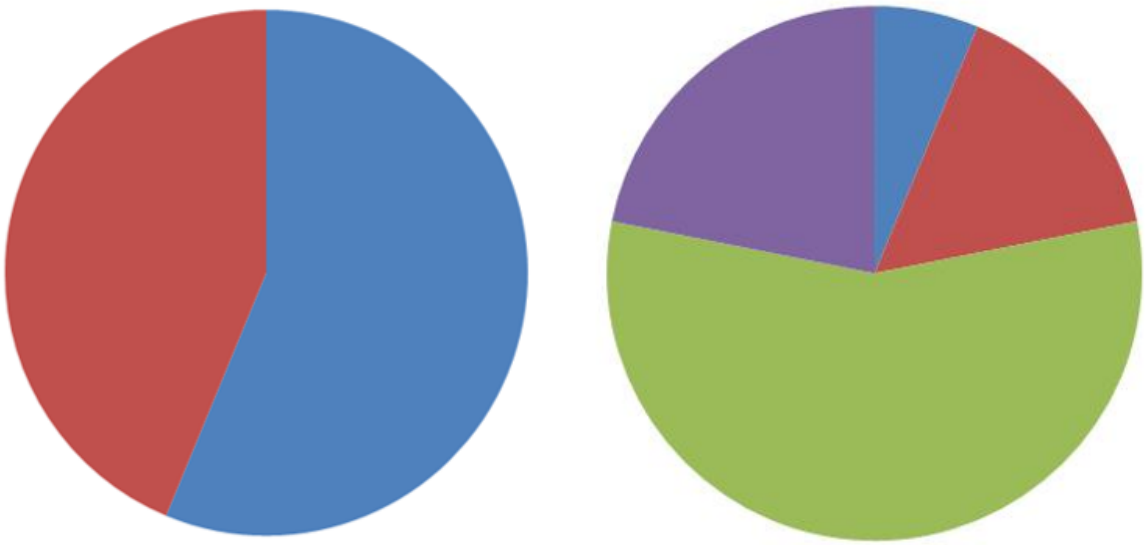
$$DV = \frac{\varepsilon P}{T}$$

where

DV: Dependent value of people on plants

P: number of plants used by an interviewer

T: total number of plants.



A B

Figure 1: ^{A} Gender; Blue reflected to male and red reflected to Female; ^{B}Education level; where Blue, Red, Green, Violet reflected to High school, Bachelor, Master and Ph.D. student or holder respectively

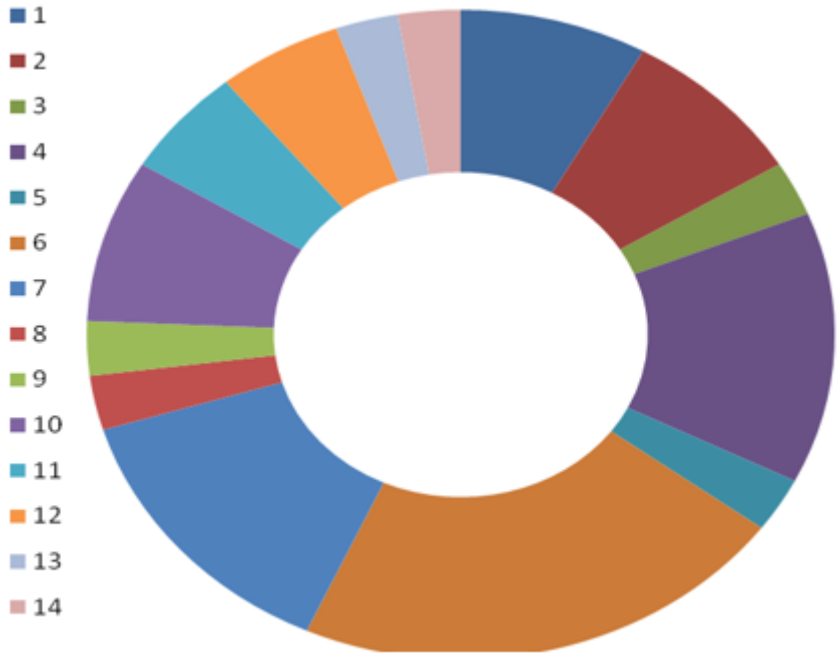


Figure 2: Informant consensus factor: Treat Oral ulcer[1]; Treat Canker sores[2]; Treat Coldsore[3]; Mouth wash[4]; Treat Bleeding[5]; TreatInflammation of gums[6]; Treat Toothache[7]; Healing of the damaged tissues[8]; Increase the strength of gums[9]; Treat Gingivitis[10]; Protection from Caries[11] Tooth paste[12];Oral candidiasis[13]; Analgesic[14]

Table 1: Gender * Source_of_knowledge Cross tabulation

			Source of knowledge				Total
			Website	Social Media	Books	Health profes-sional	
Gender	Male	Count	44	97	20	19	180
		% within Gender	24.4%	53.9%	11.1%	10.6%	100.0%
		% within source_of_knowledge	51.2%	58.4%	51.3%	65.5%	56.2%
	Female	Count	42	69	19	10	140
		% within Gender	30.0%	49.3%	13.6%	7.1%	100.0%
		% within source_of_knowledge	48.8%	41.6%	48.7%	34.5%	43.8%
Total		Count	86	166	39	29	320
		% within Gender	26.9%	51.9%	12.2%	9.1%	100.0%
		% within source_of_knowledge	100.0%	100.0%	100.0%	100.0%	100.0%

Table 2: Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.629a	3	.452
Likelihood Ratio	2.644	3	.450
Linear-by-Linear Association	1.028	1	.311
N of Valid Cases	320		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.69

Table 3: Independent Samples T-Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
DV	Equal variances assumed	.391	.532	-2.441-	318	.015	-.06307-	.02584	-.11390-	-.01223-
	Equal variances not assumed			-2.496-	316.409	.013	-.06307-	.02526	-.11277-	-.01336-

Table 4: Plants and herbs used in Dental healthcare in Baghdad, Iraq.

Scientific name (Family)	Arabic name	Part used	Methods of use	Role in dental health	UV value
Basil (Ocimum basilicum)/ Lamiaceae	Rayhan	Leaves	Decoction	treat Oral ulcer, Canker sores, Cold sore	0.70
Chamomile (Matricaria Chamomilla) / Asteraceae.	Babunj	Flowers	Decoction	Mouth wash, stop bleeding, treat Inflammation of gums	0.60
Clove (Syzygium aromaticum)/ Myrtaceae	Alqurnafil	Buds	Crude	Toothache	0.90
Common oak (pedunculate oak)/ Fagaceae	Albulut	Bark/ fruit	Decoction	Protect healing of the damaged tissues, treat Inflammation of gums	0.25
Fenugreek) Trigonella foenum-graecum (/ Fabaceae	Alhalba	Dried or fresh leaves	Decoction	Mouth wash	0.35
Fennel (Foeniculum vulgare)/Apiaceae	Alshamra	Root	Decoction	treat Inflammation of gums	0.10
Ginger (Zingiber officinale)/ Zingiberaceae	Zanjibayl	root	Crude	Treat Toothache,Gingivitis, Inflammation of gums	0.55
Green tea (Camellia sinensis)/ Theaceae	Shay ’akhdar	Fresh and dried leaves	Crude and Decoction	Treat Canker sore, Oral ulcer, mouth wash	0.85

Continued on next page

Table 4 continued

Mint (Mentha)/ Lamiaceae	Alnaenae	Fresh and dried leaves	Crude and Decoction	treat Toothache, Mouth wash improved oral smell, keep the mouth moist and fresh	0.80
Parsley (Petroselinum Crispum)/ Apiaceae	Baqdunas	leaves, seed, and root	Crude and Decoction	Mouth wash treat Inflammation of gums	0.65
Sage (Salvia officinalis)/ Lamiaceae	Almurimia	flowers, dried and fresh leaves, and stem	Crude and Decoction	Protection from Caries, homemade Toothpaste, increase the strength of gums. treat Inflammation of gums	0.15
Thyme (Thymus)/ Lamiaceae	Zaetar	Dried and fresh	Crude and Decoction	Treat Toothache, Gingivitis, oral candidiasis, Protection from Caries	0.75
Turmeric (Curcuma longa)/ Zingiberaceae	Alkarakum	Dried root	Crude	Toothpaste for reducing Toothache	0.60
Yarrow (Achillea millefolium)/ Asteraceae	Yaru	Dried and fresh leaves and roots	Crude	Analgesic, treat Gingivitis. treat Inflammation of gums	0.35
Willow (sallows)/ Salicaceae	Safasaf	Bark and leaves	Decoction	Treat Inflammation of gums, Canker sores, and Oral ulcer	0.25

Statistical analysis

Data were collected by the questionnaire containing of plants and plants part used. The techniques most often used for treatment and role in dental health management. Then, frequency, ratio and percentage were calculated based on given variables and chi-square statistical test was performed for determination of association between variables. were SPSS analyses, Version 21 was used.

Test of Independence

H0: There is no association between the two variables.

Ha: The two variables are associated.

Hypotheses for a Two-Sample t-Test

H0: $\mu 1 = \mu 2$ (the population means of the two groups are the same).

Ha: $\mu 1 \neq \mu 2$ (the population means of the two groups are different).

RESULTS AND DISCUSSION

It is well-known, oral hygiene could be maintained by daily removing of dental food deposits, which play the main factor in the protection of dental from caries and other Oral/Dental disease. Numerous studies involving the use of medicinal plants have demonstrated worldwide (Gasparetto *et al.*, 2012). Herbal medicine have been used in tooth cleaning by chewing sticks selected and prepared from the twigs, stems, or roots from a diversity of plant species have been used during the past millennium worldwide (Rasingam *et al.*, 2012).

Ethnopharmacological uses of plant species could be vary from due to cultural differences. As a result of our ethnopharmacological survey, a total of 15 medicinal species belonging to 8 families were documented. The traditional use of these plants, their method of preparation and route of administration are shown in Table 4. The main reported families are Lamiaceae (4 species), Other families such as Myrtaceae, Fagaceae, Fabaceae, Zingiberaceae, Theaceae, and Salicaceae were also recorded.

According to the survey results, Decoction was the main way of preparation when water used as an extraction solvent.

The relationship between people's choice for herbal medicine and source of them knowledge and information was examined using cross-tabulation and shown in Table 1 that 51.9% (166 of 320) of sample male/female depended on social media information in herbal dental care.

Table 2 shown An association between gender type and source of them knowledge and information was found, $\chi 2$ (3, N = 320) = 2.6, p=0.452. So there was no association between gender type.

First, we have been done the Independent Samples Test, as shown in Table 3, first notice the results of the F-test (Levene's test) for evaluating the equality of variance. And results shown that the p-value was 0.532, which indicates that the variances were not significantly different.

then two-sample t-test, has been done to know the difference in DV cross-gender, and results shown that, The mean DV of herbal using cross Male (M = 0.5657, SD = 0.24, N = 180) was significantly different from that DV of herbal using cross Female (M = 0.6288, SD = 0.20, N = 140), with t(318)=-2.44,p=0.015."

According to calculated UV, the species with the highest values were Syzygium aromaticum (0.90), Camellia sinensis (0.85), and Mentha (0.80).

Syzygium aromaticum was used by the locals for treatment of Toothache, Camellia sinensis was used for the treatment of treat Canker sore and Oral ulcer. Also, they used Camellia sinensis as a homemade mouth wash, and Mentha was used to treat Toothache, as a homemade Mouth wash.

As shown in Figure 2 Informant consensus factor were Inflammation of gums shown the highest Fic value (57.14) then followed by Mouth wash and Treating Toothache which they represented up to (35.71) for each one alone, while Oral candidiasis, Increase the strength of gums, Treat Cold sore, Treat Bleeding, and Analgesic shown the least percentage with value of (7.14) each one alone.

Our results shown that Syzygium aromaticum, shown highest used value (UV) up to 0.90, and mostly used for treatment of Toothache, and this compatible with many of studies which have been proven, that Cloves (Syzygium Aromaticum), is one of the most famously herb applied to toothache, and for mouth and throat inflammation (Bhowmik *et al.*, 2012).

While, Camellia sinensis shown second highest used value (UV), as a treatment for Canker sore and Oral ulcer, throw homemade mouth wash, There are many studies shown the advantages of using of Camellia sinensis (green tea) on oral/dental health such as dental caries, periodontal disease and halitosis when studies suggest that Camellia sinensis (green tea) work on reducing activity of bacteria in the oral cavity, in addition, to its activity as antioxidant which could reduce the probability of oral cancer (Sultan *et al.*, 2016).

Finally, Mint (Mentha) shown the thrid highest used value (UV), in reducing toothache, and used as homemade mouth wash to improve oral smell, and chewing Mint papers to keep mouth moist and fresh, Mint (Mentha) has been traditionally used in dental care, where the essential oil, used topically to treat oral mucosal inflammation and also an antimicrobial and an ingredient in many analgesic creams (Fayed, 2019).

CONCLUSIONS

Worldwide, herbal medicine species has been traditionally used in dental care products.

The demand of herbal medicine in Iraq increased day by day as an alternative method of oral/ dental diseases treatment due to economic reasons and reduced side effects in comparison with a synthetic compound.

Using Syzygium aromaticum, Camellia sinensis and Mint in preparing dental care products will increase the company's profit in the market. This benefits results from studying consumer behaviors that play a great role in controlling the type of marketing strategy.

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