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## DOCUMENTATION OF DOUBLE AND TRIPLE PHYTOTHERAPEUTIC REMEDIES AGAINST DIABETES MELLITUS IN FAISALABAD CITY, PAKISTAN

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### ABSTRACT

Diabetic mellitus is a major health concern all over the world associated with many functional and structural ailments and is a serious metabolic disorder. Various natural products, plants and herbs have been used effectively for antidiabetic effects. Present study was conducted to know the ethnomedicinal practices (double and triple phytotherapy) for diabetes mellitus by having interviews with qualified herbalists (Hakeems) practicing in Faisalabad city, Pakistan. It was revealed that a total of 40 species belonging to 25 families are presently used for the treatment of diabetic mellitus. Among these 4 families (Paparaceae, Convolvulaceae, Asteraceae, and Solanaceae) had two species each, and one family (Moraceae) had three species (*Ficus religiosa*, *Ficus benghalensis*, and *Ficus carica*) while another one family (Zingiberaceae) had four species (*Zingiber officinale*, *Curcuma longa*, *Elettaria cardamomum*, and *Alpinia galangal*) had been successfully used for treatment of diabetic mellitus. In double therapy, ten out of 15 prescriptions were being used in pulverized form while the others in liquid form for treatment. In triple therapy, 17 remedies out of 20 were used in powder form while the remaining others used in mixing with liquid. According to the herbalists both double phytotherapy and triple phytotherapy were successfully used to reduce the sugar level and exerted antidiabetic effects. It was concluded that these plants may have potential ingredients which can be exploited in further studies for the development of effective drug against diabetes.

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### INTRODUCTION

Diabetes mellitus is one of the major diseases affecting human beings all over the globe (Fuangchan *et al.*, 2011). It is a metabolic and endocrine disease characterized by chronic hyperglycemia (Bello *et al.*, 2018), which brings about a variety of complications like nephropathy,

neuropathy, retinopathy, and cardiopathy (Sharma *et al.*, 2010) and is the fourth major death causing disease all over the world (Khan *et al.*, 2011), and it is rising very rapidly day by day (Meral *et al.*, 2001). Diabetic complications include increased ketogenesis, gluconeogenesis, and increased risk of heart attacks and

strokes (Hadia *et al.*, 2018). Overeating and lack of exercise are ascribed to its surge (Islam and Choi, 2008). This leads to exhaustion of the pancreas partially or completely resulting in decreased insulin production or complete absence. This disease is equally important in both developed and underdeveloped countries (Hakeem and Fawwad, 2010). Diabetes mellitus is of two types i.e., type I (insulin-dependent) and type II absence (noninsulin-dependent) which is four to six-fold more common than type II. Most of the diabetes mellitus II patients do not feel its presence and do not care properly until it flares up into type II (Islam *et al.*, 2008). A total of 143 million world population is affected by diabetes mellitus and may rise to 300 million in 2025 (Boddupalli *et al.*, 2012). Most of the afflicted population belongs to Asian and African continents and its rate will be increased two to three times by 2030 (Shaw *et al.*, 2010). A change in lifestyle is said to be the main cause of its predominance and lack of physical exercise along with sedentary conditions is worsening the scenario rapidly (Hakeem and Fawwad, 2010; Shaw *et al.*, 2010). In Pakistan, it is projected that the number of patients suffering from diabetes will rise from (4.3 million) in 1995 to (14.5 million) in 2025. It is assumed that at end of 2025, about 70 percent of diabetic ratio will belong to developed countries (Ashraf *et al.*, 2011). The pattern of provincial supremacy is as in Sindh 33.5 Percent, Punjab 31.3 percent, Baluchistan 28.2 percent, and Khyber Pakhtunkhwa 13.2 percent. If the current situation persisted, the highest incidence of diabetes is expected in Pakistan worldwide. The current diabetes situation presents a tremendous challenge for the health concern community and public health care policymakers (Hadia *et al.*, 2018).

The demand of herbal medicines and medicinal plants has been increased dramatically during the recent few decades. The use of medicinal plants and herbs in treatment of various disease has been mentioned in the various religions. Control and treatment of diabetes mellitus without negative effects on body is still under investigation by medical researchers. There are many synthetic drugs available to treat hyperglycemia coupled with insulin. These synthetic drugs have many complications, contraindicated in pregnancy and much costly. These complications have increased the demand of herbal anti-diabetic drugs with lesser side effects and less price as compared to synthetic medicines. These herbal anti-diabetic medicines can replace the synthetic

oral drugs to treat type 2 diabetes mellitus where beta cells are not destroyed absolutely (Bharti *et al.*, 2012). At present in the USA nearly 25% of all prescriptions contain one plant originated component (Gupta, 2012). In modern medical practice, Insulin administration has been considered as an absolute remedy but its prolonged usage has led to the problem of resistance and ineffectiveness despite increasing the dose (Boddupalli *et al.*, 2012). In this situation, it seems to be wise to search out an alternative that should be cheap, inexpensive, and effective.

Indigenous system of medicine i.e., Tibb-a-Unani teems with the names of plants having anti-hyperglycemic activity. These are being got used by the qualified Hakeems or natives of a locale or area (Qureshi *et al.*, 2010) for centuries (Sarwat and Ahmad, 2012) and they make lofty claims about their efficacy. It is pertinent to mention that about 80% population of the world depends on the traditional system of health care in rural areas particularly and urban areas generally (Ahmad *et al.*, 2009). Double phytotherapy means combination of two medicinal plants while triple phytotherapy means combination of three medicinal plants.

Keeping in view the importance of medicinal plants, the present study was designed to get the data of medicinal plants from different Hakeem's practicing in the area of Faisalabad city, Pakistan so that scientists can be known about these plants and focus their attention to make an effective drug against diabetes by exploring their active ingredients and Molecular Mechanisms.

## MATERIALS AND METHODS

### Study Area

Faisalabad is the 3rd largest city of Pakistan and 2nd largest city in Punjab province, Pakistan. It was previously known as Lyallpur and is teamed with textile mills having approximately 3.6 million population. It is abounding in a great variety of herbs that are being got used by the Hakeems for treating the ailing humanity.

To perform this study a questionnaire was designed comprising a host of information about the use of plants in their practice against diabetes Mellitus type II (non-Insulin-dependent). The clinics of 25 practicing qualified Hakeems (Herbalists) of different age who were practicing for the last 10 years were visited to pursue for the said purpose and a printed Performa was handed over to each for filling it. Fifteen days later, a visit was paid again to their clinics for collecting the filled in

Performa, and those were interviewed to make further clarification and understanding about the ambiguous points of the given information about double and triple remedies of diabetes Mellitus. After collecting the data, it was organized in the form of tables, to sum up, the various facades of information for concluding.

## RESULTS

An information of 15 prescriptions of double phytotherapy that used successfully to treat diabetic patients and 20 prescriptions of triple phytotherapy used for the same purpose were received mentioned in Table 1 and Table 2. In double therapy, ten out of 15 prescriptions were being used in pulverized form while

the others were used in liquid form. In triple therapy, 17 remedies out of 20 were used in powder form while the remaining were used in mixing with liquid.

The species of plants successfully used for the treatment diabetic mentioned in table 3. A total of 40 species of plants belonging to 25 families came to our knowledge. Among these 4 families (Papaveraceae, Convolvulaceae, Asteraceae, and Solanaceae) have two species each, and one family (Moraceae) has three species (*Ficus religiosa*, *Ficus benghalensis*, and *Ficus carica*) while another one family (Zingiberaceae) has four species (*Zingiber officinale*, *Curcuma longa*, *Elettaria cardamomum*, and *Alpinia galangal*).

Table 1. Details of double Phytotherapy prescriptions used for Diabetes Mellitus.

Sr.#	Name of Plants / Ingredients	Quantity	Method & Dose
1	<i>Eugenia jambolana</i> <i>Papaver somniferum</i> (poppy plant) Opium	10 gm 1gm	Pulverize the stones & opium to mix very well for making 32 tablets. Take one pill twice a day with lukewarm 250 ml cow milk.
2	<i>Convolvulus microphyllus</i> (Sinkhaholi) root Vitex negundo (Sambalu) root Water	6 gm 1½ gm 250 ml	Boil till becomes 150 ml sift and take lukewarm twice a day for a few days.
3	<i>Cocculas cordifolius</i> extract (Glo) <i>Aloe barbadensis</i> (Kawar Gandal marrow) Water	1 gm 6 gm 250 ml	Mix very well and decant to take twice a day.
4	<i>Gymnema sylvestre</i> (Gurmar booti) <i>Eugenia jambolana</i> (Jaman) stone	48 gm 48 gm	Pulverize both and 3 gm powder with water twice a day.
5	<i>Mangifera indica</i> (Mango) stone marrow <i>Eugenia jambolana</i> (Jaman) stone	1 part 1 part	Grind and take 4 gm with fresh water once a day for a few weeks.
6	<i>Chichorium intybus</i> (Kashni) <i>Nigella sativa</i> (Kalvangi)	1 part 1 part	Pulverize both and take 5 gm daily for a few weeks.
7	<i>Mangifera indica</i> (Mango) Juice <i>Eugenia jambolana</i> (Jaman) juice	1 part 1 part	Mix equal parts to make 250 ml and take it once daily for a few weeks.
8	<i>Hyoscyemus niger</i> (Ajwain) <i>Sesamum indicum</i> (Til Siah)	24 gm 48 gm	Mix and grind partially. Take 6 gm twice a day.

9	<i>Peganum harmala</i> (Harmal) seed <i>Acacia arabica</i> (Desi Kiker) pods	1 part 1 part	Pulverize both and take 4 Ratti - 1 gm thrice a day with water or coffee
10	<i>Cephalandra indica</i> (kundru ki bail) leaves <i>Piper nigrum</i> (Kali mirch)	7 gm 7 gm	Grind in mortar and pestle with water. Sift it to drink for a few days.
11	<i>Cocculus cordifolius</i> (Glo) <i>Eugenia jambolana</i> (Jaman) dry leaves	1 part 1part	Pulverize and mix Dose: 4 gm twice a day with butter milk (whey) for 1-2 weeks.
12	<i>Nigella sativa</i> (Kalvangi) <i>Cicharium endivia</i> (Kashni)	3 part 1 part	Mix and grind partially Dose: 5gm take it after meal daily for 1-2 weeks.
13	<i>Eugenia jambolana</i> (Jaman) fruit extract Crystal sugar (Kusa missari)	1 part 1part	Macerate the ripened fruits with hands to remove marrow in some earthen port. Sieve it through a muslin cloth and boil it till remains one fourth then add equal amount of crystal auger to make a thick syrup. Dose: 6 gm with 12 ml distilled concoction of aniseed for 1 month.
14	<i>Citrus lemon</i> (Lemon) juice Hen's Eggs	1 liter 8 in No.	Crush the lemons to get juice 1 liter then place 8 hen eggs in it. Within 10 days, eggs will become soft then churn this mixture very well. Add 100 ml olive oil to it. Pour this mixture into a bottle and place it in a cold place. Dose: 60 ml, drink it daily. Disease will vanish with the end of medicine.
15	<i>Peganum harmala</i> (Harmal) seed Earth worms (dry)	3 part 1 part	Dose: pulverize both and use @ 1 gm twice a day with water for 1-2 weeks.

Table 2. Details of triple Phytotherapy prescriptions used for Diabetes Mellitus.

Sr. No	Name	Quantity	Method & Dose
1	<i>Gymnema sylvestre</i> (Gurmar booti) <i>Eugenia jambolana</i> (Jaman) stone <i>Zingiber officinale</i> (dry ginger)	10 gm 10 gm 10 gm	Pulverize all these three and mix to preserve in a vial Dose: 1 gm twice a day with cow milk (250ml)
2	<i>Gymnema sylvestre</i> (Gurmar booti) any one <i>Eugenia jambolana</i> (Jaman) stone <i>Zingiber officinale</i> (dry ginger)	3 part 1.5 part 1.5 part	Pulverize all and preserve in a Glass vial Dose: 3gm twice a day with water or milk for a week.
3	<i>Gymnema Sylvester</i> (roots/ leaves/bark/ offshoots/twigs) (Gurmar booti) <i>Eugenia jambolana</i> (Jaman) stone <i>Zingier officinale</i> (dry ginger)	24 gm 12 gm 12 gm	Pulverize all and put into a vial Dose. 3 gm with Lukewarm milk for once a day.
4	<i>Citrus lemon</i> (Lemon) juice Hen eggs Brandy (wine)	500 ml 10 250 ml	Add all these in a glass made utensil. Eggs will be dissolved within 7 days in summer and within 15 days in winter. Shake it well. Medicine is ready. Dose: 5 ml twice a day after meal. Take it daily for a month
5	<i>Ficus religiosa</i> (Peepal)	1 part	Take roots of these, dry under shade and pulverize Dose: 10

	<i>Ficus benghalensis</i> (Bargad)	1 part	gm with water daily for a few days.
	<i>Azadirachta indica</i> (Neem)	1 part	
6	<i>Curcuma longa</i> (Heldi)	12 gm	Mix these very well after pulverization
	<i>Kushta Coral</i> (Murjan)	12 gm	Dose: 2 gm daily for 15-20 days
	<i>Withania coagulans</i> (Tukhm-e-paneer dodi)	5 gm	
7	<i>Saxifraga lingulata</i> (Pakhan Baid)	1 part	All be pulverized and make tablets of gram size Dose: 1 tablet/pill twice a daily with water.
	<i>Strychnos nux-vomica</i> (detoxified)	1 part	
	<i>Kuchlaa</i>	1 part	
	<i>Opium conine powder</i>		
8	<i>Embelia ribes</i> (Baobarang)	1 part	Pulverize well all & mix Dose: 7 gm early in the morning with water.
	<i>Embelia</i>		
	<i>Trapa bispinosa roxb</i> (Singhaaraa)	1 part	
	<i>Crystal sugar</i> (Kusa missari)	1 part	
9	<i>Eugenia jambolana</i> (Jaman) stones	36 gm	Pulverize all these and preserve in a glass made bottle. Dose: 5 gm with water twice a day for 21 days.
	<i>Elettaria cardamomum</i> (Schoti alachi)	18 gm	Time tested & extremely efficacious remedy.
	<i>Bamoo plant sugar</i> (Tabasheer)	12 gm	
10	<i>Eugenia jambolana</i> (Jaman) stone	12 gm	Mix & pulverize to store in a vial Dose: 2 gm twice a day for seven days.
	<i>Curcuma longa</i> (Heldi) dry	12 gm	
	<i>Kushta silver</i> (chandi)	6 gm	
11	<i>Tamarindus indica</i> seeds (Imli)	20 gm	Pulverize all these ingredients finely Dose: 5 gm twice a day for a few days.
	<i>Alpinia galanga</i> (Khulanjaan)	20 gm	
	<i>Trachyspermum ammi</i> (DesiAjawaayin)	10 gm	
12	<i>Eugenia jambolana</i> (Jaman) stone	15 gm	Mix and pulverize to preserve in a vial Dose: 5 gm with water three times a day for a few days.
	<i>Alpinia galanga</i> (Khulanjaan)	10 gm	
	<i>Rheum emodi</i> (Revandachini roots)	20 gm	
13	<i>Eugenia jambolana</i> (Jaman) stones	100 gm	Soak and dry E. jamnolana stones in syrup of gymnea sylvestre 21 times and then pulverize. Add into it kusht-e-Folaud (which be prepared in pods of Acacia arabia) 5 gm and make 30 doses. One dose twice a day with water.
	<i>Gymnea sylvestre</i> (Gurmar booti)	50 gm	
	<i>Kushta Folaud</i>	5 gm	
14	<i>Gymnea sylvestre</i> (Gurmar booti) (leaves, twigs, flower, fruits, roots) anyone	15 gm	Grind all & mix Dose: 3 gm twice a day with water.
	<i>Eugenia jambolana</i>	7 gm	

	(Jaman) stone <i>Zingiber officinale</i> (dry ginger)	7 gm	
15	<i>Eugenia jambolana</i> (Jaman) stones <i>Papaver somniferum</i> (poppy plant) Opium Kushta Folaud	4 part 1 part 2 part	Grind and mix. Dose: 4gm once daily with water.
16	<i>Gymnema Sylvester</i> (Gurmar booti) <i>Zingiber officinale</i> (dry ginger) <i>Eugenia jambolana</i> (Jaman) stone	10 gm 5 gm 10 gm	Dry under shade & grind to make powder Dose: 3 gm with 250 ml milk once a day for eight days.
17	<i>Gymnema sylvestre</i> (Gurmar booti) <i>Zingiber officinale</i> (dry ginger) <i>Eugenia jambolana</i> (Jaman) stones	24 gm 12 gm 12 gm	Dry under shade & grind to make a refined powder Dose: 1 gm with 250 ml milk of cow twice a day (Morning & evening)
18	<i>Cinnamomum tamala</i> (Tejpaata) <i>Hygrophila spinosa</i> (Taalmaakhaanaa) <i>Argyreia speciosa</i> (Samunder sokh)	12 gm 12 gm 12 gm	Dry under shade, Mix and pulverize Dose: 1-2 gm 4times a day with water
19	<i>Citrus lemon</i> (Lemon) juice Hen's Eggs <i>Olea europaea</i> (Zaitoon)	1 liter 8 90 ml	Wash the eggs and dip in juice. Within 10 days these will be dissolved. Then churn it well and then add 90 ml olive oil. Store in bottles and place in cool place. Dose: 60 ml drink Disease will finish with the end of solution
20	<i>Nigella sativa</i> (Kalvangi) <i>Ficus carica</i> (Anjeer) <i>Vitex trifolia</i> (Munaqqaa) without seeds	1 part 1 part 1 part	Mix all these and pulverize. Dose: 12 gm twice a day for 15 days

Table 3. Plants families along with their species, English and local names, used for treatment of diabetes.

Sr. #	Botanical Name	English Name	Common Name	Family
1	<i>Eugenia jambolana</i>	Jambul / Black plum	Jaaman	Myrtaceae
2	<i>Papaver somniferum</i>	Opium poppy	Gul-e-lala	Papaveraceae
3	<i>Convolvulus microphyllus</i>	Bindweed	Sinkhaholi	Convolvulaceae
4	<i>Vitex negundo</i>	Five-leaved chaste tree	Sambalu	Lamiaceae
5	<i>Cocculus cordifolius</i>	Rain of Nectar	Gaduchi	Menispermaceae
6	<i>Aloe vera</i>	Barbados aloe	Ghee kunwar	Liliaceae
7	<i>Gymnema sylvestre</i>	Gumnema	Gurmar	Asclepiadoideae
8	<i>Mangifera indica</i>	Mango tree	Aum ka darakht	Anacardiaceae
9	<i>Cichorium intybus</i>	blue sailors, succory,	Kashni	Asteraceae

		and coffeeweed		
10	<i>Nigella sativa</i>	Latin niger (black)	Kalvangi	Ranunculaceae
11	<i>Hyoscyemus niger</i>	black henbane	Ajwain	Solanaceae
12	<i>Sesamum indicum</i>	Sesame	Til Siah	Pedaliaceae
13	<i>Peganum harmala</i>	African rue	Harmal	Nitrariaceae
14	<i>Acacia nilotica</i>	Babul	Desi Kiker	Fabaceae
15	<i>Cephalandra indica</i>	Scarlet fruited gourd	kundru ki bail	Cucurbitaceae
16	<i>Piper nigrum</i>	Black pepper	Kali mirch	Piperaceae
17	<i>Cicharium endivia</i>	Endive	Salad	Asteraceae
18	<i>Citrus lemon</i>	Lemon	Leemu	Rutaceae
19	<i>Zingiber officinale</i>	Ginger	Adrak	Zingiberaceae
20	<i>Ficus religiosa</i>	Bot-tree	Peepal	Moraceae
21	<i>Ficus benghalensis</i>	Banyan tree	Bargad	Moraceae
22	<i>Azadirachta indica</i>	Margosa tree	Neem	Meliaceae
23	<i>Curcuma longa</i>	Turmeric	Haldi	Zingiberaceae
24	<i>Embelia ribes</i>	Embelia	Baobarang	Myrsinaceae
25	<i>Elettaria cardamomum</i>	Lesser Cardamom	Schoti alachi	Zingiberaceae
26	<i>Bambusa Arundinacea</i>	Bamboo	Bahans	Gramineae: Poaceae
27	<i>Alpinia galangal</i>	Greater Galangal	Khulanjaan	Zingiberaceae
28	<i>Trachyspermum ammi</i>	Ajowan.	DesiAjawaayin	Umbelliferae: Apiaceae
29	<i>Rheum emodi</i>	IndianRhubarb, Himalayan Rhubarb	Revandachini (roots)	Polygonaceae
30	<i>Papaver somniferum</i>	Red Poppy	Kaskas	Papaveraceae
31	<i>Cinnamomum tamala</i>	Indian Cassia	Tejpaata	Lauraceae
32	<i>Hygrophila spinose</i>		Taalmaakhaanaa	Acanthaceae
33	<i>Olea europaea</i>	Olive	Zaitoon	Olaeaceae
34	<i>Argyreia speciosa</i>	Elephant Creeper.	Samunder sokh	Convolvulaceae
35	<i>Strychnos nux-vomica</i>	Nux vomica	Kuchlaa	Loganiaceae: Strychnaceae
36	<i>Trapa bispinosa roxb</i>	Water Chestnut	Singhaaraa	Trapaceae
37	<i>Withania coagulans</i>	Indian Cheese-maker	Paneer dodi	Solanaceae
38	<i>Saxifraga ligulate</i>	Pakhan Baid	Pakhan Baid	Saxifragaceae
39	<i>Ficus carica</i>	Common Fig.	Anjeer	Moraceae
40	<i>Vitex trifolia</i>	European Grape	Munaqqaa	Verbenaceae

## DISCUSSION

It is well established that the herbs/ plants belonging to a specific area, have special healing power for the natives (Akhtar *et al.*, 2011). The persons of that area have a vast knowledge about the local plants to treat the various health problems. This type of specific information being transferred from generation to

generation. With the passage of time, this knowledge is vanishing from the earth because of the natural process of life (Ahmad *et al.*, 2009). It is in dire need of the hours to preserve this type of knowledge as much as possible. Diabetes Mellitus has become a global disease spreading at an equal pace both in under developing and developed countries due to mental stress, obesity, and

over-eating along with sedentary habits (Hakeem and Fawwad, 2010). The allopathic treatment has led to several complications affecting the eyes, nerves, kidneys, skin, and blood vessels (Boddupalli *et al.*, 2012), along with development of resistance (Sarwat and Ahmad, 2012). Several researchers reported this precious information in different areas of Pakistan to preserve the indigenous knowledge about plants. Ahmad *et al.* (2009) recorded 37 plant species having to 33 genera and 23 angiosperms families from district Attok, Pakistan. Boddupalli *et al.* (2012) reported review on anti-diabetic plants about active phytoingredients from 41 plants. Most of these plants were used by herbalist in our study. Khan *et al.* (2011) reported about 8 species of genus *Ficus* plant used to treat diabetes in Pakistan. In our study, *Ficus* plants were used in several prescriptions. In conclusion, it was the first study conducted in Faisalabad, Pakistan which gave the information about the double and triple anti-diabetic herbal remedies which successfully treat the diabetic patients. This will preserve the information about remedies used for treatment diabetic for next generation. It will also open a new vista of research about combined therapy. It will also urge scientists to search out better alternative way of coping up with this ever-spreading disease across the globe.

### CONCLUSION AND RECOMMENDATIONS

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