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Original Article

Complementary and Alternative Medicines Use in Diabetes Mellitus: A Descriptive Cross-Sectional Study in Pakistan

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ABSTRACT

Objectives: The main objective of this study was to determine the pattern of Complementary and Alternative Medicine (CAM) used in patients having Diabetes mellitus (DM) and their attitudes, beliefs and perception towards CAM in North West region of Pakistan.
Material and Methods: A three months descriptive cross-sectional study was conducted in tertiary care teaching hospital, Peshawar, Pakistan. We interviewed total 121 individuals having diabetes using a standard questionnaire, and examined carefully for diabetes type and CAM usage pattern.
Results: 73 male and 48 female patients with average age of 52.76 years, among which majority were illiterate and from rural background having high income were using some form of CAM to treat their diabetes. The increase CAM usage level in addition to conventional medicines found in our study substantiates that individual may use CAM medicines as adjuvant to conventional medicines. Multivitamin, ginseng and herbal products were the most frequently used CAM modalities. Interestingly ethno medicinal local plants named Caralluma tuberculata (n= 11) and Solanum surrattens Burm.f. (n= 10) were recorded as the most widely used CAM with highest satisfaction level to control DM.
Conclusion: A majority of peoples used CAM and having good belief and attitude regarding CAM.
Keywords: Complementary and alternative medicine (CAM), Diabetes mellitus (DM), Biological based therapy (BBT).

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INTRODUCTION

Complementary and Alternative Medicine (CAM) is the art, science and practice of beliefs associated with broad range of healing resources. Moreover, it includes politically dominant health system and all such practices and ideas self-defined by their users as preventing or treating illness or promoting well-being [1][2].

Diabetes mellitus (DM) is a lifelong condition that causes the level of glucose in the blood of a person to become very high [3]. DM is a global health problem and among the leading causes of death [4]. Conventional medicine focuses merely on regulating the blood glucose while balancing some food intake with some dietary modification, insulin and/or oral agents, maintaining ideal body weight, exercising regularly and self-monitoring blood sugar [5]. However, perfect glucose control can be difficult for many patients as it requires an overhaul of a complete lifestyle and eating behaviour. Due to the chronic nature of diabetes, the debilitation of complications and threat of death, as well as the complexities of treatment plans, diabetics often work proactively to manage their condition, optimize their health and alleviate complications through the use of CAM [6].

CAM use may be related to changes in the general community. This change in society can be interpreted as part of the patient's self-empowerment dominance. It suggests that patients who seek CA believe that, it provides them more personal autonomy and control over their health care decisions [7]. In Pakistan, considered CAM to be the first line of treatment in rural areas, comprising 61.7 % of the country's population [8]. Home CAM systems practiced in Pakistan are Greek, homeopathy, Ayurveda, Biochemy, Reiki, traditional Chinese medicine, and odors. The Greek and homeopathic systems of medicine are the most practiced while practices of Ayurveda and Biochemy are less popular [9].

The present study explores usage pattern of complementary and alternative medicine among patients with diabetes mellitus and their attitudes, beliefs and perception towards CAM in North West region of Pakistan.

METHOD

It was a descriptive cross-sectional study, conducted in Hayatabad medical Complex, district of Peshawar, Khyber Pakhtunkhwa, Pakistan. Study included patients who suffer from diabetes. The total sample size of 121 patients were interviewed using a standard questionnaire. The questionnaire consists of 27 questions covering various demographic variables (age, sex, weight, height, and religion), and the level of education, occupation, monthly income, and source of income, social status, and used zip accommodation for the classification of their residency such as urban or rural.

Patients were categorized into type 1 or type 2. Patients specified, with which of a list of clinical characteristics, and which pathological conditions that have been diagnosed and which health professionals they had been visited. Patients were classified based on frequency of visits to their health care providers during their course of treatment (Conventional, CAM or both). Questions asked, comprised of open and close end questions. The patient's response was measured using a Likert scale. The data were entered into the Statistical Package for Social Sciences (SPSS)and descriptive statistics were used for frequency counts and percentages of patient’s characteristics.

RESULTS

Socio-demographic data: A total of 121 diabetic patients were included in the study, majority of the patients were male (n= 73; 60.3%). Most of the patients were in the age group 30-59 years (n= 83; 68.59%) and their ratio was higher in rural area (n= 95; 78.5%). The ratio of type-2 patients 110 (90.9%) was higher than type-1 patients 11 (9.9%). The other socio-demographic characteristics are shown in **Table 1.**

Clinical characteristics and risk factors: The clinical characteristic and risk factors associated with diabetes. Out of 121 patients the prevalence of clinical characteristic included concomitant heart disease (20.7%), renal disease (15.7%), neurological disease (10.7%), digestive problems (22.3%), allergies (4.1%), anxiety (47.1%), arthritis (30.6%) and chronic pain (33.9%). Risk factors included obesity (11.6%), smoking (13.2%) and other factors such as Naswar, cannabis, alcohol and pan (23.1%). Details are shown in **Table 2.**

Pattern of CAM use: A total of 67 patients (55.4%) considered conventional therapy most effective for diabetes, 4 answered CAM (3.3%) while 50 (41.3%) favored CAM plus conventional. The level of adherence to CAM was higher in 60 (49.6%) patients. Only 4 patients (3.3%) got completely better, 57 (47.1%) got a bit better and 60 (49.6%) felt no change. 57 patients (47.1%) favored CAM for the treatment of DM while 64 (52.9%) didn’t favor **(Table 3).**

Different modalities of CAM used: The most prevalent CAM’s modalities used by patients were multivitamins 97 (80.2), herbs 74 (61.2%), prayer/

relaxation 121 (100%), hakeemi 66 (54.5%), bitter gourd 114 (94.2%) and garlic 79 (65.3%). The other prominent CAM's modalities used are shown in**Table4**.

Response to selected study questions on CAM related beliefs and health services by CAM use status: Table 5 shows how patients responded to questions regarding their CAM-related perceptions towards health beliefs and healthcare services. Out of 121 patients, 24% disagreed that CAM has made contribution towards advancing medical treatment, 52% agreed that CAM can help in diabetes control, 28% agreed while having good example from the other users and keen to share with others, 43% agreed that CAM is easily available and better value for money, only 7% agreed that they are dissatisfied with western medicines, 60% agreed CAM use for other co morbidity, 7% disagreed that CAM had fewer side effects, 9% agreed that CAM are better than conventional medicines, about 32% knew enough about CAM, 14% disagreed that CAM is necessary, 41% disagreed with CAM affordability as compared to conventional medicines, 92 % agreed that they need more information on CAM, 97% thought that it is important to talk to a doctor or a pharmacist before using CAM, 3% disagreed that CAM can be used to help maintain and promote health, and 17% considered that Government of Pakistan does a good job of informing the public about CAM use in diabetes.

Record of CAM products: Most frequently used CAM products were those found locally, Caralluma tuberculata (n= 11), Solanum surrattens Burm.f. (n= 10), Consolida ambigua (n= 6), Fagoniacretica (n= 6), Justicia adhatoda (n= 5), Oral drops (n= 5), Carumcarvi (n= 4), powder, Vernonia amydalina, Hakeemi, Nigella sativa (n= 3 each), A. ParvifloraBenth, Citruluscolocynthis, Koshta, Brberis lycium Royle, Trigonellaemodi Both. (n= 2 each), Abelmoschus esculentus, Vitana coronas, Kadugak, Home remedy, Homeopathic, Psyllium Husk, Lemon juice, Local herb, Artmisiamaritima, and Nasturtium officinale R. Br. (n= 1 each). Most of them were free of cost used for diabetes, recommended by a friend/neighbor/relative/ hakeem/physician. Cost of few products was ranging from 50-2500 PKR. Outcome of products used was satisfactory while some were not satisfactory **(Table 6).**

DISCUSSION

Complementary and alternative medicine (CAM) increasingly important aspect of the management of chronic diseases, but unfortunately neglected to a large extent by health care providers. The widespread CAM usage in diabetic individuals, male patients (60.3%) showed consistency with the studies conducted in Malaysia (54%) [10], and Sri Lanka (53%) [11], and Queensland (54.7%) [12]. The current usage is higher when compared with studies conducted in Australia (34.68%) [13], the United States (38.5%) [14], Japan (34.2%) [15], and Taiwan (44.2%) [6]. It is evident from research that the reasons for diabetic people to go for CAM may because diabetes is a chronic, incurable and annihilating lifelong condition and patient's favourable perception about CAM may be because of the fact that it may have fewer side effects because of its organic nature, the patient–physician relationship, huge fears about the side-effects of the drugs, personal beliefs favouring a more holistic orientation to health care, and their high availability in the system. It is found that the middle aged were more likely to use CAM with chronic disease like diabetes (68.6%) in our study which is consistent with India[16]but prevalence of CAM use in Queensland indicated that it was low (33.9%) [12]. The response of our study was more toward rural communities (78.5%); however it was higher when compared with Lebanon study (28.5%) [17]. Literacy rate was low among study participants (64.5%), similar to Malaysian study (61.1%) [10]. This may be due to gaps in our healthcare system, easy availability of CAM and the general perception of having no side effects associated with CAM usage.

Our study explored that herbals were the most important locally available products used, such as Caralluma tuberculata, Solanum xanthocarpum, Consolida ambigua and Justicia adhatoda whose consumption was higher than other herbs consumed and their increase usage is not surprising because many patients may consider herbals safer, easily available and affordable. This was further supported by the fact that majority of the CAM used were free of cost. The total expenses were ranging from 50-2500 PKR. The most common sources of information about CAM were recommended by relatives, neighbours and friends. This is consistent with research in Malaysia [10].

Pakistan have been part of subcontinent for hundreds year under the British rule. Where the use of Ayurveda and other traditional ways of treating diabetes have been reported in literature. Being a developing country, Pakistan has different cultures which greatly influence CAM usage which is deeply rooted and it has ethnic diversity which also influences CAM. In the Northeast of Pakistan, China is located which has the history of using Traditional Chinese Medicine for thousands of years. The use of multivitamins, Ginseng, acupuncture, herbal medicine, massage therapy, prayer/relaxation, cultural heritage Gingko biloba, cupping, mushroom, homeopathic, spiritual healing

and hakeemi are believed to cure ailments. This study reported that 94.2% of diabetes patients used Bitter gourd commonly known as Karela. It is believed that Bitter gourd decreases blood glucose level, though robust evidence is lacking [18-21]. Literature showed the use of bitter guard as ayuverdic in India [22]. Use of CAM among type 2 (90.1%) diabetic patients were higher than type 1 patients. Our findings were in consistency with Queensland (95.7%) [12]. The reason that type 2 DM patients mostly depend upon oral hypoglycemic drugs, many studies reported that CAM has the ability to reduce the blood glucose level [10]. Majority of the diabetes patients had poor control over blood glucose. This is due to the fact that conventional therapy needs them to be more disciplined regarding diet they used, lifestyle they had and their attitude [23, 24]. So as a result, patients go for complementary and alternative medicines for their health status optimization and mental satisfaction. Chronic disease such as diabetes require long term therapy, majority of population in the developing countries can't afford conventional medicine, therefore find alternate way to control their disease [25]. The current study reported that 41.3% of the patients consider CAM plus conventional medicines most effective way of treatment which is consistent with the study conducted in India [16]. In America more than 33% of diabetes patients practice CAM somehow for management of diabetes [2]. 55.4% showed trust in CAM for treatment in diabetes only 8% were dissatisfied with conventional medicine which is consistent with the study in Taiwan (1%) [6], Lebanon (4.7%) [17] and Malaysia (3.3%) [10].

CONCLUSION AND RECOMMENDATIONS

The current study reported the use of CAM products as control ailments among the DM patients. Although a vast majority of the diabetes patients considered CAM without side effects but adverse events have been reported in CAM, hence, empirical evidence should guide the safe and appropriate use of CAM. The government of Pakistan should also provide adequate information to the public regarding CAM as most of the patients were ignorant from the government role in this regard. Furthermore, promulgating rigorous guidelines and policies to regulate CAM usage are required to ensure the safe, effective and economic usage of CAM. This will be a great help in controlling the pernicious approach specifically in underdeveloped countries where people may because of poverty, ignorance, and inadequate health facilities ultimately go for nonconventional approaches to improve their health status. Advance research studies are needed to explore bioactive CAM molecule for future therapeutic intervention of DM.

Competing interests

The authors declare that they have no competing interests.

Abbreviations

CAM; complementary and alternative medicines, DM; diabetes mellitus, BBT; biological based therapy, PKR, Pakistani rupees.

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Availability of data and materials

The data and materials of this article are included within the article.

Table 1 Socio-demographic, utilization of healthcare and self-health management of patients

Gender	Frequency (n)	Percentage (%)	Monthly income (PKR)	Frequency (n)	Percentage (%)
Male	73	60.3	<10,000	11	9.1
Female	48	39.7	10,000-20,000	23	19
Age			20,000-30,000	20	16.5
≤29	3	2.47	>30,000	67	55.4
30-59	83	68.59	**Source of income**		
≥60	35	28.92	Self	50	41.3
Weight			Husband	19	15.7
≤59	12	9.9	In-laws	3	2.5
≥60	109	90.1	Children	49	40.5
Height			**Diabetes type**		
≤5.5	43	35.54	Type 1	11	9.9

>5.5	78	64.46	Type 2	110	90.9
Religion			**Other major illness**		
Muslim	121	100	HTN	24	19.8
Non-Muslim	0	0	Kidney disease	3	2.5
Marital status			Chest problem	3	2,5
Single	4	3.3	HCV	3	2.5
Married	198	81	Fever	1	0.8
Widowed	19	15.7	Eye problem	1	0.8
Residence			Deafness	2	1.6
Rural	195	78.5	Edema	1	0.8
Urban	26	21.5	Paralysis	1	0.8
Educational level			BPH	1	0.8
Primary	13	10.7	Diabetic Foot	5	4.1
Middle	5	5.1	Nil	75	62
Secondary	11	9.1	**Personal health**		
Graduate	3	2.5	Excellent	5	4.1
Master or Above	11	9.1	Very Good	18	14.9
Illiterate	78	64.5	Good	48	39.7
Occupation			Fair	31	25.6
GOVT. Employee	11	9.9	Poor	19	15.7
Private Employee	26	21.5	**Exercise regularly**		
Self-Employee	35	28.9	Yes	16	13.2
Housewife	48	39.7	No	105	86.8
None	1	0.8	**Clinic visit frequency**		
			≤Monthly	64	52.9
			>Monthly	57	47.1

n number, *%* Percentage, *Pkr* Pakistani rupees

Table 2 Clinical characteristics and risk factors

Clinical characteristics	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Concomitant heart disease	25	20.7	96	79.3
Renal disease	19	15.7	102	84.3
Neurological disease	13	10.7	108	89.3
Digestive problem	27	22.3	94	77.7
Allergies	5	4.1	116	95.9
Anxiety	57	47.1	64	52.9
Arthritis	37	30.6	84	69.4
Chronic pain	41	33.9	80	66.1
Risk factors				
Obesity	14	11.6	107	88.4
Current smoker	16	13.2	105	86.8

Others (Naswar, Alcohol, Cannabis)	28	23.1	93	76.9	

Table 3 Pattern of CAM use

Variables	**n**	**%**	**Variables**	**n**	**%**
Most effective therapy			**Adverse events reported**		
Conventional	67	55.4	Minor	12	9.9
CAM	4	3.3	Moderate	5	4.1
Both	50	41.3	Severe	2	1.7
Trust in CAM for DM			None	102	84.3
Yes	67	55.4	**Net result of CAM use**		
No	54	44.6	Got completely better	4	3.3
Level of adherence			Got a bit better	57	47.1
Low	20	16.5	No change	60	49.6
Moderate	60	49.6	**Patient view about CAM!**		
High	41	38.9	Favors CAM	57	47.1
			Doesn't favor	64	52.9

n number, *%* Percentage

Table 4 Different modalities of CAM used

Modalities	**n**	**%**	**Modalities**	**n**	**%**
Multivitamins	97	80.2	Mushrooms	7	5.8
Ginseng	24	19.8	Sichem	1	0.8
Acupuncture	1	0.8	Qigong	1	0.8
Herbal medicine	30	24.8	Homeopathic	44	36.4
Hot-spring bath	14	11.6	Spiritual healing	52	43
Massage therapy	22	18.2	Hakeemi	66	54.5
Brown rice	8	6.6	**BBT like herbal products**		
Green vegetable juice	34	28.1	Bitter gourd	114	94.2
Herbs	74	61.2	Misaim Kuching	8	6.6
Prayer/relaxation	121	100	Garlic	79	65.3
Gingko	25	20.7	Sabah snake grass	4	3.3
Yoga	4	3.3	Basil leaf	12	9.9
Cupping	18	14,9			

n number, *%* Percentage

Table 5 Selected survey questions on CAM related beliefs and health services by CAM use status

Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Do you agree that CAM has made contributions toward advancing medical treatment?	0	29	28	61	3
Believe CAM can help in diabetes control?	0	27	32	59	3
Having good example from the other user of CAM and keen to share with others?	1	21	65	32	2
Easily available and better value for money?	1	44	25	49	2
Dissatisfied with western medicines?	38	55	20	7	1
Use for other co morbidity treatment?	0	12	37	69	3
Believed that CAM had fewer side effects?	2	6	12	65	36
Do you think CAM are better for me than conventional medicines?	12	56	42	9	2
You use it because you know enough about CAM?	0	16	68	36	1
You think CAM is necessary?	2	15	58	44	2
CAM is/are affordable to you as compared to conventional medicine?	4	45	33	37	2
Do you need more information on CAM?	0	1	9	86	25
Do you think it is important to talk to a medical doctor or a pharmacist before using CAM?	0	0	3	57	61
Govt. of Pakistan does a good job of informing the public about CAM use in DM?	26	28	48	19	0

Table 6 Record of CAM products

Name of product	n	Average duration of use (y)	Recommended by	Average cost (Pkr)	outcome (n)	
					Satisfactory	Not satisfactory
Caralluma tuberculata	11	6.6	Relative, Friend, Hakeem	150	10	1
Solanum surrattens Burm.f.	10	1	Relative, Neighbour, Physician	Free	7	3
Consolida ambigua	6	0.09	Friend, Hakeem, Neighbour, Physician	Free	4	2
Fagoniacretica	6	0.843	Friend, Hakeem, Neighbour	Free	3	3
Justicia adhatoda	5	0.032	Friend, Hakeem, Physician	Free	4	1
Oral Drops	5	3.26	Hakeem,	350	5	-

			Homeopathic			
Carumcarvi	4	4.5	Neighbour, Friend	50	4	-
Vernonia amydalina	3	5	Relative, Friend	Free	1	2
Powder	3	2	Hakeem, Baba Ji, Friend	350	2	1
Nigella sativa	3	2.33	Neighbour, Friend	Free	3	-
Hakeemi	3	1.7	Hakeem	193.33	2	1
Citruluscolocynthis	2	4	Neighbour	Free	1	1
Brberis lycium Royle	2	10	Neighbour	Free	2	-
A. ParvifloraBenth	2	7.5	Neighbour	Free	2	-
Vitana coronas	1	0.03	Relative	Free	1	-
Artmisia Maritima	1	1	Physician	Free	-	1
Abelmoschus esculentus	1	0.02	Friend	Free	-	1
Kadugak	1	0.3	Physician	Free	1	-
Home Remedy	1	0.01	Relative	Free	-	1
Homeopathic	1	2	Physician	2500	1	-
Local Herb	1	0.3	Friend	Free	1	-
Nasturtium officinale R. Br.	1	0.1	Friend	Free	1	-
Psyllium Husk	1	0.5	Physician	150	1	-
Caralluma tuberculata	11	6.6	Relative, Friend, Hakeem	150	10	1
Solanum surrattens Burm.f.	10	1	Relative, Neighbor, Physician	Free	7	3
Consolida ambigua	6	0.09	Friend, Hakeem, Neighbour, Physician	Free	4	2

n number, *Pkr* Pakistani rupees, *y* years

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