

A STUDY TO ASSESS THE KNOWLEDGE, ATTITUDE, AND BELIEFS TOWARD TRADITIONAL HERBAL MEDICINE USE AMONG DIABETIC PATIENTS

Baruah Hima Dutta.¹, Kumar Gaurav.^{1*}

¹*School of Biosciences and Technology, Galgotias University.*

**Corresponding author: Gaurav Kumar, School of Biosciences and Technology, Galgotias University, gauravkumar.sbme@galgotiasuniversity.edu.in*

Keywords:	ABSTRACT
Type 2 Diabetes Mellitus, Primary prevention, Herbal formulation.	Herbal extracts have long been used for the treatment and prevention of Type 2 diabetes. A cross-sectional study was undertaken on a random sample of diabetic patients to assess their knowledge, attitudes, and beliefs about using herbal formulations to manage Type 2 diabetes Mellitus. The study revealed that approximately 67% of patients had previously utilized herbal formulations to manage their diabetes. Among them, 16.76% utilized Neem (<i>Azadirachta Indica</i>), 15.56% used Ash Gourd (<i>Benincasa hispida</i>), 17.36% used Karela (<i>Momordica charantia</i>), and 26.75% used Methi (<i>Trigonella foenum-graecum</i>). Approximately 58.08% of patients favoured taking herbal formulations over prescription pharmaceuticals, while 62.5% utilized herbs with prescribed prescriptions. Only 34.73% of patients told their doctors about utilizing herbs. Furthermore, 76.04% of respondents reported no adverse effects and 57.48% believe that improvement in blood sugar levels is possible after utilizing herbal formulation. No significant correlation was found between demographic factors and the use of herbal medications. Overall, diabetic patients demonstrated limited knowledge, attitudes, and beliefs regarding the use of herbs. Therefore, it is essential to develop an awareness program to address and improve these areas

1.Introduction

Diabetes mellitus is a complex metabolic disorder characterized by inadequate insulin synthesis, which results in elevated blood sugar levels (hyperglycaemia). Diabetes is classified into two types: insulin-dependent diabetes mellitus (type 1 diabetes, IDDM) and non-insulin-dependent diabetes mellitus (type 2). Prolonged hyperglycaemia can lead to both macrovascular consequences (cardiovascular diseases and stroke) and microvascular issues (diabetic retinopathy, nephropathy, and neuropathy). These problems significantly contribute to the morbidity and death associated with diabetes [1]. The rapidly increasing number of incidences, severity, its complication, and the socio-economic burden greatly demonstrate the importance and necessity of the preventive action for type 2 DM. As of 2021, approximately 10.5% of the adult population aged 20 to 79 years worldwide were living with diabetes, equating to around 537 million individuals. The International Diabetes Federation projects that by 2030, this number projected to be raised to 643 million by 2030 and to 783 million by 2024 as per International Diabetes Federation [2]. Herbal products, particularly medicinal plants, have traditionally served as the primary treatment for a wide range of ailments and conditions. This study sought to assess the effect of combining numerous herbal components. Several plant species have been recognized in traditional medicine systems for their medicinal value in the treatment of Diabetes Mellitus. The concept of polyherbal preparations is well-established in ancient medical texts, and evidence supports their increased medicinal potential. Polyherbal formulations have greater therapeutic benefits than single-

plant medicines due to synergistic interactions. The common Phytochemical based plant product used by Diabetic patients include Babul (*Acacia arabica*), bael (*Aegle marmelose*), church steeples (*Agrimonia eupatoria*), onion (*Allium cepa*), garlic (*Allium sativum*), ghrita kumara (*Aloe vera*), neem (*Azadirachta indica*), ash gourd (*Benincasa hispida*), beetroot (*Beta vulgaris*), fever nut (*Caesalpinia bonducella*), bitter apple (*Citrullus colocynthis*), Nut (*Jatropha curcas*), mango (*Mangifera indica*), karela (*Momordica charantia*), mulberry (*Morus alba*), kiwach (*Mucuna pruriens*), tulsi (*Ocimum sanctum*), bisasar (*Pterocarpus marsupium*), anar (*Punica granatum*), jamun (*Syzygium cumini*), giloy (*Tinospora cordifolia*), and methi (*Trigonella foenum-graecum*). According to the World Health Organization (WHO), up to 90% of the population in underdeveloped nations relies on plants and their products for primary health care [3]. The WHO has identified 21,000 plants that are utilized for medical reasons around the world. There are 2500 species in India [4]. There are over 800 plants that have been claimed to have antidiabetic properties [5]. A diverse set of plant-derived active principles representing various bioactive chemicals have been identified for potential application in the treatment of diabetes [5].

2. Methodology

2.1: Polulation

Diabetes patients were picked at random from several clinics and hospitals in Greater Noida, Uttar Pradesh. Patients under the age of 20 were excluded and those with gestational diabetes mellitus and who did not speak Hindi or English. Patients were recruited while waiting in the outpatient clinics. The research involved interviewing and introducing patients to the study, assuring them that their information would be kept confidential and used only for research purposes. Patients were not required to answer any questions they feel not to and were not compensated for their participation.

2.2 Study Design:

This cross-sectional study evaluated a convenience sample of diabetic patients' knowledge, attitudes, and beliefs on the use of traditional herbs for diabetes management. A 20-item questionnaire was used to measure the knowledge, attitude, and beliefs of diabetic patients from January to April 2023. In total, 200 questionnaires were distributed.

Table 1: Main questions included in study questionnaire

	Part	Main Questions
Part 1	Patient Demographic	Age, Gender, education, Type of DM
Part 2	Knowledge level of Patients (In terms of use of anti-diabetic herbal formulations)	Awareness regarding the use of Herbal formulation with anti-diabetic potential and functional food. Knowledge level regarding the aetiology and preventive measures of the complication of type 2 DM
Part 3	Belief of Patients towards use of herbal formulation with anti-diabetic potential	Patient were asked about their perception of use of herbal formulation with anti-diabetic potential. What were their experienced after using the anti-diabetic herbal formulation if they are using it.
Part 4	Attitude of Patient towards use of herbal formulation with anti-diabetic potential	Patients were asked about their preferences of use of herbal formulation with anti-diabetic potential over other anti-diabetic medication. They were asked if they are taking other anti-

		diabetic medication along with herbal formulation if so, what were the experienced. They were asked if they have informed their primary care physician regarding the use of herbal formulation if they are using it.
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2.3 Statistical Analysis:

The collected data were analysed using GraphPad Prism 10 software. The results were presented as frequencies and percentages for each valid response related to knowledge, attitudes, and beliefs about the use of herbal formulations with anti-diabetic potential. The association between demographic characteristics, including age, gender, nationality, education level, type of diabetes, and herbal use habits, was assessed using cross-tabulation analysis and the chi-squared test. Additionally, binary and multinomial logistic regressions were applied to identify predictive factors associated with herbal use. Herbal use was treated as the dependent variable, while demographic characteristics served as independent variables. Odds ratios (ORs) were calculated, with non-herbal users as the reference category. A p-value of 0.05 was considered statistically significant

3. Result

3.1 Patient Demographic:

Although 200 diabetic individuals were invited to participate in this study, 83.5 % (167) of them completed the questionnaires. The decline in response rate was mostly due to patients' limited time spent waiting for clinic visits. Table 2 shows that the majority of patients were between the ages of 40 and 62 (49.52%). Females accounted for 55% of responders, while males made for 45%. About 53.5% of the patients were graduates. Patients with type I diabetes accounted for 23.35% of the participants, while those with type II diabetes made up 76.65%.

Table 2: Patient demographic data (n=167)

Characteristics		Overall	
		Frequency	Percentage
Age	20-29	12	7.18
	30-39	23	13.77
	40-59	78	46.7
	≥60	54	32.33
Gender	Male	73	43.72
	Female	94	56.28
Level of Education	Intermediate	48	28.74
	Graduate	86	51.49
	Post Graduate	33	19.76
Type of DM	Type I	39	23.35
	Type II	128	76.64

3.2 Co-relation between patient demographic data and usage of herbal formulation with anti-diabetic activity:

A total of 107 diabetic individuals (60.47%) used herbal products to treat their condition. Table 3 shows the frequencies and percentages (based on total herbal users and non-users) in several demographic groups, such as age, gender, nationality, education level, and type of diabetes. Herbal users and non-users have similar demographic features.

Table 3: Association between patient demographic data with usage of herbal formulation (n=107)

Characteristics		Herbal user		Non-herbal user		P-value
		Frequency (n=107)	Percentage	Frequency (n= 66)	Percentage	
Age	20-29	5	4.67	7	11.66	0.12
	30-39	13	12.14	10	16.66	
	40-59	48	44.85	30	50	
	≥60	41	38.31	13	21.66	
Gender	Male	44	41.12	29	48.33	0.22
	Female	63	58.87	31	51.66	
Level of Education	Intermediate	27	25.23	21	35	0.39
	Graduate	53	49.53	33	55	
	Post Graduate	27	25.23	6	10	
Type of DM	Type I	24	22.42	15	25	0.45
	Type II	83	77.57	45	75	

3.3 Knowledge level of Diabetic patients about the usage of Herbal formulation:

The frequencies and percentages of patients' knowledge regarding the usage of various herbal formulation for management of diabetes is shown in table 4.. Approximately 22.75% of diabetic patients were aware that Fenugreek seed or its leaves could aid in diabetes management, followed by Karela (17.36.8%), Neem (16.76%), Ash gourd (15.56%).. Furthermore, 43.11% of patients understood that herbal medicines might lower blood glucose levels by increasing the insulin secretion, 20.95% believed herbs could reduce insulin resistance, and 35.92% were unaware of the specific process.. The majority of patients (34.73%) learned about herbal use from various media, while friends and family, the Physician, and others provided 31.73.%, 21.53%, and 11.97% of the information, respectively. The knowledge of hypoglycaemic and hyperglycaemic symptoms was relatively good, with 58.56% of patients aware of the symptoms and 41.31% unfamiliar with them.

Question		Frequency	Percentage
Any herb you that can control Blood sugar	Methi (Fenugreek seed)	38	22.75
	Neem	28	16.76
	Karela	29	17.36
	Ash Gourd	26	15.56
	Garlic	23	13.77
	Cinamon	17	10.17

	Garlic	6	3.59
How the herb can help to control blood sugar	By decreasing the insulin resistance	35	20.95
	By increasing the insulin secretion	72	43.11
	Don't know	60	35.92
Where do you get the information regarding the beneficial effect of herbal formulation	Physician	36	21.56
	Family member and friends	53	31.73
	Media	58	34.73
	Others	20	11.97
Do you know the symptoms of hyperglycaemia and hypoglycaemia	Yes	98	58.56
	NO	69	41.31

Table 4: Knowledge of Diabetic patient about the usage of herbal formulation with anti-diabetic potential (n=167)

3.3 Attitude of Diabetic patients regarding the usage of Herbal formulation:

As shown in table 5, around 58.08% of participants in this study preferred herbal remedies to conventional medications. The perceived additional benefits of herbs (35.32%) were the top reason for their selection, while 14.97% highlighted herb's low cost and ease of availability. Furthermore, 23.35% chose herbs to avoid diabetes problems, but only 19.16% believed herbs may increase the efficacy of their medicines. Despite the widespread use of herbs, the majority of patients (66.46%) reported taking them in addition to their prescribed anti-diabetic medications. More than half of the participants (54.49%) used herbs on a regular basis. Interestingly, more than half (65.26%) of participants had not informed their doctors about their herbal use.

Table 5: Attitude of diabetic patient about the use of herbal product with anti-diabetic potential (n=167)

Question		Frequency	Percentage
Do you prefer to use herbal formulation to control blood sugar	Yes	97	58.08
	No	70	41.91
Why do you use herbal product	Believe in the benefits of herbs	59	35.32
	Due to inexpensive and easily available	25	14.97

	Herbal formulations are effective in controlling diabetes complication	39	23.35
	Because of its synergistic effect with other anti-diabetic medication	32	19.16
	Other	12	7.18
Do you use herbal formulation along with other medication	Yes	111	66.46
	No	56	33.53
Do you use herbal formulation on regular basis	Yes	91	54.49
	No	76	45.5
Do you use tell your physician about taking the herbal formulation	Yes	58	34.73
	No	109	65.26

3.3 Belief of Diabetic patients regarding the usage of Herbal formulation:

As shown in Table 6, 52.3% of diabetic patients thought herbs might be used instead of anti-diabetic medicines. Furthermore, 60.3% of patients believed that herbs might successfully treat diabetes. Despite the extensive usage of herbs in conjunction with conventional treatments, only half of the participants suspected that herbs could interact with drugs. Furthermore, 64.5% of patients were satisfied with the effectiveness of herbal remedies in diabetes management, while 54.2% believed herbs to be safe and devoid of negative effects.

Table 6: Pattern of belief of Diabetic patient about the usage of herbal formulation with anti-diabetic potential

Question		Frequency	Percentage
Do you believe that your anti-diabetic medication can be replaced by herbal formulation	Yes	112	67.06
	No	55	32.93
Do you believe that herbs can help in managing Diabetes effectively	Yes	96	57.48
	No	71	42.51
Do you believe that herbs can interact with other herbs or medication	Yes	58	34.73
	No	109	65.26
Do you believe that herbs have no side effect	Yes	40	23.95
	NO	127	76.04

4. Discussion:

Patient knowledge, attitudes, and beliefs about chronic medical disorders are critical to the efficient management of diseases such as diabetes. This emphasizes the importance of public health education programs that focus on chronic illnesses. To create an educational program for diabetic patients, it is critical to examine their present knowledge, attitudes, and beliefs about herbal products. The study's findings showed the widespread usage of herbal treatments for self-treatment. However, it also indicated considerable gaps in patients' knowledge, attitudes, and beliefs regarding the use of herbal therapies for diabetes management.

The current investigation discovered no significant relationship between demographic characteristics and herbal use in diabetes individuals. This finding is consistent with other research undertaken in other parts of India. The extensive usage of herbal remedies among many population groups may have led to the lack of substantial connections. Furthermore, the inability to find predictive indicators for herbal usage in diabetes patients emphasizes the necessity for a comprehensive national health education campaign that includes all age groups and educational levels.

More than half of the study participants favoured herbal treatments over conventional pharmaceuticals, citing the perceived superiority of herbs in diabetes management and complication prevention. However, the majority of patients reported taking herbs on a daily basis in conjunction with their anti-diabetic drugs, raising concerns about potential drug-herb interactions. A considerable proportion of participants stated that they had never mentioned their herbal use with their doctors. This finding is consistent with previous research undertaken in Arab countries. According to prior study, this could be due to patients' anxiety of receiving negative feedback from their doctors. Furthermore, only a tiny proportion of patients reported being questioned by their doctors about their herbal use. Standard medical practices frequently focus on inquiring about pharmaceutical prescriptions while ignoring herbal supplements. As a result, it is advised that physicians routinely inquire about the use of herbal products and maintain open contact with patients about their use.

Half of the patients thought that antidiabetic medicines might be replaced with botanicals. This is consistent with research that found lower adherence to antidiabetic medicines among herbal users with diabetes. Most herbal users reported satisfaction with their effects on diabetic results. Patients strongly believed that utilizing herbs with medications was safe and had no negative side effects, which was concerning. The significant risk of herb-drug interactions among diabetic patients highlights the need for clinicians to routinely ask about their usage of herbal items.

5. Conclusion:

Patient knowledge of herbal use in diabetes therapy can be enhanced through awareness programs run by physicians and nurses, which use a variety of educational approaches for effective counselling and patient education to get the best therapeutic effects. Public health education campaigns should aim to encourage the responsible use of medicinal herbs among people of all ages and educational backgrounds. Furthermore, as noted in a recent analysis, the increased usage of herbal products among the Saudi populace highlights the importance of establishing a national centre for complementary and alternative medicine. When consulting with diabetic patients, physicians should routinely question about their use of herbal products.

Acknowledgement

A prior permission was obtained from the authorities of urban family welfare center in West Delhi.

Declaration

We Author(s) of the above titled paper hereby declare that the work included in the above paper is original and is an outcome of the research carried out by the authors indicated in it. Further, We author(s) declare that the work submitted has not been published already

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