

Review Article**Concept and Management of Zayabeetus Shakari (Diabetes Mellitus)****Ingreco Arabic Medicine – An Overview****Syed Ayesha Fatema* and Jaleel Ahmed Siddiqui ****

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Background:

When we stand before the threshold of the new millennium, and the new century of knowledge, it is the duty of humanity to interlink tradition with science for leading a better life. Health science is one of such fast changing areas of human activities where a holistic approach is necessary to promote a proper understanding of tradition with modern research. India leads the world with largest number of diabetic subjects as “diabetes capital of the world. 415 million people have diabetes in the world and 78 million people in the sea region by 2015; this will rise to 140 million by 2040. There were 69.1 million cases of diabetes in India in 2015. Of these, it remained undiagnosed in more than 36 million people. Now throughout the world the human are turning towards alternative system of medicine, particularly unani system of medicine in search of answers to their sufferings. Even the W.H.O expert committee on diabetes has recommended that traditional medicinal herbs be further investigated. These herbal medicines by way of powders, extracts, decoctions, oils, ointments etc. Will be a sure panacea for many illnesses.

Objective: In view of this the topic has been selected. The aim of the study is to review the basic unani concepts and management about the most prevalent disease diabetes

Key words: Unani System Of Medicine, Zayabeetus Shakari, Management, basic unani concepts, Diabetes Mellitus.

INTRODUCTION:

The researchers of different systems of medicine are continuously working for the development of effective and safe anti diabetic drugs. Now throughout the world the human are turning towards alternative system of medicine, in search of answers to their sufferings¹.

Today modern medicine is in the crossroad and unable to answer all these diverse range of human ailments. The W.H.O Expert Committee on diabetes has recommended that traditional medicinal herbs be further investigated².

The western medicine has its boundaries as the philosophy is to treat the disease while Unani treatments are concerned that the aim is to treat the person's temperament as a whole. As far as the Unani system of medicine is concerned

diabetes mellitus is being treated since Greco Arab period.¹ To date, over 400 traditional plant treatments for diabetes have been reported, although only a small number of these have received scientific and medical evaluation to assess their efficacy². Many conventional drugs have been derived from prototypic molecules in medicinal plants e.g. Metformin derived from *Galega officinalis*³. Numbers of important and therapeutically effective single and murakab drugs have been described to be useful in type 2 diabetes mellitus in standard books and qarabadeen. These herbal medicines by way of powders, extracts, decoctions, oils, ointments will be a sure Panacea for many illnesses.

OBJECTIVE: In view of above, the topic has been selected. The aim of the study is to review the basic unani concepts and management of the most prevalent disease diabetes mellitus.

LITERATURE REVIEW: It is difficult to produce a single complete definition for Diabetes Mellitus because of the different aetiologies and varying combinations⁴.

Ibne Sina described in *Al Qanoon-Fit-Tib* that Zayabeetus shakari is a disease in which the consumed water is passed out through the kidney immediately after intake by the patient. It is similar to Zalaq-ul-Meda walama` in which the food passed rapidly through the stomach and intestine without proper digestion⁵. Kirmani B.N. explained in *Moalijat-E-Nafesi* that Zayabeetus Shakari is a disease in which the thirst is prolonged and even when the patient consumes plenty of water there is no enough irrigation, and the patient passes the urine immediately and not enough metabolic change take place in the consume water.⁶ Samar qandi has particularized in *Sharh-e-Asbab* that Zayabeetus is a disease in which water excretes out after a while in the same form in which it was consume, without any alternation in it^{7,8}.

In Ayurveda: Sushruta, Vagbhata, and Charaka described the urine of Madhumeh patients, having a taste like honey, being sticky to touch, and yellow white in color and strongly attract to the ants.^{9,10,11} In Sushrut Samhita, the descriptions contain Zayabeetus of two type's congenital or late onset.^{9,10,11,12,13}

As per the WHO, Diabetes Mellitus is a heterogeneous metabolic disorders characterized by common feature of chronic hyperglycemia with disturbance of Carbohydrate, fat and protein metabolism.¹⁴

PREVALENCE: India leads the world with largest number of diabetic subjects earning the dubious distinction of being termed the "diabetes capital of the world".¹⁴

The World Health Organization (WHO) reports show that 32 million people had diabetes in the year 2000.^{14, 15} According to the Diabetes Atlas 2006 published by the International Diabetes Federation, the number of people with diabetes in India currently around 40.9 million is

expected to rise to 69.9 million by 2025 unless urgent preventive steps are taken.^{14,16} In 2008, an estimated 347 million people in the world had diabetes and the prevalence is growing, particularly in low- and middle-income countries.¹⁷

415 million people have diabetes in the world and 78 million people in the SEA Region; by 2040 this will rise to 140 million. There were 69.1 million cases of diabetes in India in 2015.^{17,18} Of these, it remained undiagnosed in more than 36 million people.

REVIEW OF DIABETES IN UNANI : The term Zayabeetus is a Greek word, means "to run through or siphon"¹⁹, in which there is, excessive thirst¹⁹, even with excessive drinking of water¹⁹, followed by micturition immediately.^{5,19} It is characterized by hyperglycemia, glycosuria, increased appetite, and gradual loss of body weight. All philosophers and hakims have described this ailment in their valuable writings, as a disease of kidney^{5,8,20-25}.

Different Names of Disease: From Hippocrates to present era so many names are generated from innovation, e.g.

Attasa²⁶,
Barkarya^{19-24,27-28},
Dawwarah^{5,19-26,28-29}
Dawariya^{5,29},
Dayabeetus [Some tabibs, use 'Dal' instead of 'Zal' (for Zayabeetus)]¹⁹,
Dayasqoomas,^{5,20-22}
Dolabya^{5,8,19-26,28-31}
IllateBarkarya³²,
Istisqa-e-Anmas^{8,19,23,28,31}
Kasrat-ul-baul²⁹,
Moattasha^{8,19,24},
Prameh(Sanskrit word)^{8,33}
Qaramees^{8,21-22},
Silsul-ulbaul^{8,21,23,26-27},
Zalaq-ul-Kuliya^{5,19-22, 24- 26, 29, 30, 32}
Zayasqoomas⁵.

According to unani physicians and tabibs, as patient consumes water, it runs through the body and passes out through urination just like zalaqul-Am'a where the diet taken in any form excretes out soon after through the stomach and

intestine. This excretion of water in form of urine is like a cycle so that it is called as Dolabiyah (Dol+Aab=Container to pull water in well), Barkarya, Dawariyah, Zalaq-ul-kulya`^{5,21-27,30-32}. Due to similarity in clinical features, Zayabeetus Shakari has been co-related with Diabetes Mellitus¹⁹.

HISTORY: Our ancestors knew diabetes Mellitus since the age of ancient times, where symptoms of Zayabeetus were described. Many references are found in Indian, Egyptian and Greek medicines.

Ancient Egypt (Misri) was the first sphere of influence, known to have an extensive study of Zayabeetus and to have left behind written records. It is proved by the innovation of the Eber's Papyrus (of **1550BC**), which contains detailed descriptions of various diseases including a polyuric state resembling Zayabeetus Shakari⁹⁻¹⁰.

Ancient Indian physician's Charak and Sushrut Samhitas, written in 600B.C. and 400B.C. respectively, described diabetes mellitus.

The father of Medicine Buqrat (Hippocrate**460 - 377BC**) did not specifically mentioned Zayabeetus in his writings, but there are records in the Buqrat's writing that consist of the sign and symptoms of Zayabeetus.¹⁰

In 1st century AD, Arsyatoos (Aritaeus**81-138AD**) provided the first precise account of the symptoms of Zayabeetus³⁴. He was the first who used the term Diabetes (Zayabeetus) in link with this ailment^{9, 34-38}.

Jalinoos (Galen **131-201 AD**), the most influential medical author of all time, discussed Zayabeetus as a rare, in a number of his books, since he had seen only two cases. He refers to the ailments as "DiarrheaUrinosa (Diarrhea of urine)" and "dipsakos (the thirsty Disease)"^{9-10,39}.

However, the association of polyuria with sweet tasting urine was first reported in Sanskrit literature dating from **5th to 6th century AD** at the time of Sushruta and Vagbhata and Charaka. In this system, diabetes is described by the name Madhumeḥ, which comprises a variety of Prameḥ, (a group of twenty anomalies of urine excretion)^{8-10, 40}. During the same era

Chinese and Japanese physicians also described Zayabeetus which apparently attracted the dogs^{9-10,40}. During the period of Galen (2nd and 3rd century AD), Greek medicine transcended to its apotheosis but after Paul Aegina (**615- 690AD**), Greek medicine descended to a stage of inactivity and then traveled to Arab world, through school of Alexandria (Askandriya) and Jundishapur of Persia, where it was preserved and nurtured⁴¹. In this connection, the first book was Firdaus-ul-Hikmat by AbulHasan Ali bin Rabban Tabri in **9th century AD** but the writer had not mentioned any such disease, which resemble to diabetes. Zakariya Razi (Rhazes **865-925 AD**), after translocation of Tibb in Arabic, was the first, used the term Zayabeetus in his most popular compilation Al Hawi-fi-Tibb⁴². Following Razi, Majoosi (**930-994 AD**) mentioned about the disease in his famous book Kamil-ul-sina'a²⁷.

During the 9th and 11th centuries AD, the two prominent physicians of this era, who contributed to the knowledge of Zayabeetus were Ibn-e-Seena (**960-1037 AD**) and Musa Bin Maymoon (**1135-1214 AD**)⁵. Ibn-e-Sina described accurately the clinical features of the disease⁸. While on the other hand Musa bin Maymoon claimed to have seen more than 20 cases⁹⁻¹⁰.

In mid of **11th century AD**, Ismail Jurjani in his book Zakheera-e-Khwarezmi Shahi mentioned causes of Zayabeetus³¹. In the fag end of 11th century, Ibn-e-Zohar (**1091-1164 AD**) has described the disease in his book Kitab-ut-Taiseer^{9, 32, 43-46}. No further progress was made in the understanding of Zayabeetus until the 16th century AD, when the Swiss physician Von Hohenhein (Paracelsus) reported that urine of Zayabeetus patient contained an abnormal substance which remains as a white powder after evaporation, he concluded that the substance was salt and that diabetes was due to the deposition of salt in the kidneys causing thirst of the kidneys and polyurea²².

Surprisingly, there is no reference in Diabetes in Chinese and Persian medicine as could be ascertained from available reference books. Diabetes is first recorded in English, in a medical text written around 1425. For more then

2000 years Zayabeetus was believed to be a disease of kidney^{9,32,43-46} but this misty era got cleared in 1674 AD by Thomas Willis (1621-1675 AD) added the word mellitus, from the Latin meaning "honey", a reference to the sweet taste of the urine. He stated that the diabetes is the disease of blood not the kidney and sweetness first appears in the blood and later in the urine^{9, 43-46}.

In 1682 A.D. John Conrada Bruner (1653-1727 AD) partially removed the pancreas of the dog and observed that the dog drinking plenty amount of water and passes urine frequently and gets very thirsty⁴³⁻⁴⁷.

In 1776 AD, Matthew Dobson found an easily breakable, smells like brown sugar, whitish granulated substance, in evaporated urine of a diabetic patient. He confirmed that the sweet taste was because of an excess of a kind of sugar in the urine and blood of people with diabetes⁴⁸.

In 1784 AD, Mathew Dobson of America verified the observation of Willis and confirmed that, sweetness of urine in DM is due to sugar, which is excreted from blood stream³⁴.

In 1798AD John Rollo a surgeon of royal artillery first reused the term mellitus to distinguish it from other polyuric conditions in which glycosuria is absent he also described the cataract and acetone odor in breath in advance cases of diabetes⁴⁹.

In 1822 AD, Adolf Kussmaul a German, described a peculiar type of breathing associated with diabetic acidosis now named after him "Kussmaul's air hunger"³⁴.

In 1857 AD, Claude Bernard (1813-1878 A.D) described starch like substance, glycogen, was a product of glucose metabolism in the liver and propounded the concept that the altered glucose metabolism in the liver is the cause of diabetes⁵¹.

In 1869 AD, Paul Langerhans a medical student described in dissertation about an unknown small group of duct less cells in pancreas⁵².

In 1890AD, the discovery of a role for the pancreas in Diabetes is generally ascribed to Joseph Von Mering and Oskar Minkowski, who in 1889 found that dogs, with removed pancreas developed all the signs and symptoms of Diabetes and died shortly afterwards⁵⁰.

In 1893 AD after 24 years of Langerhans's experiment, EdovardLaguesse coined the term "Islets of Langerhan's" to these small groups of duct less cells in the honor of Langerhans and suggested that these cells might be the endocrine tissue of pancreas⁵³.

In 1901 AD, Eugene Undsay Opie's study on Diabetes Mellitus revealed that any lesion or injury of the pancreas, which mainly destroys the Islets of Langerhans, causes Diabetes Mellitus⁵⁴.

In 1909 AD, Jean de Meyer bestowed the term insulin to the secretion of the Islets of Langerhans⁵⁵.

In 1910 AD, Sir Edward Albert Sharpey-Schafer suggested that people with diabetes were deficient in a single chemical that was normally produced by the pancreas. He proposed calling this substance insulin, from the Latin insula, meaning island, in reference to the insulin-producing islets of Langerhans in the pancreas⁵⁶. The endocrine role of the pancreas in metabolism, and indeed the existence of insulin, was not further clarified until 1921, when Sir Frederick Grant Banting and Charles Herbert Best repeated the work of Von Mering and Minkowski, and went further to demonstrate they could reverse induced diabetes in dogs by giving them an extract from the pancreatic islets of Langerhans of healthy dogs⁵⁷.

The first patient was treated in 1922; Banting, Best, and colleagues (especially the chemist Collip) went on to purify the hormone insulin from bovine pancreases at the University of Toronto-insulin injections. For this, Banting and laboratory director MacLeod received the Nobel Prize in Physiology or Medicine in 1923⁵⁸.

In 1926 JJ Abel, crystallized the insulin in two chain of 51 amino acid linked by disulphide bridge, who later on in 1955 got noble prize for his work⁶⁰.

In 1936, the distinction between type 1 and type 2 Diabetes was first clearly made by Sir Harold Percival Himsworth, and published in January⁵⁹.

Other landmark discoveries include

- **1942:** Identification of the first of the sulfonylureas

- **1956:** Biguanide –was introduced.
- Reintroduction of the use of biguanides for Type 2 diabetes in the late 1950s. The initial phenformin was withdrawn worldwide (in the U.S. in 1977) due to its potential for sometimes-fatal lactic acidosis and metformin was first marketed in France in 1979, but not until 1994 in the US.
- The radioimmunoassay for insulin, as discovered by Rosalyn Yalow and Solomon Berson (gaining Yalow the 1977 Nobel Prize in Physiology or Medicine)⁶¹.
- In **1980**, U.S. biotech company Genentech developed human insulin. The insulin is isolated from genetically altered bacteria (the bacteria contain the human gene for synthesizing human insulin), which produce large quantities of insulin. Scientists then purify the insulin and distribute it to pharmacies for use by diabetes patients⁶².
- In **1983**: Human insulin was prepared by cloning of DNA in *E. coli* by Frank and Chance. This has now been to practical use in the treatment of Diabetes Mellitus³⁴.
- In **1988**: Dr Gerald Reaven's identification of the constellation of symptoms now called metabolic syndrome.
- Identification of the first thiazolidinedione as an effective insulin sensitizer during the 1990s
- **1990:** Human Insulin prepared by Genetic Engineering³⁴.
- **1990:** Use of Glitazones – Pioglitazones and Rosiglitazones³⁴.

CLASSIFICATION: According to Unani literature, Zayabeetus can be divided in to two types^{19, 7}. The types are according to presence or absence of sugar, as Zayabeetus Shakari and Zayabeetus Sada. According to shiddat and khiffat^{7,29, 66}, of the signs and symptoms, the two types are Zayabeetus Har, Zayabeetus Barid.

Zayabeetus Har (Sukri): In this disease, the patients' passes white colored, sugar containing, excessive urine frequently and feels extremely thirsty¹⁹. The excretion of sugar renders the body weak¹⁹, the muscles degenerated and

become lean and thin and the general health is run down¹⁹. In fact, it is the Diabetes in true sense^{19,22,24, 29,66,67}. There is no further classification given, for Zayabeetus Har in Unani, May be due to Absence of Diagnosing aids.

Zayabeetus Barid (Sada): In this condition the patient feel acute thirst and passes white colored urine in large quantity but does not contain sugar. This type of Diabetes can be matched with Diabetes Insipidus^{22, 24, 29, 66,68-69}.

Due to resemblance in clinical features of the disease, Zayabeetus Shakari has been co-related with Diabetes Mellitus. In modern medicine there are four type of diabetes Mellitus depending upon its etiology and treatment among them two broad categories of DM are designated type 1 and type2⁷⁰.

ETIOPATHOGENESIS: Although diabetes has been recognized since antiquity, and treatments of various efficacy have been known in various regions since the Middle Ages, and in legend for much longer, pathogenesis of diabetes has only been understood experimentally since about 1900⁷¹. Before it was known as the disease of kidney³².

Mahiyat-ul-Marz (Etiopathogenesis): According to Unani physicians, there are three types of Quwa-e-Khadema for Quwat-e-TabieyaShakhsiyaGhaziya, which plays foremost role in the absorption, digestion, and excretion of the water absorbed by the kidneys from the liver⁷². These are 1) Quwate-e-Jazeba (Absorptive Faculty), 2) Quwat-e-Masika (retentive Faculty), 3) Quwat-e-Dafea (expulsive Faculty) and 4) Quwat-e-Hazema (Digestive Faculty)⁷².

According to the Unani physicians due to the sue-e-mizaj HarGurda (Hot Derangement of the temperament of the kidney)^{27,42}, there is disturbance in the renal function⁷³, So the **Quwat-e-Jazeba** (Absorptive faculty) of the kidneys absorbs water from the liver but due to weakness of the **Quwat-e-Masika** (retentive Faculty) of the kidneys⁴², the renal tubules are not able to retain the water inside them as a result the **Quwat-e-Dafea** (Expulsive Faculty) of the kidneys is increased and causes increase

in excretion of the water. Subsequently the kidneys absorb water again from the liver, but due to the reasons mentioned above, the water is excreted again by the urinary system. Hence, the term polyurea is applied. To meet the water requirement of the kidneys, the liver absorbs water from the stomach and intestine, causing dryness of these organs, so the patient feels thirsty and tends to take water frequently. Hence, the term polydipsia is applied^{5,6,42}.

There are some major causes described in most of the classical Unani literatures, responsible for the development of Zayabeetus are as follows.

1) Sue Mizaj HarKulya (Abnormal Hot temperament of Kidney)^{5,8-10,20-25,27-28,30-31,42,67,69,74-78}

2) Majari ka Kushada ho jana (Dilatation of Renal vessels)^{5,8, 20,24-25,31.}

3) Zo'af-e-Kulya (weakness of Kidney)^{5,8, 20,24-25,31}

4) Sue Mizaj Barid of tamamBadan/ Kuliya / Jigar (Abnormal Cold temperament of body /Kidney/liver)^{5,8, 20-25, 30-31,42, 67,74, 76,79} (this may be the cause of Zayabeetus Sada).

5) Other causes: Obesity is the most problem causes, excessive mental work⁸⁰⁻⁸¹, excessive coitus⁸⁰, excessive hot food intake⁸⁰⁻⁸¹, excessive food Intake, any damage, or Injury to the base of the brain⁷⁹, nervous weakness, emotional excitement⁷⁹, alcohol consumption²⁹, sweet water⁹⁻¹⁰ etc

Among all above-mentioned causes, most emphasis was given to abnormal hot temperament of kidneys by most of the eminent Unani physicians during the description of Zayabeetus. Also described that weakness of kidneys and dilatation of renal vessels occurs due to abnormal hot temperament of kidneys,^{5,8, 20,23, 24, 25, 30, 31, 42, 69}. Aretaeus described the disease as “Zayabeetus is a dread full affliction not very frequently among men, being a melting down of the flesh and limbs in to urine”^{9,34, 35,36,37, 38}. The Indian physicians noticed the relation of Zayabeetus to heredity, obesity sedentary life style and diet^{9-10,40,82,83}.

CLINICAL FEATURES: In Unani treatise following Symptoms and signs has mentioned. Initially patient feels dull and inactive with

normal appetite¹⁹, then excessive thirst¹⁹, Excessive drinking of water^{27, 77-79, 80-81, 84}, Frequent urination^{8-10,19,27-28,80-81,84,85}, with large amount^{19,85,81}, whitish and thin in consistency^{8,27, 77-79}, without burning²⁷, Sweet odor^{19,79}, sweet taste^{19,79}, with the color (sharbati) of urine^{19,80}. In sever condition there is increased appetite (Joo'-e-kalbi)^{19,79}, constipation^{19,79}, debility^{19,80-81,84}, evening rise temperature⁸⁰, excessive dryness of mouth and body^{19,27,79,80}. Sometimes burning sensation on the site of kidneys,⁸⁰⁻⁸¹, wasting of the body^{10,19}, lack of sexual desire¹⁹. Aretaeus described the disease as “being a melting down of the flesh and limbs in to urine”^{9,34-38}.

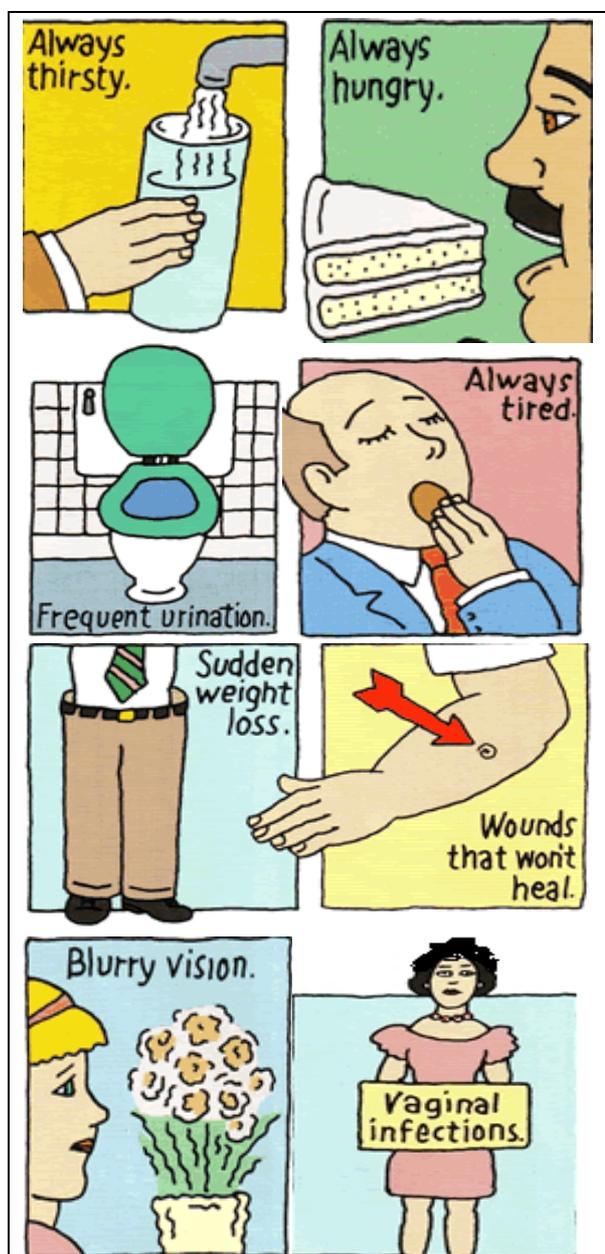


Figure1: Symptoms of Zayabeetus Shakari⁸⁶

DIAGNOSIS: According to Unani physicians, diagnosis of Zayabeetus Shakari depends on the clinical features, due to the lack of scientific tools and infra structure, the physicians of Unani system of Medicine at that time, did not mention investigations for the diagnosis of the Zayabeetus shakari. The ancient Indians tested for diabetes by ob-serving whether ants were attracted to a person's urine, and called the ailment "sweet urine disease"^{5,20,25,31}. The ancient Greeks, Chinese, Egyptians, and Indians^{9, 43-46}, had noticed the sweet taste in urine.

Table No 1: Essentials of Diagnosis⁸⁷:

Type 1 diabetes:

- Polyurea, Polydipsia, Weight loss, associated with random plasma glucose \geq 200mg/dl.
- Plasma Glucose of \geq 126mg/dl or higher after whole night fasting more than one occasion.
- Ketonuria or ketonaemia or both
- Islet auto anti bodies are frequently present .

Type 2 diabetes Mellitus:

- Many patients have few or no symptoms
- Candidal vaginitis in women may be an initial manifestation
- Polyurea and polydipsia,
- Ketonuria and weight loss are uncommon at the time of diagnosis
- Most patients of > 40 years and obese
- Plasma glucose \geq 126mg/dl or higher after overnight fasting more than one occasion. After 75gm oral glucose, diagnostic values are 200mg/dl or more, two hours after oral glucose.
- Hypertension, Hyperlipidaemia and Atherosclerosis, associated often.

COMPLICATIONS: The physicians of Unani system of medicine had mentioned some complications of Zayabeetus Shakari⁵. Ibn-e-Sina described accurately the specific complication of the disease namely gangrene and the collapse of sexual function⁵, he mentioned that this disease insidiously changes in to Zooban¹⁹ and Dique^{5,19}, Sil¹⁹.

According to Jurjani and Ibn-e-Sina, when Zayabeetus Shakari lasts for several days, it causes dissolution of the renal fat, which is excreted with urine, dryness of the organs and pain at the site of urinary bladder^{5, 31}. Akbar Arzani says prolonged Zayabeetus shakari causes several pathological changes like: **1)**Z'auf-e-kabid (weakness of the liver)²⁸, this is due to deficiency of water in the liver. **2)** Debility of the body it is due to lack of supply of water and nutrition to the organs, which increases the viscosity of the blood so the blood is not able to flow in the blood capillaries and can't reach to the organs properly. As a result, the body becomes weak and thin^{24,80,81,84}. **3)** Dryness of the body and increased thirst, which may be developed in to Diq-ul-Shaikhukhat (senile altered dry temperament) and Humma-e-Dique (Tubercular Fever)^{5-6,20,31,88}. **4)**Dique^{5,28}. **5)** Sweet smell in respiration⁷⁹. Indian physicians observed that people with Zayabeetus were prone to develop boils and an affliction, which clinically resembles tuberculosis^{9-10,19,40}.

MANAGEMENT:

The past decades have witnessed a rapid rise in the prevalence of diabetes, especially in the urban areas. The fact that there is a shift in age of onset to younger age groups is alarming as this could have adverse effects on the nation's economy. Hence, the early identification of at risk individuals and appropriate intervention in the form of weight reduction, changes in dietary habits and increased physical activity could greatly help to prevent, or at least delay the onset of diabetes and thus reduce the burden due to non-communicable diseases in India¹⁴. In this Scenario, the Unani system of medicine evolved effective & permanent cure for diabetes, though it is age-old.

Usool-e-Ilaj (Principles of Treatment): The Unani physicians have described the principles of the treatments of all diseases as under. Three Methods of Treatment are there⁷³.

- I)** Ilaj-bit-tadbeer Wat-taghziya (Diet alone 50% cases)
- II)** Ilaj bid-Dawa (20-30%)
- III)** Ilaj bil Yad(20-30 %)

I) Ilaj-bit-Tadbeer Wat-Taghziya (50% cases): It consist of Modifications inasbab-e-sittazarooriya, according to need ⁷³. In Zayabeetus Shakari Cold, moist and fresh atmosphere should be provided⁵, moderate Exercise and rest should be advised, Samarqandi described in his book to use cold zimad on lumbar region between the buttocks⁸. Local application of cold flowers oils on the site of kidneys is beneficial ⁷⁸. The following three are the important things to follow. **a.** patient's education; **b.** Diet; **c.** Physical activity.

II) Ilaj bid-Dawa (20-30%)

Mubarridat (Coolants): in unani medicine physicians use Ilaj-biz-zid, and the main cause is su-e-Mizaj Har. So Mubarridat are use to over come this problem, ^{5,6,8,20,28,31,27,89}.

Murratibat (humectants): unani physicians advised Murratibat, because they attribute the dryness in diabetes to the elimination of excessive water^{5,6, 8, 20, 31,27,78}. Ingestion of oils of cold flowers is good ⁷⁸.

Taquwiyat-wa-Tabreed-e-Gurdah

(strengthening and cooling of the kidney): In order to over come the hot derangement of Mizaj of the kidney and to restore the normal function of the kidneys Taquwiyat-wa-tabreed-e-gurdah (strengthening and cooling of the kidney is done. e.g. zimad-e-barid (cold liniment) at the site of kidney⁵.

Habisat wa Qabizat (Styptics and astringents): habis and qabis drug and diet have been used to control to polyurea by increasing the power of retention of kidneys, there by decreasing excretion of urine^{5,6, 8,20,28}.

Taskeen-e-Atash (Quenching of thirst): Aab-e-taza, Aab-e-Muqattirand aab-e-Golar are advised for the same ⁶. Local application of Muqaddiradvia at the site of both kidneys to anaesthetize the Quwa of kidneys, so the kidneys will not be able to absorb water more then their capacity. Subsequently the polyurea and thirst will decreased^{5,20,31}.

Muquiyat wa Muarriquat (emetics and diaphoretics): Muquiyat wa Muarriquat (emetics and diaphoretics) are used to Imalah the fluids upwards, which may reduce the blood

flow in the kidneys, subsequently decreased the frequency and formation of urine^{5,20,31}.

Massage and zimad of the lumbar region: Samaqandi described in his book to use cold zimad on lumbar region between the buttocks⁸. Local application of cold flowers oils on the site of kidneys is beneficial ⁷⁸.

Ab-e-Zan Barid (sitz Bath): This is done to provide a cold atmosphere for the kidneys, and Taquwiyat for the kidneys; strength to the body ^{5,6,31}.

Cold and fresh atmosphere: Samaqandi described in his book to rest and sleep on the bed of cold flowers, ^{5,8,28}.

Huqna-e-Motadila: This is done to release Constipation⁵.

Daf-e-Zayabeetus Advia (anti diabetic drugs): Traditional unani physicians had described medicinal plants either single or as a constituent of compound formulations, which are used for the treatment of Zayabeetus shakri e.g. gurmar booti, Jamun and Afyun etc.

Alternative therapies with anti-diabetic activity have been researched relatively & comprehensively, particularly in India. In this scenario the unani formulation (Kasni, Kalonji and Hulba)⁹⁰ is a very good glucose lowering agent, used by reknowned unani physicians⁹⁰. In addition to exercise, weight control, and medical nutrition therapy, oral glucose-lowering drugs is the conventional therapy, Modern medicine advices OHA one of them or in a combination. Somemurakkabat(compound formulations) andmufradat(single drugs) are being used from ancient time and describe in our classical text.

mufradat (single drugs) such as Kachnar (Bauhinavariegata), Tukhme Jamun (Eugeniajambolana), Tukhme Karela (Momordicacharantia), SatteGilo (Tinosporacordifolia), Tukhme Methi (Trigonella foenum-graecum), Kalonji (Nigella sativa), Tukhme Hayat (Withaniacoagulans), Chiraita (Swertiachirayta), DammulAkhwain (Pterocarpusmarsupium), Lahsun (Allium sativum), Gurmar Booti (Gymnemmasylvester), Tahlab (Spirulinaplatensis) etc.⁹¹

murakkabat (compound formulations) such as Safoofe Ziabetus, QursTabasheer, Safoofe Hindi, Diabeaze, dolabi tablets, herbodiabecon,

gurmar capsule, neem capsule, fenugreek capsule, safoofezayabeetus –dolabi, qurstabasheer, hoodiab capsule, madhugamini diabetes powder, brahmi capsule, qurskushtabaizae murgh, shugar no, diabetic care tablets, qurskushtazamarrud, garlitab, qursziabitus and jawarishmastagi and many more compounds are available in the market.⁹³

III) Ilaj bil Yad

Fasd (Venesection) of the Basalique Vein:

Unani physician advised fasd⁵ of basalique, the purpose is to Imalah of the fluid up wards, in order to reduce the excessive water excretion through urinary system (if the patient can tolerate)^{20, 28, 31}.

Cupping(hijamabish-shurt): Cupping is effective in treatment of blood factors in diabetes patients. It is proposed to be used as a complementary method in patients suffering from diabetes type II.⁹²

Insulin: Insulin is usually added to an oral agent when glycemic control is suboptimal at maximal doses of oral medications. Weight gain and hypoglycemia are common side effects of insulin therapy. Vigorous insulin treatment may also carry an increased risk of atherogenesis. Insulin is indicated for type 1 DM, as well as for type 2 DM with insulinopenia, whose hyperglycemia does not respond to diet therapy either alone or combined with other OHA³⁰.

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REFERENCES:

1. Ayesha F S. Effect of A Unani Formulation In Type 2 Diabetes Mellitus. Dessertation: Pune : MUHS Nashik;2009.P5-60

2. Lucy D., Anoja S., Chun-Su Yuan, *Alternative Medicine Review*, Volume 7, Number 1, 2002; Pp45-58.
3. Witters L, "The Blooming Of the French Lilac". *J Clin Invest* 108 (8) 2001: 1105-7doi: 10.1172/JCI14178. PMID 11602616. Full text at PMC: 209536
4. Bell, J.I., &Hockaday, TDR, Diabetes Mellitus In: Weather All, D.J., Ledingham, and J.G.G. And Warrell D.A. (Eds), Oxford Text Book Of Medicine, Vol.2, Oxford Medical Publications, Newyork, 3rd Edition, 1996; Pp14448-1504.
5. Ibne Sina, Al Qanoon-Fit-Tib, (Urdu Translation by Ghulam Hassan Kantoori), Vol 2 & 3, Matba Munshi Nawal Kishore, Lucknow, (India), 1887; Pp89, 111-112, 117-118, 213, 248-50.
6. Kirmani B. N., Moalijat-E-Nafesi, Matba Munshi Nawal Kishore, Lucknow, India, 1314H; Pp378-379.
7. Samar khandi, Sharh-e-Asbab, (comentary by Burhan-u-ddinNafees and Urdu translation by AllamaKabiruddin), vol III, Al Naseer publication, Lahore, Pakistan, 2006; p36-44.
8. Samarqandi N., Sharah Asbab (Urdu Translated by Mohammad Ayyub), Vol-2, Matab Munshi Nawal Kishore, Lucknow, (India), 1918; Pp118-120.
9. Pickup, J. And William, G., Text Book of Diabetes, 2nd Edi, Vol-1, Black Well Science, Oxford, London, 1997; pp3-10.
10. Sanders, L.J., From Thebes to Toronto and the 21th Century, an Incredible Journey, *Diabetes Spectrum* 2002; 15: 56-60.
11. Algaonkerss, Diabetes Mellitus As Seen In Ancient AyurvedicMedicien, In Bajaj, A S. Editor And Insulin And Metabolism, Bombay Press, (India), 1972; pp1-191.
12. Sathe R.V. , Diabetes In India Retrospect And Prospect, *Journal Of Diabetes Association Of India*.1984; July Xxiv: p75
13. OjhaJk, DwividiKn, Concept Of Diabetes Mellitus In Ancient Era With Special Reference To Genetic Involvement, *J Of Diabetes Association In India*; 34(1):37-41.
14. Mohan V. et.al. "Epidemiology Of Type 2 Diabetes, Indian Scenario", *Indian J Med Res* 125, Indian Council Of Medical Research, New Delhi & Office Of The W. H. O. Representative To India, New Delhi, India, March 2007; Pp 217-230.
15. Wild S, Roglic G, Green A, Sicree R, King H. Global Prevalence Of Diabetes, Estimates

- For The Year 2000, And Projections For 2030, *Diabetes Care*, 2004; 27 : 1047-53.
16. Sicree R, Shaw J, Zimmet P. Diabetes and Impaired Glucose Tolerance; In: Gan D, Editor. *Diabetes Atlas. International Diabetes Federation*, 3rd Ed. Belgium, International Diabetes Federation, 2006; P. 15-103.
 17. World Health Day 2016: Let's beat diabetes, New Delhi, 7 April 2016: A consultation, organized by the WHO Country for India in collaboration with the Ministry of Health & Family Welfare, Government of India, on the occasion of the World Health Day 2016 http://www.searo.who.int/india/mediacentre/events/world_health_day/press_release_whd2016_newdelhi_2016.pdf?ua=1 (On 24th march 2017)
 18. DIABETES IN INDIA – 2015 by IDF Members, Diabetic Association of India and Research Society for the Study of Diabetes in India, published by © 2015 International Diabetes Federation south east Asia.
 19. *Almaseeh: Almaseeh Special, Risala-e-Zayabeetus; zayabeetuskiTaheqiqiMahiyat, Asbab, Alamat, Aur Usool-e-Ilaj ka Mudallil aur mufasssil Tazkera*, December 1924 (5) 4
 20. Sadid G., Moalijat–Sadidi, (Urdu Translation by Hussain A.), Matba Munshi Nawal Kishore, Lucknow, (India), 1845; P328.
 21. Al Baghdadi ABH; *Kitab-Ul-Mukhtarat-Tib* (Arabic), DairahtulMarif Al Usmaniyah, Hyderabad, Deccan (India), 1363H; Pp 425-427.
 22. Sharif M., Miftahul-Hikamat, Vol. 1, Daftarul Hakeem Wa RafeequlAtibba Wa Chasmae Sehat, Lahore (Pakistan), 1931; Pp 1005-1023.
 23. Arzani M A.; *Tibbe Akbar, Vol- 2, Matab Munshi Nawal Kishore, Lucknow, (India), 1890; P69.*
 24. Kabiruddin M.; *Al-Ikseer, Vol-2, Aijaz Publishing House, New Delhi (India), 2003; Pp1195-1199.*
 25. Aqsarai J. Aqsarai; *Sharah Moajiz* (Urdu Translation By Ayyub M.), Matab Munshi Nawal Kishore, Lucknow (India), 1908; Pp351-352.
 26. Hussain F., *Tibe Usmani Al-Maruf Kulliyat-Asrare-Nishani*, Union Salim Press, Lahore (Pakistan), NA: 778-780.
 27. Majusi A.A., *Kamilus Sana`*, (Urdu Translation By Kantoori Ghulam Hasan), Vol-1, Matab Munshi Nawal Kishore, Lucknow (India), 1889; Pp 496-470.
 28. Arzani Akbar, *Tibb-e-Akbar*, (Urdu Translation by Hakim Mohammad Hussain), Faisal Publications, Deoband, (YNM); pp 525-26
 29. Khan G. J., *Makhgane-Hikmat, Matab Munshi Nawal Kishore, Steem Press, Lahore (Pakistan); 1910, P. 781.*
 30. Mohammad M., *Kifayat Mansoori* (Persian). NA: Dar Mataba Mustafa-Mohammad Hussain Khan, India, 1271H; P119.
 31. Jurjani AH, *Zakheera Khwarezam Shahi* (Urdu Translation By Khan H.H.) Vol L, Part-6, Matab Munshi Nawal Kishore, Lucknow (India), 1878; Pp1336-1337.
 32. Ibn Zohar, *Kitab-Ul-Taiseer*, (Urdu Translation by CCRUM), Ministry Of Health and F.W., New Delhi, India, 1986; pp160-163.
 33. Abdullah Mohammad, *Kanz-ul-Mujarebat Mukammil*, jaseem book depo, 1992; pp 439-41.
 34. Raman, P.G., *Diabetes Mellitus*, 3rd Edition, AITBS Publishers And Distributors, Delhi, India, (2004); Pp. 1-9,13, 44-56, 156-164, 410-412, 428-438.
 35. Leopald, E.J., *Aretaeus the Cappadocian, Anne Med, Hist* 1930; 2: 424-455.
 36. Henschen, F. *On The Term Diabetes in the Work of Aretaeus and Galen Med.*, *Hist*, 1996; 13: 190-192.
 37. *Atretaeus on Diabetes, the Extant Works*, (Edit and Translated By, F. Adams), London Sydenham Society, 1856; 338-339.
 38. *Atretaeus C, on Causes and Symptoms Of Chronic Diseases*, Translated By Adams CF, London Sydenham Society, London (UK), 1856; p138.
 39. Galen, *Om Sjukdomarnas Lokalisation*, Translated By A. Renander, Stockholm; 1960; N.A.
 40. Algoonkerss, *Diabetes Mellitus As Seen In Ancient Ayurvedic Medicin*, In Bajaj, A S. Editor *And Insulin And Metabolism*, Bombay Press, (India), 1972; pp1-191.
 41. Altaf Ahmed Azmi, *Impact of Arabian Medicine On The Western World In Middle Age*, *Studies In History Of Medicine And Science* 2001; Xvii (1-2): 1-12.
 42. Razi M.Z., *Kitab-Ul –Hawi* (Urdu Translation), Vol-X, CCRUM, New Delhi, 2002; Pp181-183.
 43. Farmer L. *Notes On The History Of Diabetes*, *Bulletin Of New York Academy Of Medicin*, New York, 1952; 28: 408-416.
 44. Willis T. *Pharmaceutical Rationalis or an Excercitation of the Operations of Medicines*

- in Human Bodies, In His Practice of Physics, Sect 3: Chapt.3. London, During, 1684; pp N.A.
45. Paton A. The English Diabetes, (1674-1877) St. Thomus, Hosp. Gaz, 1954; 52: 189-191.
 46. Macleod JJR and Banting FG, The Antidiabetic Functions Of The Pancrease And The Successful Isolation Of The Antidiabetic Hormone Insulin, St. Louis: CV Mosby Company; 1923: 7.
 47. Mann R.J Historical Vignette, Honey Urine To Pancreatic Diabetes, 600BC-1922, A.D Mayo Clinic Proceedings, 1971; 46; 56-58.
 48. Dobson, M. "Nature of the Urine in Diabetes", Medical Observations And Inquiries, (1776); 5: 298–310.
 49. Rollo J., Causes of the Diabetes Mellitus, 2nd Edi, London, C. Dilly; 1798.
 50. Von Mering J. And O. Minkowski, "Diabetes Mellitus Nach Pancrease Ex Stirpation," *Arch Exp Pathol Pharmacol*, 1889-1890; 26:371-387.
 51. Bernard C., Memoire Sur Le Pancreas Paris Bailliere, 1856, (Publishes As Monograph Of The Physiological Society Academic Press London) 1985;
 52. Langerhan's P., Beitrage Zur Mikroskopischen Anatomy De Bauchs Peicheldruses, Berlin, 1869.
 53. Lauguesse GE., Sur La Formation Des ilots De Langerhans Dons Le Pancreas, C.R. Soc. Biol, Paris, 1893; 45: 819-820.
 54. Opie Eu, The Relation Of Diabetes To Lesion Of The Pancreas, Hyaline Degeneration Of The Islets Of Langerhan's, 1901; 5: 527-540.
 55. Meyer JD, Sur La, Signification Physiologic De La Secretion Intern Du Pancreas, *ZBL Physiol*, 1913; 18: 826.
 56. Patlak M, "New Weapons To Combat An Ancient Disease, Treating Diabetes", *FASEB J*, (2002); 16 (14): 1853.
 57. Banting FG, Best CH, Collip JB, Campbell WR, Fletcher AA "Pancreatic Extracts In The Treatment Of Diabetes Mellitus", *Canad Med Assoc J*, (1922); 12: 141–146.
 58. Wrenshall G.A Et All, The Story Of Insulin, The BodleyHeod Ltd, London (UK), 1962; pp39-52.
 59. Himsworth, "Diabetes Mellitus, Its Differentiation In to Insulin-Sensitive And Insulin-Insensitive Types", *Lancet I*, (1936); pp127–130.
 60. Pherson Mac, Feedy JN, Insulin, *BMJ*, 1990; 300:731-736.
 61. Yalow RS, Brerson SA, Immunoassay Of Endogenous Plasma Insulin In Man, *Journal Of Clinical Investigation*, 1960; 36: 1157-1175.
 62. Thieman, W.J. And Palladino, M.A. Introduction To Biotechnology, Pearson, Benjamin Cummings, 2004; Page 6.
 63. Ramzi S. C., Vinay Kumar, Tucker Collins, Robbin's Pathologic Basis Of Diseases, (The Pancreas Chapter 20 By James M.C. And Ramzi, S.C.), 6th Edition, Harcourt India Private Ltd. 2001; Pp 902-929.
 64. Goldman Lee, And Ausiello Dennis; Cecil Medicine, 23rd Edition, Vol 2, Elsevier, New Delhi, India, 2007; Pp-1727-1760.
 65. Anonymous, Report Of The Expert Committee On The Diagnosis And Classification Of Diabetes Mellitus, *Diabetes Care* 1997;20: 1183-1191.
 66. Khan A., Bayaze Ajmal, Aijaz Publishing House, New Delhi (India), 1995; Pp146-147.
 67. Khan A.D, Tarkeebul Ilaj, Matab Munshi Nawal Kishore, Lucknow (India), 1905; Pp246-248.
 68. Hussain F., Tibe Usmani Al-Maruf Kulliyat-Asrare-Nishani, Union Salim Press, Lahore (Pakistan), NA: 778-780.
 69. Karim N., Shifaul-Amraz, Matab Munshi Nawal Kishore, Lucknow (India), N.A 222-223.
 70. Braunwald Eugene, Hauser S.L., Fauci A.S., Longo D.L., Kasper D.L., Jamson J.L., "Harrison's Principles Of Internal Medicine", Vol. 2, 15th Edition, (International Edi), Diabetes Mellitus, Alvin C. Power, The McGraw-Hill, 2001; Pp 2109-2137.
 71. Patlak M, "New Weapons To Combat An Ancient Disease: Treating Diabetes". *FASEB J* 16 (14): 2002; P1853.
 72. Nafees Allama Burhanuddin; Nafeesi, (Urdu translation by Mohammad Kabiruddin as Kulliyat-e-Nafeesi), Idar Kitabushifa; New Delhi, 1934; pp 106, 114-122, 451-453.
 73. Jaleel Abdul Raheem, Luqumani Guide, edit by syedahtesham and syed Amer, Aijaz Publishing House, 1994; pp 88-91
 74. Arzani M.A., Meezane-Tib (Urdu Transaltion by Ali M.H.), Matab Tej Kumar Ltd., Lucknow (India), 1976; P152.
 75. Matees H., Mujjarrabate-Farangi (Persian), Dar Matab Mufeeda-Aam, Agra (India), 1896; Pp435-436.
 76. Hameed A, Marjul-Behreen, Vol 2, Agra Akbar Press, Agra (India), 1934; Pp 305-311.

77. Abdul Aleem, Al Moalijat-ul-Moreba-bil-Nushkh Al Mujareba (Sharah Rubayat-tibb-e-Yusufi), Munshi nawal Kishore, Lucknow, India, (YNM); p168.
78. Khan G J., Ilaj Bil mufredatmaiaquawal-ul-huzzaque, siddiqui publication, Lahore, Pakistan, (YNM); P215-17.
79. Mustufa G.H. and Ram P.N., Molijat-e-Hazeaqan-e-Hind waMujrebat-e-AtebaiFarhang, Mumtaziya, Agra, India, 1884; pp227-30.
80. Jaleel Abdul Raheem, Luqumani Guide, edit by syedahtesham and syedAmer, Aijaz Publishing House, 1994; pp 88-91.
81. Abdullah Mohammad, Kanz-ul-Mujarebat Mukammil, jaseem book depo, 1992; pp 439-41.
82. Sathe RV. , Diabetes In India Retrospect And Prospect, *Journal Of Diabetes Association Of India*.1984; July Xxiv: p75
83. OjhaJk, DwividiKn, Concept Of Diabetes Mellitus In Ancient Era With Special Reference To Genetic Involvement, *J Of Diabetes Association In India*; 34(1):37-41
84. Ummulfazl and Abdul razzakmohammad, Tibb Unani Mai GhareluAdviaauraamMoalejekiKitab, CCRUM, New Delhi, 2001; pp105-06
85. Balaquidas Munshi, Aksir I. Hayat (Guldasta-e-ChaharHikamt), Mayor Press, Delhi, (YNM); pp.382-384
86. The walking encyclopedia, Diabetese mellitus, sign and symptoms of diabetes, APRIL 28,2016 BY DOCTOR,FILEDUNDER: HEALTH&MEDICINE, (RETRIEVED ON 28 APRIL 2017)<http://www.thewalkingencyclopedia.com/diabetes-mellitus/>
87. McPhee, S.J, Papadakis M.A., Tierney, L.M., Current Medical Diagnosis and Treatment, Diabetes Mellitus and hypoglycemia, UmeshMasharani, 47th Edition, The McGraw-Hill, 2008; Pp 1034-1073.
88. Khan M. Azam, Ikseer-E-Azam, (Al-Ikseer), Vol.2, Urdu Translation ByKabiruddin, Tibbi Company, Pakistan, 1940; Pp1194-1202.
89. Kirmani B.N., Sharhul Asbab Wal Alamat, Vol I and II, Matba Munshi Nawal Kishore, Lucknow, India, 1898; Pp65-66.
90. Takmili, JU. Mujarreat-e-Takmili, Nishan press seetapur, January 2003, p60
91. Anzar M.A et al.; International Journal of Pharmamedix India, 2013, 1(3), 460-74.
92. Akbari A, ShariatZadeh SMA, Ramezani M; NATIONALPARK-FORSCHUNG IN DER SCHWEIZ (Switzerland Research Park Journal); Vol. 102, No. 9; September 2013; p788-793.
93. Mukeshsharma et al, *Int.J. Of allied med. Sci. And clin. Research*, vol 2(1)2014; p51-63.