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CASE STUDY

Case Study: *Ayurvedic* Treatment Of Dyslipidemia Coexisting With Type 2 Diabetes Mellitus

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ABSTRACT

Dyslipidemia, characterized by abnormal lipid levels including elevated LDL cholesterol, low HDL cholesterol, and increased triglycerides, is a major risk factor for atherosclerotic cardiovascular disease and is frequently associated with type 2 diabetes mellitus (T2DM). Its multifactorial etiology involves genetic, dietary, and lifestyle influences, and effective management requires early detection and comprehensive intervention. *Ayurveda* conceptualizes dyslipidemia with T_2DM under *Medoroga* and *Madhumeha*, attributing the condition to *dosha* imbalances, especially involving *Kapha* and *Meda Dhatu*, and impaired metabolic fire (*Agni*). *Ayurvedic* treatments combine purificatory (*Shodhana*) and palliative (*Shamana*) therapies, supported by lifestyle and dietary regulation to restore metabolic harmony. This case study reports on a 35-year-old male patient diagnosed with dyslipidemia and T_2DM, treated at Jeena Sikho Lifecare Limited Clinic, Bhagalpur, India. Initial complaints included abdominal heaviness and gastritis. Following *Ayurvedic* intervention, the patient exhibited significant symptomatic relief alongside marked improvements in laboratory parameters. Over a two-month period, total cholesterol, triglycerides and LDL cholesterol were reduced, and HbA_{1c} improved from 8.10% to 5.80%. HDL levels remained borderline but stable, while other lipid fractions such as VLDL and non-HDL cholesterol showed favorable reductions. The integrative *Ayurvedic* approach targeting *dosha* balance and metabolic correction effectively improved lipid profiles and glycemic control, contributing to symptom relief and stabilized vital parameters. These promising results highlight the potential of *Ayurveda* in managing dyslipidemia with T_2DM, however, larger-scale clinical trials are necessary to validate these findings and develop standardized treatment protocols.

INTRODUCTION

Dyslipidemia refers to abnormalities in lipid levels in the blood, primarily characterized by elevated low-density lipoprotein (LDL) cholesterol, low high-density lipoprotein (HDL) cholesterol, and increased triglycerides [1]. This condition is a significant risk factor for atherosclerotic cardiovascular disease (ASCVD) and is influenced by genetic, dietary, and lifestyle factors. Understanding dyslipidemia is crucial for effective screening and management strategies. Dyslipidemia is defined by abnormal lipid profiles, including high total cholesterol (TC), high LDL-C, low HDL-C, and elevated triglycerides [2,3]. It can be asymptomatic, making

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early detection through screening vital (Chou). Several causes contribute to dyslipidemia. Dietary factors such as high intake of saturated and trans fats, refined carbohydrates, and sugars are significant contributors [2,4]. Genetic predisposition also plays a role, with familial dyslipidemias increasing the risk of cardiovascular complications [5,6]. Additionally, lifestyle choices like sedentary behavior and obesity are closely linked to dyslipidemia [7]. Management and prevention involve lifestyle interventions such as adopting a Mediterranean diet or reducing saturated fat intake, which have been shown to be effective [8]. Regular lipid profile screenings are recommended, especially for high-risk populations [9], and statin medications have demonstrated efficacy in reducing cardiovascular events [8]. While dyslipidemia is a critical public health issue, some argue that the focus on lipid levels may overshadow other important cardiovascular risk factors, such as hypertension and diabetes.

Dyslipidemia is a prevalent condition among patients with type 2 diabetes mellitus (T2DM), significantly increasing the risk of cardiovascular diseases. Research indicates that the patterns and prevalence of dyslipidemia vary based on the duration of diabetes and other demographic factors. Studies have found that up to 87.95% of T_2DM patients exhibit dyslipidemia, with mixed dyslipidemia being the most common type [10]. Another report documented an even higher prevalence of 92.6%, emphasizing its strong association with poor glycemic control and longer diabetes duration [11]. Notably, even newly diagnosed patients show a high prevalence (64%), indicating the early onset of dyslipidemia in T_2DM [12]. The most common patterns include elevated low-density lipoprotein (LDL) levels, reported in up to 94.2% of patients, and reduced high-density lipoprotein (HDL) levels [13]. The severity of dyslipidemia has been found to correlate with HbA_{1c} levels, suggesting that improved glycemic control may help mitigate lipid abnormalities [14]. Risk factors such as gender, obesity, and hypertension are significantly associated with dyslipidemia in T_2DM patients [15], with male patients exhibiting a higher prevalence compared to females [11]. While dyslipidemia remains a critical concern for individuals with T_2DM, evidence suggests that lifestyle interventions and regular lipid monitoring can effectively manage dyslipidemia and reduce cardiovascular risk, underscoring the importance of proactive healthcare strategies in this population.

In *Ayurveda*, dyslipidemia associated with T_2DM can be understood through the lens of *Medoroga* (disorders of fat metabolism) and *Prameha*, particularly *Madhumeha* (diabetes) [16]. *Medoroga* is attributed to the vitiation of *Kapha* and *Meda Dhatu*, leading to excessive accumulation of fat and impaired lipid metabolism [17]. *Madhumeha* is caused by the derangement of *Kapha* and *Vata doshas*, along with *Meda Dhatu Dushti*, resulting in increased *Kleda* (moisture) and abnormal metabolism [18]. The simultaneous vitiation of *Agni* (digestive fire), especially *Medodhatvagni*, plays a central role in both conditions by disrupting the normal transformation of nutrients, leading to hyperlipidemia and hyperglycemia [19]. *Ayurvedic* management includes *Shodhana* such as *Vamana, Virechana*, and *Basti*, and *Shamana* with *Ayurvedic* formulations like *Triphala, Guggulu, Shilajit,* and *Nishamalaki*, which help in regulating lipid levels, improving insulin sensitivity, and restoring metabolic balance [20,21]. Lifestyle interventions such as regular *Vyayama* (exercise), *Pathya-Apathya* (dietary regulation), and *Dinacharya* (daily regimen) are emphasized for long-term disease control [22].

Table 1. The *Samprapti Ghataka* of the case

Ghataka	Description
Dosha (Humors)	Predominantly ***Kapha*** and ***Medo-dushti*** (vitiation of fat tissue), with ***Vata*** (*Apana Vata*) also involved.
Dushya (Affected Tissues)	***Medas*** (adipose tissue), ***Mamsa*** (muscle tissue), ***Rasa*** (plasma), ***Rakta*** (blood)
Srotas (Channels)	***Rasavaha*** (plasma-carrying), ***Medovaha*** (fat-carrying), ***Raktavaha*** (blood-carrying), ***Mutravaha*** (urine channels)
Srotodushti (Channel Vitiation Type)	***Sanga*** (obstruction), ***Atipravriti*** (hyperactivity), ***Granthi*** (nodular formations)
Agni (Digestive Fire)	***Jatharagni Mandya*** (weak central digestive fire), ***Medo-dhatvagni Mandya*** (weakened fat tissue metabolism)
Ama (Toxins)	Presence of ***Saam Meda*** (improperly metabolized fat due to weak digestion)
Strotorodh (Obstruction)	Obstruction in channels due to accumulation of ***Kapha*** and ***Saam Meda***
Udbhav sthan (*Site* of Origin)	***Amashaya*** (gastrointestinal tract)
Sanchara Sthan (Spread)	***Rasa***, ***Medas***, and ***Rakta Dhatus*** (plasma, fat, and blood tissues respectively)
Adhisthan (Main Site of Affliction)	***Medovaha Srotas*** (fat transport channels), ***Yakrit*** (liver), ***Agnashay*** (pancreas), ***Vasa*** (adipose deposits)
Vyaktasthan (Site of Manifestation)	***Twak*** (skin), ***Meda*** (fat tissue), ***Rakta*** (blood), ***Hridaya*** (heart/cardiovascular system)
Rog marg (Pathway of Disease)	***Abhyantar*** (internal pathway)

The *Ayurvedic* treatment for Dyslipidemia associated with T_2DM aims to correct *Medo-dushti* (fat tissue vitiation), *Agni Mandya* (metabolic weakness), and *Kapha-Vata* imbalance, which are central to the *Samprapti* (pathogenesis) [23]. The primary approach includes *Shodhana* such as *Vamana* and *Virechana* to eliminate accumulated *Kapha* and *Medas*, followed by *Basti* to regulate *Vata* and improve lipid metabolism [24]. *Shamana chikitsa* includes the use of *Ayurvedic* herbs and formulations like *Triphala, Guggulu, Guduchi, Haridra*, and *Arjuna* which possess *Medohara* (fat-reducing), *Rasayana* (rejuvenative), and *Pramehaghna*

(anti-diabetic) properties [25]. Dietary regulation and lifestyle changes (*Dinacharya*, *Ritucharya*, and *Vyayama* – exercise) are emphasized to maintain *Agni* and prevent recurrence. This integrative approach not only manages dyslipidemia and T_2DM effectively but also prevents their complications through long-term metabolic correction [26].

OBJECTIVE

To assess the impact of *Ayurvedic* interventions for Dyslipidemia with T2DM in a 35-year-old male patient.

MATERIALS AND METHODS

Case Report

On April 14, 2025, a 35-year-old male visited the Jeena Sikho Lifecare Limited Clinic in Bhagalpur, India. A detailed clinical assessment was carried out, which included a review of his medical and family history, a physical examination, and relevant diagnostic tests. The patient had no notable family history or history of substance use. He presented with complaints of abdominal heaviness and symptoms of gastritis. Upon evaluation, he was diagnosed with type 2 diabetes mellitus accompanied by dyslipidemia. The *Ashta vidha pariksha* (Eight-fold examination) during the visits is noted in **Table 2.** The lipid profile during the treatment period is provided in **Table 3.**

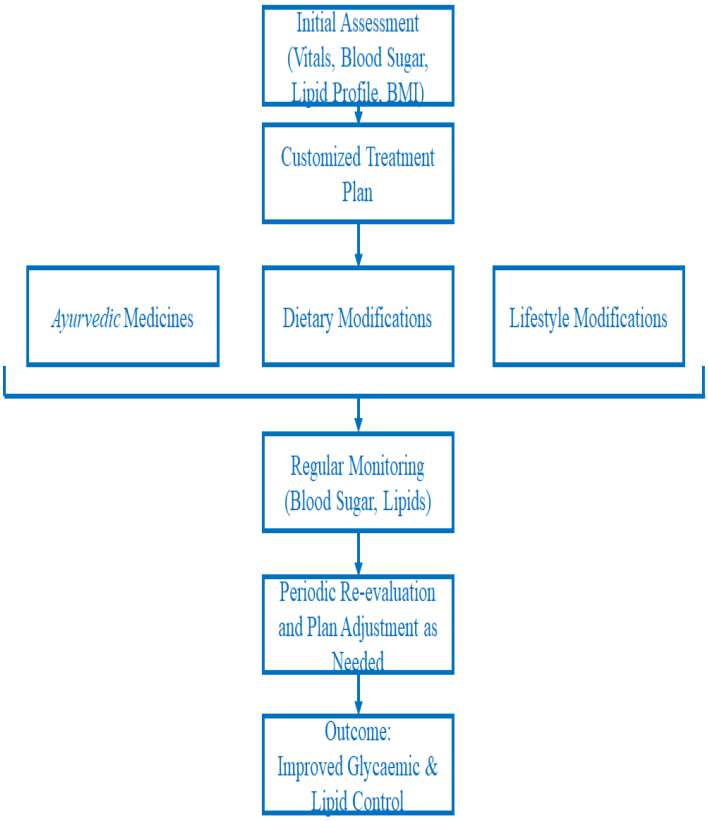
Table 2 The *Ashta vidha pariksha* during the visit on April 14,2025

Parameter	07-10-2024
Naadi (Pulse)	*Vataj Pittaj*
Mala (Stool)	*Badha* (Constipated)
Mutra (Urine)	*Avikrit* (Normal)
Jiwha (Tongue)	*Saam* (Coated)
Shabda (Voice)	*Spashta* (Normal)
Sparsha (Touch)	*Anushna sheet* (Normal)
Drik (Eye)	*Avikrit* (Normal)
Akriti (Physique)	*Madhyam*

Table 3 The lipid profile during the treatment period (Fig 1)

Parameter	22-03-2025	25-05-2025
Total cholesterol	231 mg/dl	156.8 mg/dl
Triglyceride	222.41 mg/dl	134.5 mg/dl
HDL	43.30 mg/dl	40.8 mg/dl
LDL	143.22 mg/dl	89.1 mg/dl
VLDL	44.48 mg/dl	26.9 mg/dl
Non-HDL Cholesterol	188 mg/dl	116 mg/dl
HbA1C	8.10%	5.80%

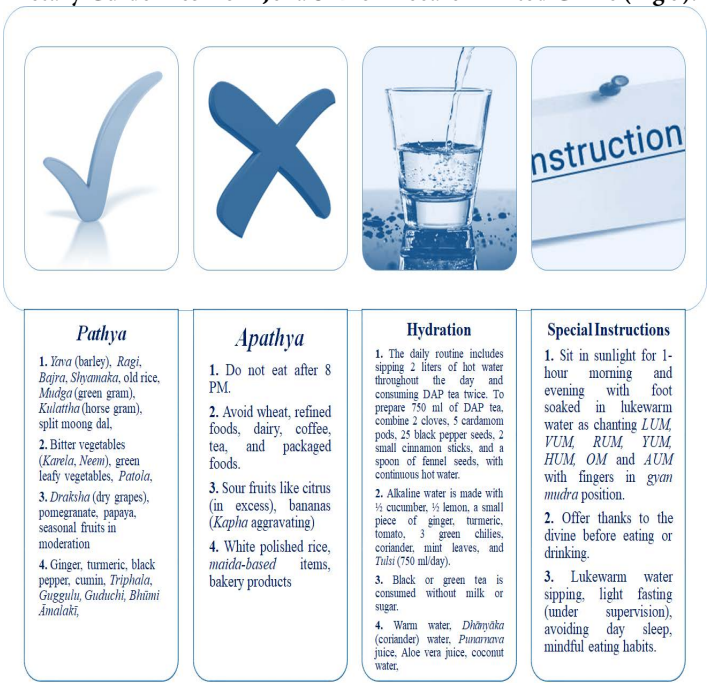
Treatment Plan (Fig 2)



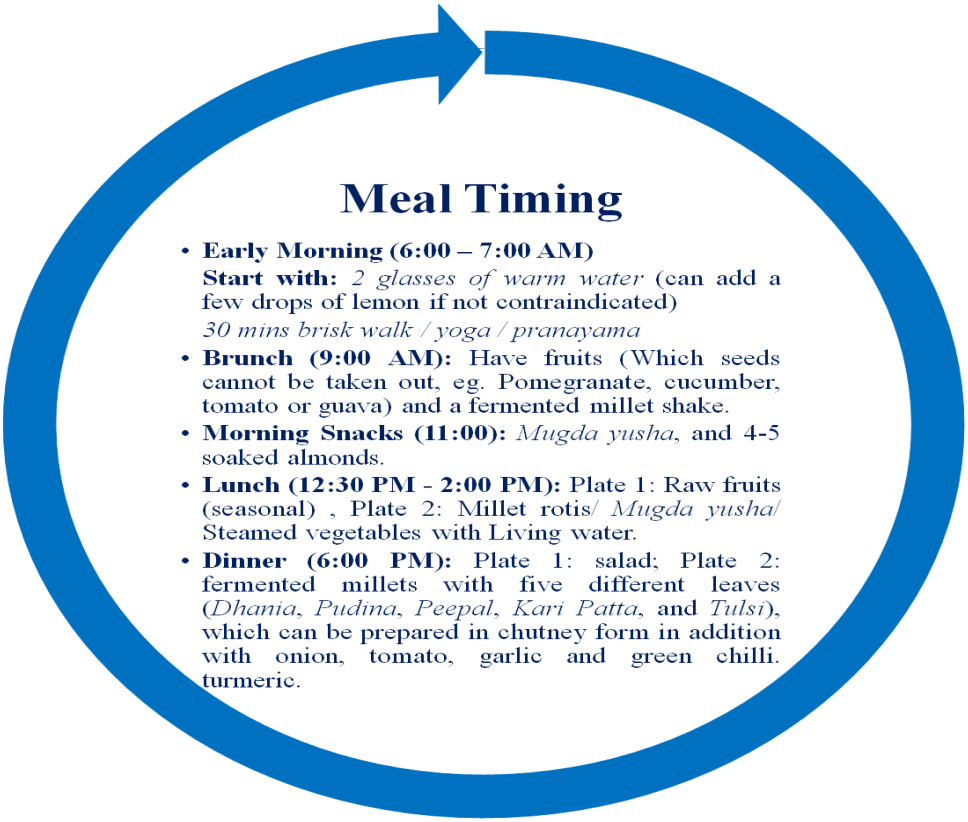
A customized Disciplined and Intelligent Person's (DIP) Diet and *Ayurvedic* diet was provided to the patient to complement the *Ayurvedic* treatments administered for Dyslipidemia associated with T_2DM [27,28]:

Diet Plan:

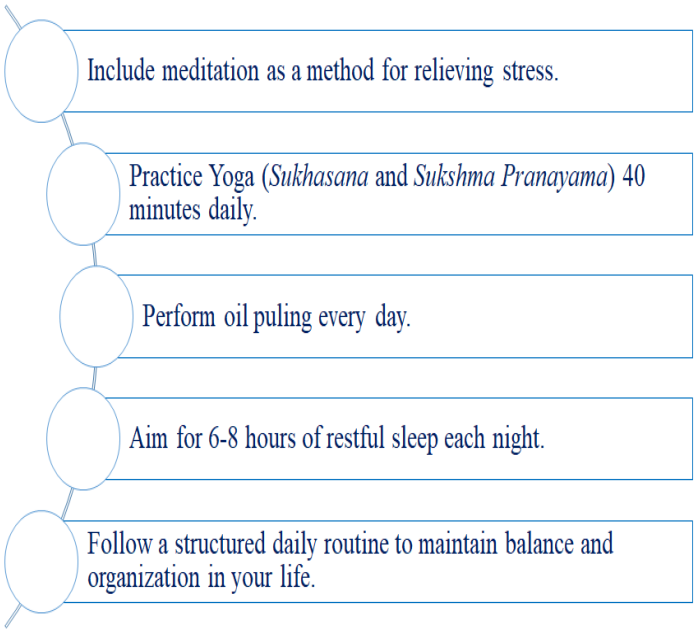
Dietary Guidelines from Jena Sikho Lifecare Limited Clinic (Fig 3):



Meal Timing and Structure (Fig 4):



Lifestyle Recommendations (Fig 5)



Medicinal Interventions

Ayurvedic intervention

The *Ayurvedic* treatment employed in this case included Dr. Shuddhi Powder, Lipi Capsule, Hrid Care Capsule, Telome + Syrup, Liver Tonic, Yakrit Shoth Har Vati, GE-LIV FORTE SYRUP, Hridyacare Tonic, Sandhi Aarogya, Dr. Immune tablet, 32 Herbs Tea, Dr. Nabhi oil, Dr. Tooth Oil, Liv DS, Gokshura Tablet, Platojee Capsule and Shilajit Tablet. The dosage with *anupana* is mentioned in **Table 4** and details of the medicines are in **Table 5.**

Table 4 The medicine advised during the treatment

Date	Medicines	Dosage with *Anupana*
14-04-2025	Udar Shodhak	Half a teaspoon BD (*Adhobhakta* with *koshna jala*- After meal with lukewarm water)
	Prameh Har Powder	Half a teaspoon BD (*Adhobhakta* with *koshna jala*- After meal with lukewarm water)
	DM Capsules	1 CAP BD (*Adhobhakta* with *koshna jala*)
	Shilajit Tablets	1 TAB BD (*Adhobhakta* with *koshna jala*)
	Hridyacare Tonic	15 ml BD (*Adhobhakta* with *sama matra koshna jala*- After meal with equal amount of lukewarm water)
	Liver Tonic	10 ml BD (*Adhobhakta* with *sama matra koshna jala*)
25-05-2025	Udar Shodhak	Half a teaspoon BD (*Adhobhakta* with *koshna jal*)
	DM Capsules	1 CAP BD (*Adhobhakta* with *koshna jala*)
	Shilajit Tablets	1 TAB BD (*Adhobhakta* with *koshna jala*)
	DM+ Syrup	15 ml BD (*Adhobhakta* with *sama matra koshna jala*)

Table 5 The details of the Ayurvedic medications

Medicine	Ingredients	Therapeutic Effects
Udar Shodhak Powder	***Shah Jeera*** *(Carum carvi),* ***Pippal / Pippali*** *(Piper longum, fruit),* ***Pipplamool*** *(Piper longum, root),* ***Ajwain*** *(Trachyspermum ammi),* ***Marich (Black Pepper)*** *(Piper nigrum),* ***Dhaniya (Coriander)*** *(Coriandrum sativum),* ***Jeera (Cumin)*** *(Cuminum cyminum),* ***Saunth (Dry Ginger)*** *(Zingiber officinale, dried rhizome),* ***Dhalchini (Cinnamon)*** *(Cinnamomum verum or C. zeylanicum),* ***Chhoti Elaichi (Cardamom)*** *(Elettaria cardamomum),* ***Tejpatra*** *(Cinnamomum tamala),* ***Nagkesar*** *(Mesua ferrea),* ***Vanshlochan*** *(Bambusa arundinacea),* ***Tatari / Tatri*** *(Garcinia pedunculata or Citrus medica),* ***Kapadik Bhasm*** (Calx of Cypraea moneta, Cowrie shell), ***Sendha Namak*** **(Rock Salt)** (Halite), ***Kala Namak*** **(Black Salt)** (Mineral salt rich in iron and sulfur compounds), ***Cheeni*** **(Sugar)** *(Saccharum officinarum)*	*Deepan* (stimulates digestive fire), *Pachan* (metabolizes toxins and undigested food), *Udar shodhan* (detoxification of the abdomen), *Vata shamak* (pacifies aggravated *Vata dosha), Anuloman* (promotes proper downward movement of *Vata), Aruchi Nashak* (appetite enhancer), *Shool Nashak* (relieves abdominal pain), *Grahi* (improves absorption and reduces excessive stool frequency)
Prameh Rog Har	***Kutaki*** *(Picrorhiza kurroa),* ***Chiraita*** *(Swertia chirata),* ***Neem*** *(Azadirachta indica),* ***Karela*** *(Momordica charantia),* ***Rasonth*** *(Berberis aristata),* ***Imli Beej*** *(Tamarindus indica),* ***Kala Namak*** *,* ***Giloy*** *(Tinospora cordifolia),* ***Sonth*** *(Zingiber officinale),* ***Babool Chhaal*** *(Vachellia nilotica),* ***Sarpgandha*** *(Rauvolfia serpentina),* ***Trivang Bhasm*** *,* ***Yashad Bhasm*** *,* ***Revend Chinni*** *(Rheum emodi),* ***Sodhit Guggulu*** *(Commiphora mukul),* ***Methi*** *(Trigonella foenum-graecum),* ***Jamun*** *(Syzygium cumini),* ***Babool Fruit*** *(Vachellia nilotica),* ***Karanj*** *(Millettia pinnata),* ***Shilajeet*** *,* ***Haldi*** *(Curcuma longa),* ***Harad*** *(Terminalia chebula),* ***Inderjaun*** *(Holarrhena antidysenterica),* ***Vanshlochan*** *(Bambusa arundinacea),* ***Bahera*** *(Terminalia bellirica),* ***Amla*** *(Phyllanthus emblica),* ***White Musli*** *(Chlorophytum borivilianum),* ***Gurmar*** *(Gymnema sylvestre).*	*Pramehaghna* (Anti-diabetic), *Raktashodhaka* (Blood purifier), *Deepan* (Appetizer), *Pachan* (Digestive), *Rasayana* (Rejuvenator), *Medohara* (Fat-reducing), *Shoth har* (Anti-inflammatory), *Mutrala* (Diuretic).
DM Capsule	***Amba Haldi*** *(Curcuma amada),* ***Giloy*** *(Tinospora cordifolia),* ***Safed Musli*** *(Chlorophytum borivilianum),* ***Methi*** *(Trigonella foenum-graecum),* ***Neem*** *(Azadirachta indica),* ***Karela*** *(Momordica charantia),* ***Jamun*** *(Syzygium cumini),* ***Bilva Patra*** *(Aegle marmelos),* ***Gudmar*** *(Gymnema sylvestre),* ***Shuddh Shilajeet*** *.*	*Pramehaghna* (Anti-diabetic), *Raktashodhaka* (Blood purifier), *Deepana* (Appetizer), *Pachana* (Digestive), *Rasayana* (Rejuvenator), *Medohara* (Fat-reducing), *Shothahara* (Anti-inflammatory), *Mutrala* (Diuretic)
Shilajit Tablet	***Shilajit*** *(Asphaltum punjabianum)*	*Rasayana* (Rejuvenative), *Vata-Pitta Shamaka* (Balances *Vata* and *Pitta doshas*), *Medhya* (Enhances intellect and memory), *Balya* (Tonic), *Vrishya* (Aphrodisiac), *Agnideepan* (Digestive stimulant), *Shoth har* (Anti-inflammatory), *Stambhan* (Astringent), *Ojavardhak* (Enhances vitality).
Liver Tonic	***Drakshasava, Jirkadhyarishta, Punarnavarishta, Rohitakarishta and Mustakarishta***	*Deepan* (Digestive stimulant), *Pachan* (Digestion or digestive process).
Hridyacare Tonic	***Arjun Chhaal*** *(Terminalia arjuna),* ***Munakka*** *(Vitis vinifera),* ***Mahua Phool*** *(Madhuca longifolia),* ***Brahmi*** *(Bacopa monnieri),* ***Shatavari*** *(Asparagus racemosus),* ***Vidarikand*** *(Pueraria tuberosa),* ***Harad Badi*** *(Terminalia chebula),* ***Khas*** *(Chrysopogon zizanioides),* ***Adrak*** *(Zingiber officinale),* ***Saunf*** *(Foeniculum vulgare),* ***Madhu*** *(honey).*	*Hridya* (Cardiotonic), *Raktagata Vata Shamaka* (Pacifier of Vata in the blood), *Raktavahini Shodhak & Srotoshodhak* (Purifier of blood channels & body channels), *Rasayana* (Rejuvenator), *Manasa Shamak* (Calmer of the mind), *Vatahara* (Vata-pacifying), *Balya* (Strength-promoting)
DM+ Syrup	***Kumari*** *(Aloe vera),* ***Papita*** *(Carica papaya),* ***Giloy*** *(Tinospora cordifolia),* ***Saptrangi*** *(Salacia oblonga),* ***Karela*** *(Momordica charantia),* ***Jamun*** *(Syzygium cumini),* ***Neem*** *(Azadirachta indica),* ***Gurmar*** *(Gymnema sylvestre),* ***Kalmegh*** *(Andrographis paniculata),* ***Arjun*** *(Terminalia arjuna),* ***Pipal*** *(Ficus religiosa),* ***Dalchini*** *(Cinnamomum verum),* ***Tulsi*** *(Ocimum sanctum),* ***Vijaysaar*** *(Pterocarpus marsupium),* ***Ashwagandha*** *(Withania somnifera).*	*Madhumeha Nashaka* (Anti-diabetic), *Kapha-Vata Shamaka* (Balances *Kapha* and *Vata doshas*), *Agnivardhaka* (Enhances digestive fire), *Rasayana* (Rejuvenative), *Shoth har* (Anti-inflammatory), *Balya* (Strength-promotin), *Medohara* (Reduces excess fat), *Prameha Nashak* (Removes urinary disorders related to diabetes)

RESULT

After one month of *Ayurvedic* treatment, the patient exhibited notable improvement in clinical symptoms, highlighting the effectiveness of the interventions in managing dyslipidemia associated with T_2DM. The patient reported relief from abdominal heaviness and gastritis, further validating the therapeutic potential of *Ayurvedic* management in addressing his condition. A comparison of the patient's condition before and after treatment is presented in **Table 6.**

Table 6 The conditions before and after treatment

Conditions	Before treatment	After treatment
Heaviness in abdomen	Severe	Mild
Gastritis	Moderate	Mild

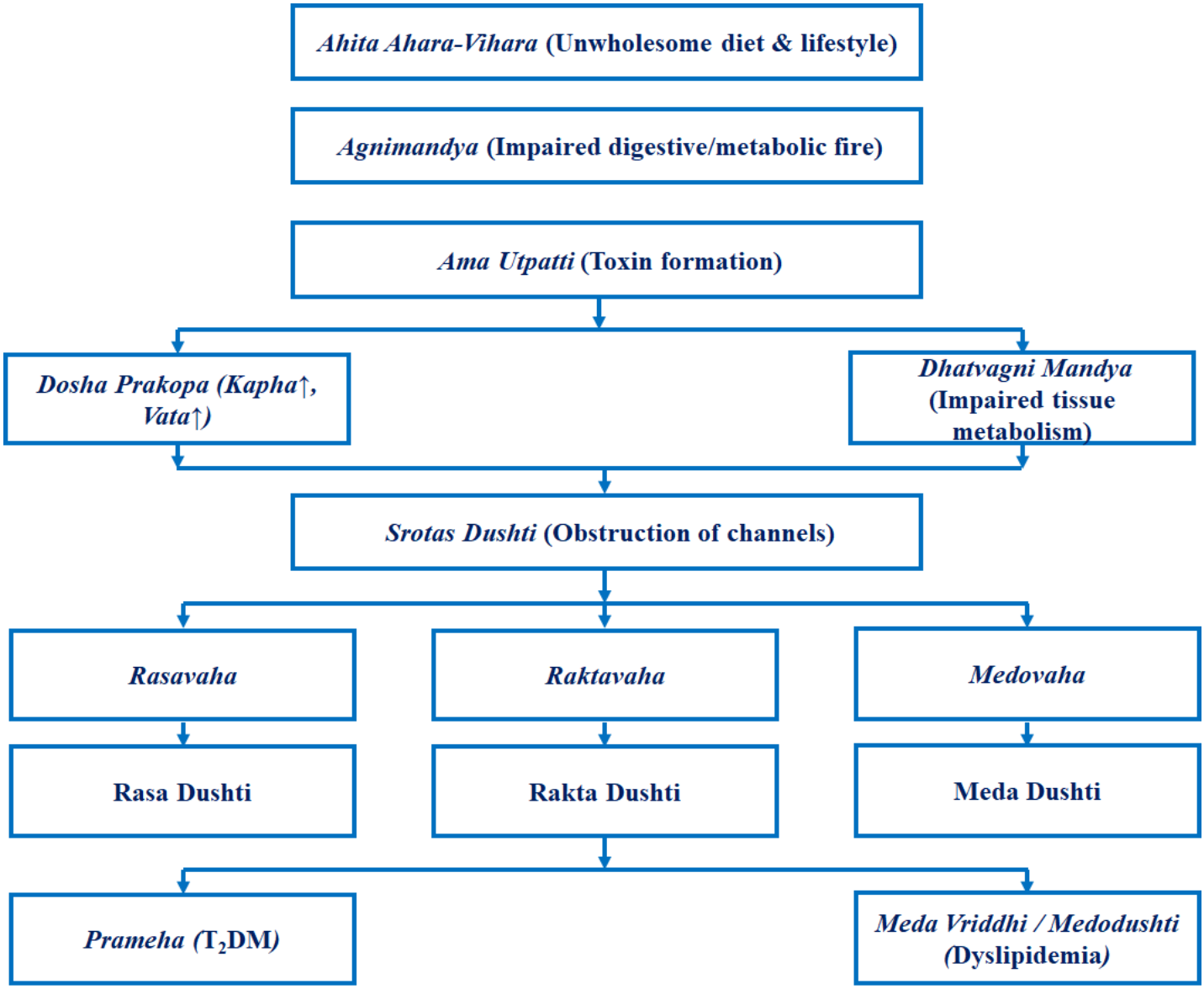
Implications for Future Research

The coexistence of dyslipidemia with T_2DM significantly increases the risk of future cardiovascular events, fatty liver disease, nephropathy, and retinopathy due to persistent insulin resistance and lipid imbalance. If not managed proactively, this condition may lead to atherosclerosis, stroke, and other end-organ complications. From an *Ayurvedic* perspective, it reflects *Meda-vriddhi* and *Prameha*, involving *Dhatvagni mandya* and *srotas dushti*, especially **of** *Rasavaha* and *Medovaha srotas*. Future implications emphasize the need for integrative approaches combining modern medicine with *Ayurvedic* interventions like *Rasayana*, *Medohara*, and *Pramehaghna*, along with lifestyle interventions such as the DIP diet, stress management, and *Panchakarma* therapies. Advancements in personalized medicine, nutraceuticals, and *Ayurvedic* clinical research hold promise for more sustainable and individualized metabolic disorder management.

DISCUSSION

The *Ayurvedic* approach to managing dyslipidemia associated with T_2DM offers a promising alternative to conventional treatment methods. This case study presents the application of specific *Ayurvedic* interventions in a 35-year-old male diagnosed with dyslipidemia and T_2DM. The therapeutic regimen resulted in a marked improvement in symptoms, particularly the alleviation of abdominal heaviness and gastritis. The *Samprapti* (pathogenesis) [29,30,31,32,33,34,35] relevant to this case is illustrated in Fig. 6.

Fig. 6 The *samprapti* for this case study



The *Samprapti*

In dyslipidemia associated with T_2DM, the primary pathological process involves the aggravation and vitiation of *Kapha* and *Medo Dhatu* (adipose tissue), alongside *Meda* (fat) and *Mala* (waste products) accumulation, which disrupts normal lipid metabolism [36]. Concurrently, *Vata dosha* gets aggravated due to impaired glucose metabolism and insulin resistance, causing disturbances in fat mobilization and utilization. The deranged *Agni* (digestive/metabolic fire) leads to *Ama* (toxic metabolites) formation, further aggravating *Rasa* (plasma) and *Rakta* (blood) *dhatus*, resulting in increased production of LDL and triglycerides, and decreased HDL. This metabolic imbalance culminates in endothelial dysfunction, oxidative stress, and chronic inflammation, representing the *Srotorodha* (channel obstruction) and *Dhatu Kshaya* (tissue depletion) observed in the disease. *Ayurvedic* texts describe these disturbances as *Medo Dushti* (fat tissue vitiation) and *Prameha* (diabetic syndrome), with mutual interactions of *doshas* and *dhatus* culminating in the clinical manifestations of dyslipidemia coexisting with T_2DM [29,30,31,37].

The *Nidan Parivarjana*

Dyslipidemia associated with T_2DM primarily arises due to the intake of *Madhura* (sweet), *Snigdha* (unctuous), and *Guru* (heavy) foods that increase *Kapha* and *Medo Dhatu*, along with sedentary lifestyle and physical inactivity, leading to impaired fat metabolism. Excessive consumption of processed, oily, and fried foods causes *Medo Dushti* (vitiation of fat tissue) and aggravates *Kapha Dosha*, obstructing metabolic channels. Irregular meal timings, overeating, and stress contribute to *Mandagni* (weak digestive fire), resulting in accumulation of *Ama* and impaired glucose metabolism, which underlies the pathogenesis of *Prameha*. Genetic predisposition, obesity, and prolonged exposure to environmental toxins also play significant roles. The combined aggravation of *Kapha* and *Vata Doshas* disturbs lipid and carbohydrate metabolism, leading to the clinical features of dyslipidemia coexisting with T_2DM [33,34,35,38].

To manage dyslipidemia with Type 2 Diabetes Mellitus effectively, it is essential to avoid the causative factors that aggravate *Kapha* and *Medo Dhatu*. This includes abstaining from *Madhura*, *Snigdha*, and *Guru* foods, as well as oily, fried, and processed items that lead to fat accumulation and metabolic disturbances [39]. Regular avoidance of overeating, erratic meal timings, and sedentary habits is crucial to prevent *Mandagni* and *Ama* formation [40]. Lifestyle modifications such as reducing physical inactivity, managing stress, and avoiding exposure to environmental toxins are also necessary. Emphasizing a diet rich in fiber, light, and easily digestible foods, along with regular physical activity, helps balance the *doshas* and maintain healthy lipid and glucose metabolism, thereby preventing disease progression [41].

Effects of *Ayurvedic* medicines

Samprapti Vighatana involves therapies aimed at pacifying aggravated *doshas*, enhancing *Agni*, clearing *Ama*, and restoring lipid and glucose metabolism. This includes the use of *Deepan* and *Pachan* to kindle digestive fire, *Medohara* and *Lekhana* therapies to reduce excess fat, *Shodhana* (detoxification) to cleanse blocked channels, and *Rasayana* to rejuvenate metabolic functions and improve insulin sensitivity. Balancing *Vata* also helps in correcting impaired circulation and nerve functions involved in the disease process. Together, these interventions break the cycle of *dosha* aggravation, metabolic imbalance, and tissue damage, thereby managing dyslipidemia in *Madhumeha* effectively.

Common ingredients used in *Ayurvedic* formulations exhibit a variety of therapeutic effects. *Giloy* is known for its *Pramehaghna* (anti-diabetic), *Raktashodhaka* (blood purifier), *Deepan* and *Pachan* (appetizer and digestive stimulant), *Rasayana* (rejuvenative), *Medohara* (fat-reducing), *Shothahara* (anti-inflammatory), and *Mutral* (diuretic) properties [42]. Neem shares similar benefits including *Pramehaghna*, *Raktashodhaka*, *Deepan*, *Pachan*, *Rasayana*, *Medohara*, and *Shothahara* actions [43]. *Karela* provides *Pramehaghna*, *Deepana*, *Medohara*, and *Rasayana* effects [44]. *Jamun* contributes *Pramehaghna*, *Raktashodhaka*, digestive support, *Medohara*, and *Shothahara* benefits [45]. *Methi* acts as *Pramehaghna*, digestive stimulant, *Medohara*, and *Shothahara* agent [46]. *Vanshlochan* helps pacify aggravated *Vata* (*Vata shamak*), supports *Shodhana* (detoxification), and enhances digestion [47]. *Dalchini* stimulates *Agni* (digestive fire) as *Deepan* and reduces excess fat (*Medohara*) [48]. *Shilajeet* is well-regarded for its *Rasayana* and *Pramehaghna* properties [49]. **Table 6** shows the *Ras Panchaka* of the common ingredients used in the *Ayurvedic* formulations.

Table 6 The *Ras Panchaka* along with therapeutic effects of the common ingredients in the *Ayurvedic* formulations

Ingredient	*Rasa* (Taste)	*Guna* (Quality)	*Veerya* (Potency)	*Vipaka* (Post-digestive Taste)	*Prabhava* (Specific Action)	Therapeutic Effects	Medicines
Giloy *(Tinospora cordifolia)*	*Tikta* (Bitter), *Kashaya* (Astringent)	*Laghu* (Light), *Snigdha* (Unctuous)	*Ushna* (Hot)	*Madhura* (Sweet)	*Rasayana* (Rejuvenator)	*Pramehaghna (Anti-diabetic), Raktashodhaka (Blood purifier), Deepan (Appetizer), Pachan (Digestive), Rasayana, Medohara (Fat-reducing), Shoth har (Anti-inflammatory), Mutral (Diuretic)*	Prameh Rog Har, DM Capsule, DM+ Syrup
Neem *(Azadirachta indica)*	*Tikta* (Bitter), *Kashaya* (Astringent)	*Laghu* (Light), *Ruksha* (Dry)	*Sheeta* (Cold)	*Katu* (Pungent)	*Krimighna* (Antiparasitic)	*Pramehaghna, Raktashodhaka, Deepan, Pachan, Rasayana, Medohara, Shoth har*	Prameh Rog Har, DM Capsule, DM+ Syrup
Karela *(Momordica charantia)*	*Tikta* (Bitter), *Kashaya* (Astringent)	*Laghu* (Light), *Ruksha* (Dry)	*Ushna* (Hot)	*Katu* (Pungent)	*Pramehaghna*	Anti-diabetic, Deepan, Medohara, Rasayana	Prameh Rog Har, DM Capsule, DM+ Syrup
Jamun *(Syzygium cumini)*	*Kashaya* (Astringent) , *Madhura* (Sweet), *Amla* (Sour)	*Laghu* (Light), *Ruksha* (Dry)	*Sheeta* (Cold)	*Katu* (Pungent)	*Pramehaghna*	Anti-diabetic, Raktashodhaka, Deepan, Medohara, Shoth har	Prameh Rog Har, DM Capsule, DM+ Syrup
Methi *(Trigonella foenum-graecum)*	*Tikta* (Bitter), *Katu* (Pungent)	*Guru* (Heavy), *Snigdha* (Unctuous)	*Ushna* (Hot)	*Katu* (Pungent)	*Stanyajanana* (Galactagogue), *Medohara*	*Pramehaghna, Deepan, Medohara, Shoth har*	Prameh Rog Har, DM Capsule
Vanshlochan *(Bambusa arundinacea)*	*Madhura* (Sweet), *Kashaya* (Astringent)	*Laghu* (Light), *Ruksha* (Dry)	*Sheeta* (Cold)	*Madhura* (Sweet)	*Vatahara* (Pacifies *Vata*)	*Vata Shamak, Shodhan (Detoxifier), Digestive support*	Udar Shodhak Powder, Prameh Rog Har
Dalchini *(Cinnamomum verum)*	*Tikta* (Bitter), *Katu* (Pungent), *Madhura* (Sweet)	*Laghu* (Light), *Snigdha* (Unctuous)	*Ushna* (Hot)	*Katu* (Pungent)	*Agnivardhaka* (Stimulant of digestive fire)	*Deepan, Medohara*	Udar Shodhak Powder, DM+ Syrup
Shilajeet *(Asphaltum punjabianum)*	*Tikta* (Bitter), *Kashaya* (Astringent) , *Katu* (Pungent)	*Laghu* (Light), *Ruksha* (Dry)	*Ushna* (Hot)	*Katu* (Pungent)	*Yogavahi* (Catalyst for other herbs)	*Rasayana , Pramehaghna*	Prameh Rog Har, DM Capsule, Shilajeet Tablet

Effects of *Ahar-Vihar*

The combined application of *Ahar* (diet) and *Vihar* (lifestyle) plays a significant role in managing dyslipidemia associated with T_2DM from an *Ayurvedic* perspective. A diet incorporating *tikta* (bitter), *katu* (pungent), and *kashaya* (astringent) tastes helps in reducing *Kapha dosha* and *meda dhatu* (adipose tissue), thereby aiding in the correction of lipid imbalance and improving insulin sensitivity. Foods such as *shaka* (green leafy vegetables) and *mugda* (green gram) are recommended for their light, digestible nature and metabolic benefits, while the inclusion of fermented millets supports gut health and reduces insulin resistance through enhanced *Agni* (digestive fire). Avoiding guru (heavy) and *snigdha* (oily) foods prevents excessive lipid accumulation and postprandial hyperglycemia [50]. Seasonal fruits high in fiber improve bowel movement and help in stabilizing blood glucose levels. Warm water intake further stimulates digestion and helps in the elimination of *ama* (metabolic toxins) [51].

In terms of lifestyle (*Vihar*), waking up during *Brahma Muhurta* (early morning) aligns bodily rhythms and enhances glucose metabolism [52]. Regular physical activity (*Vyayama*) like brisk walking and yoga improves insulin sensitivity and lipid profiles by reducing LDL and triglycerides while increasing HDL [53]. Practices such as *Pranayama* (breath regulation) and *Dhyana* (meditation) reduce stress-induced glycemic spikes and balance the autonomic nervous system [54]. Maintaining an early dinner schedule and practicing overnight fasting for 12 to 14 hours support better glycemic

control and mental clarity (*Manasika Shuddhi*) [55]. Avoiding day sleep (*Divasvapna*) prevents *Kapha* aggravation and further weight gain, while moderate exposure to early sunlight (*Surya Snehana*) enhances Vitamin D synthesis and helps reduce insulin resistance. Collectively, these *Ahar-Vihar* strategies form a holistic framework for the effective management of dyslipidemia with T2DM.

This case study underscores the potential of *Ayurvedic* therapy in effectively managing dyslipidemia with T2DM. *Ayurvedic* interventions provide a cost-efficient strategy by addressing the root causes of these conditions and supporting improved kidney function. However, additional research is essential to validate their efficacy and safety in the treatment of these disorders.

CONCLUSION

This case study evaluating the treatment of dyslipidemia with T2DM through *Ayurvedic* interventions yields the following findings:

Symptoms: Upon first visit, the patient presented with abdominal heaviness and gastritis. After *Ayurvedic* treatment, significant improvements were observed. The patient reported relief from the issues with abdomen with no new symptoms emerging, suggesting a marked improvement in overall health.

Investigations: The laboratory investigations conducted on 22-03-2025 and 25-05-2025 demonstrate significant improvements in both lipid profile and glycemic control. Total cholesterol decreased from 231 mg/dl, which was high, to 156.8 mg/dl, nearing the desirable range. Triglyceride levels also improved markedly, dropping from 222.41 mg/dl (high) to 134.5 mg/dl, which is near normal. HDL cholesterol showed a slight decrease from 43.30 mg/dl to 40.8 mg/dl but remains within a borderline acceptable range. LDL cholesterol was significantly reduced from 143.22 mg/dl (high) to 89.1 mg/dl (near optimal. VLDL decreased from 44.48 mg/dl to 26.9 mg/dl, correlating with the reduction in triglycerides. Non-HDL cholesterol also fell from 188 mg/dl to 116 mg/dl. Importantly, HbA_{1c} improved significantly from 8.10%, indicating poor glycemic control, to 5.80%, within the normal or prediabetic range.

The use of *Ayurvedic* therapies for dyslipidemia in patients with T_2DM led to significant clinical benefits, such as improved laboratory results, stabilized vital signs, and relief from symptoms. These treatments target the underlying causes by restoring *dosha* balance and enhancing the function of key systems, especially the kidneys and liver. Although the results are encouraging, more extensive clinical studies are needed to validate these effects and develop standardized *Ayurvedic* protocols for managing these disorders.

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Fig 1 The Laboratory investigation reports during the treatment

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Name			Age	:	35 Years
Lab No.			Gender	:	Male
Ref By	:	Self	Reported	:	22/3/2025 8:17:24PM
Collected	:	22/3/2025 12:37:00PM	Report Status	:	Final
A/c Status	:	P	Processed at	:	Bhagalpur Lab Second & Third Floor, Holding No. 8/8A/3 Ward No. 30 NetaJi Subhash Chandra Lane, G.P. Market, Jail Road, Tilkamanjhi, Bhagalpur – 812001 NULL
Collected at	:	BHAGALPUR C.C DNA PATHLABDR LALPATHLABS PVT LTD R.K MA RKET ,NEAR S.P RESIDENCE TILKAMANJHI CHO BHAGALPUR			

Test Report

Test Name	Results	Units	Bio. Ref. Interval
HbA1c (GLYCOSYLATED HEMOGLOBIN), BLOOD (HPLC, NGSP certified)			
HbA1c	**8.1**	%	4.00 - 5.60
Result Rechecked, Please Correlate Clinically.			
Estimated average glucose (eAG)	186	mg/dL	

Interpretation

HbA1c result is suggestive of Diabetes/ Higher than glycemic goal in a known Diabetic patient.

Please note, Glycemic goal should be individualized based on duration of diabetes, age/life expectancy, comorbid conditions, known CVD or advanced microvascular complications, hypoglycaemia unawareness, and individual patient considerations

Before

Result Rechecked,
Please Correlate Clinically.

Interpretation as per American Diabetes Association (ADA) Guidelines

Reference Group	Non diabetic adults >=18 years	At risk (Prediabetes)	Diagnosing Diabetes	Therapeutic goals for glycemic control
HbA1c in %	4.0-5.6	5.7-6.4	>= 6.5	<7.0

Note: Presence of Hemoglobin variants and/or conditions that affect red cell turnover must be considered, particularly when the HbA1C result does not correlate with the patient's blood glucose levels.

FACTORS THAT INTERFERE WITH HbA1C MEASUREMENT	FACTORS THAT AFFECT INTERPRETATION OF HBA1C RESULTS
Hemoglobin variants,elevated fetal hemoglobin (HbF) and chemically modified derivatives of hemoglobin (e.g. carbamylated Hb in patients with renal failure) can affect the accuracy of HbA1c measurements	Any condition that shortens erythrocyte survival or decreases mean erythrocyte age (e.g.,recovery from acute blood loss, hemolytic anemia, HbSS, HbCC, and HbSC) will falsely lower HbA1c test results regardless of the assay method used.Iron deficiency anemia is associated with higher HbA1c

Page 5 of 9

If Test results are alarming or unexpected, client is advised to contact the Customer Care immediately for possible remedial action.
Tel: 011-4988-5050, *Fax:* +91-11-2788-2134, *E-mail:* customer.care@lalpathlabs.com

Dr Lal PathLabs

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Web: www.lalpathlabs.com, CIN: L74899DL1995PLC065388

Name			
Lab No.			
Ref By	: Self	Age	: 35 Years
Collected	: 22/3/2025 12:37:00PM	Gender	: Male
A/c Status	: P	Reported	: 22/3/2025 8:17:24PM
Collected at	: BHAGALPUR C.C DNA PATHLABDR LALPATHLABS PVT LTD R.K MA RKET ,NEAR S.P RESIDENCE TILKAMANJHI CHO BHAGALPUR	Report Status	: Final
		Processed at	: Bhagalpur Lab Second & Third Floor, Holding No. 8/8A/3 Ward No. 30 NetaJi Subhash Chandra Lane, G.P. Market, Jail Road, Tilkamanjhi, Bhagalpur – 812001 NULL

Test Report

Test Name	Results	Units	Bio. Ref. Interval
LIPID SCREEN, SERUM (Spectrophotometry)			
Cholesterol, Total	**231.00**	mg/dL	<200.00
Triglycerides	**222.41**	mg/dL	<150.00
HDL Cholesterol	43.30	mg/dL	>40.00
LDL Cholesterol, Calculated	**143.22**	mg/dL	<100.00
VLDL Cholesterol,Calculated	**44.48**	mg/dL	<30.00
Non-HDL Cholesterol	**188**	mg/dL	<130

Note

1. Measurements in the same patient can show physiological & analytical variations. Three serial samples 1 week apart are recommended for Total Cholesterol, Triglycerides, HDL& LDL Cholesterol.
2. Additional testing for Apolipoprotein B, hsCRP, Lp(a) & LP-PLA2 should be considered among patients with moderate risk for ASCVD for risk refinement.

Treatment Goals as per Lipid Association of India 2020

Before

RISK CATEGORY	TREATMENT GOAL		CONSIDER THERAPY	
	LDL CHOLESTEROL (LDL-C)(mg/dL)	NON HDL CHLOESTEROL (NON HDL-C) (mg/dL)	LDL CHOLESTEROL (LDL-C)(mg/dL)	NON HDL CHLOESTEROL (NON HDL-C) (mg/dL)
Extreme Risk Group Category A	<50 (Optional goal ≤30)	<80 (Optional goal ≤60)	≥50	≥80
Extreme Risk Group Category B	≤30	≤60	>30	>60
Very High	<50	<80	≥50	≥80
High	<70	<100	≥70	≥100
Moderate	<100	<130	≥100	≥130
Low	<100	<130	≥130*	≥160*

*In low risk patient, consider therapy after an initial non-pharmacological intervention for at least 3 months

If Test results are alarming or unexpected, client is advised to contact the Customer Care immediately for possible remedial action.
Tel: 011-4988-5050, Fax: +91-11-2788-2134, E-mail: customer.care@lalpathlabs.com

BIO CAME PATH LAB

PATEL BABU ROAD, OPP HANUMAN MANDIR GHANTAGHAR BHAGALPUR

BCPL

24 X 7 HELP LINE NO+91-8936895904

Patient ID
Patient Nan
Referred by
Reg No : 111(P)dt16-08-2022\3,485.00

Age :34 Y 0 M 9 D
Sex :Male
Receiving Date :25/05/2025
Reporting Date :25/05/2025

Investigation	Observed Value	Unit	Biological Ref Interval
BIOCHEMISTRY			
LIPID PROFILE			
SERUM CHOLESTROL	156.8	mg/dl	0.00 - 200.00
SERUM TRIGLYCERIDES	134.5	mg/dl	0.00 - 150.00
HDL CHOLESTROL DIRECT	40.8	mg/dl	30.00 - 60.00
L.D.L CHOLESTROL (ENZYMATIC COLORIMETRIC END POINT)	89.1	mg/dl	0.00 - 100.00
V.L.D.L	26.9	mg/dl	0.00 - 30.00
NON-HDL CHOLESTEROL	116.0	mg/dl	0.00 - 130.00

Specimen : SERUM

** END OF REPORT **

After

LAB TECHNICIAN

Dr.J KUMAR
M.B.B.S(MD)

We wish a good health: BIOCAME PATH LAB, Patal Babu Road Opp Hanuman Mandir Bhagat Singh Chowk, Bhagalpur

Page 2 of 2

1 of 2

BIO CAME PATH LAB

PATEL BABU ROAD, OPP HANUMAN MANDIR GHANTAGHAR BHAGALPUR

BCPL

24 X 7 HELP LINE NO+91-8936895904

Patient ID
Patient Na
Referred by : SELF
Reg No : 111(P)dt16-08-2022\3,485.00

Age :34 Y 0 M 9 D
Sex :Male
Receiving Date :25/05/2025
Reporting Date :25/05/2025

Investigation	Observed Value	Unit	Biological Ref Interval
	BIOCHEMISTRY		
LIVER FUNCTION TEST (LFT)			
BILIRUBIN TOTAL	0.75	mg/dl	0.20 - 1.20
CONJUGATED (D. BILIRUBIN)	0.34	mg/dl	0.00 - 0.40
UNCONJUGATED (I.D.BILIRUBIN)	0.41	mg/dl	0.00 - 0.80
ALKALINE PHOSPHATASE	90.23	U/L	25.00 - 147.00
SGOT	38.5 H	IU/L	0.00 - 35.00
SGPT	46.5 H	IU/L	0.00 - 40.00
TOTAL PROTEIN	6.8	gm/dl	6.00 - 8.30
ALBUMIN	3.7	gm/dl	3.20 - 5.00
GLOBULIN	3.1	gm/dl	1.50 - 3.60
A/G RATIO	1.19	None	1.00 - 2.30
Specimen : SERUM			
HbA1c(GLYCOSYLATED HEMOGLOBIN)			
HBA1C (GLYCOSYLATED HEMOGLOBIN)	5.8 H	%	Non diabetic adults >=18 years < 5.7 At risk (Prediabetes) 5.7 - 6.4 Diagnosing Diabetes>>= 6.5
AVERAGE GLUCOSE	120	mg/dl	90-120 mg/dl : Excellent Control 121-150 mg/dl : Good Control 151-180 mg/dl : Average Control 181-210 mg/dl : Action Suggested >211 mg/dl : Panic Value
Specimen : EDTA BLOOD			

After

Comment : 1.Since HbA1c reflects long term fluctuations in the blood glucose concentration, a diabetic patient who is recently under good control may still have a high concentration of HbA1c. Converse is true for a diabetic previously under good control but now poorly controlled.
2.Target goals of < 7.0 % may be beneficial in patients with short duration of diabetes, long life expectancy and no significant cardiovascular disease. In patients with significant complications of diabetes, limited life expectancy or extensive co-morbid conditions, targeting a goal of < 7.0 % may not be appropriate.
HbA1c(%) Mean Plasma Glucose (mg/dL)

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Page 1 of 2