



COMPARATIVE STUDY OF TREATMENT OF GESTATIONAL DIABETES MELLITUS CITED IN VARIOUS AYURVEDIC AND MODERN RESEARCH PAPERS PUBLISHED IN LAST 5 YEARS

Swati S. Mohite¹, Rahul Gajare², Namrata B. Khose³

¹HOD and Professor at *Prasuti Evam Streeroga* Department, College of *Ayurved*, Bharati Vidyapeeth Deemed (to be) University, Pune, Maharashtra, India

²Professor at *Prasuti Evam Streeroga* Department, College of *Ayurved*, Bharati Vidyapeeth Deemed (to be) University, Pune, Maharashtra, India

³MS Scholar at *Prasuti Evam Streeroga* Department, College of *Ayurved*, Bharati Vidyapeeth Deemed (to be) University, Pune, Maharashtra, India

Corresponding Author: dr.ssmohite@gmail.com

<https://doi.org/10.46607/iamj1808112020>

(Published online: November 2020)

Open Access

© International Ayurvedic Medical Journal, India 2020

Article Received: 17/10/2020 - Peer Reviewed: 08/11/2020 - Accepted for Publication: 16/11/2020



ABSTRACT

Gestational Diabetes Mellitus is a metabolic disorder during pregnancy. It is defined by WHO as carbohydrate intolerance resulting in hyperglycemia of variable severity with onset or first recognition during pregnancy. The entity usually present late in second and third trimester. The factors which constitute good health, i.e. balanced *Dosha*, *Dhatu* and *Mala*, optimally functioning *Indriyas* or sense organs, a happy contented soul and a balanced mind are the very factors that go towards a smooth pregnancy, labour and healthy progeny and this is what *Ayurveda* treatment focuses on. Pregnancy is a particular time for all women. This condition becomes even more delicate when there is diagnosis of GDM which makes necessary controls and therapies that will inevitably affect the women's life. GDM can lead to potential risk for mother, fetus and child's development. There is no direct reference of GDM in *Ayurveda*. But we get reference of *Garbhavridhi* excessive increase in size of abdomen and perspiration. *Garbhavridhi* or macrosomia condition can be interpreted as complication of GDM. In current scenar-

io GDM in pregnancy is one of the major complications during pregnancy. Overt maternal diabetes mellitus can adversely influence intrauterine development. Spontaneous abortions and major congenital anomalies may be induced in the first trimester. Excessive foetal growth, neonatal hypoglycemia, still birth may be induced during second and third trimester. Gestational Diabetes may lead to gangrene, damage of retina, kidneys. If diabetes is not properly controlled, then in the long run fat gets deposited on inner layer of arteries and the possibilities of occurrence of paralysis increase. Complications of diabetes include eye problems and blindness, heart disease, stroke, neurological problems, amputation, and impotence It is needed to cure maternal diabetes as soon as it is diagnosed. Adopting pre-conceptional and thorough antenatal care through *Ayurveda*; this aims that a woman enters pregnancy in healthy state of body and mind. While describing *Garbhadhan vidhi* *acharyas* have advised certain body purifying measures (*Sanshodhana karma*) followed by special dietetics and mode of life for the couple. *Ayurveda* focuses on change in lifestyle of the *Garbhini* which helps in maternal health and fetal growth minimizing the complications related to pregnancy. *Ayurveda* efforts of having healthy baby commences with pre-conception care and management. Pre-conception counselling, Diet, Herbs, *Yoga*, *Asanas* are useful as a supportive therapy together with modern medication under supervision. The best way to improve your diet is by eating a variety of healthy foods. Various vegetables, pulses, spices, cereals, fruits, dry fruits are helpful in GDM patients. Daily 20 mins walk is also helpful. *Ayurvedic* herbs like *Guduchi*, *Amalaki*, *Haritaki*, *Haridra*, *Bilva*, *Neem*, *Jamun* are also useful in GDM. They are having antidiabetic, antioxidant properties. *Tinospora Cordifolia* are potential therapeutics that act as anti-diabetic drug in the prevention and treatment of GDM. Metformin is safe and effective drug in treatment of GDM. Combination of metformin, diet, *Ayurvedic* herbs, preconception counselling, *Yoga*, *Pranayama* and meditation can give best result in GDM.

Keywords: Gestational Diabetes Mellitus, Treatment of GDM, *Ayurvedic* Treatment of GDM

INTRODUCTION

Gestational Diabetes Mellitus is a metabolic disorder during pregnancy. It is defined by WHO as carbohydrate intolerance resulting in hyperglycemia of variable severity with onset or first recognition during pregnancy⁴. The entity usually present late in second and third trimester⁵. insulin resistance increases in normal pregnancy due to progressively rising levels of fetoplacental hormones such as progesterone, cortisol, growth hormones, prolactin and human placental lactogen. The pancreas normally compensates by increasing insulin secretion but when it fails to do so, or when insulin secretion declines due to beta cell function impairment then GDM develops. The factors which constitute good health, i.e. balanced *Dosha*, *Dhatu* and *Mala*, optimally functioning *Indriyas* or sense organs, a happy contented soul and a balanced mind are the very factors that go towards a smooth pregnancy, labour and healthy progeny and this is what *Ayurveda* treatment focuses on⁶. There is no direct reference of GDM in *Ayurveda*. But, we get refer-

ence of *Garbhavridhi* excessive increase in size of abdomen and perspiration. *Garbhavridhi* or macrosomia condition can be interpreted as complication of GDM. There are some signs and symptoms related to *Garbha Arishta Lakshana* as well as *Garbhini Nashta Lakshanas* which can be correlated with *Prameha* in *Garbhawastha*. Pregnancy is a particular time for all women. This condition becomes even more delicate when there is diagnosis of GDM which makes necessary controls and therapies that will inevitably affect the women's life. GDM can lead to potential risk for mother, fetus and child's development. Dietary restrictions are the mainstay of GDM management and suitable physical exercise like 20 min walk everyday along with indulging into various physical activities are found to be of major help. Numerous studies have found metformin safe in women with GDM.

Aim and Objectives

AIM-Comparative study of treatment of Gestational Diabetes Mellitus cited in various *Ayurvedic* and modern research papers published in last 5 years.

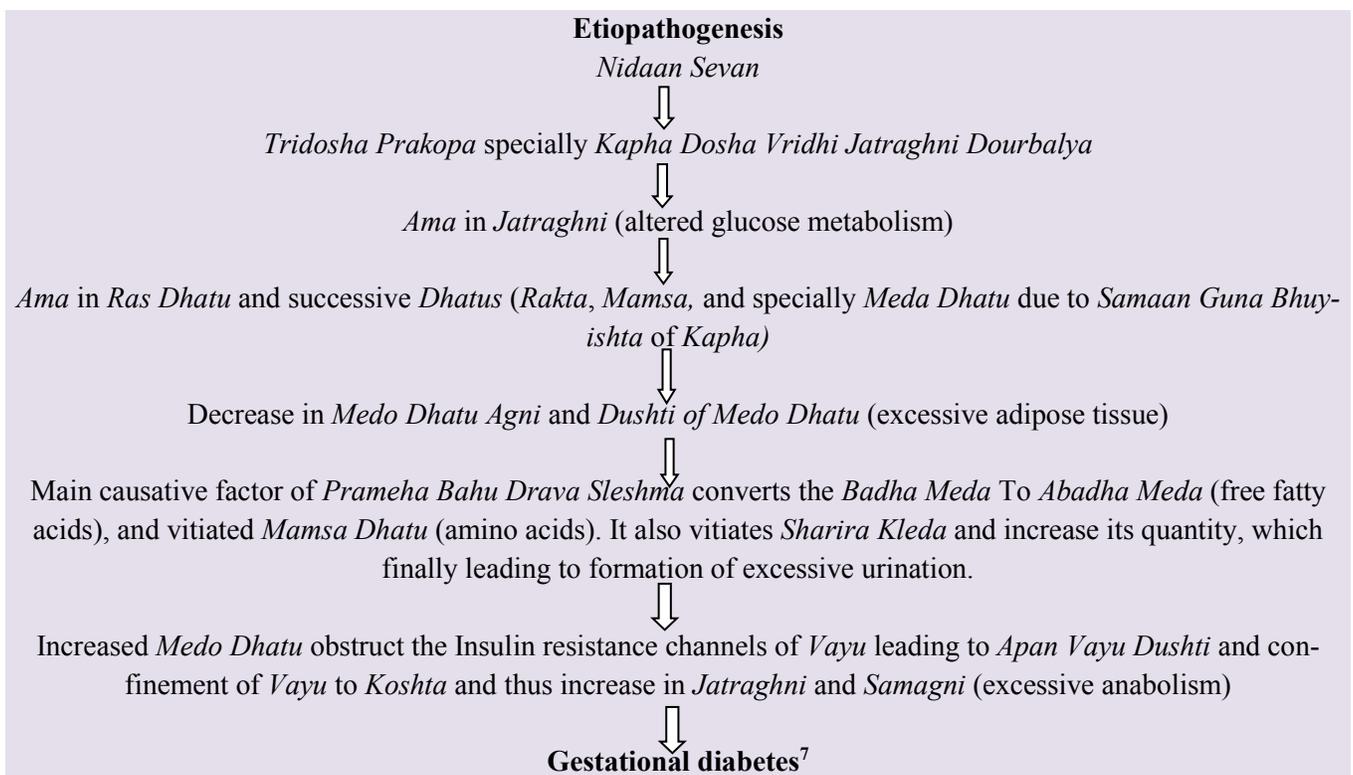
Objectives-

1. To find treatment of GDM in various *Ayurvedic* and modern research papers published in last 5 years.
2. To compare the treatment of GDM mentioned by research papers
3. To develop a common treatment mentioned by maximum research paper.

Need for Study

In current scenario GDM in pregnancy is one of the major complications during pregnancy. Overt maternal diabetes mellitus can adversely influence intrauterine development. Spontaneous abortions and major congenital anomalies may be induced in the first trimester. Excessive foetal growth, neonatal hypoglycemia, still birth may be induced during second and third trimester.

It is needed to cure maternal diabetes as soon as it is diagnosed.



Materials and Method

Information sources and Searches-

A search was conducted for GDM management. The search strategy used the keywords “pregnancy”, “diabetes”, “hyperglycemia”, and “insulin resistance”. Informative sources were identified from the Google scholar, Pubmed, Ayurmed, American Diabetes Association (ADA) including additional manual research. Based on quality evaluations, the content was summarized and assessed. For Each research paper we extracted the following information:

Title of guideline, author, development institute, example-social organization, year of publication, guideline type, methodological quality and relevant recommendation.

Eligibility Criteria.

Papers were eligible for inclusion if they were research reports in last 5 years

Literature Review

Research Papers Reviewed-

Ayurvedic Papers-

1. Management of GDM through Ayurveda

Generally beneficial, congenial, purifying and suppressive dietetics and mode of life, not causing loss of *Doshas* and *Dhatus* but capable of decreasing the aggravated *Dosha-Dhatu* should be used in *Garbha vriddhi*.

Preventive measures: Adopting pre-conceptual and thorough antenatal care through *Ayurveda*; this aims

that a woman enters pregnancy in healthy state of body and mind. While describing *Garbhadhan Vidhi Acharyas* have advised certain body purifying measures (*Sanshodhana Karma*) followed by special dietetics and mode of life for the couple. Again a special month wise dietetic regime has been prescribed for the pregnant woman by following which the woman remains healthy and delivers the child possessing good health, energy, compactness. Clinical studies have been conducted on this regime and have proved of great significance to mother and child both.

Actual management

Dietary regime: Diet management plays a significant role in regulating blood sugar level in DM. Following can be included in the diet (in moderation).

Table. Vegetables	Bitter vegetables like <i>Methi</i> (fenugreek) leaves, <i>Karela</i> (bitter gourd), tomatoes, spinach, cucumber, radish, sponge gourd, <i>Sahjan</i> (drumstick) leaves & fruits, broccoli, cauliflower, cabbage
Pulses	<i>Moonga</i> (green gram), <i>Chana Daal</i> (Bengal gram), <i>Raungi/lobia</i> (black eyed pea), <i>Kaabuli Chana</i> (chick pea)
Spices	Turmeric, cinnamon, fenugreek seeds, garlic
Cereals	Wheat, (jau) barley, oats, <i>Shashtika</i> rice, <i>Bajra</i> (pearl millet)
Fruits	Plums, kiwi, lime, oranges, guava, apple, peaches, gooseberry
Dry fruits	Almond, apricot, walnut

Regime for *Yogasana* in pregnancy: *Yogasana* should not be practiced empty stomach. Light diet is advised one hour before. Also, *Yogasana* with lying down on abdomen and involving many twists and turns are contraindicated. *Yogasana* are also contrain-

dicated in cases of threatened abortion, recurrent abortion. The commonly recommended schedule is to practice yoga from 18 to 32 week of gestation, 1-hour session of yoga at least thrice a week.

Table. First trimester asanas. Lying on the back, gentle twists, *Supta Baddha Konasana*, *Marjariasana* (Cat pose), *Adho mukha svanasana* (dog pose), *Uttanasana*, *Tadasana*, *Surya namaskar* (sun salutation-I), *Vrikshasana* (tree pose), baby pose.

Table. Second trimester asanas. Lying on the back or on the side, pelvis and hip openers, gentle twists, *Setu Bandha*, *Supta Baddha Konasana*, *Uttanasana*, sun salutation-I with variations, *Trikonasana*, *Ardha Chandrasana* (with and without the wall), *Virabhadra Asana* (warrior pose), *Prasarita Padottanasana* (wide legged forward bend) When seated, strengthening and releasing the shoulder girdle, poses that allow pelvic asymmetry, *Baddha Konasana*, *Upavishta Konasana*, *Vajrasana*, baby pose, *Matsya Kridasan* (Flapping Fish Pose), *Vajrasan* (Thunderbolt Pose), *Kati Chakrasan* (Waist Rotating Pose).

Table. Third trimester asanas. *Ardha Titali Asan* (Half Butterfly), *Poorna titali asan* Contracting and compressing the pelvic floor compared to releasing and relaxing it; Birth advancing poses, Modified sun salutation, sun salutation-I with variations and modifications, warrior poses. Pelvic openers, pelvic asymmetry, strengthening the thighs and shoulder girdle, stretches, gentle twists. Less lying on the back and more variations on the side; baby pose, cat pose.

Prenatal yoga under expert supervision significantly reduces pregnant women's stress and enhances their immune function. Studies have been conducted to monitor maternal and fetal response to 26 yoga postures in pregnancy, which state that practicing *Yogasana* does not have any adverse on mother (BP) and fetus (FHR).

Role of Pranayama and meditation in GDM

Pranayamic breathing, also known as deep breathing, is defined as a voluntary manipulation of breath movement and serves as the cornerstone of any *Yoga* practice. Slow deliberate, deep breathing activates the parasympathetic nervous system mainly by stretching of lung tissue and the vagal nerves. This leads to a physiological response characterized by a decrease in heart rate, blood pressure, metabolic rate and oxygen consumption.

Herbs in Ayurveda for GDM: Many different plants have been used individually or in formulations for treatment of diabetes and its complications. Among these the commonly used are; turmeric, *Neem*, *Amalaki*, *Haritaki*, bitter gourd, *Bilva*, cinnamon, gymnema, fenugreek, *Allium sativum*, *Eugenia jambolana*, *Phyllanthus amarus*, *Pterocarpus marsupium*, *Tinospora cordifolia*, *Trigonella foenum graecum* and *Withania somnifera*.

Pterocarpus marsupium (Vijaysaar): *Pterocarpus marsupium* has been shown to cause pancreatic beta cell regeneration. The heartwood of the tree is used to make tumblers/ goblets/beakers which are filled with water and allowed to stand overnight to give „*Beeja wood water*“ the positive activity of which against diabetes has been confirmed. Epicatechin, its active principle, has been found to be insulinogenic, enhancing insulin release and conversion of proinsulin to insulin in vitro.

Trigonella foenum graecum (Fenugreek): It is found all over India and the fenugreek seeds are usually used as one of the major constituents of Indian spices. 4-hydroxyleucine, a novel amino acid from fenugreek seeds increased glucose stimulated insulin release by isolated islet cells in both rats and humans.

Tinospora cordifolia (Guduchi): It is a large, glabrous, deciduous climbing shrub belonging to the family

Menispermaceae. It is widely distributed throughout India and commonly known as *Guduchi*. Oral administration of the extract of *Tinospora cordifolia* (*T. cordifolia*) roots for 6 weeks resulted in a significant reduction in blood and urine glucose and in lipids in serum and tissues in alloxan diabetic rats. The extract also prevented a decrease in body weight. *Phyllanthus amarus (Bhuiawala):* It is a herb of height up to 60 cm, from family *Euphorbiaceae*. It is commonly known as *Bhuiamala*. It is scattered throughout the hotter parts of India, mainly Deccan, Konkan and south Indian states. Traditionally it is used in diabetes therapeutics. Methanolic extract of *Phyllanthus amarus* was found to have potent antioxidant activity. This extract also reduced the blood sugar in alloxanized diabetic rats. The plant also shows anti-inflammatory, antimutagenic, anticarcinogenic.

Ocimum sanctum (Holy basil): It is commonly known as *Tulsi*. The aqueous extract of leaves of *Ocimum sanctum* showed the significant reduction in blood sugar level in both normal and alloxan induced diabetic rats. *Momordica charantia (Bitter gourd):* *Momordica charantia* is commonly used as an antidiabetic and antihyperglycemic agent in India as well as other Asian countries. Extracts of fruit pulp, seed, leaves and whole plant was shown to have hypoglycemic effect in various animal models. The phytochemical momordicin, charantin and a few compounds such as galactose-binding lectin and insulin-like protein isolated from various parts of this plant have been shown to have insulin mimetic activity.

Eugenia jambolana (Indian gooseberry, jamun): Oral administration of pulp extract of the fruit of *Syzygium cumini* to normoglycemic and STZ induced diabetic rats showed hypoglycemic activity in 30 min possibly mediated by insulin secretion and inhibited insulinase activity.

Emblca officinalis (Amalaki): It decreases lipid peroxidation, antioxidant, hypoglycemic. *Azadirachta indica (Neem):* Hydroalcoholic extracts of this plant showed anti-hyperglycemic activity in streptozotocin treated rats and this effect is because of increase in glucose uptake and glycogen deposition in isolated rat hemidiaphragm. Apart from having antidiabetic activity, this plant also has antibacterial, an-

timalarial, antifertility, hepatoprotective and antioxidant effects.

Aegle marmelos (Bel or *Bilva*): Administration of aqueous extract of leaves improves digestion and reduces blood sugar and urea, serum cholesterol in alloxanized rats as compared to control. Along with exhibiting hypoglycemic activity, this extract also prevented peak rise in blood sugar at 1h in oral glucose tolerance test.

Gymnema sylvestre (Gurmar): The major bioactive constituents of gymnema are a group of oleanane type triterpenoid saponins known as gymnemic acids. *Gymnema*'s antidiabetic activity appears to be due to a combination of mechanisms. It increases the activity of enzymes responsible for glucose uptake and utilization and inhibits peripheral utilization of glucose by somatotrophin and corticotrophin.⁸

2. Gestational Diabetes Mellitus is a metabolic disorder during pregnancy. It is defined by WHO as carbohydrate intolerance resulting in hyperglycemia of variable severity with onset or first recognition during pregnancy. The prevalence of gestational diabetes mellitus is increasing worldwide and is associated with both short term and long term adverse effect for the mother and her infant. There is no direct reference of GDM in *Ayurveda*. But, we get reference of *Garbhavridhi* excessive increase in size of abdomen and perspiration. *Garbhavridhi* or macrosomia condition can be interpreted as complication of GDM. Pregnancy is associated with progressive insulin resistance. Human placental lactogen, progesterone, prolactin, and cortisol are associated with increased insulin resistance during pregnancy. *Ayurveda* focuses on change in lifestyle of the *Garbhini* which helps in maternal health and fetal growth minimizing the complications related to pregnancy. *Ayurvedic* management brings balance of the *Dosha*'s with the combination of herbs, diet, *Aoushadha*, *Yogas* are more beneficial in the management of gestational diabetes.⁹

3. Gestational diabetes is a common problem in India. Risk stratification and screening is essential in all pregnant women. Strict glycemic targets are re-

quired for optimal maternal and fetal outcome. Patient education is essential to meet these targets. Long term follow up of the mother and baby is essential. According to Ayurveda efforts of having healthy baby commences with pre-conception care and management. But in India most of the females visit clinics after having pregnancy, so role of pre-conception care and management is very limited. *Garbhini parichrya* by monthly regimen described by various acharyas is highly effective for this purpose. If pregnant woman strictly follows *Garbhini parichrya* and *Ritumati charya* before conception, diseases of *Garbhini* and *Garbha* can be avoided.¹⁰

4. *Ayurveda* helps in limiting the maternal and fetal complications. Herbs are helpful as a supportive treatment along with the modern medicine under supervision. Generally beneficial, congenial, purifying and suppressive dietetics and mode of life, not causing loss of *Doshas* and *Dhatus* but capable of decreasing the increased *Doshas* and *Dhatus* should be used.¹² *Garbhadhan Vidhi*: Preconception counseling is a must. Diet : Following can be included in the diet (in moderation) : Vegetables : Bitter gourd, fenugreek leaves, tomatoes, bell pepper, spinach, cucumber, radish, sponge gourd, drumstick leaves & fruits, broccoli, kale, lettuce, cauliflower, cabbage. Pulses: Mainly beans – green gram, Bengal gram, black eyed pea, garbanzo beans, chickpea. Spices: Turmeric, cinnamon, garlic, fenugreek seeds. Cereals: Wheat, barley, pearl millet, oats. Fruits: Plums, kiwi, lime, oranges, guava, java plum / black plum, apple, peaches, gooseberry. Dry Fruits: Almond, apricot, walnut. Diabetes mellitus *Yoga* cure - natural treatment alternative home medicine 3.8 out of 5 based on 4 votes. Natural cure and preventing diabetes mellitus through holistic alternative complementary medicine like *Yoga Aurveda* reiki eft and other home remedies. Gestational Diabetes may lead to gangrene, damage of retina, kidneys. If diabetes is not properly controlled, then in the long run fat gets deposited on inner layer of arteries and the possibilities of occurrence of paralysis increase. Complications of diabetes include eye problems

and blindness, heart disease, stroke, neurological problems, amputation, and impotence.¹¹

5. Gestational diabetes mellitus (GDM) is increasing in prevalence in tandem with the dramatic increase in the prevalence of overweight and obesity in women of childbearing age. Diabetes mellitus is becoming fastest considerable disease in the world. Overweight and obese women have an increased risk of developing GDM leading to complications during pregnancy, birth and neonatal. The clinical management of obese pregnant women and women with GDM is a challenge and puts additional stress on the healthcare system. If newly proposed criteria are adopted universally a significantly growing number of women will be diagnosed as having GDM, implying new therapeutic challenges to avoid foetal and maternal complications related to the hyperglycemia of gestational diabetes. The main causative factor is said to be sedentary lifestyle and food habits. *Ayurveda* offers comprehensive safe and effective approaches to manage such conditions. Various *Ayurveda Classics* and studies published in journals related to effect of *Tinospora cordifolia* on GDM will be reviewed and analyzed. Evidence from various studies show that phytochemicals obtain from *Tinospora cordifolia* are potential therapeutics that act as anti-diabetic drug in the prevention and treatment of GDM. Analysis of classical references and various experimental studies of *Tinospora cordifolia* used to cure GDM by regulating level of blood glucose and it act as anti-diabetic drug through explanatory oxidative stress, promoting insulin secretion by inhibiting gluconeogenesis and glycogenolysis.¹²

Modern Research Papers

1. Glyburide and metformin have been found safe, effective and economical for treatment of GDM.¹³
2. In summary, based on the short-term data available, metformin could be a safe and effective treatment for GDM. However, clinicians should pay attention to the relative lack of long-term offspring data with GDM patients treated with metformin. Compared with insulin, glyburide had a

higher increase of neonatal hypoglycemia. The other use of glyburide in pregnancy for GDM women appears to be unclear. Clinicians should weigh in practice the condition of patients when selecting different GDM treatment strategy. Further studies with larger sample sizes are required to confirm the long-term maternal and neonatal outcomes in the metformin-treated GDM patients for the safety of metformin as a universal treatment in GDM patients and to reassess the efficacy and safety of glyburide in the treatment of GDM patients.

3. Medical Management (Oral Antidiabetic Drug-Metformin; and Insulin Therapy) Metformin or Insulin therapy is the accepted medical management of pregnant women with GDM not controlled on MNT. Insulin is the first drug of choice and metformin can be considered after 20 weeks of gestation for medical management of GDM. Insulin can be started any time during pregnancy for GDM management. If pregnant women with GDM before 20 weeks, and Medical Nutrition Therapy (MNT) failed, Insulin should be started. Metformin can be started at 20 weeks of pregnancy, if MNT has failed to control her blood sugar. If the woman's blood sugar is not controlled with the maximum dose of metformin (2 gm/ day) and MNT, Insulin to be added. The dose of metformin is 500 mg twice daily orally up to a maximum of 2 gm/day. Hypoglycemia and weight gain with metformin are less in comparison to Insulin. If Insulin is required in high doses, metformin may be added to the treatment. At PHC, MO should initiate treatment & refer pregnant women with GDM to a higher center if blood sugar levels are not controlled or there is some other complication.
4. lifestyle intervention and metformin reduced progression to diabetes by 35% and 40%, respectively.

DISCUSSION

Pre-conception counselling, Diet, Herbs, *Yoga, Asanas* are useful as a supportive therapy together with modern medication under supervision. Eating a bal-

anced diet is an important part of any pregnancy. Diet is even more important if you have diabetes. The best way to improve your diet is by eating a variety of healthy foods. Various vegetables, pulses, spices, cereals, fruits, dry fruits are helpful in GDM patients. Daily 20mins walk is also helpful. *Ayurvedic* herbs like *Guduchi*, *Amalaki*, *Haritaki*, *Haridra*, *Bilva*, *Neem*, *Jamun* are also useful in GDM. they are having antidiabetic, antioxidant properties. studies have been conducted proving that systematic and safe adoption of *Yoga* therapy module can be effective in reducing the stress level in high risk pregnancies (GDM, PIH, IUGR, Preeclampsia). *Yoga* reduces anxiety, depression. *Pranayama* and meditations also play important role in treatment of GDM by reducing stress levels. Metformin is safe and effective drug in treatment of GDM.

CONCLUSION

With help of above research papers, we can conclude that Metformin is safe and effective drug in treatment of GDM. Combination of Metformin, Diet, *Ayurvedic* Herbs, Preconception Counselling, *Yoga*, *Pranayama* and meditation can give best result in GDM.

REFERENCES

1. Richa Saxena, Bedside obstetrics and gynecology, 2nd edition, chapter, page no.520
2. Harilal Konar, D. C. Dutta textbook of obstetrics, chapter 20, page no.326
3. Anubha Chandla, Gestational Diabetes Mellitus Management Through Ayurveda, World Journal of Pharmacy And Pharmaceutical Sciences, 2017, Volume 6, Issue 12
4. Dr. Garg Saloni, Nidaan Panchak (Possible Pathogenesis of Garbhini Prameha (Gestational Diabetes) And Its Screening Through Ayurveda, International Journal of Ayurvedic and Herbal Medicine,2017,7:2
5. Anubha Chandla, Gestational Diabetes Mellitus Management Through Ayurveda, World Journal Of Pharmacy And Pharmaceutical Sciences, 2017, Volume 6, Issue 12
6. Dr. Shilpa Gangadharamath, A case study on Ayurvedic management of Gestational Diabetes Mellitus, Journal of Ayurveda and Integrated Medical Sciences,2019, Vol 4, Issue 4

7. Dr. Manisha Gupta, Garbhini Madhumeha And Its Management W.R.T. Gdm-A Conceptual Study, World Journal Of Pharmaceutical And Medical Research,2018,4(6),136-140
8. Anushree Kumari, A review on Gestational Diabetes Mellitus during Pregnancy, Journal of Drug Delivery and Therapeutics,2019; 9(3-S):1123-1125
9. Dr.Pinky Chauhan, Role of Tinospora Cordifolia On Gestational Diabetes-A Comprehensive Review, International Ayurveda Publications,2017,Vol 2,Issue 3
10. MUHAS C., A REVIEW ARTICLE -GESTATIONAL DIABETES MELLITUS, International Journal of Current Pharmaceutical Research,2017, vol 9, Issue 1
11. Lanlan Guo, Comparative Efficacy and Safety of Metformin, Glyburide, and Insulin in Treating Gestational Diabetes Mellitus: A Meta-Analysis, Journal of Diabetes Research,2019
12. Diagnosis & Management of Gestational Diabetes Mellitus, technical and operational Guidelines, Ministry of Health and Family Welfare, Government of India, feb 2018
13. American Diabetes Association, Management of Diabetes in Pregnancy: Standards of Medical Care in Diabetes-2019, volume 42, supplement 1(S165-S172)

Source of Support: Nil

Conflict of Interest: None Declared

How to cite this URL: Namrata B. Khose et: Comparative Study Of Treatment Of Gestational Diabetes Mellitus Cited In Various Ayurvedic And Modern Research Papers Published In Last 5 Years. International Ayurvedic Medical Journal {online} 2020 {cited November, 2020} Available from: http://www.iamj.in/posts/images/upload/5081_5088.pdf