



The Interplay Between Diabetes Mellitus and Menopause - (Mini Review)

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Abstract

Women often around 40's or 50's, get menopause (MP) and their oestrogen levels decline. Around the same time type 2 diabetes generally develops and thus both coincide. Menopause marks the end of ovarian function, and it is called 'early' or 'premature' if it occurs before 45 years. While very little is known about the menopause transition in Diabetic women, diabetes will accelerate the reproductive ageing and determine premature ovarian failure by various mechanisms. The menopausal transition is accompanied by metabolic changes that predispose to type 2 diabetes mellitus (T2DM), as menopause results in increased risk of upper body adipose tissue accumulation and increased incidence of insulin resistance.

Keywords: Menopause; Diabetes Mellitus; Women

As women get closer to menopause, hormones in the body change during and after menopause. Women diabetics do know lots of things related to diabetes like eating too much of foods at a time, or missing a meal or snacks, stress, lack of exercise, gaining weights anxiety affect blood sugar and they also realize that as they get older it becomes difficult to control the bold sugar levels. This is mainly because their body doesn't respond to the Insulin it makes as well as it did when they were younger. Their body also reduces producing hormones like Progesterone and Oestrogen, that can increase the blood sugar levels.

These hormonal changes may cause hot flashes, irritability, and difficulty in sound sleep, that impact their moods and entire life and affect fluctuation in blood sugars, needing more frequent bold sugar testing and adjusting diet, exercise and even drugs schedule.

Post-menopause women have higher chances of Urinary tract and vaginal infections, causing vaginal dryness as the oestrogen levels go down and may need hormonal replacement in extreme cases.

The World Health Organization (WHO) has estimated the number of postmenopausal women worldwide to reach 1.1 billion by 2025. The market potential for menopause-related products and services is increasingly hard to ignore. A total of 47 million women goes through menopause each year. Age at natural menopause can largely affect the risk of both morbidity and mortality. Age at natural menopause may vary depending on several demographics, socioeconomic, cultural, reproductive, and lifestyle-related factors.

Menopause can alter the risk of various health conditions like hypertension, diabetes, gastroenteritis, chronic renal disease, and cardiovascular diseases. Meanwhile, certain chronic diseases (e.g., diabetes) seem to accelerate reproductive aging and possibly lead to more premature ovarian aging. Getting through menopause, though, brings a sense of relief. Fifty-nine percent of postmenopausal women reported feeling relieved or happy, compared with 29% of menopausal women and 19% of perimenopausal women [5].

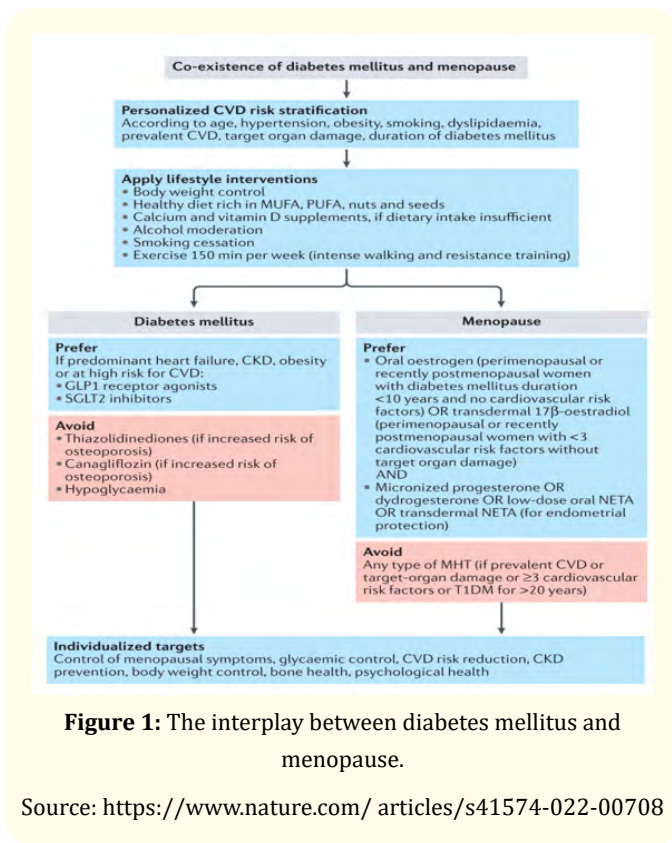


Figure 1: The interplay between diabetes mellitus and menopause.

Source: <https://www.nature.com/articles/s41574-022-00708>

What prompted to write this review?

My interest in this subject is growing since I lost my mother in 1998 at the age of 68 years because of uncontrolled diabetes type 2 following menopause. Right now, I am managing six such cases:

- **Geetha’s Peripheral Neuritis:** Geetha aged 68 now diabetic for 15 years C/O worsening peripheral neuritis for the last one year. Her BS was well managed till she had her Menopause in 2008. Thereafter the fluctuation in her BS had increased but was still able to manage. In 2021 she had to attend to her husband’s illness, that made her run around and put lot of mental pressure. She was unable to take periodical, monitor BS, was irregular in taking and her diet and exercise routine was also disturbed
- **Early Menopausal Arthritis:** Gouramma a 44-year-old, housewife, diabetic for 5 years reported with swelling and pain in both the ankles, toes, and foot pain in November 2020, to a local practitioner in Kalburgi who treated with Analgesics and anti- inflammatory drugs with remission of

the pain. The next menstrual cycle was delayed by 2 weeks and the number of joints involved, and severity of the pain increased. This time they consulted a private Orthopaedic specialist who again a battery of investigations including serological assessment of Rheumatoid Arthritis factor made the diagnosis of ‘Menopausal Arthritis with seronegative RA. She was put on a combination of corticosteroids, NSAIDs and anti-rheumatoid drugs and Insulin for diabetes for over 2 months and then switched to oral anti-diabetics since mid- May 2021. While the follow-up visit in August 2021 had shown nearly 50% relief and full recovery by end December 2021, ending in menopause.

- **Weight gain and Eczematous Skin infection:** One of my own Sister-in law a retired AWW, diabetic for 20 years. Moved in 2018 to stay with her son in Bengaluru for last 3 years. Her BS started worsening after the menopause in 2015, and she was under inadequate treatment. After coming to Bengaluru, she put on 10Kg weight in 2 years and had multiple skin (Eczema, infections) conditions, joint pains, and bad control of BS. Since the beginning of 2022 has been able to reduce the weight by 5 kg and feels much better now
- **Cardio-respiratory and renal (CRR) failure:** A 62-year-old retired Auxiliary Nurse midwife admitted on 30/03/22 to a private nursing home with C/O vomiting (3 episodes), general weakness and breathlessness, and loss of appetite for 3 days. Her past medical history revealed that she was diabetic for over 10 years and Menopause at the age of 40 years. Developed Breast Cancer and treated with combination of surgical, chemo, radiation, and hormone therapy for breast cancer since 2018. Diabetes worsened and had 3 episodes of pleural effusion secondary to breast cancer since early 2020, that was managed by tapping. High frequency USG chest showed bilateral Pleural effusion USG guided Thoracentesis. done and Maleroth tube was inserted. Laboratory investigations like LFT parameters were all in normal ranges, Blood Urea=73mg/ dl, Serum Creatinine 1.7 Sodium 122, Potassium=6.3 (3.5-5.5). She succumbed to renal failure and Cardiac arrest on 4/4/22.
- **Complications Galore due to Early menopause and Diabetes:** A young woman of thirty-eight-year-old, tailor by profession, reported with an oozing swelling over left malleolus (ankle) in January 2020. She was a known type 2

diabetic since April 2019, put on oral anti-diabetic's therapy and achieved early Menopause in 2020. She developed Diabetic Retinopathy in 2021 left eye and in early 2022 in right eye now vision in Right only needing laser treatment. All the series of episodes are attributable for hormonal disturbances and her productivity has been less than 50% in just 2 years.

- **Diagnostic challenge to the Family doctor:** A well-to-do spinster woman of 40 years came with C/O irregular period for last 6 months and weight loss since a year. Her married younger sister informed that she was very pleasant person but for the last six months she is depressed and sometime becomes aggressive especially around her periods. A local lady doctor had put her on oral pills for 3 months during which she appeared to be normal but relapsed after stopping the Oral pills. A detailed history revealed increased thirst, and nocturnal frequency of urine since a year and family H/O diabetes. Random blood sugar (RBS) showed 170mg/dl and Hb1Ac was 7.5 confirming Diabetes. With diet, exercise, and oral antidiabetics the BS is under control after 3 months now.

The lady is now able to reverse her diabetes and Menstrual cycles have become regular.

This coexistence of menopause and diabetes is not only a challenge for the patients, but I have also observed following challenges faced by family physician in last 20 years.

- **Clinical confusions:** Difficult to analyse the differences between hypoglycaemia, moodiness, and other similar peri-menopause symptoms. Distinguishing between signs of menopause and Diabetes like dizziness, sweating, irritability, and difficulty in concentration. Diabetic women may also reach menopause 5-6 years earlier than normal women. In Overweight and Obese women with type 2 diabetes Oestrogen hormone doesn't drop fast and women may have late menopause.
- **Diagnostic Challenges and advances:** 1. Only by Fasting, PP Blood sugar and HbA1C tests can Confirm. 2. Frequent testing with traditional haemoglobinometers may lead to emotional set back. 3. People do not need to prick their fingers to test BS. Continuous Glucose Monitoring (CGM) sensors test interstitial fluid and other tissues are evolving are at a prohibiting cost to many as of now.

- **Case management Challenges:** Post-menopause women have higher chances of Urinary tract and vaginal infections, causing vaginal dryness. Hormonal replacement may be needed in extreme cases. The associations of menopause age with type I/II diabetes, hypertension, or atherosclerosis as their primary outcomes are to be monitored continuously.

Discussions and Conclusion

Type 1 diabetics may notice hypoglycaemia more often with same drug regimen, stressing the need for readjusting the drug doses and frequency. It may be difficult but must analyse the differences between hypoglycaemia, moodiness, and other similar peri-menopause symptoms. Diabetic women may also reach menopause 5-6 years earlier than normal women. Overweight and Obese women with type 2 diabetes may see such changes much later as Oestrogen hormone doesn't drop fast among heavier women. The biggest challenge even for a general practitioner is to distinguish between signs of menopause like dizziness, sweating, irritability, and difficulty in concentration, that can be clarified only by Blood sugar and HbA1C testing.

The most recent study of a total of 20,128 in China investigated the association of menopausal status, age at menopause, and length of the reproductive period with T2DM. The prevalence of T2DM was 13.7%. Postmenopausal women exhibited a higher prevalence of T2DM than premenopausal women ($p < 0.001$) and an unfavourable metabolic profile, including higher body mass index, hypertension, and hyperlipidaemia. A higher risk of T2DM was observed in postmenopausal women (PR2.12, 95%CI: 1.79–2.51, $p < 0.001$). The study inferred that Postmenopausal status is associated with T2DM, while menopausal age and reproductive period are not associated with T2DM [2].

A study carried out at a tertiary care, teaching hospital in Southern India among post-menopausal women who attended the Department of Medicine during August 2013 to August 2014, recruited 600 patients by systematic random sampling, 300 diabetic and 300 non-diabetic after obtaining their consents. All of them were non-smokers, took mixed diet and other somatometric variables were similar in both the groups. The results indicated that average age of menopause among diabetic women was 44.65 years as compared to the menopause in non-diabetic women (48.2 years). While a total of 212 women had an early menopause (<45

yrs.), among them, 54 were non-diabetic and 158 were diabetic. The study also revealed a higher BMI among the diabetics than the non-diabetic women, attributed to the changes in body composition and increase in abdominal fat after menopause, a change more in diabetics due to the disturbances in insulin sensitivity and glucose metabolism [3].

An observational-analytical study in 2015 focused and found that the association of menopause age with type I/II diabetes, hypertension, or atherosclerosis as their primary outcomes [4]. Menopause at ages 45 to 55 was linked to 60 percent higher odds for diabetes compared to menopause at later ages, women who developed diabetes at ages under 20 years had a lower age at menopause compared to non-diabetic women. Meanwhile, developing diabetes over 50 years of age delayed the onset of menopause. Women whose periods stopped between 40 and 44 were 2.4 times more likely to develop diabetes [4].

Solutions

Frequent testing of HbA1c and fasting blood sugar levels can only confirm by Blood sugar.

Frequent testing with traditional haemoglobinometers may lead to emotional set back in such women. Digital equipment's may resolve the issue.

These healthy steps will help in the long run:

- Exercise more in general.
- Do weight-bearing exercise.
- Eat a healthy diet that limits sugar and fat.
- Control your weight.
- Limit your alcohol intake.

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