



The key phrase is 'focus on the foetus, for the future'

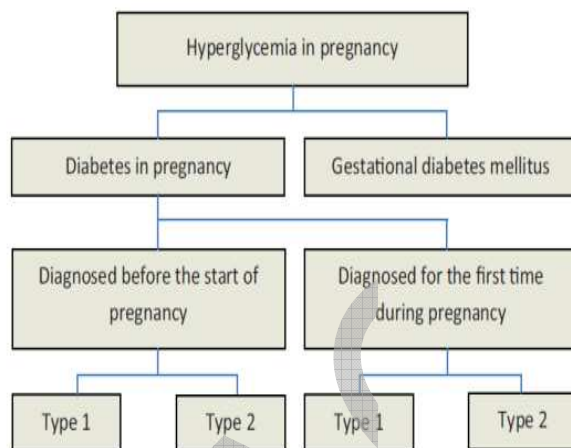


Figure 1 Types of hyperglycemia in pregnancy.

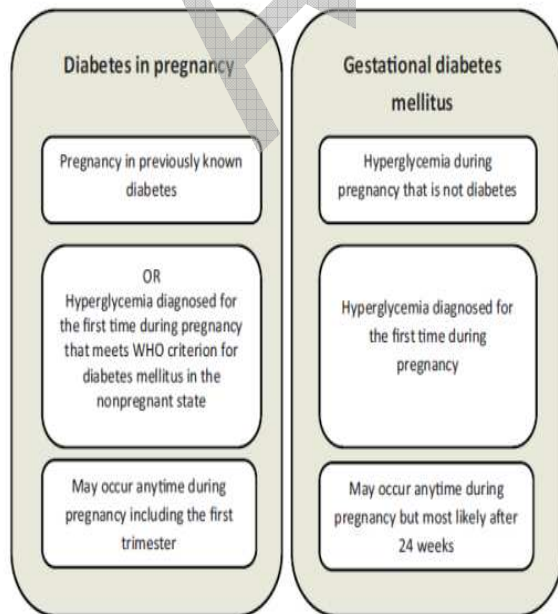


Figure 2 The difference between diabetes in pregnancy and gestational diabetes mellitus.

## Introduction:

The novel coronavirus pandemic has been an eye-opener to all about what a widespread, global public health issue looks like.

Drawing an analogy from this communicable disease pandemic, one would be better placed to fathom the range and the depth of another pandemic – a **silent 'pandemic of non-communicable diseases' (NCDs)**, i.e., diabetes and related conditions such as obesity, hypertension and heart disease, sweeping across the world, rapidly yet steadily over the last few decades.

## What is the impact of noncommunicable diseases?

1. Noncommunicable diseases represent a major burden to individuals, governments and societies.
2. On the individual level, they cause premature death and severe disability among survivors.
3. Noncommunicable diseases cut lives short, often claiming people at their most productive age. They can drive individuals into poverty **due to lack of their productivity** and the need to pay for medications and drugs for prolonged periods of time.
4. At a governmental level, noncommunicable diseases represent a huge burden that puts pressure on health systems and resources.
5. They **increase health care costs and out-of-pocket and catastrophic expenditure**.
6. This is especially challenging for low- and lower-middle-income countries, which constitute more than half of the countries in the Region.
7. Ultimately, they undermine economic progressiveness and stifle growth for countries.
8. On the societal level, they have detrimental socioeconomic consequences. In the Region, the impact is further amplified as a result of humanitarian and emergency crises.

### The global burden: Global burden of NCDs: Diabetes:

To illustrate the global burden of NCDs, let us use the example of diabetes mellitus.

1. Diabetes is a disease characterized by a **sustained increase in blood sugar ("hyperglycemia")** that eventually affects the blood vessels in the body causing damage of various vital organs that include the heart, eyes, kidneys, nerves and brain.
2. In the year 2021, the prevalence of diabetes was estimated by the International Diabetes Federation (IDF) to be 537 million people.
3. On extrapolating the data to the year 2045, it is safe to say that almost 783 million people will be living with diabetes.
4. In addition to this, for every person who is known to have diabetes, there is another person whose diabetes has yet to be detected.
5. Further, a number of people live with what is called '**pre-diabetes**', which is the penultimate stage before overt diabetes.
6. There is a saying in Tamil that one should not search for the origin of a sage and the headwaters of a river.

7. But, in the case of diabetes and other NCDs, we have no other option but to fervently search for the sage and the headwaters before the world faces a deluge.
8. While **several reasons** can be ascribed for this rising trend – these include an aging population, urbanisation, genetic predisposition, nutrition and lifestyle transition – there is one factor that has not yet received due attention, namely, diabetes that occurs during pregnancy.
9. **Pregnancy-related diabetes** encompasses both newly detected diabetes during pregnancy (or ‘gestational diabetes’) as well as women with pre-existing diabetes (or ‘pre-gestational diabetes’).
10. For the sake of simplicity, we will use the broader term ‘**Hyperglycemia-in-Pregnancy (HIP)**’ that covers both.
11. The **global prevalence of HIP is 16.7% of all live-births**. In India, one out of four live-births is complicated by HIP.

### Why adolescents are important in control of NCDs?

1. Treating NCDs bears a **huge cost in terms of money and productive lives lost**. Hence, it is wise to prevent NCDs by all means.
2. **Focusing on prevention of even risk factors** in young people is likely to be more effective.
3. **Adolescence** is probably the **last best opportunity** to build **positive health habits** and to limit the harmful behaviors. Adolescence is an age of developing brain and the time of habit formation.
4. Habits adopted during this time are likely to persist in adult life. Hence, it is important to detect and manage harmful behaviors related to NCDs early.
5. These risk factors can be less damaging if identified early in life when habits are still forming. This offers for better health, more years of productivity and certainly a lesser cost of health care to nation.

### Rising Concerns:

1. The epidemic of NCDs poses devastating health consequences for individuals, families and communities, and threatens to overwhelm health systems.
2. The socio-economic costs associated with NCDs make the prevention and control of these diseases a major development imperative for the 21st century.

3. While it may be argued that **NCDs are the result of a combination of genetic and physiological factors**, there is no doubt that deliberate lifestyle choices (tobacco, liquor, lack of exercise), poverty and environmental factors play a major role.
4. Those at the lower end of the income scale, who live in squalid, often crime ridden communities, are the main victims.
5. Their environment predisposes them to drug, alcohol and tobacco abuse which when combined with cheap, mostly unhealthy, diets increase their health risk substantially and decreases their longevity.
6. Other predisposing factors which have ensured the spread of NCDs to a larger cross section of the population include rapid unplanned urbanisation, globalisation of unhealthy lifestyles and population ageing.
7. The good news is that most of these risk factors are modifiable. The bad news is that underprivileged and uneducated communities are not only ignorant of the factors that **cause ill health** but cannot access or afford the health care costs related to NCDs.

#### **A programming: Hypothesis of “fetal origins of adult disease”:**

In the 1980s, the British physician and epidemiologist, Prof. David Barker, put forward his hypothesis of “**fetal origins of adult disease**”.

1. In this intra-uterine (inside the womb) programming, any adverse stimulus – say an increased blood sugar level in case of maternal diabetes – permanently affects the structure, the functioning and the metabolism of the developing human body at the cellular and tissue levels, thereby predisposing the individual to disease in adult life.
2. Furthermore, the pancreas of the foetus (which secretes the hormone insulin), is able to respond to the maternal blood-sugars present in the blood that go to the foetus.
3. In case the blood sugar levels are increased, the fetal pancreas secrete excessive insulin, which in turn deposits fat in the growing foetus, sometimes even **resulting in a ‘big baby’**.
4. Eventually, the child develops diabetes or pre-diabetes. He also becomes prone to other related NCDs such as hypertension and heart disease.

#### **Concerns associated with ‘Hyperglycemia-in-Pregnancy (HIP)’:**

1. Several studies have indicated the foetal origins of adult disease which notes that a person's susceptibility to many of the adult diseases is already programmed while he/she was still an unborn, developing baby ("foetus") inside his mother's womb.
2. The health of offspring and of further generations depends upon the **metabolic health of the pregnant woman**.
3. Based on the above hypothesis, a foetus exposed to increased blood sugar levels in the mother's womb gets adversely affected.
4. Maternal diabetes permanently affects the structure, the functioning and the metabolism of the developing human body at the cellular and tissue levels, thereby predisposing the individual to disease in adult life.
5. Such a child when exposed to an unhealthy environment of high caloric foods, lesser physical activity and stress in adulthood develops diabetes.
6. Also, such a person also becomes prone to other related NCDs such as hypertension and heart disease.
7. Also HIP can give rise to transgenerational effects. The foetus exposed to HIP, after growing into an adult might transmit unfavourable genetic and epigenetic effects to the next generation. Thus, a vicious cycle is established.

### **A window of opportunity:**

The time around conception offers a great window of opportunity to **optimise metabolic status in all women** in the reproductive age group.

The **health of offspring and of further generations** depends upon the **metabolic health of the pregnant woman**.

### **Conclusion:**

The Government of India has declared the March 10, as "National Gestational Diabetes Mellitus Awareness Day".

At this juncture, it is wise to reiterate his words on the prevention of NCDs in the community, i.e., "**Focus on the Foetus, for the Future**".

Like other NCDs, detection, screening and preventive treatment should be the key components of the response to diabetes.

**Targeting pregnancy-related diabetes and breaking the vicious cycle of transgenerational transmission** is a wholesome action to significantly bring down the expanding burden of diabetes and other NCDs.

Screening women for their vulnerability to gestational diabetes and management of sugar levels in women with pre-existing diabetes would be a **critical intervention against HIP**.

Early detection of diabetes in pregnancy can help prevent trans-generational transmission of NCDs.

## Energy Transition and Fiscal Impact

**Energy transitions** are gaining momentum worldwide, and India is no exception. It has created one of the world's largest markets for **renewable energy**.

However, this transition is going to be a complex task keeping in mind the fiscal impacts of it. Also, ensuring that the opportunities of India's transition are shared fairly throughout society is not an easy task, given the country's population and diversity.

To achieve the **trifecta of jobs, growth and sustainability**, India must strive to **put people and a smooth fiscal transition at the centre** of its energy transformation.

### What about India's Fiscal Dependence of Fossil Fuels?:

- In a document published by the **International Monetary Fund (IMF)**, governments' (both Centre and State) **revenue from coal, oil and natural gas, will be affected over the next two decades** as India shifts toward renewable energy sources.
- As per the **International Energy Agency (IEA)**, under fairly standard assumptions on growth, prices and taxes, there would be **continued growth in revenues from fossil fuels till 2040**.
  - However, revenues would **fall significantly as a share of the GDP** and overall government budget, naturally imposing fiscal challenges for both the Central and State governments in the next two decades.
- As of 2019, more than a fifth of the Centre's revenues were from fossil fuels including both **tax (both direct and indirect) and non-tax revenues (including royalties, dividends etc.)** paid by **public sector undertakings (PSUs)**.
  - For the State governments, total revenues from fossil fuels were lower at about **8% of total revenues**.
  - The **combined revenue** for both the Centre and States was **13% of the total revenue collected**, which translates to **3.2% of India's GDP**.

- This share is much higher than India's Defence expenditure, and comparable to the combined education, culture and sports expenditures of both the Centre and States.

### What is the Fiscal Impact of Transition?:

- **At Global Level:** The impacts will not be felt evenly. **China will feel about 27% of a cumulative \$75 trillion economic hit** to global GDP by 2050, while the **US will see about 12%**, Europe will experience 11% and **India about 7%**.
  - **Economies such as Iraq** that do not have financial reserves to invest in non-fossil fuel sectors **could suffer the biggest losses** in economic output.
  - Wealthy economies with deep capital markets that already have big investments in energy transition technologies, such as **France and Switzerland, will be better positioned.**
- **At National Level:** During the Covid-19 period, governments' reliance on fossil fuel for revenues – mainly petroleum increased.
  - Despite decrease in the international crude oil prices, **taxes on petrol/diesel in India were increased** leading to decoupling of international and domestic oil prices.
  - According to latest data, the **revenue from petroleum was 2.7% of GDP** in 2019-20 which **increased to 3.4% of GDP** in 2020-21 on account of **higher excise and VAT.**
  - As India starts pursuing its **net-zero commitments**, the first step would be to reduce the use of fossil fuels. Consequently, this **major source of revenues will disappear.**

### What are the Concerns Associated?

- **Decline in Revenues:** Over time the **revenues from fossil fuel will steadily fall as India shifts to renewable energy sources**, ramps down the use of fossil fuels, and as **electric vehicles (EVs)** increase.
  - If current economic trends persist, revenues are estimated to fall from 3.2% in 2019 of GDP to **1.8% and 1% in 2030 and 2040 respectively.**
- **Subsidies - A Necessary Evil:** A large part of the energy transition may need to be supported through direct or indirect **subsidies by concession of excise duty**

on EVs, concessional GST on electric cars, concessions given under Green Hydrogen Policy etc. like the Small wind energy and Hybrid systems programme.

- The subsidies will add to the Centre and States' fiscal stress. But without these subsidies the energy transition itself may slow down.
- **Impact on Political Economy:** The declining revenue can have political economic ramifications as well. The year 2022 is the last year of GST compensation given to State governments, which may put stress on certain States' revenue.
  - Furthermore, under the GST structure, States have limited autonomy to raise taxes, which may exacerbate the issue.
    - The Centre in the last few years have started collecting more revenues via cess which is not shared with States, running the risk of straining the Centre-State relationship.
- **Challenges of Investments:** The 21<sup>st</sup> report of the Standing Committee on Energy (2021-22) on financial constraints in the renewable energy sector highlights that India's long-term RE commitments require - 1.5-2 trillion annually. Actual investments in the last few years have been around - 75,000 crore.
- **Gender Disparity in Green Sector:** According to a 2019 study by Council on Energy, Environment and Water (CEEW) and the IEA, women account for nearly 32% of the renewables workforce globally but only around 11% of the rooftop solar workforce in India.

### How can India Cope with the Fiscal Transition?:

- **Additional Taxes:** When the government experiences revenue stress, it finds energy to be the easiest source of revenues. Additional taxes on coal or probably a carbon tax can be imposed.
  - Slowly phased in from a small amount roughly equivalent to the existing coal cess (or GST compensation cess) to reach Rs 2,500 per tonne of carbon dioxide by the middle of the century.
  - In the short run, India can also increase revenues from some other source like increasing tax on demerit goods like alcohol, tobacco etc. to compensate for the reduction in energy sourced from fossil fuels.



- **Strong Policies:** Just as we need strong climate policies, we also need **strong social policies and local institutions** to ensure that the **clean energy transition is fair and just.**
  - India must be prepared for the fact that job gains might not occur in the same locations as job losses and that **most new jobs are expected to be non-unionised**, often lacking safety nets. The policies need to be framed accordingly.
  - **Carbon tax revenues may need to be recycled back to poorer** households who spend a large fraction of their income on energy.
- **Investment Challenge as an Opportunity:** The **Budget 2022** announced that the government proposes to issue **sovereign green bonds** to mobilise resources for green infrastructure.
  - These bonds are expected to be **serviced by rupee revenues, with rupee-denominated end-use.** This makes a strong case for domestic as well as 'masala' bond issuances overseas.
  - Several Indian corporates have tapped the India International Exchange (India INX) to raise capital from international investors. India's immense requirements for green finance could be turned into an advantage to **develop a homegrown but world-facing capital market.**
    - This could establish India as a **gateway for emerging economies** in Asia and Africa looking to raise international capital for their own transitions.
- **A Gender Balanced Transition:** While India's energy transition will create many new jobs, the **limited participation of women in the growing green workforce** must be addressed.
  - As a priority, renewable energy companies must **promote policies to ensure gender parity in their workforce.**
  - These could include **investments in suitable facilities for women** at project sites, designing guidelines for **flexible working arrangements**, and **creating programmes** to prepare more **women for leadership roles.**