Addressing Diabetes in Pregnancy

A priority for improving maternal health and preventing non-communicable diseases
A programme by Jhpiego in collaboration with the Government of India and the state government of Madhya Pradesh, supported by an educational grant from Novo Nordisk.

A 20-year-old woman, Bharti Verma, conceived for the first time, wanting the best for their first baby, her husband—a daily wage earner—spared no expense and took Bharti to a private clinic for a check-up. There she was diagnosed with gestational diabetes (GDM). Bharti and her family did not understand much of what the diagnosis meant, but they followed the doctor’s instructions. The doctor started her on insulin therapy. However, her blood sugar levels remained high, as her insulin dose was not adjusted to manage her blood sugar levels throughout her pregnancy. Due to this, her condition worsened and, eventually, she had to be referred to a higher-level facility in the state capital. Bharti recalls that it was a very difficult delivery.
Extract from a call to action by Women Deliver, NCD Alliance and the World Diabetes Foundation to address gestational diabetes (GDM) as a step forward in meeting the Sustainable Development Goals

Despite the staggering statistics on the burden of the disease, diabetes in pregnancy remains under-recognised, underprioritised, underresearched and underfunded. The impact of inaction is clear – backward progress on preventable maternal and child deaths, increased prevalence of non-communicable diseases (NCDs) at all ages and rising costs as health systems respond to chronic diseases. To save lives and achieve health and well-being for all, as called for in Sustainable Development Goal 3, diabetes in pregnancy needs to be addressed as a priority.

Pregnancy offers a window of opportunity for addressing diabetes in women, mitigating the significant health risks associated with diabetes in pregnancy, and preventing diabetes and other chronic NCDs in women, newborns and children. Interconnected health benefits, combined with efficiencies and cost savings from integrated service delivery and disease prevention, make addressing diabetes in pregnancy a smart and strategic decision.

Addressing diabetes in pregnancy needs to be seen as part of the services offered on the road to universal health coverage.

Source: A Call to Action – Prioritize Diabetes in Pregnancy to Save Lives, Improve Maternal Health, and Curb Intergenerational Transmission of NCDs
Hyperglycaemia (high blood sugar) is one of the most common medical conditions that women encounter during pregnancy. It is estimated that 75–90% cases of high blood sugar during pregnancy involve gestational diabetes mellitus (GDM).

GDM is present when blood sugar levels are above normal but still below those indicative of diabetes. The condition is diagnosed through prenatal screening during the second trimester. GDM exists as a transient disorder during pregnancy and disappears once the pregnancy ends. It entails short- and long-term health consequences for both the mother and the child, including several pregnancy- and birth-related complications, as well as an increased risk of developing type 2 diabetes.

**SHORT-TERM CONSEQUENCES OF GDM**

Women with GDM are at increased risk of several complications during pregnancy and delivery, as are their infants (Fig. 1).

**LONG-TERM CONSEQUENCES OF GDM FOR WOMEN, NEWBORNS AND CHILDREN**

Pregnant women who have had some level of hyperglycaemia in pregnancy are at higher risk of developing GDM in subsequent pregnancies. In addition, about half of all women with a history of GDM are at risk of developing type 2 diabetes within five to 10 years after delivery. Babies born to mothers with GDM are also up to eight times more likely to develop type 2 diabetes and obesity in their teens or early adulthood.

The risk and severity of long-term health consequences for women and their newborns are directly related to the severity of the diabetes during pregnancy and the stage of pregnancy at which the diabetes is detected. These intergenerational impacts lead to long-lasting, chronic health issues that compromise health and well-being, increase burdens on health systems and increase healthcare costs.

**FIGURE 1 SHORT-TERM CONSEQUENCES OF GDM**

<table>
<thead>
<tr>
<th>MATERNAL RISK</th>
<th>FOETAL RISK</th>
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<tbody>
<tr>
<td>PRE-ECLAMPSIA (high blood pressure and signs of damage to organs)</td>
<td>STILLBIRTH</td>
</tr>
<tr>
<td>POSTPARTUM HAEMORRHAGE (mother bleeds more than expected after delivery)</td>
<td>CONGENITAL MALFORMATION (physical defect present in infant at birth)</td>
</tr>
<tr>
<td>INFECTION</td>
<td>SHOULDER DYSTOCIA (baby's shoulders get stuck in mother's body during delivery)</td>
</tr>
<tr>
<td>PROLONGED OR OBSTRUCTED LABOUR</td>
<td>BIRTH INJURIES</td>
</tr>
<tr>
<td>SPONTANEOUS ABORTION</td>
<td>NEONATAL HYPOGLYCAEMIA</td>
</tr>
<tr>
<td>POLYHYDRAMNIOS (excessive accumulation of amniotic fluid)</td>
<td>INFANT RESPIRATORY DISTRESS SYNDROME (due to inadequate production of surfactant in the lungs)</td>
</tr>
<tr>
<td>CAESAREAN SECTION</td>
<td></td>
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<tr>
<td>UTERINE ATONY (loss of tone in the uterine musculature)</td>
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<tr>
<td>PROGRESSION OF RETINOPATHY</td>
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</table>
In 2017, the International Diabetes Federation (IDF) estimated the global prevalence of hyperglycaemia in pregnancy to be 16.2%, corresponding to 21.3 million live births affected by some form of hyperglycaemia in pregnancy, of which 86.4% were due to GDM. One in seven live births were affected by GDM.

The vast majority of cases of hyperglycaemia in pregnancy occur in low- and middle-income countries (LMICs), where access to maternal care is often limited. More than half of the global diabetes burden is borne by just eight LMICs – the same countries that account for more than half of global live births and two-thirds of maternal and newborn deaths and disabilities – India being one of them.

According to the IDF, South-East Asia has the highest prevalence of hyperglycaemia in pregnancy (24.2%), affecting one in every four births.

Prevalence of GDM in India
In India, the IDF estimates the prevalence of GDM to be as high as 27.9%, affecting an estimated 6 million live births in 2017.

\* Bangladesh, Brazil, China, India, Indonesia, Mexico, Nigeria and Pakistan.
A CASE STUDY FROM INDIA

From November 2015 to October 2017, Jhpiego, in close collaboration with the Government of India and supported by an educational grant from Novo Nordisk, implemented a demonstration project in Hoshangabad, Madhya Pradesh. The aim was to operationalise an integrated antenatal care (ANC)-based service delivery model for GDM testing and management, as envisioned in the national GDM guidelines.

This two-year programme generated important learnings, which helped assess the feasibility of an ANC-based GDM diagnosis and management approach in an Indian context and provided an operational model for service delivery in both rural and urban settings. Furthermore, learnings from the programme informed a revision of the national guidelines, which were relaunched in February 2018 with technical and operational modifications.4

This case study provides the context of the programme, its design, challenges, winning strategies, impact and learnings.

GDM IS ACKNOWLEDGED AS A PUBLIC HEALTH ISSUE IN INDIA

With growing evidence of the prevalence globally and in India, the Government of India has acknowledged GDM as a public health issue with maternal and neonatal health implications, and as a risk factor for complications during pregnancy and childbirth.

In December 2014, the Government of India published the National Guidelines for Diagnosis and Management of GDM, which endorse universal screening, early diagnosis and comprehensive management of GDM, based on the guidelines of the World Health Organization (WHO).8

THE HOSHANGABAD PROGRAMME

INDIA’S RURAL PUBLIC HEALTHCARE SYSTEM

In rural areas of India, primary healthcare services are provided through a network of sub-centres, primary health centres and community health centres.

PREGNANT WOMAN

ACCREDITED SOCIAL HEALTH ACTIVIST (ASHA)

Each village has one ASHA – a community health worker – who is selected from within that village and acts as a link between the community and the healthcare system.

SUB-HEALTH CENTRE (SHC)

First point of contact between the primary healthcare system and the community. It is designed to handle maternal and child health, disease control and health counselling for a population of 3,000 to 5,000.

AUXILIARY NURSE MIDWIFE (ANM)

An auxiliary nurse midwife provides maternal and child health services at the sub-centre and serves five or six adjoining villages.

PRIMARY HEALTH CENTRE (PHC)

The PHC is the first point of contact between a village community and a medical officer, and provides curative and preventive services to 20,000–30,000 people.

COMMUNITY HEALTH CENTRE (CHC)

CHCs are managed and maintained by state governments and are required to have four medical specialists supported by 21 paramedical and other staff, with 30 beds as well as laboratory, X-ray and other facilities. CHCs serve a population between 80,000–100,000 people.
Hoshangabad District is one of the 51 districts of Madhya Pradesh state in India. The district includes seven administrative blocks and was recorded to have a population of 1.29 million people in the 2011 state census.

- **1.29 MILLION**
  total population (2011 census)

- **218 MATERNAL DEATHS**
  per 100,000 live births
  (maternal mortality ratio – MMR)

- **59 INFANT DEATHS**
  per 1,000 births
  (infant mortality rate)

- **31,053 PREGNANCIES**
  estimated in 2017/18

- **22,424 PREGNANCIES**
  reported in 2017/18
PROGRAMME GOAL
To demonstrate operationalisation of an integrated ANC-based GDM testing and management approach in Hoshangabad, Madhya Pradesh.

PROGRAMME OBJECTIVES

- To introduce universal GDM testing in accordance with the 2014 national guidelines.
- To increase community awareness of GDM in the catchment population of seven community health centres (CHCs) and 25 primary healthcare centres (PHCs).
- To ensure that women who test positive for GDM receive appropriate treatment, follow-up support and referral.
- To ensure appropriate documentation and dissemination of evidence and implementation tools.
- To advocate for subsequent scale-up at state and national levels.

PROGRAMME MODEL

- To promote ANC-based universal testing for GDM by building the capacity of service providers (doctors, staff nurses and auxiliary nurse midwives) to test women during ANC and initiate medical nutrition therapy. In addition, if required, to prescribe insulin for women diagnosed with GDM.
- To mobilise women to get tested for GDM by training community health workers (ASHAs) to identify pregnant women in their community, mobilise them for ANC, educate them about GDM and its impacts, reinforce medical nutrition therapy and insulin therapy (if prescribed) for those diagnosed with GDM, and motivate them for regular follow-up.
- To reduce medical complications due to GDM by closely monitoring women diagnosed with GDM and ensuring adherence to treatment.
- To reduce the burden on healthcare providers by ensuring that women diagnosed with GDM are assisted during follow-up by a team of trained community health workers and professionals.

PROGRAMME DESIGN

A baseline assessment to understand the existing GDM management practices in the field suggested that overall awareness about GDM diagnosis and management was low among all groups of service providers, especially ASHAs and auxiliary nurse midwives. In addition, despite the launch of the national guidelines in 2014, service providers were still not trained in the diagnosis and management of GDM. Before the programme was initiated, only one doctor had prescribed insulin to a patient diagnosed with GDM.

FIGURE 2 WHO HEALTH SYSTEMS FRAMEWORK

SYSTEM BUILDING BLOCKS

<table>
<thead>
<tr>
<th>Leadership/governance</th>
<th>Health workforce</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare financing</td>
<td>Essential medical products and technologies</td>
</tr>
<tr>
<td>Health information systems</td>
<td>Service delivery</td>
</tr>
</tbody>
</table>

GOALS/OUTCOMES

- Improved health (level and equity)
- Responsiveness
- Financial risk protection
- Improved efficiency
As hospital laboratories were conducting all the tests, including tests for GDM, the high workload led to delays in initiating treatment for women with GDM. Since diagnosis and management of GDM were not included in the existing ANC package, the roles and responsibilities of staff were not clearly established.

The programme was designed with these challenges in mind, and the design programme design also ensured the following:

- Integration of GDM prevention and care within the maternal health service delivery platform by leveraging the advantages of a well-established ANC platform.
- Creation of linkages between the maternal health and NCD departments to ensure follow-up of postpartum women diagnosed with GDM during pregnancy at operational NCD clinics.
- Establishment of community processes for generating awareness and mobilising the women, their families and the community.

The programme design is based on the Health Systems Framework developed by the WHO (Fig. 2).

At the very outset, the programme ensured the involvement, alignment and buy-in of all stakeholders at state, district and facility levels, including programme managers and all groups within the healthcare workforce, in respect of the programme’s objectives and activities. Experienced officials and programme managers who supported other maternal health programmes in the area, including the maternal health division lead, were involved to ensure that the programme was customised to the local context and leveraged the existing maternal health platform.

Leadership/governance

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Health workforce

It was critical to ensure that the entire health workforce understood the significance of GDM diagnosis and knew the line of treatment for those diagnosed with GDM. An array of training materials and job aids was developed to train community health workers, medical officers, staff nurses and auxiliary nurse midwives. This included information on the burden of GDM and the need for testing, as well as technical details on GDM testing, diagnosis, management and postpartum follow-up of women diagnosed with GDM.

Posters, flipbooks and job aids providing information on GDM were developed and customised to the local context. ASHAs used these job aids to improve awareness about GDM during home visits and community outreach activities such as village health sanitation and nutrition days (VHSNDs). At the health facilities, the auxiliary nurse midwives and staff nurses counselled pregnant women on GDM, its complications and the need for testing. Healthcare staff counselled women diagnosed with GDM on medical nutrition therapy and physical exercise, calculated their body mass index (BMI) and calorie intake, prepared food charts and made suggestions for a healthy lifestyle. Doctors counselled women on GDM testing during ANC outpatient department (OPD) visits, reinforced the need for medical nutrition therapy and, if required, started them on insulin therapy.

Healthcare financing

The programme implementation plan (PIP) is the annual programme budget of the National Health Mission (India’s state-run public health programme) and spells out the strategies to be deployed, as well as the budgetary requirements and targeted health outcomes, for the state for the year. Jhpiego successfully conducted advocacy meetings with the state government to include the budget for GDM testing and management in the state PIP for 2016/17 and 2017/18. Prior to budgetary inclusion in the state PIP, an educational grant from Novo Nordisk was used to develop and print training materials, conduct training activities and procure commodities. The grant continued to provide technical assistance to the state government throughout this programme.

Leveraging the interdepartmental coordination between the maternal health and NCD departments, the NCD department provided financial support for procuring glucometers and glucometer strips in 2016, and continued to procure glucometer strips in 2017.
A robust supply chain was developed to maintain sufficient stocks of plasma-calibrated glucometers, glucometer strips, lancets, 75-g glucose packets, 300-ml measuring jars, glucometer batteries, glucometer calibration fluid, vials of insulin (human premix 30/70) and insulin syringes. Building the capacity of the storekeepers and service providers at all levels helped ensure a seamless supply. The supply chain was operational at district, block, sub-health centre (SHC) and village levels (Fig. 3).

**FIGURE 3 SUPPLY CHAIN**

**DISTRICT LEVEL**
District hospital and CMHO store

Procurement of one year’s stock of supplies and distribution of four months’ stock to the blocks

**BLOCK LEVEL**
CHC, block store

Block-level store in charge distributes three months’ stock to the SHCs

**SUB-HEALTH CENTRE LEVEL**
SHC

Auxiliary nurse midwives keep one month’s stock in the SHC

**COMMUNITY LEVEL**
VHSND

Two months’ stock are kept in village-level rural childcare centres and village health centres

**INDIAN CONTEXT**

Proper use of glucometers

GDM testing was conducted at the health facilities and during community outreach sessions (VHSNDs). In order to ensure efficient functioning and accurate results, it is important to calibrate the glucometers regularly and store the test strips under suitable conditions. The programme established an effective system for regular calibration of glucometers by strengthening the supply of calibration fluid to the PHCs, where all field-level service providers could calibrate glucometers easily. Information on calibration was shared with the auxiliary nurse midwives, laboratory technicians and programme managers during training. Laboratory technicians were also trained to calibrate glucometers, maintain records and track the auxiliary nurse midwives to ensure monthly calibration. Implementation of the process was monitored through records maintained at the facility.

**FIGURE 4 PROGRAMME APPROACH**

**TESTING OF ALL PREGNANT WOMEN**

All women tested for GDM at their first ANC visit

**BLOOD SUGAR CONTROL**

Counselling on medical nutrition therapy and physical exercise

Blood sugar levels tested every 15 days

Poor blood sugar control

Referral to doctor for assessment

Good blood sugar control

Managed as a normal ANC patient

**NOTES**

Jhpiego, in collaboration with the state government, developed a GDM-specific recording and reporting toolkit, including a dashboard of indicators. More specifically, this toolkit captured the following:

- Number of first and second GDM tests conducted and their positivity rate
- Number of trimesterly GDM tests conducted and their positivity rate, as well as logistical supply information
- Data on management of GDM:
  - Number of women diagnosed with GDM who attended follow-up visits
  - Number of women started on insulin therapy

**MEDICAL PRODUCTS AND TECHNOLOGIES**

Essential medical products and technologies

**ANC at village health nutrition day**

Village health sanitation and nutrition days (VHSNDs) are a major initiative under the National Rural Health Mission (NRHM) to improve access to maternal, newborn, child health and nutrition services at village level in India.
- Number of women diagnosed with GDM whose blood sugar was controlled
- Number of women diagnosed with GDM who were tested using an oral glucose tolerance test (OGTT) after delivery.

After successful implementation of the programme, the state has now included GDM-related information in its existing health management information systems.

Diagnosis, treatment and referral, with comprehensive counselling at the facility and during community outreach, formed the cornerstone of the programme. A rigorous schedule of testing had to be followed, especially for women diagnosed with GDM.

At the first ANC visit, pregnant women were asked to drink a solution of 75 g of glucose and wait for two hours before being tested.

- **Negative test result:** If the first blood test revealed a blood sugar level of less than 140 mg/dl (negative), the auxiliary nurse midwife or staff nurse counselled the woman on the importance of a second test and asked her to come in for a follow-up between 24 and 28 weeks of pregnancy.

- **Positive test result:** If the blood sugar level after two hours was equal to or more than 140 mg/dl (positive), the woman was diagnosed with GDM. The auxiliary nurse midwife or staff nurse then counselled the woman on medical nutrition therapy and physical exercise, and also shared information on follow-up visits. To ensure follow-up, which was carried out every 15 days, the ASHA referred the woman to the nearby health facility or community outreach session (VHSND) for a postprandial blood sugar test. At these sessions, an auxiliary nurse midwife or staff nurse checked the woman’s blood sugar and assessed whether she was following the medical nutrition therapy by asking about her dietary routine.

### Follow-up of women diagnosed with GDM

- **If blood sugar was in control:** If the follow-up test showed a blood sugar level of less than 120 mg/dl, the auxiliary nurse midwife asked the woman to continue medical nutrition therapy and physical exercise, and to come in for a follow-up after 15 days.

- **If blood sugar was uncontrolled:** If the follow-up test showed a blood sugar level equal to or more than 120 mg/dl, the auxiliary nurse midwife referred the woman to the nearby health facility. A doctor assessed the reason for the uncontrolled blood sugar and, if required, initiated insulin therapy in addition to medical nutrition therapy and physical exercise.

The doctor prescribed insulin based on the blood sugar level and monitored the dose very closely. The doctor counselled the woman on medical nutrition therapy, physical exercise, insulin dose, symptoms of hypoglycaemia and ways to prevent hypoglycaemia. The staff nurse administered the first dose of insulin and demonstrated the method. The woman was asked to come in for a follow-up every week.
PROGRAMME

CHALLENGES

AND MITIGATING STRATEGIES ADOPTED

BENEFICIARY LEVEL
(PREGNANT WOMEN)

CHALLENGE
Compliance with GDM testing during ANC and postnatal care
Getting the pregnant women to wait for two hours and repeat the test as per the protocol was a significant challenge, especially for those who tested negative in the first test. Most of the pregnant women were accompanied by their husbands or mothers-in-law, who were reluctant to wait.

STRATEGY
Strengthening counselling and improving awareness among women
COUNSELLING BY SERVICE PROVIDER: To ensure that the pregnant women were aware of the impact of GDM, counselling was strengthened at health facility and community levels. Flipbooks and information education communication (IEC) materials were utilised as job aids to provide an understanding of GDM, its impact and management. This awareness encouraged the pregnant women and their families to prioritise GDM tests.

PRIOR INFORMATION BY ASHAS: ASHAs informed the pregnant women about the time required for the GDM test the day before the VHSND, so that they could plan their day accordingly and come prepared for the wait.

CHALLENGE
Compliance with follow-up visits for women diagnosed with GDM
Ensuring that the women diagnosed with GDM had their blood sugar tested every two weeks proved to be a challenge. It was difficult for them to visit the facility repeatedly due to time constraints, the high cost of travel and discomfort during travelling.

STRATEGY
Improving community care
Auxiliary nurse midwives started visiting the village once a month for the VHSND to test the blood sugar of women diagnosed with GDM, thereby making the test more accessible. The national government adopted this strategy and included it in the 2018 revised national guidelines.

CHALLENGE
Low compliance with medical nutrition therapy
Most of the food recommended in the standardised meal plan was not available in the programme area. Moreover, varied eating habits among the women made it difficult for the service provider to recommend a standardised meal plan.

STRATEGY
Customising meal plans
With the help of local service providers, meal plans based on locally available foods were developed. The service providers gave the pregnant women a booklet with records of their blood sugar levels, illustrations of recommended physical exercises and detailed meal plans, giving them a ready reference for all the elements of medical nutrition therapy.

CHALLENGE
Reluctance to self-inject insulin
The women and their families in rural areas were not comfortable with self-injecting insulin due to low levels of literacy.

STRATEGY
Educating pregnant women about self-injecting
Staff nurses and auxiliary nurse midwives were trained to demonstrate the technique for self-injecting insulin using job aids. While giving the injections, they demonstrated the procedure and counselled the women on the dos and don’ts of self-injecting insulin. In addition, they gave the women a booklet illustrating the process.
SERVICE PROVIDER LEVEL (DOCTORS, STAFF NURSES, COMMUNITY HEALTH WORKERS)

CHALLENGE

Reluctance of medical officers to prescribe insulin
Despite evidence that uncontrolled blood sugar could be fatal for mother and child, doctors were found to be reluctant to prescribe insulin due to fear of possible hypoglycaemia.

STRATEGY

Training of medical officers
The state government, with support from Jhpiego, trained all medical officers in insulin management using case scenarios, group exercises and brainstorming sessions. Senior experts from medical colleges were called in to advise medical officers on various types of insulin, the role of insulin in GDM management, calibrating the dose of insulin, and managing hypoglycaemia and other side effects.

CHALLENGE

Challenge of auxiliary nurse midwives and staff nurses customising medical nutrition therapy counselling
Following diagnosis, the auxiliary nurse midwives and the staff nurses counselled the women on lifestyle modifications. However, they were unable to customise the medical nutrition therapy counselling due to their lack of qualifications in nutrition, low buying capacity, varied eating habits among the women and limited food options in the villages.

STRATEGY

Involving feeding demonstrators
Feeding demonstrators (nutrition experts based at the CHC) counselled the women on various lifestyle changes, modified diets in line with eating habits and buying capacity, and provided food alternatives taking into account the calorie and nutrition component.

CHALLENGE

Difficulty of calculating calories for pregnant women with GDM
The auxiliary nurse midwives, staff nurses and feeding demonstrators found it time consuming and difficult to calculate the exact calorie requirements of the women diagnosed with GDM.

STRATEGY

Developing a ready-to-use toolkit
To make the calculation of calorie requirements easier, Jhpiego prepared a ready reckoner of calories for women with GDM for ease of use by health workers. This was based on body weight, level of physical activity and a calorie calculation formula recommended by the Indian Council of Medical Research.
In India, public health institutions are often overburdened and understaffed, lacking doctors and specialists in many rural settings. Involving community health workers (ASHAs) to enhance awareness about GDM and utilising auxiliary nurse midwives and staff nurses to handle the bulk of the work (testing and management) did not, therefore, place additional pressure on the existing doctors and worked to the programme’s advantage.

- Building the GDM capacity of community health workers and field-level service providers was imperative for the effective implementation of the programme.

- ASHAs played an active role in raising awareness about GDM through home visits and monthly meetings in villages. They mobilised women to access GDM services at the village health sanitation and nutrition days (VHSND) and during ANC-OPD at the health facility.

- Auxiliary nurse midwives conducted sessions on GDM testing and management at the VHSND once a month. Similarly, a doctor and a staff nurse conducted sessions on GDM testing and management during ANC-OPD at the health facility twice a week.

- ASHAs supported the auxiliary nurse midwives in preparing the glucose solution and ensured that the pregnant women consumed it. This helped reduce the workload of auxiliary nurse midwives and staff nurses, who had other responsibilities during VHSNDs.

- ASHAs mobilised women diagnosed with GDM for blood sugar follow-up tests, and auxiliary nurse midwives or staff nurses checked the blood sugar. To ensure proper management and follow-up, the state government provided incentives for the ASHAs to mobilising women.

- Competence-based skill training was conducted for auxiliary nurse midwives and staff nurses on implementing the programme, counselling methods and equipment use.

- Involving auxiliary nurse midwives in the programme made it possible for testing services to be available in the villages and drastically improved the coverage of GDM services as well as increased awareness about GDM among pregnant women and their families.

The programme was implemented in 176 health facilities and 975 villages in Hoshangabad.

**PROGRAMME RESULTS**

- **Reach** – 84% of the 29,950 pregnant women were tested for GDM.

- **Diagnosis** – 9% were diagnosed with GDM. Of these, 53% were given a blood sugar test after two weeks of medical nutrition therapy. 53% of the women testing negative were tested for a second time after 24 weeks of pregnancy.

- **Management of GDM** – 99% of the women diagnosed with GDM were managed with medical nutrition therapy and physical exercise. The remaining women were prescribed insulin alongside medical nutrition therapy and exercise.

- **Capacity-building** – The programme trained 1,079 ASHAs, 89 ASHA supervisors, 216 auxiliary nurse midwives and supervisors, 98 staff nurses, 52 doctors, 30 laboratory technicians and 10 facility-level counsellors in GDM awareness, screening, diagnosis and management.

- **Postpartum test** – 33% of the women diagnosed with GDM had their blood sugar tested six weeks after delivery.
State-level expansion – Given the programme’s success, the state government of Madhya Pradesh scaled up the programme to five districts in two years.

Streamlining GDM diagnosis and management in the private sector as per the 2018 national guidelines was approved by the state government of Madhya Pradesh and implemented in five districts.

Influence on the national guidelines revised in 2018:

- **Use of metformin for GDM management** – The programme showed a lack of confidence among doctors in prescribing insulin, and pregnant women and their families were uncomfortable with self-injecting insulin. As a result of these findings, in conjunction with growing global evidence of the safety of oral hypoglycaemic drugs as well as the recommendations of a technical advisory group, the 2018 revised national guidelines include the use of metformin in the line of management for GDM.

- **Involving counsellors, programme managers and storekeepers was found to be helpful with effective implementation.** Training of these groups was therefore incorporated into the 2018 revised national guidelines. A training package developed for the programme has been adopted by the government.

**LESSONS LEARNT**

- **Empowering community health workers** – Community workers play a very important role in generating awareness and mobilising the community, which in turn helps in achieving the programme objectives by establishing forward and backward referral linkages. Their capacity should be built through training, hand-holding and supportive supervision.

- **Uninterrupted supply chain of essential medical products and technologies** – The success of the programme depends on maintaining an uninterrupted supply of commodities. Existing supply chains can be adapted and customised to local needs.

- **Interdepartmental coordination** – Implementing a GDM programme requires coordination between maternal health and NCD programmes. Links between these departments help provide continuity of care for women with GDM. Nutrition experts from the child health department were included in this programme, which helped improve medical nutrition therapy counselling. Creating linkages with community processes helps to build awareness and mobilise communities to seek care. Exploring such linkages helps achieve the best possible outcome.

- **Effective counselling techniques** – Counselling plays a critical role during pre-testing, diagnosis, management and postpartum follow-up. It is therefore imperative to strengthen counselling services and capacity-building of cadres within the healthcare system facility and community levels. Simplified job aids and flipbooks also support with effective counselling.

- **Maintaining equipment** – To get accurate results and ensure proper functioning of the glucometers, it is important to regularly calibrate the glucometers and store test strips properly. This can be done by maintaining a supply of calibration solution up to periphery level and by training staff in the calibration of glucometers and the use and storage of test strips.

- **Incorporating GDM-related data in the health department’s monitoring and evaluation (M&E) system** – Incorporating GDM-related data in the government’s health system results in better implementation and sustainability of the programme.
Jhpiego is a non-profit global health leader and Johns Hopkins University affiliate that is saving lives, improving health and transforming futures.

Jhpiego partners with governments, health experts and local communities to build the skills and systems that guarantee a healthier future for women and families. Jhpiego translates the best science and practice into moments of care that can mean the difference between life and death for women and families. The moment a woman gives birth; the moment a midwife helps a newborn to breathe.

Through its partnerships, Jhpiego is revolutionising healthcare for the world’s most disadvantaged and vulnerable people.

For more information, visit [www.jhpiego.org](http://www.jhpiego.org) or [www.jhpiego.org/india](http://www.jhpiego.org/india)

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Novo Nordisk is a global healthcare company with 95 years of innovation and leadership in diabetes care. This heritage has given us experience and capabilities that also enable us to help people defeat obesity, haemophilia, growth disorders and other serious chronic diseases. Headquartered in Denmark, Novo Nordisk employs approximately 43,100 people in 79 countries and markets its products in more than 170 countries.

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**REFERENCES**


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