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A FRESH APPROACH TO GESTATIONAL DIABETES. FUTURE NCD PREVENTION FOR MOTHERS AND CHILDREN

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Gestational diabetes mellitus, also known as GDM, is the most common medical condition linked to pregnancy. It is widely recognized that GDM is connected to immediate issues during pregnancy such as excessive fetal development and obesity as well as to hypertensive illnesses during pregnancy[1]. However, the connections between a number of longer-term maternal and fetal health outcomes, such as lifelong risks for obesity, pre-diabetes, diabetes, and cardiovascular disease, have received less attention, and few health systems consistently address these important issues.

The use of demographic, clinical, and biochemical variables to forecast the onset of GDM is examined using both historical and recent data. The important role of a GDM diagnosis as a long-term predictor of the probability of developing a non-communicable disease (NCD), in particular[2].

Global epidemic levels are being reached by both obesity in women of reproductive age and hyperglycemia in pregnancy (HIP) . For the current report, we are following the diagnostic standards for HIP put forward by the International Federation of Gynecology and Obstetrics (FIGO), which classify any rise in blood glucose levels during pregnancy as a component of the overall definition of HIP. This sizable group is then further divided into women who either have known pre-pregnancy diabetes or notably high glucose levels that are consistent with a diagnosis of diabetes outside of pregnancy[3]. The phrase "Diabetes in Pregnancy" describes this condition.

(DIP). The considerably larger group of women with high glucose levels below this is referred to as having "Gestational Diabetes Mellitus[4]".

It is challenging to establish a definite causal relationship because obesity is on the path to hyperglycemia and HIP is causally linked to obesity in the progeny. Overweight/obesity and GDM frequently affect the same people[5].

Hyperglycemia (also known as pre-diabetes or diabetes) may very well present before pregnancy, according to large studies like the NHANES (National health and nutrition examination survey). It can only be identified when (and if) systematic testing is carried out in the context of pregnancy because it is now often asymptomatic[6].
The Hyperglycemia and Adverse Pregnancy Outcome (HAPO) study found a correlation between maternal BMI and hyperglycemia and pregnancy complications. Both exhibited a higher prevalence of pregnancy-related hypertension problems, clinical newborn hypoglycemia, primary cesarean delivery, excessive fetal growth, and neonatal obesity[2,3].

However, the association between BMI and outcomes has a quadratic pattern with decreasing increments at the highest BMI categories, unlike the relationship between high blood sugar and un favorable outcomes, which is frequently linear.

Additionally, HAPO claimed that GDM and BMI were taken into account in addition to pregnancy-related issues. Of the HAPO individuals who were still blindfolded, obesity was visible in 13.7% of cases and GDM according to IADPSG criteria in 16.1% of cases. Obesity was present in 25% of GDM women, however the prevalence varied greatly by region[7]. Positive results were lower for both groups of women than for those who lacked either trait. Pre-eclampsia was more common in the "obesity/non GDM group," while abnormally rapid fetal growth and hyperinsulinemia were somewhat more common in the "GDM/no obesity group" than in the "obesity/non GDM group." The two causes' interplay led to an additive increase in pregnancy issues[8].

Therefore, maternal obesity and hyperglycemia have separate and combined consequences that lead to poor pregnancy outcomes. While acknowledging obesity as a serious health problem, our current study will primarily focus on the prediction and diagnosis of GDM and explain appropriate management both during and after pregnancy[4, 5] .

GDM forecast
Many women who are currently diagnosed with "GDM" may really have had undiagnosed hyperglycemia previous to getting pregnant, as was already indicated.

Hyperglycemia screening would be a crucial component of well-planned and resourced preconception care in high incidence countries.
The fact that only about 40% of pregnancies worldwide are "planned" poses certain limitations to this method[9, 10].

Due to the absence of preconception testing, we cannot conclusively state that testing during the first trimester of pregnancy "predicts" GDM[9].

However, early testing does give the opportunity to spot those women who most likely already have issues with their glucose metabolism.

For instance, it has been reported that in India, more than 70% of GDM women can be identified at their first antenatal consultation.

Additionally, using clinical characteristics and biochemical tests, it may be possible to distinguish a subgroup of pregnant women with glucose levels that are within the normal range in the early stages of pregnancy but who have a high risk of developing "standard GDM," which is typically diagnosed at around 24 to 28 weeks' gestation[10]. It makes sense from a practical standpoint to concentrate early intervention efforts on women with pre-pregnancy hyperglycemia, early-stage GDM, and high-risk GDM[11].

GDM is an indication of (premature) cardiovascular disease in women and frequently acts as a precursor to Type 2 diabetes later on. Along with their shared sine qua non of hyperglycemia, GDM and Type 2 diabetes share a variety of underlying processes, including insulin resistance, chronic metabolic inflammation, alterations in adipocytokines, and abnormalities in many areas of metabolism[12].
The most basic models for GDM prediction divide GDM risk into subgroups based on one or more clinical factors. The most effective models for prediction, according to Van Hoorn et al. who recently evaluated the effectiveness of various models, incorporated a variety of clinical characteristics and early pregnancy glucose levels. Machine learning or artificial intelligence approaches have lately been utilized to improve predictive capability using demographic data and previous laboratory findings[13].

Predictive models also include early pregnancy signs such pregnancy associated plasma protein A (PAPP-A) and free HCG, which are widely used to predict aneuploidy and are linked to GDM[14]
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Using preserved serum samples from a first trimester screening program in Sydney, Sweeting et al. showed that the utilization of several biochemical markers along with clinical features is able to predict GDM with high accuracy [area under receiver operator curve (AUROC) 0.91-0.93]. However, these findings require confirmation in further cohorts[15, 16] .

A cluster associated with insulin synthesis, binding, resistance, and signaling was found by early prenatal proteomic screening to be one of several potential protein predictors for later GDM . Vitonectin, which has been associated to metabolic syndrome outside of pregnancy, significantly increases the accuracy of maternal risk variables and may be a helpful predictor in clinical settings, claim Ravnsborg et al. Because proteomic technologies are now too complex and expensive for ordinary use, they must first develop into automated, low-cost laboratory tests[17].

ECVs have lately received attention as potential GDM indicators. These circulating particles, which are mostly made of adipose tissue and the placenta during pregnancy, "package" a range of potential protein and RNA molecules and transport them to specific sites. Certain microscopic ECVs have been associated to GDM, according to study by James-Allan et al. and mice treated to human ECVs from GDM patients exhibit insulin resistance and reduced insulin secretion, simulating the development of the illnes[18].

Micro RNAs, which are essential for the metabolism of glucose, are abundant in ECVs. First trimester blood samples contained micro RNA-223 and micro RNA 23a, and Yoffe et al. discovered that they were highly predictive of later GDM (AUROC 0.91; exploratory case-control study) . A recent cohort study has supported this finding for micro-RNA-233[19].

Recent in-depth research on the relationships between non-coding RNAs and GDM has shown intriguing findings. As with other biomarkers, these intriguing findings from small studies need to be confirmed in different cohorts. The necessary assays will also require in order for them to be used in typical diagnostic laboratories at low cost and high throughput.

In conclusion, cohort studies have found a wide range of putative early pregnancy indicators of later GDM . A complex network of molecular indicators, information on early pregnancy's glucose levels, and one or more clinical or demographic assessments can all be included. To be useful in routine clinical practice, molecular biomarkers must both outperform clinical risk factors and simple glucose tests in predicting GDM and pregnancy outcomes and exhibit cost-effectiveness. Practically speaking, they should be useful for early pregnancy health screening procedures as well as non-fasting tests. Despite the fact that multiple biomarkers have a strong link with eventual GDM, no assay has been sufficiently developed as an automated and cost-effective tool to be utilized frequently in clinical practice.

Diagnosis of GDM

GDM is commonly diagnosed with an oral glucose tolerance test (OGTT) administered between 24 and 28 weeks of gestation. This timing has traditionally been advised for routine GDM diagnosis because the majority of the physiological insulin resistance associated with pregnancy would be largely developed by then. Recent studies from several parts of the world have found significant rates of GDM diagnoses early in pregnancy, which raises the possibility that this presumption is no longer valid given the aging of mothers, the prevalence of obesity worldwide, and other environmental risk factors. The increasing frequency of undiagnosed dysglycaemia (diabetes and pre-diabetes) in reproductive age women, which calls into question the prior standard of testing, increases the need to rule out pre-existing undiscovered diabetes as soon as possible[20].

The exact procedures and requirements for diagnosing GDM via an OGTT vary widely between nations. The "one step" OGTT testing, which uses thresholds of 5.1 mmol/L fasting, 10.0 mmol/L at 1 hour, and 8.5 mmol/L at 2 hours after a 75gram glucose load for diagnosis of GDM, is supported by the World Health Organization (WHO), the International Association of Diabetes in Pregnancy Study Groups (IADPSG), and FIGO. However, the practical FIGO recommendations, which take into account varied healthcare environments, allow for other diagnostic approaches for China, India, South America, and the United Kingdom[21].

The diagnostic process differs significantly in the USA and Canada. In these countries, testing frequently involves two steps: a non-fasting, one-hour "glucose challenge" test (GCT), followed by an OGTT (100 gramme or 75 gramme), if the GCT result exceeds predetermined thresholds. The IADPSG, WHO, and FIGO have all acknowledged the need for early testing as well as testing throughout the traditional 24 to 28 week window[22].

Another notable difference in testing methods for GDM around the globe is the ongoing debate over whether testing should be mandatory (for all pregnant women) or confined to those with established risk factors that increase the likelihood of a positive result. FIGO, the IADPSG and the American College of Obstetricians and Gynecologists (ACOG) , among others, all recommend universal testing. The HAPO experiment clearly demonstrated that OGTT glucose values are independently associated with worse pregnancy outcomes, even after taking into account a variety of other maternal variables, such as BMI. Because GDM is virtually always asymptomatic, a diagnostic approach that emphasizes symptoms is obviously untenable [23] .

However, some organizations—most notably the National Institute for Clinical Excellence (NICE) in the UK—continue to support risk factor-based screening. Even while the most current Cochrane review was unable to reach a definitive result, a recent systematic examination of economic assessments of GDM screening also concluded that the most effective approach was universal screening. The study conducted by Adam et al. found that while using risk factors would increase compliance, official endorsement of risk factor-based screening protocols appears to be low in a number of countries, including South Africa , Sweden, and the UK (61%), where only 31% of women received the screening test deemed appropriate for their documented risk factor profile.

It is obvious that a less expensive, more precise, non-fasting test would be desired because the glucose tolerance test is laborious, resource- intensive, and not very reproducible . Self-administered home OGTTs typically provide more convenience and perform comparably to lab oratory testing[24].

FIGO has approved this tactic for use in limited resource scenarios .Some meters with strict labo ratory-based quality control may also provide sufficient accuracy for fasting glucose testing.

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Glycosylated haemoglobin (HbA1c), which is widely used to diagnosis diabetes outside of pregnan cy, is an obvious replacement for this test.

Apart from detecting undiagnosed hyperglycemia early in pregnancy, it doesn't seem to be very help ful. It also doesn't do well in predicting the end of pregnancy or OGTT-diagnosed GDM.
Other general glycemia markers that have been investigated and found to be more suggestive of shor t- term glycemia abnormalities are fructosamine (FA), glycated albumin (GA), and 1.5 anhydroglucitr ol (1.5 AHG) .

It is not advised that the general public use this strategy. Although pregnancy related dilutional anemia affects FA, it is easily measured.
Preeclampsia causes a lower renal threshold for glycosuria, which is why when albuminuria is pre sent, FA and GA vary, and 1.5 AHG is incorrect .

More recent studies have connected the glycated complement fraction GCD59 to large for gestational age (LGA) babies and early GDM in an obese pregnant population.
Larger future reviews are currently being carried out. GDM Prevention During and After Pregnancy
The general public should be encouraged to adopt healthier eating habits and increase their physical activity levels through communal and individual initiatives, with a focus on fitness.

Maternal age at conception is a substantial predictor of pregnancy complications, including gestatio nal diabetes mellitus (GDM), but it is also strongly influenced by societal and personal factors, so it is unlikely to be a useful target for preventive efforts.
Maternal obesity and overweight should be treated as a major risk factor prior to conception[25].
For people with severe obesity, bariatric surgery is the most efficient technique to decrease weight.
Despite a comprehensive analysis of its effects, surgery that results in malabsorption causes more w eight loss and exhibits lower rates of LGA but higher rates of SGA, suggesting that clinical judgmen ts need to weigh the advantages and disadvantages.

The most recent evaluation of many GDM prevention strategies by the Cochrane group states that no one lifestyle or medication-based treatment has been demonstrated to be useful; nonetheless, we will take a closer look at some of the more well-liked potential options. Interventions in Lifestyle In spite of the negative Cochrane results mentioned above, which concluded that neither diet nor exercise alone could prevent GDM and that the combination of diet and exercise could only prevent GDM in a "possible" (non-significant) way, a systematic review conducted by Song et al. revealed that changing one's lifestyle before the 15th gestational week could reduce GDM by 20% [RR 0.80 (95% 9I 0.66–0.97)] [26].

Although there is some promise for lifestyle-
based interventions because of this, the overwhelming body of research indicates that any lifestyle i ntervention beyond the first trimester is unfavorable. Metformin usage
In early pregnancy, women with polycystic ovarian syndrome are frequently prescribed metformin. If glycemic objectives are not met by lifestyle adjustments, it is also utilized as a medication treatme nt for GDM in the second and third trimesters[22].

Numerous facets of metformin use during pregnancy have been condensed in a recent study . Metformin, however, is not recommended as a prophylactic measure for GDM based on the availabl e data.
Between weeks 12 and 16 of pregnancy, 449 obese women with normal baseline glucose tolerance were randomly assigned to receive up to 2,500 g of metformin per day against a placebo in the (EM POWaR) research. The treatment lasted until the baby was delivered[27].

No differences were observed in the prevalence of GDM, maternal weight increase, or maternal lipid metabolism by EMPOWaR. The groups' birth weights and birthweight SD (Z) scores were similar. A higher percentage of reported diarrhea (42 % vs. 19%, $P < 0.0001$) was linked to metformin. From 12 to 18 weeks gestation until delivery, Syngelaki et al. randomized women with BMI > 35 kg/m2 to receive either a placebo or 3 g of metformin daily . The trial was completed by 202 women on metformin and 198 taking a placebo. The fetal growth was not different. Metformin lowered maternal GWG by 1.7 kg ($P < 0.001$). Not only were GDM rates comparable among groups, but so were other pregnancy outcomes. Dodds et al.'s GRoW RCT, which used metformin for overweight and obese women starting early in pregnancy[28, 29].

Myoinositol Insulin sensitivity is increased by myoinositol outside of pregnancy. A study including 69 women with GDM who were randomly assigned to receive 4 grams of myoinositol daily along with 400 micrograms of folic acid daily, as opposed to folic acid alone, revealed that the myoinositol group had lower insulin resistance. In another trial, 220 obese women were started at 12- to 13-week gestation and followed throughout the pregnancy to compare myoinositol 2 g with 200 mcg folic acid daily vs. 200 mcg folic acid daily alone. The myoinositol group allegedly had a decrease in GDM prevalence, from 33.6% to 14% ($P = 0.001$). However, a different RCT compared women randomly assigned to receive 1,100 mg myoinositol, 27.6 mg D-chiroinositol + 400 mcg folic acid, or 400 mcg folic acid alone. No decrease in the frequency of GDM was observed from the beginning of pregnancy until 24-28 weeks of gestation[25].

Another randomized controlled study (RCT) with overweight pregnant women compared resveratrol to inositol. The trial was divided into three arms: inositol only, resveratrol plus inositol, and placebo. Resveratrol was linked to lower glucose and cholesterol levels. Intake of a nutritious drink boosted with conventional micronutrients twice a day will be compared to twice a day intake of a nutritional

drink enriched with probiotics, myoinositol, and other micronutrients as part of the NiPPeR trial. The results are not available yet. Prebiotics In a Finnish study, probiotics were found to lower GDM in women of normal weight[26.27]. This finding sparked intense interest in probiotics as a low-risk treatment agent in the prevention of GDM.

Results with women who are obese prior to pregnancy, however, have not been as encouraging. The main objective of the Probiotics in Pregnancy Study was a change in fasting glucose. During a four-week period from 24 to 28 weeks gestation, 175 obese women were randomly assigned to receive probiotic or placebo capsules. Baseline BMI varied throughout treatment groups. The primary endpoint of fasting glucose did not show any appreciable therapeutic improvements after adjusting for BMI. Other metabolic markers and infant birthweight did not improve. The majority of the available data is undoubtedly negative because more recent research, such as the SPRING study, HUMBA study and studies from Finland and Denmark, have found negative effects for probiotic supplementation.[28,29]

Fish-based oil Additionally, dietary fatty acids have been proposed as a treatment that may lower GDM and increase the likelihood of preterm deliveries. 2399 women were randomly assigned, prior to 21 weeks of gestation, to receive either 800 mg/day of DHA-enriched fish oil or vegetable oil capsules devoid of DHA until the time of birth. This was done as part of the DHA to optimize mother infant outcome (DOMInO) RCT. There were no changes in the size or adiposity of the neonates, nor in the incidence of GDM or preeclampsia. An evaluation of the kids at age 7 revealed no anthropometric differences[30] .

Calcium D Although the results of treatment trials have been conflicting, low serum 25 hydroxy vitamin D levels are unquestionably a risk factor for the development of GDM. Vitamin D supplementation alone "probably" lowers the population incidence of GDM [RR 0.51 (95% CI 0.27–0.97)] and pre-eclampsia [RR 0.48 (95% CI 0.30–0.79)], according to the most recent Cochrane review, which mostly included research from the Middle East. But there was no discernible advantage for vitamin D + calcium or vitamin D + calcium + other minerals. The Cochrane Group, in its review of research on GDM prevention, rated the overall quality of available evidence as "low"[31].

We regard the following conclusion from Corcoy et al.to be a fair summary, taking into account the overall divergence in populations investigated, baseline Vitamin D levels, and therapeutic Vitamin D doses employed in the studies included in/excluded from various reviews: When pregnant women have a baseline vitamin D level of less than 50 nmol/L, the rate of GDM is halved when they take high doses of vitamin D supplements. Up to 5,000 IU per day of vitamin D supplementation does not seem to cause any toxicity. Practically speaking, then, vitamin D seems to be a good choice for groups with low baseline levels. Perhaps more research will shed light on its actual medicinal function.

Handling GDM: Throughout Pregnancy and After Delivery If glycemic control cannot be reached with lifestyle changes alone, treatment for gestational diabetes mellitus (GDM) during pregnancy focuses on dietary modification, encouraging healthy physical activity, and pharmacologic therapy, typically with insulin and oral hypoglycemic agents (OHA) [32]. The specifics of the treatment strategy vary greatly between and within nations, particularly with regard to different dietary approaches and the possible use of OHAs like metformin and glyburide (glibenclamide). A thorough discussion of these ongoing points of contention is outside the purview of our review but has recently been thoroughly covered.

In terms of immediate pregnancy outcomes, two ground breaking prospective RCTs have demonstrated the benefits of GDM diagnosis and treatment for both mother and child. The Australian

(Crowther) study's intervention arm's female participants displayed decreased preeclampsia, fewer cases of LGA, and lower rates of fetal macrosomia. Women with GDM who received treatment showed reduced GWG and pre-eclampsia rates in the US (Landon) research[25,31]. Infants of treated moms showed lower incidence of macrosomia and LGA. Future NCD Prevention for Mother and Children Antecedent GDM is the best historical predictor of future Type 2 diabetes, excluding its brief, direct correlations with unfavorable perinatal outcomes.

Women with GDM have a nearly tenfold higher chance of developing type 2 diabetes later in life [RR 9.51 (95% CI 7.14–12.67)]. (Additionally, women with GDM have an increased risk of CV disease. Even in women who do not develop overt Type 2 diabetes, there is still a higher risk. Those with antecedent GDM also seem to be at higher risk than those without such a history in the general population of women with Type 2 diabetes. Women with GDM had a twofold increased risk of CV events in the future [RR 1.98 (95% CI 1.57–2.50)] compared to those without GDM[33].

According to a meta-regression analysis, this relationship (P = 0.34), is independent of the incidence of Type 2 diabetes in different studies. GDM was linked to a higher risk of experiencing future CV events, even when limiting the analysis to women who did develop overt Type 2 diabetes [RR 1.56 (95% CI 1.04–2.32)]. A significant portion of this risk arises early in the postpartum phase, with a 2.3-fold increase in CV events observed in the first ten years after delivery [RR 2.31 (95% CI 1.57–3.39)]. It has been conclusively demonstrated that there is a therapeutic opportunity to delay or prevent type 2 diabetes in women identified as being "at risk" due to prior GDM by implementing postpartum lifestyle modifications and potentially using medication.

According to a German study, breastfeeding (BF) appeared to postpone the onset of type 2 diabetes by an additional 10 years and was linked to a reduction in diabetes of >40%. These effects were independent of established risk factors for mothers, such as preexisting obesity or the requirement for insulin therapy during the index pregnancy. Women who breastfed for longer than three months had the biggest decrease in their risk of developing diabetes later on. Reduced risks for both pre-diabetes and type 2 diabetes were found in a systematic review and meta-analysis of the relationship between BF and the postpartum risk of progression from GDM to overt type 2 diabetes. There was a significant decrease in pre-DM (OR = 0.66; 95% CI, 0.51–0.86) and a decrease in the frequency of T2DM (OR = 0.79; 95% CI, 0.68–0.92) [34].

Women who had any BF for a longer period of time after a GDM pregnancy reported benefits. With a longer follow-up, these were even more apparent. Longer BF duration was linked to improvements in glucometabolic parameters, such as reduced fasting glucose and improved insulin sensitivity, as well as lower BMI at follow-up and improved lipid metabolism as evidenced by lower triglyceride levels, when compared to women with shorter BF duration. Therefore, in addition to its other widely known benefits, BF may be very beneficial as a low-cost preventive measure in preventing both T2DM and related metabolic derangements in women with a history of GDM.

Although there is currently little evidence to support the use of post-partum interventions to prevent CV disease in women with a history of GDM, it makes sense that improved post-partum lifestyle and breastfeeding would greatly lower the risk. Failure to regain pre-pregnancy weight is frequently linked to an excessive increase in maternal weight from one pregnancy to the next. This is directly linked to a greater likelihood of unfavourable outcomes in subsequent pregnancies. Known hazards include increased stillbirth rates. Additionally, the "vicious cycle" of weight gain and increased risks of developing T2DM and CV disease is exacerbated by this continued weight gain. Clinical research has,

however, been able to pinpoint the precise role that weight gain gained between pregnancies plays in the overall CV risk profile[35].

Offspring raised in a hyper glycemic environment in utero are more likely to experience obesity early in life, which can lead to early impaired glucose tolerance, later type 2 diabetes, and long-term risks of overt cardiovascular disease. Maternal obesity is not a factor in these risks, which generally fit under the umbrella of "developmental origins of health and disease" (DoHaD). German researchers found that even after controlling for mother BMI, children of GDM and non-GDM parents had increased chances of developing childhood disorders. For childhood overweight, they found an adjusted OR of 1.81 (95% CI, 1.23–2.65) and for obesity, 2.80 (95% CI, 1.58–4.99) [36].

The risk of childhood abdominal adiposity was also elevated by maternal GDM (OR, 1.64; 95% CI, 1.16–2.33). According to Israeli researchers, there is a correlation between offspring CV morbidity (relative risk, 1.6; 95% CI, 1.2–2.2) and mild GDM (diet treated). There has been a suggestion by other researchers that GDM and neuropsychiatric disorders in offspring are related. It is far less evident how well the current standard GDM interventions work during pregnancy to reduce the risks of obesity and impaired glucose metabolism in the offspring of GDM mothers. The current report has methodological issues with incomplete cohort follow-up and post hoc design. Prospective follow-up studies that are specifically planned would be very beneficial, but it is obvious that these are challenging to plan, finance, and carry out.

The landmark GDM RCTs that demonstrated the benefits of GDM treatment during pregnancy have been followed up on. Gillman et al. reported Crowther study follow-up, but this report consisted of limited follow-up via school-based databases rather than direct clinical contact. There was no benefit to the offspring after maternal GDM treatment. Landon et al. reported a follow-up of their North American study and found no clear offspring benefits from maternal GDM therapy despite detailed clinic visits. The Landon et al. study did show a minor improvement in glucometabolic status for girls whose mothers had GDM.

This was in contrast to their earlier research on the effects of GDM treatment on immediate pregnancy outcomes, which revealed that men were more likely to benefit from it. This discrepancy's cause is still unknown. Recently, Gunderson et al. reported that breastfeeding may lower some of the offspring risks associated with maternal GDM, describing a cohort based in the USA. They observe that when babies of GDM mothers who were breastfed intensively at 12 months of age, the offspring weight for length Z score decreased by 0.36–0.45 standard deviation units. There is currently no information available regarding possible longer-term effects. Postpartum Blood Sugar Monitoring Every woman with HIP (overt DIP and GDM) should have a 75 g OGTT 6-12 weeks after delivery to reevaluate their glycemic status.

The majority of health care systems, however, do not follow this recommendation. Alternative strategies based on testing in the early post-partum period are somewhat supported by physiologic research showing that changes in maternal insulin sensitivity occur quickly after delivery. At this point, early testing seems adequate to rule out ongoing Type 2 diabetes, but not impaired fasting glucose (IFG) or impaired glucose tolerance (IGT) . Diagnosis at 6–12 weeks should follow the local non-pregnant criteria for diabetes, impaired fasting glucose (IFG), and impaired glucose tolerance (IGT).

Women whose test results are currently within the normal range should continue to be monitored for diabetes, and those whose results are abnormal should receive targeted interventions for either pre-diabetes or diabetes, depending on the results. All women with GDM should be regarded as having a

higher risk of developing diabetes and cardiovascular disease in the future, regardless of their early postpartum glucose readings. They ought to be counseled to pursue a normal body weight, establish healthy eating habits, engage in regular physical activity, and breastfeed for as long as feasible. Support should ideally come from ongoing follow-up and consultation with medical professionals who are knowledgeable about diabetes prevention[26].

It is imperative to acknowledge that postpartum care offers a crucial chance to impact maternal and infant health throughout their lives, and is frequently the best (and only) way to try to improve overall health before the next pregnancy. The inability to set up programs that can aid in intergenerational NCD prevention and post-partum follow-up are the main obstacles in the care of the mother with GDM and her children. A lot of obstacles stand in the way of accomplishing these goals. Women with GDM typically no longer have glucose levels in the pre-diabetic or diabetic range after giving birth. Moreover, since they are no longer pregnant, the maternal health care system hardly ever offers continuing care after six to twelve weeks after giving birth.

As a result, they are less likely to go for routine checkups regarding their personal health problems. Moreover, there is frequently no clear plan for continued follow-up and the issue of who is responsible for continuing care is left "open".On the other hand, women are typically very vigilant in making sure that their baby receives scheduled vaccinations, routine health checks, and growth and developmental assessments. At this point, however, baby health care is frequently a top priority. These frequently persist for at least five years following birth in a well-organized manner.

As a result, obstetricians, family physicians, internists, and pediatricians must develop systems to connect post-partum follow-up women with GDM with the recommended routine care of their child, as this appears to give the mother-baby dyad the best chance of high quality care and health care engagement. All offspring of mothers with HIP are at increased risk of glucometabolic and cardiovascular disease. However, when the female offspring reach reproductive age, they face an increased risk of developing HIP, compounding the intergenerational "vicious cycle" of NCD transmission. Pregnant women with a maternal GDM history are more likely to develop GDM than those with a paternal GDM history.

Therefore, it's critical to screen these women for hyperglycemia prior to conception or as early in the pregnancy as possible, and to repeat the test after each trimester. In brief In conclusion, GDM poses a significant short- and long-term challenge. It is obvious that GDM detection and treatment are helpful in enhancing outcomes in the immediate pregnancy context. The correlations with moms' and babies' long-term health are also evident, but more research is needed to determine the best course of action. This is an international issue! It is critically necessary to prevent and treat GDM during and after pregnancy in order to lessen the NCD burden on afflicted women and their children[36, 37] .
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Despite growing knowledge in this field, practical application of tried-and-true strategies remains limited. There is significant potential for reducing NCD burden through widespread implementation of relatively simple strategies to stem the tide of the "slow motion disaster" of obesity and diabetes, as identified by World Health Organization Director Dr. Margaret Chan.
Author Contributions: HM is the work's guarantee and authored the manuscript's original draft. The final draft of the manuscript was approved by AK, HD, and MH after they had examined and modified it. Each author accepted the submitted version of the paper and made contributions to it[38].

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