



InDependent Diabetes Trust

Pregnancy and Diabetes

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Introduction

Most women with diabetes are aware that pregnancy means that they face greater risks to their own health and that of their baby than women without diabetes. For women considering having a baby, it is important to have information and advice before conception and throughout pregnancy. It is also important to know that breastfeeding

and weaning affect blood glucose control.

This leaflet aims to cover these aspects for women with existing diabetes. It also covers gestational diabetes which is diabetes that develops during pregnancy and usually disappears once the baby is born.

Facts

- The rate of congenital abnormalities in babies born to women with Type 1 diabetes has not changed in recent years.
- Diabetic mothers of malformed babies were significantly younger than mothers of babies that were not malformed. Nearly two thirds of the malformed babies were boys.
- The perinatal mortality remains 3-5 times higher in women with diabetes than in non-diabetic women. [A perinatal death is usually defined as death of the foetus after 28 weeks of pregnancy and the first week of the baby's life.]
- The proportion of perinatal deaths caused by congenital abnormalities has reduced but the post-natal mortality has significantly increased. This could be due to better care during pregnancy or that the mortality rate in the general population has also reduced markedly.

A study carried out in 2004 also showed that 84% of the pregnancies were planned suggesting that blood sugar control was good in early pregnancy and most women were taking folic acid. Yet despite this:

- More than 12% of the pregnancies were complicated by pre-eclampsia - 12 times higher than the general population.
- 32.2% of babies were born prematurely [before 37 weeks] - a fourfold increase in risk compared to non-diabetic women.
- There is a high risk of babies being born with dangerously low blood glucose levels, hypoglycaemia.
- 44.3% had Caesarean births - again a fourfold increased risk.
- Congenital abnormalities, such as heart problems occurred in 29 babies - 3 times the number for the general population.

The researchers concluded that even near perfect control of blood glucose levels during pregnancy was not sufficient to guarantee

protection of mother and child.

Latest NICE Guidelines

Pregnancy and diabetes

The latest National Institute for Health and Clinical Excellence (NICE) guidelines on pregnancy and diabetes were issued in July 2008. NICE recommends:

- women with diabetes should be able to access specialist services before they become pregnant.
- They should aim for a fasting blood glucose of 3.9 to 5.9mmol/l and one hour post-prandial [after meals] blood glucose below 7.8mmol/l if planning to become pregnant and during pregnancy.
- Women should be directed to take folic acid supplements and given lifestyle advice.
- They should be told of the importance of maintaining vitamin D levels during pregnancy and while breast feeding and if required, they should be offered Vitamin D supplements.
- Health professionals should advise on good glycaemic control in reducing the risk of miscarriage, malformation at birth, still birth and neonatal death.
- GPs must tell women who are pregnant and those planning to conceive to avoid alcohol because it can increase the risk of miscarriage in the first trimester.
- Women with gestational diabetes should be offered advice on diet and exercise and offered a fasting plasma glucose test at the 6-week postnatal check and yearly after that.

Pre-conception

It has been known for some years that good diabetic control at the

time of conception improves the chances of having a healthy baby. Entering the pregnancy with good control increases the chances of a healthy baby because important organs of the foetus develop during the early part of pregnancy - the brain, the spine, the heart, the kidneys and the gastrointestinal system. Malformations associated with diabetes are spina bifida, where the spine does not completely close and heart defects. As these malformations are formed during early pregnancy, getting into better control later in the pregnancy does not change what has already developed. However, it is important to remember that just because a woman does not have good control she is bound to have a baby that is affected.

For these reasons, a planned pregnancy with good blood glucose control at the time of conception is the ideal situation although it is estimated that as many as two thirds of pregnancies are unplanned. A planned pregnancy also means that folic acid supplements, which reduce the risk of spina bifida and other defects, can also be taken prior to conception. Many diabetes clinics now offer 'pre-conception counselling' for couples intending to have a baby to try to ensure that the mother's blood glucose control is good at conception and from the outset of the pregnancy.

However, research has shown that quite a high proportion of women do not attend pre-conception counselling despite the fact that it is freely available to them. Women with diabetes who have already had one pregnancy seem even less likely to seek counselling. Whatever the reason for this, it is still advisable to have a discussion with your healthcare professional if you are considering pregnancy.

Just a note: Also worth checking at this stage is the safety of the insulin you are using and any other drugs. None of the analogues have been tested in pregnant women or those planning pregnancy so any risks to the foetus and/or mother are unknown. Commonly prescribed for people with diabetes are ACE-inhibitors for the treatment of blood pressure and/or to slow down the progression of kidney disease and also statins to reduce cholesterol levels. Both these classes of drugs are potentially toxic for the foetus.

But do women attend pre-conception counselling?

Researchers in Hull [ref1] who carried out a study looking into the use of Humalog during pregnancy were struck by the large number of women in this study who did not have pre-conception counselling. Despite the fact that this was freely available to them – only 40% took it up.

So they carried out a questionnaire study in 69 women between the ages of 16 and 45 to survey their attitudes and knowledge of maternal diabetes and pregnancy. 18 of the women already had children and the rest didn't. The results were surprising but according to the researchers are similar to other studies:

- In both women with and without children, a high proportion of women [85%] knew that their diabetes could affect the health of the baby and that good control was important at the time of the conception.
- Of the 18 with children only 44%, less than half, had attended pre-conception counselling before their last pregnancy.
- Only 52% of those without children and 28% of those with children reported the intention to do so before a future pregnancy.

So although the knowledge about the need for pre-conception counselling was there, this knowledge is not acted upon. What is more, the women that had already had one pregnancy were even less likely to seek counselling before a future pregnancy! The researchers point out that teaching and knowledge do not necessarily change behaviour and they suggest that a novel approach is needed if pregnancy outcomes are to be improved and that this should continue throughout the reproductive years.

Just a comment...

It is a shame that the questionnaire did not ask why women don't attend pre-conception counselling. It is well recognised that pregnant women with diabetes go to great lengths to maintain very tight blood sugars to safeguard the health of the baby and indeed,

their own health, so it is surprising that so few women attend. Perhaps the term 'Pre-conception counselling' is not one that appeals to people contemplating having a baby, especially young people! The word counselling alone can be off-putting for some people. Straight forward 'Family Planning' may be more appealing but a little imagination would produce a better name.

Ref 1 Diab Med 2002, Vol 19:605

Pregnancy

Blood glucose control throughout pregnancy

Blood sugar control is important throughout pregnancy but for different reasons. In the early stages of pregnancy it is important for the healthy development of the foetus and in the later stages, it is important to avoid hyperglycaemia because of the impact on the baby's metabolism.

Excess glucose in the mother's circulation easily passes through the placenta to the baby and it is as if it is eating sweets all the time. This stimulates insulin production in the baby, insulin is a potent growth hormone and so fat is deposited. This can result in a large baby which can lead to complications at delivery because the baby will not easily fit through the birth canal. After delivery the baby still produces large amounts of insulin which can result in the new born baby being hypoglycaemic. The hypoglycaemia can be dealt with by the paediatrician.

The first trimester – the first 3 months

Low blood sugars are more common during the first 3 months of pregnancy because the baby begins to feed off the mother's glucose stores. In addition to this, the hormones are working hard to create the placenta and this can make it hard to control blood sugars. So it is important to blood test frequently and be prepared for unexpected hypos. Sometimes during this period the symptoms

of hypos may change and you may not always recognise them, so it is advisable to warn friends and work colleagues about the signs of hypos. If you don't already have glucagon for emergencies, then it may be a good idea to discuss this with your doctor. Glucagon is an emergency hormone that is injected if you have a severe hypo and are unconscious so cannot eat or drink. It works by making the liver release its own stores of glucose.

Morning sickness is common in 70% of pregnant women. It is worse on an empty stomach and some women find that eating a cracker or something similar may help. It may also help to make sure that you have a bedtime snack with protein and carbohydrate. Sometimes eating smaller and more frequent meals helps. If morning sickness is a real problem, you should discuss this with your dietitian. If it is so severe that you are vomiting up to 10 times a day, then you should call your doctor because there is a risk of ketoacidosis [very high blood sugars that are out of control].

The doses of insulin you need may change frequently because of the body's hormone activity during this time. It may also be necessary to change your insulin regime – your meal times and injection times.

The second and third trimesters [4 to 9 months]

During this time insulin requirements usually increase and could be as high as two or three times your normal daily amount. This is because the placenta produces a hormone that makes it more difficult for the insulin to work. So frequent testing and dose adjustments when necessary are essential. Once the baby is born, insulin requirements quickly drop back to normal.

During this time the doctors will continue to monitor your blood glucose levels, blood pressure and kidney function. Some women with and without diabetes develop high blood pressure and oedema [fluid retention causing swelling] during the latter part of their pregnancy. If this is left untreated it can lead to pre-eclampsia which puts both mother and baby at risk.

Labour

Many women with diabetes go into natural labour and delivery is normal but this depends largely on the baby's size and position. Women with diabetes tend to have bigger babies and so if the baby is large it may have problems moving safely through the birth canal. This is one of the reasons the healthcare team monitor the health and size of the baby very closely. If the baby is large then labour may be induced.

The decision to induce labour is usually taken after 36 weeks and this will depend on the baby's size, the maturity of its lungs, the health of the placenta and the mother's health.

If the baby is too large or the health of mother and baby is at risk then a Caesarian section will be carried out. This is much more common in women with diabetes than in women without diabetes.

Caesarian Section

Women with diabetes are more likely to give birth by Caesarean section as their babies tend to be larger, labour tends not to progress as smoothly and/or if the mother's safety is at risk. If the mother to be has diabetes complications this can make vaginal delivery of the baby more dangerous for both mother and baby. However, giving birth by Caesarean section has disadvantages:

- Diabetes increases the chances of infection and can slow down wound healing so making surgery such as a Caesarian section more risky.
- Caesarean section means a longer stay in hospital, greater chance of transfusions and a slower recovery.

If a woman has had one Caesarean section does it mean that this will happen with the birth of subsequent children?

A study published in The Journal of Reproductive Medicine [Dec 2000] looking at 127 women most of whom had already given birth by Caesarean showed that only 43.7% of diabetic women that attempted vaginal birth after a Caesarean, succeeded but in women without diabetes 60 – 80% of them had successful vaginal births after a Caesarean. The authors of the study called for more research because they felt unable to conclude that vaginal birth after a Caesarean was safe for women with diabetes.

New techniques for Caesarean sections

Research carried out in Austria, published in the Journal Obstetrics and Gynaecology [January 2003], describes a new technique for Caesarean sections which is less painful and far quicker than past methods, taking about 20 minutes in all. The new method reduces blood loss in the mother by half so cutting the length of the procedure and allowing the mother to recover more quickly.

The new method means that doctors use a sharp knife to cut the skin but then blunt instruments to gently pull the uterine wall apart and deliver the baby. This compares with sharp dissection used by some doctors. The women need fewer stitches because only three layers need to be stitched compared to between four and seven in other methods.

Professor James Walker of the Royal College of Obstetricians and Gynaecologists reported that many aspects of this technique are already in use in Britain as this is 'good practice'. Perhaps this is a question that mothers-to-be should raise during pregnancy.

Note: In November 2011 the National Institute for Clinical Excellence [NICE] updated its guidelines on Caesarian Section, CG132. This can be found on the NICE website: <http://guidance.nice.org.uk/CG132> For those without internet access, telephone 0845 003 7780

Breast Feeding

A great deal is published about pregnancy and women with diabetes but what about after the birth? It is difficult to find research that deals with the effects of breast feeding on diabetic mums and the control of their diabetes.

There is no reason why women with diabetes should not breast feed like any other mum. Breast milk production uses a lot of glucose/ carbohydrate from the mother's supply so it is important to avoid hypoglycaemia by lowering insulin doses as necessary. According to the Nutritional Subcommittee of Diabetes UK, [Diab Med 20.786-807] the high energy needs of lactation mean that a mother is likely to require 40-50g carbohydrate per day compared with pre-pregnancy amounts. Extra carbohydrate may be required before going to bed while the baby is still having night feeds. However, once breastfeeding stops, insulin doses and carbohydrate intake will need to be changed.

Although only small, a published study [Pract Diab Int October 2003, Vol.20 No.8] showed:

- in both breastfeeding and non-breastfeeding mothers with Type 1 diabetes glucose levels were lower during the first week after delivery.
- Insulin requirements remained lower than before pregnancy throughout the 2 months after the baby is born, whether the mothers were breastfeeding or not.
- Hypoglycaemia does not occur more frequently during or immediately after breastfeeding.

Weaning

There seems to be even less information on how to deal with weaning and advice is usually given on the basis of common sense. If you have been doing a lot of regular exercise and then you stop your blood sugars would go up unless you either ate less or increased insulin doses. The same applies when milk production ceases when the child is weaned.

Although there is little research on this, the general advice for diabetic mums is that weaning should be done gradually so that adjustments in diet and insulin can be slow and smooth. Natural weaning where the child outgrows his/her need for breast feeding, is the easiest to allow the mother's body to adjust. But if there is an active decision to wean the baby, then reducing breastfeeds by no more than one feed per week seems to be the general advice. This enables blood glucose control to be more easily managed.

Report - Diabetes in Pregnancy: Caring for baby after birth [2007]

Do babies of diabetic mothers need to be placed in special care units?

This is an issue that has been raised with IDDT as pregnant women with diabetes have been advised that their newborn babies will be removed from them and placed in the special baby care unit. Some women are told that this is a necessary and normal procedure – even in hospitals with a 'good reputation'. While this could be necessary on health grounds, many diabetic mothers are being separated from their babies for no other reason than hospital convenience or 'hospital policy'.

The findings of a national inquiry, the Confidential Enquiry into Maternal and Child Health [CEMACH] produced in a report, Diabetes in Pregnancy: Caring for baby after birth [2007], stated that in over half of mothers with Type 1 and Type 2 diabetes their newborn babies are automatically moved to a special care baby unit when there was no specific medical indication for admission and in other cases because babies were not being kept warm enough. This leads to unnecessary separation of babies from their parents. The report goes on to confirm that there are many benefits of early interaction between mother and baby and hospitals should have

policies to enable this to happen.

The author of the report stated: *“Babies of mothers with diabetes have more complications and do need careful monitoring, nevertheless in the absence of specific risks or complications, every effort should be made to ensure that these babies can be kept with their mothers safely in order for bonding, temperature control and breast feeding to take place.”*

The report also shows that there were a number of barriers to breastfeeding and these were:

- A quarter of babies did not have early feeding on the labour ward.
- Instant formula was given as first feed to two thirds of babies.
- Maternal choice not to breastfeed was the main reason for instant formula feeding on the postnatal ward.
- The first blood glucose test was often performed too early to be informative, with inaccurate methods of testing used and insufficient documentation of management.
- The report recommends that:
- Mothers with diabetes to receive advice about the benefits of breastfeeding for their child during the antenatal period.
- Babies to be with their mothers immediately after birth, provided there are no postnatal complications. Early mother-baby contact helps to establish breastfeeding and to regulate the temperature in babies.
- Encouragement of breastfeeding within an hour of birth, but all mothers should be supported in the feeding method of their choice.
- Better guidelines and training for healthcare professionals in the management of babies of mothers with diabetes.

IDDT advice to pregnant women with diabetes: make sure that you know the hospital system before you are due to have your baby and make it clear that you don't want to be separated from your newborn baby unless there are medical grounds for doing so.

Insulin Analogues and pregnancy

Pregnant women or those considering pregnancy are always concerned about any medications they take at this time. Clearly women with diabetes have to take insulin but still need to know about any safety issues for both themselves and the unborn baby. For the newer insulin analogues it is important to know that the information about their safety is limited as trials have not been carried out in sufficient numbers of pregnant women. Here is some information that may be helpful.

Lantus

Some experimental studies have shown that insulin analogues have growth-promoting effects and concerns have therefore been raised that use of Lantus insulin during pregnancy could cause excessive foetal growth and other problems. Reuters reported that a review actually recommended Lantus was not used during pregnancy, but called for further studies to investigate its safety.

A small study carried out in Oxford [ref 1] involving 20 pregnant women with Type 1 diabetes and 44 with gestational diabetes [diabetes during pregnancy] investigated the safety of Lantus [glargine]. Half the women used Lantus and the other half 'standard' insulin.

There were no significant differences in birth weight between infants born to Lantus users and those born to standard insulin users. [The rate of excessively large babies was actually slightly lower in the Lantus group: 38 versus 41%.] The groups were also comparable in terms of infant complications, admission to special care infant units, and congenital abnormalities.

The authors recommend that large trials should be carried out to confirm the efficacy and safety of Lantus for the treatment of pregnant women with Type I diabetes and those with gestational diabetes.

Ref 1 British Journal of Obstetric and Gynecology, April 2007

NovoRapid

The information from the manufacturers of NovoRapid [NovoLog in the US] states: "There are no adequate well-controlled clinical studies of the use of NovoRapid in pregnant women. NovoRapid should be used during pregnancy only if the potential benefit justifies the potential risk to the foetus."

A published study [ref 1] concluded that NovoRapid is as safe and effective as GM 'human' insulin in pregnant women with Type 1 diabetes as the mother and pregnancy outcomes were the same. However, in this study the long-acting insulin used was NPH insulin which is a 'human' intermediate insulin and NOT an analogue insulin.

Ref 1 Diabetes Care, April 2007

For the use of other analogues in pregnancy, the Specific Product Characteristics documents say:

Humalog: Data on a large number of exposed pregnancies do not indicate any adverse effect on pregnancy or on the health of the foetus/newborn.

Levermir: There is no clinical experience with Levemir [insulin detemir] during pregnancy.Caution should be exercised when prescribing to pregnant women.

Apidra: There are no adequate data on the use of Apidra [insulin glulisine] in pregnant women. Caution should be exercised when prescribing to pregnant women.

Interpretation of expressions used by drug companies in the above statements

- 'Limited clinical experience in pregnancy' - means that no or few clinical trials have taken place.
- 'No clinical data on exposed pregnancies are available' - no clinical trials have taken place.
- 'No clinical experience during pregnancy' - no clinical trials have taken place.
- 'Information on large numbers of exposed pregnancies do not indicate any adverse effect on pregnancy' - this does not state

that there have been trials carried out and implies that the information is from observation.

Research

Very tight versus tight control for diabetes in pregnancy
Pregnancies complicated by pre-existing insulin dependent diabetes are high risk for a number of poor pregnancy and neonatal outcomes. The objective of this review was to assess the effects of very tight glycaemic control compared with tight control in women with Type 1 diabetes.

Main results: Two trials involving 182 women were involved. The two trials were difficult to compare. Maternal hypoglycaemia was more common among women whose diabetic control was very tight compared to tight control based on one trial. There was no difference detected in perinatal outcome between the groups.

Reviewers' conclusions: There appears to be no clear evidence of benefit from very tight glycaemic control for pregnant diabetic women. Since very strict control may have a substantial impact on lifestyle, this suggests caution in advising such a tight degree of control.

Gestational Diabetes

Gestational diabetes is the type of diabetes that occurs during pregnancy but disappears after the baby is born. Like other forms of diabetes, gestational diabetes affects the way the body uses the glucose [sugar] in the blood and as a result the blood sugars rise too high. The glucose in the blood is the body's main source of energy.

If gestational diabetes is untreated or uncontrolled, it can result in a variety of health problems for both that mother and baby. So it is important that a treatment plan is worked out to keep blood sugars within the normal range. The good news is that controlling blood sugars can help to ensure a healthy pregnancy and a healthy baby.

Signs and symptoms

Most women do not have any signs or symptoms of gestational diabetes but your healthcare professional will check for gestational diabetes as part of your pre-natal care.

When signs and symptoms do occur they include:

- Excessive thirst
- Increased urination.

About 3 to 5% of all pregnant women develop gestational diabetes.

The causes of gestational diabetes

Normal metabolism

Normally during digestion the body breaks down the carbohydrates you eat into simple sugars [glucose] and this glucose is absorbed into the blood and transported around the body by the blood vessel system to provide the energy needed for all our activities.

However, this process cannot take place without insulin.

Insulin is produced in the pancreas, a gland behind the stomach, and it helps the glucose to pass into the cells to provide energy and at the same time, maintain normal levels of glucose in the blood.

The liver also plays a part in maintaining normal blood glucose

levels. When there is more glucose in the cells than your body needs for energy, your body removes it from the blood and stores it in the liver as glycogen. It can then be used when necessary, such as at times when you run low on glucose eg if you have missed a meal. In this situation the liver releases glucose into the bloodstream.

The amount of glucose in the blood varies according to several factors – the food eaten, exercise, stress and infections. The relationship between insulin, glucose and the liver makes sure that the blood glucose levels stay within normal limits. This should be 4 to 7mmols/l.

During pregnancy, the placenta, which supplies your baby with nutrients, produces hormones that prevent the insulin from working properly. These hormones include oestrogen, cortisol and human placental lactogen. They are vital for a healthy pregnancy but they also make the cells in your body more resistant to insulin.

As the placenta grows larger in the second and third trimesters, it produces even more of these hormones so further increasing insulin resistance. Normally the pancreas will respond by producing enough extra insulin to overcome this resistance but sometimes three times as much insulin as normal may be necessary and the pancreas can't produce enough. When this happens, the glucose in the blood cannot be transported into the cells and too much remains in the blood so raising the blood glucose levels above normal and this is gestational diabetes.

Who is at risk of developing gestational diabetes?

Many women who develop gestational diabetes have no known risk factors and any woman can develop it although some are at greater

risk than others. The risks increase with:

Age – women older than 25 are more likely to develop it.

Family history – if a close family member, such as a parent or sibling, has Type 2 diabetes.

Personal history – if you've had gestational diabetes with a previous pregnancy or if you have had an unexplained still birth or a baby weighing more than 9 pounds, you may be screened more closely for gestational diabetes with the future pregnancies.

Weight – being overweight before the pregnancy makes gestational diabetes more likely but gaining weight during the pregnancy does not cause it.

Race – women from certain races are more prone to gestational diabetes eg black women.

Diagnosis and screening

Screening for gestational diabetes is usually a routine part of prenatal care for most mothers. There is some debate amongst doctors about whether women under 25 with no risk factors for gestational diabetes should undergo the test because their risk is low.

Screening usually takes place between 24 and 28 weeks of the pregnancy because the condition can't be detected until then. If your doctor thinks that you are at particular risk, it may be done earlier.

What is the test?

You will be asked to drink a glucose solution that tastes very sweet and then you are asked to wait for an hour after which a blood sample is taken from a vein in your arm. This will measure the level of sugar [glucose] in your blood and will tell how efficiently your body deals with sugar.

A blood sugar level of below 7.5mmols/l is usually considered

normal in this test. Having a blood sugar level above this does not necessarily mean that you have gestational diabetes but it does mean that you will need a further test. For the next test you will be asked to fast overnight, then you will be given another sweet drink that has a higher concentration of glucose. This time your blood sugar levels will be monitored every hour for 3 hours and if at least two of the results are abnormally high, this confirms the diagnosis of gestational diabetes.

During pregnancy routine urine tests are carried out but these are not sufficiently reliable to diagnose gestational diabetes because the amount of sugar in the urine can vary throughout the day as a result of the food eaten.

Treatment

Controlling your blood sugar is essential to having a healthy baby and avoiding complications during the delivery. Most women are able to do this with lifestyle changes – diet and exercise, but some may need medication as well. In both cases measuring blood sugar levels is essential because it tells you whether your blood sugars are within the normal range.

Monitoring your blood sugar levels

This might sound difficult at first but once you have learnt how to do it, it will become routine. You draw a drop of blood from your finger with a special device and place it on a test strip which is then put into a blood glucose monitor that provides a reading of your blood sugar level at that time.

Blood sugar levels fluctuate throughout the day according to what you have eaten and how much exercise you have taken, so your doctor may suggest that you carry out blood sugar tests several times a day to ensure that they stay within healthy limits.

Note: your doctor will measure your blood sugars during labour – if they rise too high, your baby’s will also rise and this will cause the baby to produce insulin which may lead to low blood sugars [hypoglycaemia] after the birth.

Diet

A healthy diet is important for all pregnant women but for those with gestational diabetes, diet is part of the treatment – eating the right kind of food in the correct amounts is one of the best ways to control blood sugar levels.

Generally you should eat more fruit, vegetables and whole grains that are high in nutrition but low in fats and calories but fewer animal products and sweets. However, no one diet is suitable for everyone and you should discuss the diet that is suitable for you with a dietitian.

Exercise

Physical exercise generally lowers blood sugar levels for two reasons:

- it causes glucose [sugar] to be transported to the cells where it is needed for energy and so the blood sugar levels drop,
- it also reduces blood sugar levels by increasing the body’s sensitivity to insulin - so your body needs less insulin to transport glucose to your cells.

Exercise is important for all pregnant women:

- it helps to prevent some of the discomforts during pregnancy – back pain, muscle cramps, constipation and sleep difficulties,
- it prepares you for labour by increasing muscle strength and the endurance developed by regular exercise reduces the stress on your ligaments and joints during delivery.

Type of exercise suitable for women with gestational diabetes:

This should be discussed with your doctor or healthcare professional and then you can decide which activities you enjoy. Safe aerobic activities are a good way to lower blood sugars eg walking,

cycling and swimming but ordinary activities such as gardening and housework can also have a similar effect. If you haven’t been active for some time, then you should build up your exercise levels gradually until you are carrying out moderate aerobic exercise on most days.

Stretching and strength training exercises combined with aerobic exercise at the same time everyday is the best combination. Varying your exercise routine and working out with other pregnant women can help you stay motivated.

Medications

Sometimes exercise and diet are not sufficient to lower your blood sugar so medication may be necessary. Until recently insulin was the only option for women with gestational diabetes because it does not cross over to the baby through the placenta but more recently the oral drug metformin [glyburide] is used in Europe.



Monitoring your baby

Ultrasound

When you have gestational diabetes your baby’s growth will be closely monitored by ultrasound. Ultrasound uses high-frequency sound waves and computer processing to give pictures of your baby inside the uterus. Ultrasound is less accurate as your baby gets bigger.

Non-stress test or biophysical profile

If you are taking medications for your gestational diabetes your doctor may suggest a non-stress test [NST] or biophysical profile to make sure that your baby is getting enough oxygen and nourishment, especially nearer to the due date. This is a non-invasive test, simple test that takes about 30 minutes and can be done at home. It will not cause your baby any stress and simply checks how often your baby moves and how much the baby’s heart rate increases with this movement.

Length of pregnancy

In most cases doctors try to prevent your pregnancy from going longer than 40 weeks because this may increase the risk of complications. Most women with gestational diabetes deliver healthy babies but labour is not routine and delivery by Caesarian section can sometimes be necessary. Gestational diabetes does not affect your ability to breast feed or look after your new baby.

Complications

If you have gestational diabetes, it is understandable that you may worry about the health of your baby and the possibility that it may cause birth defects. However, this is not usually the case because in general birth defects develop during the first 3 months of pregnancy and gestational diabetes does not develop until the second or third trimester so blood sugar levels are normal during the early, critical months. Most women go on to deliver healthy babies but untreated or uncontrolled blood sugar levels can cause problems for you and your baby.

Complications that may affect your baby

Consistently keeping your blood sugar levels within the normal range can reduce these possible complications.

- **Macrosomia** is when the baby grows too large because extra glucose crosses the placenta into the baby's blood. The baby's pancreas then makes extra insulin to cope with this and the baby grows too large [macrosomia]. Very large babies may have difficulty during delivery and are more likely to sustain birth injuries or be born by Caesarian section.
- **Hypoglycaemia** [low blood sugar levels] occurs in some babies immediately after birth. This is because the babies are accustomed to receiving large amounts of blood sugar from their mothers and their own insulin production is high. Babies with hypoglycaemia have their blood sugar levels checked regularly after birth and are given glucose through an intravenous drip to

prevent the blood sugars dropping too low.

- **Respiratory distress syndrome** is a condition that makes breathing difficult. It is more likely to occur in premature babies. It is caused by a lack of certain substances in the lungs that help prevent the lungs from collapsing when the baby takes a breath. Some babies may need help with their breathing until their lungs become stronger.
- **Jaundice** is a yellowish colouring of the skin and the whites of the eyes. It occurs because the baby's liver is not sufficiently mature. New-born jaundice may begin within 2 or 3 days after birth but sometimes it does not appear for a week. New-born jaundice is not a disease in itself and is not serious but will be monitored by the doctor.
- **Shoulder dystocia** can occur if the baby is very large and the shoulders are too big to move through the birth canal. In most cases doctors can free the baby but injuries may occur. This is a rare but serious complication of gestational diabetes.
- **Stillbirth or death** is a rare occurrence but if it occurs, it is usually because gestational diabetes is undetected and therefore untreated.

Complications that may affect you

If you have gestational diabetes, then you may be at risk of the following complications:

- **Pre-eclampsia** is characterised by significant increase in blood pressure and left untreated, it can lead to serious complications for mother and baby. Having gestational diabetes increases the risk of pre-eclampsia.
- **Caesarian section** may be recommended if your baby is large [macrosomia] but gestational diabetes itself does not mean that a Caesarian section has to be planned.
- **Type 2 diabetes** is more likely to develop in later life in women that have gestational diabetes although many cases can be prevented with a healthy lifestyle - a healthy diet and regular exercise. Up to 40% of women develop Type 2 diabetes within 5 to 10 years after delivery but the risk may be increased in obese women.

Living with gestational diabetes

It is not easy living with a condition that can affect the health of your unborn baby and you may find it stressful, especially as you have to carry out regular blood sugar monitoring, follow a healthy diet and take regular exercise.

Prolonged stress itself can raise blood sugar levels so it is important to learn as much as you can about your condition – books from the library, talking to other women with the same condition and of course, talking to your doctor, dietitian, midwife and a diabetes specialist nurse. They can answer your questions and help you to learn how to manage your blood sugar levels during pregnancy.

After your baby is born

You can breast feed and look after your baby. After the birth your blood sugar levels will be checked frequently and then again in 6 weeks. Gestational diabetes usually clears up after the baby is born because when the placenta is removed, the hormones it was producing which caused your insulin resistance are also removed.

Once you have had gestational diabetes it is sensible to have your blood glucose levels tested at least once a year and also to maintain a healthy lifestyle to lessen your chances of developing Type 2 diabetes later in life.

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