



The University of Sheffield

Academic Unit of Primary Medical Care

PATIENT AND PUBLIC INVOLVEMENT RESEARCH REPORT
Reducing the risk of progression from Gestational Diabetes to Type 2 Diabetes Mellitus: women's perspectives on the content, research development and evaluation of a mobile health technology lifestyle intervention to support postnatal dietary and activity lifestyle change

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Executive Summary

Background

Gestational diabetes (GD) is a type of diabetes that happens to women during pregnancy and occurs in about 1 in 20 of all pregnancies in the UK. It is more likely to occur in women who have relatives with diabetes, who are overweight, and are less physically active. GD can cause complications during pregnancy, such as the baby being larger than average, but can also mean the child grows up with an increased risk of being overweight, developing type 2 diabetes mellitus (T2DM), or going on to have heart disease. Although GD usually resolves after giving birth, women who get it are over seven times more likely go on to develop T2DM later in life.

After giving birth, women diagnosed with GD should be followed up at their GP surgery and have a blood glucose test at 6 weeks after the birth. Provided that the postnatal blood test is normal, then the women should have an annual blood glucose test to screen for T2DM. However, this annual T2DM screening blood test does not always happen as it should. There is currently no UK system where women diagnosed with GD continue to receive support and encouragement to maintain a healthy lifestyle after they have left hospital, yet this is a critical time when these lifestyle changes need to be maintained.

New mothers are faced with the demands of caring for a new baby in addition to their existing responsibilities, so eating well and being active may be difficult during this time. There is also evidence that women who have had GD underestimate their risk of developing diabetes in the future and are not fully aware of the lifestyle changes they need to make to reduce their risk. Research has found that increased social support, setting personal goals and tracking behaviour could help women diagnosed with GD to maintain lifestyle changes.

Aims and Objectives of the Patient and Public involvement Project

The project aimed to consult with women who have had GD and their partners, in order to investigate how factors which support sustained lifestyle change could be enabled through the use of modern technology, such as:

- online forums (for social support)
- smartphones (for goal setting)
- fitness tracking wristbands (for behaviour tracking)
- use of online tools to help women wishing to lose weight or be more physically active, such as the NHS 12 week diet and exercise plan.

The study team also wished to explore:

- how and when women might be introduced to a mobile technology lifestyle intervention
- how they might be supported in continuing to use the new technology
- how family and friends view diet and exercise lifestyle change in the context of GD

In order to embed patient perspectives from the outset within the **research design process**, we also sought their views and ideas about:

- Research questions including content of a topic guide for a qualitative study
- The antenatal behaviour change intervention that currently exists in secondary care
- Primary outcome measure for a clinical trial
- Recruitment strategy
- Study design
- Intervention content
- Data collection methods
- Ethical issues of online support and questionnaire and health practitioners lifestyle research data collection relating to weight, diet and exercise.
- Lifestyle and social media interaction data transfer on-line to a secure research database at the university.
- PPI focused dissemination

Patient and Public involvement Project Methods

The lead researcher (BMc) first conducted a PPI group with a group of mums in Barnsley, at a 'Sure Start' Children's centre, and then attended a Jessop Wing, Sheffield University Hospital Trust established PPI group of women service users of maternity care at the hospital. BMc was introduced to a midwife at the antenatal clinic who invited him to attend one of the antenatal GD intervention sessions. This enabled us to map the current care at the Jessop Wing and helped inform our intervention plans in terms of how best this could be followed on in primary care.

Results

We spoke to 14 women and 4 male partners. Those taking part were aged between 23 and 43 and all had had a baby in the preceding 1-2 months. Four of the women were from an Asian background and did not speak English as their first language, but were proficient enough in English to take part. The discussions lasted approximately 45 minutes to one hour each from November 2015 to January 2016. Discussions were not transcribed but notes were taken during these meetings.

The Research question

All of those we spoke to felt that our research question was very relevant and important. One woman who had been diagnosed with GD in a previous pregnancy, noted;

“I thought if my Oral Glucose Tolerance Test was normal, that was the end of it”.

And her partner added;

“My partner got lots of support during pregnancy, and at 6 week follow up... but after that, we just fell off the grid”

Summary of Findings:

This PPI work has encouraged us to reconsider elements of our intervention and highlighted areas that we had not previously considered. For example it has highlighted the practical difficulties in getting groups of new mums together in one place at the same time, and thus we are likely to approach the initial intervention as a one-to-one contact rather than group based. This work has confirmed our suspicion that many women are unaware of the need for annual blood tests, and identified a feeling of being left on their own once they are discharged back to primary care. In terms of recruitment strategy, our discussions suggest that around 5 weeks postnatally may be a good time to recruit, and that this could be done via the letter inviting them to their postnatal OGTT.

Most behaviour change intervention studies to reduce the risk of incident T2DM chose weight loss as a primary outcome since modifiable risk is so strongly associated with BMI. In this PPI project, discussants felt that the most important thing to consider was whether or not the women in the study actually went on to develop T2DM in the future. Discussants also supported secondary outcome measures including, weight, physical activity levels, dietary habits, and blood test results.

The discussants preference to prioritise incident T2DM as an outcome, adds weight to a study design which incorporates longitudinal prospective cohort follow up using primary care records. They recognised the need for a control group, but would have been disappointed to be assigned to one. We need to consider the possibility that being recruited into the study will heighten women’s awareness of the issues surrounding GD, and that even those assigned to the control group may become better informed about this condition than they may have otherwise.

Our discussions generated many useful ideas for the content and form of the intervention. Many discussants suggested the need for input from a dietician and since conducting this work we have

enlisted a dietician into the project. Other useful suggestions include: resources for partners, dietary feedback, depictions of risk, and signposting to local facilities. In practical terms, the use of a web based platform and / or closed social media group may be an effective medium to provide this additional information and interactive dietary support. In terms of the mobile technology, the PPI has drawn our attention to the need for it to be simple, user friendly, and for peripheral activity monitors to have a good battery life. It has also served to caution us from assuming that technology can completely replace face-to-face contact. The discussions have led us to consider ways to ensure that the intervention is incorporated as far as possible into the existing care that these women and their babies receive, without compromising on independent data collection.

It was reassuring that those we spoke to stated they would be happy for us to access their patient records in order to ascertain if they went on to develop type 2 diabetes, and this is certainly something we plan to request in the main study. Data collection is still an issue however as there was no strong agreement amongst discussants about which method to employ for some of the other measures such as BMI or self-reported exercise. This is an issue we will need to investigate further in our qualitative and feasibility work.

Impact of the PPI

An overriding theme from this PPI process is the importance of 'co-production' of this type of intervention with the women who could benefit from it and support for 'co-design' embedded in on-going research. Several of the discussants were very enthusiastic about the project and we hope to involve them further with the forthcoming intervention design, and in subsequent work including the write up and dissemination of future findings. One discussant has already reviewed and provided input into the follow up grant application.

This PPI work has been essential to draw on the experiences of the women who had been through a diagnosis of GD and their partners and we have integrated the feedback into the next stages of a series of linked research studies and outputs including:

1. A review of the literature to write a GP clinical guideline for publication (McMillan, B., Abdelgalil, R., Madhuvrata, P., Easton, K., & Mitchell, C. (2016). Reducing the risk of type 2 diabetes mellitus in primary care after gestational diabetes: a role for mobile technology to improve current care. *British Journal of General Practice*, 66(653), 631-632.
- A Royal College of General Practitioners (RCGP) grant funded qualitative study: 'Women's perspectives on postnatal care to reduce risk of T2DM in depth (IRAS Ethics reference 192921; RCGP grant reference SFB 2015-04)

- A conference presentation at the National Royal College of General Practitioners Conference (McMillan, B., Easton, K., Delaney, B., Madhuvrata, P., Abdelgalil, R., & Mitchell, C. (2016). Fitness bands and Facebook™: Can we reduce incident diabetes in high risk postnatal women?. Poster presented at the Royal College of General Practitioner's Annual Conference, Harrogate, 6-8 October 2016).
- We are seeking funding for the next stages of the research : Postnatal Type 2 Diabetes Intervention Programme (PoNDIP): A feasibility study to evaluate a self-directed, mobile technology facilitated, exercise and dietary intervention to promote weight loss for postnatal women with a history of Gestational Diabetes.

Introduction

Gestational diabetes (GD) is a type of diabetes that happens to women during pregnancy and occurs in about 1 in 20 of all pregnancies in the UK¹. It is more likely to occur in women who have relatives with diabetes, who are overweight, and are less physically active². GD can cause complications during pregnancy, such as the baby being larger than average³, but can also mean the child grows up with an increased risk of being overweight, developing type 2 diabetes mellitus (T2DM), or going on to have heart disease⁴. Although GD usually resolves after giving birth, women who get it are over seven times more likely go on to develop T2DM later in life⁵. People with T2DM are at increased risk of heart disease, stroke, poor circulation, kidney damage, eye problems, nerve damage and foot problems⁶.

During pregnancy, women diagnosed with GD receive encouragement from hospital staff to maintain a healthy weight, eat a healthy diet, and exercise regularly. These behaviours reduce their risk of developing complications in the pregnancy relating to GD and also reduce the risk of going on to develop T2DM in later life¹. After giving birth, women diagnosed with GD should be followed up at their GP surgery and have a blood glucose test at 6 weeks after the birth¹. Provided that the postnatal blood test is normal, then the women should have an annual blood glucose test to screen for T2DM¹. However, this annual T2DM screening blood test does not always happen as it should. There is currently no UK system where women diagnosed with GD continue to receive support and encouragement to maintain a healthy lifestyle after they have left hospital, yet this is a critical time when these lifestyle changes need to be maintained⁷.

New mothers are faced with the demands of caring for a new baby in addition to their existing responsibilities, so eating well and being active may be difficult during this time. There is also evidence that women who have had GD underestimate their risk of developing diabetes in the future and are not fully aware of the lifestyle changes they need to make to reduce their risk⁸. Previous studies have been able to reduce the number of women with GD going on to develop T2DM, but these studies have involved high levels of face to face contact and been expensive to run⁷. Research has found that increased social support, setting personal goals and tracking behaviour could help women diagnosed with GD to maintain lifestyle changes⁹.

This 'Patient and Public Involvement' project aimed to consult with women who have had GD and their partners in order to investigate how factors which support sustained lifestyle change could be enabled through the use of modern technology, such as:

- online forums (for social support)
- smartphones (for goal setting)

- fitness tracking wristbands (for behaviour tracking)
- use of online tools to help women wishing to lose weight or be more physically active, such as the NHS 12 week diet and exercise plan.

The study team wished to explore:

- how and when women might be introduced to a mobile technology lifestyle intervention
- how they might be supported in continuing to use the new technology
- the ethical issues of on line support and data collection relating to weight, diet and exercise for research.

For example, the project team wished to explore whether a health care assistant at their GP practice might be a suitable person for the women to meet when they have left hospital to go through what it means to have been diagnosed with GD, how to decrease their risks of developing T2DM, and how to use modern technology to stay on track with a healthy lifestyle.

Aim

A grant from the NIHR Research Development Service Yorkshire and Humber Public Involvement Fund provided voucher support for women for childcare and travel expenses to help the research team to inform the design of the intervention aimed at reducing the risk of progression from GD to T2DM. The main aim was to find out more about what women and their partners felt would support the health behaviours that can reduce their risk of going on to develop T2DM. Subsumed within this aim were a number of objectives. We wished to find out more about these women and their partner's views on;

- Our research questions including content of a topic guide for a qualitative study
- Their experience of the antenatal behaviour change intervention that currently exists in secondary care
- Primary outcome measure for a clinical trial
- Recruitment strategy
- Study design
- Intervention content
- Data collection methods
- Ethical issues of personal data transfer on-line to a university research database
- Approach to write up and dissemination

The lead researcher (BMc) observed the GD patient education sessions, met with the administrators who organised letters to remind women to have a postnatal blood test at 6 weeks at the hospital or at their general practitioners.

Method

Please note, to avoid confusion for the remainder of this report, those taking part in the PPI exercise will be referred to as 'discussants' whilst those who may be taking part in a future intervention study are referred to as 'participants'

Prior to submitting our PPI funding application, we approached a number of key stakeholders at the Jessop Wing, Royal Hallamshire Hospital. These included a Consultant Obstetrician and Gynaecologist, a Consultant Midwife, and the Directorate Research Co-ordinator, OGN Research Office, Jessop Wing.

The lead researcher (BMc) initially conducted a PPI group with a group of mothers in Barnsley, at a 'Sure Start' children's centre, and then attended an established PPI group of women service users of maternity care at Jessop Wing, Sheffield University Hospital Trust. This initial PPI work highlighted the fact that we needed to speak to women who had a recent personal experience of GD in order to gain more meaningful insights into how we should go about designing our intervention.

A letter of authority and ID badge was obtained from Medical Personnel. BMC was introduced to a midwife at the antenatal clinic who invited him to attend one of the antenatal GD intervention sessions. This enabled us to clarify the current care at the Jessop Wing and helped inform our intervention plans in terms of how best this could be followed on in primary care.

All women diagnosed with gestational diabetes during their pregnancy and booked for care in Sheffield receive a letter inviting them to attend the hospital outpatient pregnancy clinic for an oral glucose tolerance test (OGTT) at 5 weeks postnatal. Women attending for this postnatal OGTT were approached and asked if they would like to take part in the PPI work. They were offered the opportunity to do so at a time and location that was convenient to them and were offered a £20 Meadowhall shopping voucher to thank them for taking part.

Our initial plan was to have three discussion groups with approximately 5-6 people in each group. We planned to have one group of women whose first language was not English, and one group of male partners. Due to the logistical difficulties of gathering busy new parents together at the same time and the same place, however, it became clear that a more realistic approach would be to discuss our ideas with the women and their partners separately.

We spoke to 14 women and 4 male partners. Those taking part were aged between 23 and 43 and all those taking part had had a baby in the preceding 1-2 months. Four of the women were from an Asian background and did not speak English as their first language, but were proficient enough in English to take part. The discussions lasted approximately 45 minutes to one hour each and took place from November 2015 to January 2016. Notes were taken during these meetings.

The researcher followed a topic guide whereby he started the conversation by introducing himself, and the purpose of the PPI work. Those taking part were made aware of the fact that they were not taking part in the research project itself, but were helping with the design and content of a study for which the researchers would then go on to bid for funding. Topics covered in the discussions included; the research question itself, diet, weight management and exercise during and after pregnancy, mobile health technology interventions to support lifestyle change including the use of activity monitors and social media, meaningful outcome measures, the planned recruitment strategy, the study design, the content of the intervention itself, proposed data collection methods, and the approach to write up and dissemination. A summary of the contributions made by discussants is described below.

Results

We spoke to 14 women and 4 male partners. Those taking part were aged between 23 and 43 and all had had a baby in the preceding 1-2 months. Four of the women were from an Asian background and did not speak English as their first language, but were proficient enough in English to take part. The discussions lasted approximately 45 minutes to one hour each from November 2015 to January 2016. Discussions were not transcribed but notes were taken during these meetings.

The Research question

All of those we spoke to felt that our research question was very relevant and important. One male partner summed up the general consensus with the statement;

“Everyone knows they should eat less and exercise more. People just shrug it off. They shrug off diabetes. But it’s deadly serious”

Another woman who had been diagnosed with GD in a previous pregnancy noted;

“I thought if my OGTT was normal, that was the end of it”

And her partner added;

“My partner got lots of support during pregnancy, and a 6 week follow-up... but after that, we just fell off the grid”

Discussants felt that it was important to find out more about what could be done to support women who have had GD once they are discharged back into primary care, and that testing an intervention with this aim was worthwhile.

Primary outcome measure

Most behaviour change intervention studies to reduce the risk of incident T2DM chose weight loss as a primary outcome since modifiable risk is so strongly associated with BMI. In this PPI project, discussants felt that the most important thing to consider was whether or not the women in the study actually went on to develop T2DM in the future. Discussants also supported secondary outcome measures including, weight, physical activity levels, dietary habits, and blood test results.

Recruitment strategy

Discussants felt that around the time of the OGTT (i.e. 5 weeks post-natally) would be a good time to recruit into the intervention study and felt that getting some information along with the letter that invited them to their postnatal OGTT would be a reasonable recruitment strategy. Other suggestions included putting posters up in GP surgeries, promoting the study on local radio and using community centres for recruitment.

Study design

The discussant preference to prioritise incident T2DM as an outcome, adds weight to the choice of a study design which incorporates longitudinal prospective cohort follow-up using primary care records. Discussants recognized the need for a control group in the proposed study but felt they would be disappointed if they ended up in this group. One suggested that those in the control group could perhaps be allowed to participate in the intervention at a later date, but acknowledged this would cause problems with long term follow up of data, if everyone had received the intervention at some point.

The intervention

The intervention itself was the topic that garnered most discussion.

Who should deliver the intervention?

Many women felt that a qualified dietician should either deliver the intervention or be available to answer participants' questions regarding diet. One male partner felt that the intervention should be

delivered by a dietician specialized in gestational diabetes. Some suggested the intervention could be delivered by the healthcare practitioner, who performs the postnatal OGTT, as:

“we are waiting around for 2 hours anyway, twiddling our thumbs”.

One woman had previously been to see a Health Trainer at her GP surgery and felt that they would be well placed to deliver the intervention. Others felt that Health Visitors would be best placed to deliver the intervention, as they already visit women and their babies, at home, in the postnatal period.

One partner noted that;

“The NHS only has a limited amount of money, so whatever we do needs to be cost effective. We need to incorporate it into a service that is already there, like using the health visitors more. They come at 1 week, 3 weeks, 6 weeks and 6 months. They could address this issue when they visit.”

Location and timing of the intervention

Those who had suggested that Health Visitors should deliver the intervention felt it would be easiest to deliver it at home. Those who had suggested having it take place at the same time as the OGTT felt it would be appropriate to deliver it wherever this was taking place; either hospital or the GP surgery. When discussants were informed that there were plans to move the postnatal OGTT from secondary to primary care, all felt this would be better as parking would be easier, and two mentioned this might improve continuity of care with their GP. Generally, there was less enthusiasm about the idea of gathering women together to deliver a group intervention. Several mentioned that the messages delivered during the intervention could be reinforced at key points of care – such as when women attend their GP for the postnatal check, bring their baby for immunizations, or when they attend for their annual blood test.

The Information Gap

A key message was that there is a need for more information. Most of the women were unaware that they should be having annual blood tests, and many noted that when they received the letter for the postnatal OGTT, they did not know what it was for. One stated she thought it was a mistake because the appointment was at the antenatal clinic and she was no longer antenatal. Discussants were unsure what sort of diet they should be eating after they had given birth, and one woman noted she had thought she should be continuing to check her own blood glucose postnatally.

Dietary support content of a GD postnatal intervention

All the discussants stated they would like the intervention to contain some information about diet. Suggestions ranged from sitting down with a dietician to work out a personalized plan, to recipe ideas, a website with diet suggestions, an online forum moderated by a qualified dietician, to local cookery classes. One male partner noted that he did all the cooking, and that he would like a dedicated website with a section specifically for men, as cooking is one thing they can do to help out at home, especially if mum is breastfeeding.

Exercise content of a GD postnatal intervention

In addition to dietary guidance, discussants felt the intervention also needed to contain information about exercise. Some suggested that being signposted to suitable local exercise facilities would help and a few felt this could be done easiest by being able to type their postcode into a dedicated website. One woman mentioned that she felt there was a postcode lottery in terms of facilities for exercising, and that she lived in an area where there were not many opportunities to do so. One interesting idea from one of the women was that the project website could contain a 'risk calculator' with some sliding scales so that people could see how exercising for a certain amount more each day impacted upon their lifetime risk of developing diabetes.

In terms of the activities themselves, a range of possibilities were discussed. The men and women from Asian backgrounds all noted that mixed sex gyms would put women off going to the gym, and that they would be more likely to attend single sex facilities. Several discussants mentioned they would be more likely to go to a gym that had a free crèche, whilst others suggested mother and baby gym sessions, where mums could take their babies and place them in a safe area beside where they were exercising.

A few of the women noted that they were just not the type of person who would go to a gym (referring to them as 'too macho' or 'too yummy mummy') and that they would prefer the kinds of activities they could do at home, such as using a Wii Fit or an exercise DVD. Home-based activities would be easier to fit around their baby. Others were very positive about 'buggy clubs' where a group of mums meet and walk around a park, this was seen as not only a good form of relaxed exercise but also an opportunity to socialize. All but one of those who mentioned buggy clubs however stated that poor weather would put them off attending.

Reward system for lifestyle change

Discussants suggested the idea of a 'loyalty scheme' where a certain number of gym or buggy club attendances could be rewarded using some sort of incentive, such as shopping vouchers. A woman who suggested this felt that 'some people need a dangly carrot to exercise'. One discussant mentioned a

scheme they had heard of which offered cheaper life insurance to those who engaged in more exercise and wondered if this could be used as an incentive.

Technology facilitated lifestyle interventions

Technology garnered a great deal of discussion. Most of the discussants used internet forums such as mumsnet™, although the majority were 'lurkers' searching and reading others posts rather than posting themselves. Those who had posted had asked for specific advice, e.g. one discussant had asked which the best sling was to buy so that she could go about everyday tasks whilst still having her baby close. Some felt that a specific forum for new mums who had recently been diagnosed with GD would be valuable. Discussants reported such a forum would be most helpful if there were experts, such as dieticians, available to provide professional advice.

Feelings on mobile technology were mixed, with some discussants (especially the male partners) being very positive, and others stating they did not feel they would use any sort of peripheral device. It was generally felt that for peripheral devices to be used, they would have to be simple, have a screen, and have a very good battery life. Many women felt some devices were too fiddly, while others were ugly or uncomfortable. Others described how seeing how many steps they had left to do in a day would motivate them to be more active.

Two discussants noted some reservations about the use of mobile technology in the intervention:

"These things can't replace face to face contact... it's like being back at school, everyone likes to be told they're doing well. It gives you a reason to be good, thinking someone's coming back and you don't want to let them down."

"If you have to plug it into your computer to find anything out, by the time you've booted your laptop up and found the cable, chances are the phone's ringing and the baby's wanting fed."

Data collection methods

A number of different data collection methods were discussed. None of the discussants felt that participants would have any objection to researchers accessing their medical records to obtain their HbA1c test results for long-term follow up.

With respect to dietary change, discussants did not feel it was realistic to expect participants to complete food diaries, given that they will already have several competing demands on their time. All felt that it would be acceptable to obtain measures of weight, with one noting that;

“I wouldn’t be offended, I’d just be glad they were taking an interest. I wasn’t weighed once during my pregnancy, or since I’ve given birth”

In terms of collecting exercise information, some suggested that a short questionnaire would work well, whilst others liked the idea of using a peripheral activity monitoring device that could upload this information to a website.

The idea of giving participants a choice in the data collection method was popular in the discussions, and people did not feel that this would make the data less reliable. Whilst one discussant noted that ‘no-one posts anything anymore’ another suggested it would be good to give participants the choice of returning self-reports of exercise by post, e-mail or a via a telephone conversation.

Approach to write up and dissemination

All the discussants said they would be happy to read through a draft of any resulting reports, and to comment on these. Not all were keen to be involved in the dissemination of results, but some did say they would post it on their Facebook or on Twitter, with one woman noting “I could link to it and say ‘hey look at this, this is something I’ve been involved with’”.

Impact of the PPI

This PPI work has been an extremely valuable exercise in terms of informing our intervention plans. We have received our first grant from the Royal College of General Practitioners Scientific Foundation Board to undertake a qualitative study with women who have had gestational diabetes in the postnatal period and are seeking funding for the next stages of the research evaluate a complex mobile health technology intervention to facilitate lifestyle change in this patient group.

Elements of this PPI work have encouraged us to reconsider elements of our intervention and highlighted areas that we had not previously considered. For example it has highlighted the practical difficulties in getting groups of new mums together in one place at the same time, and thus we are likely to approach the initial intervention as a one-to-one contact rather than group based. The PPI has confirmed our suspicion that many women are unaware of the need for annual blood tests, and identified a feeling of being left on their own once they are discharged back to primary care. In terms of

recruitment strategy, our discussions suggest that around 5 weeks postnatally may be a good time to recruit, and that this could be done via the letter inviting them to their postnatal OGTT. Discussants recognised the need for a control group, but would have been disappointed to be assigned to one. We need to consider the possibility that being recruited into the study will heighten women's awareness of the issues surrounding GD, and that even those assigned to the control group may become better informed about this condition than they may have otherwise.

Our discussions generated many useful ideas for the content and form of the intervention. Many discussants suggested the need for input from a dietician and since conducting this work we have enlisted a dietician into the project. Other useful suggestions which we hope to take on board include resources for partners, dietary feedback, depictions of risk, and signposting to local facilities. In terms of the mobile technology, the PPI has drawn our attention to the need for it to be simple, user friendly, and for peripherals to have a good battery life. It has also served to caution us from assuming that technology can completely replace face to face contact. The discussions have led us to consider ways to ensure that the intervention is incorporated as far as possible into the existing care these women and their babies receive, without compromising on independent data collection.

It was reassuring that those we spoke to stated they would be happy for us to access their patient records in order to ascertain if they went on to develop type 2 diabetes, and this is certainly something we plan to request the main study. Data collection is still an issue however as there was no strong agreement amongst discussants about which method to employ for some of the other measures such as BMI or self-reported exercise. This is an issue we will need to investigate further in our qualitative and feasibility work.

Evaluation

Discussants were e-mailed a "PPI monitoring form" and asked to provide feedback. Responses of those who replied to date can be found in Appendix B

Outputs and further funding applications

Several of the discussants were very enthusiastic about the project and we hope to involve them further with the forthcoming intervention design, and in subsequent work including the write up and dissemination of future findings. A participant has already reviewed and provided input into the follow up grant application. This PPI work has been essential to draw on the experiences of the women who had been through a diagnosis of GD and their partners in order to integrate the feedback into the next

stages of a series of linked research studies and outputs including:

- A review of the literature to write a GP clinical guideline for publication (McMillan, B, Abdelgalil, R., Madhuvrata, P., Easton, K., & Mitchell, C. (2016). Reducing the risk of type 2 diabetes mellitus in primary care after gestational diabetes: a role for mobile technology to improve current care. *British Journal of General Practice*, 66(653), 631-632.)
- A Royal College of General Practitioners (RCGP) grant funded qualitative study: 'Women's perspectives on postnatal care to reduce risk of T2DM in depth (IRAS Ethics reference 192921; RCGP grant reference SFB 2015-04)
- A conference presentation at the National Royal College of General Practitioners Conference, Harrogate October 2016 (McMillan, B., Easton, K., Delaney, B., Madhuvrata, P., Abdelgalil, R., & Mitchell, C. (2016). Fitness bands and Facebook™: Can we reduce incident diabetes in high risk postnatal women?. Poster presented at the Royal College of General Practitioner's Annual Conference, Harrogate, 6-8 October 2016.)
- We are seeking funding for the next stages of the research : Postnatal Type 2 Diabetes Intervention Programme (PoNDIP): A feasibility study to evaluate a self-directed, mobile technology facilitated, exercise and dietary intervention to promote weight loss for postnatal women with a history of Gestational Diabetes

Limitations

It is possible that by conducting the PPI work as one to one discussions, rather than as small groups we may not have gathered as diverse a range of views as we would otherwise. On one occasion when two women were available for a discussion at the same time, however this seemed to make them more, rather than less reserved.

Acknowledgements

We would like to thank the women and their partners who participated in this PPI work, Clare Pye (Directorate Research Co-ordinator, OGN Research Office), the health care practitioners and the administrative staff in the antenatal and postnatal clinics, at Jessop Wing, Royal Hallamshire Hospital, Sheffield Teaching Hospital NHS Foundation Trust.

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Appendix A- Feedback from discussants

-----Original Message-----

From: [removed for confidentiality]

Sent: 24 January 2016 16:03

To: b.mcmillan@sheffield.ac.uk

Subject: Fwd: Gestational Diabetes interview

Hi Brian,

Sorry for the delay in sending the feedback. Happy to send it by email.

1. What was the name of the researcher who asked you to be involved?

Dr. Brian Mcmillan

2. Please describe briefly what you were asked to do by the researcher?

I was asked about those mothers with gestational diabetes who subsequently develop Type 2 DM. We talked about their current support and what might improve their care

3. Did the researcher tell you how they would use your input in their grant application? (Please delete as appropriate)

Yes

4. Do you know if your contribution has made a difference to the research? (Please delete as appropriate)

I hope it did.

5. Did you enjoy the experience of assisting the researcher with their research? (Please delete as appropriate)

Yes

6. Can you let us know in what ways, if any, the researcher could have improved your experience?

Can't think of any. He had nice approach, assessed my awareness and led to an enjoyable discussion.

7. Thinking about your experience, would you be willing to take part in similar activities in the future to help other researchers develop their ideas and their research proposals? (Please delete as appropriate)

Yes

8. If you would be interested in finding out about other involvement opportunities in the future, please provide your name and contact details:

Name

Address

Telephone number

Email address

9. Please use this space to let us know if you have any particular area of interest (e.g. cancer, stroke, diabetes, mental health)

Cancer

-----Original Message-----

From: [removed for confidentiality]

Sent: 24 January 2016 21:12

To: McMillan Brian (NHS SHEFFIELD CCG)

Subject: Gestational Diabetes interview

Hi Brian,

This is my feedback .

Sent from my iPhone

> 1. What was the name of the researcher who asked you to be involved?

>

> Dr. Brian Mcmillan

>

> 2. Please describe briefly what you were asked to do by the researcher?

>

> The researcher assessed my awareness about gestational diabetes and on women who subsequently develop Type 2 DM. He asked about current issues and my thoughts/recommendations to address these issues.

>

> 3. Did the researcher tell you how they would use your input in their grant application? (Please delete as appropriate)

>

> No

>

> 4. Do you know if your contribution has made a difference to the research? (Please delete as appropriate)

>

> I think it has.

>

> 5. Did you enjoy the experience of assisting the researcher with their research? (Please delete as appropriate)

>

> Yes

>

> 6. Can you let us know in what ways, if any, the researcher could have improved your experience?

>

> Can't think of anything. The researcher had good knowledge and probing questions which aroused enthusiasm to participate.

>

> 7. Thinking about your experience, would you be willing to take part in similar activities in the future to help other researchers develop their ideas and their research proposals? (Please delete as appropriate)

>

> Yes

>

> 8. If you would be interested in finding out about other involvement opportunities in the future, please provide your name and contact details:

>

> 9. Please use this space to let us know if you have any particular area of interest (e.g. cancer, stroke, diabetes, mental health)

>

From: [removed for confidentiality]

Sent: 26 January 2016 17:39

To: Brian McMillan

Subject: Re: Gestational Diabetes interview

1. What was the name of the researcher who asked you to be involved?

Brian McMillan

2. Please describe briefly what you were asked to do by the researcher?

Spend a short time discussing his project ideas and my experience of gestational diabetes, and giving my ideas and suggestions.

3. Did the researcher tell you how they would use your input in their grant application? (Please delete as appropriate)

Yes

4. Do you know if your contribution has made a difference to the research? (Please delete as appropriate)

No

5. Did you enjoy the experience of assisting the researcher with their research? (Please delete as appropriate)

Yes

6. Can you let us know in what ways, if any, the researcher could have improved your experience?

Don't think there is anything that could have been done to improve it.

7. Thinking about your experience, would you be willing to take part in similar activities in the future to help other researchers develop their ideas and their research proposals? (Please delete as appropriate)

Yes

8. If you would be interested in finding out about other involvement opportunities in the future, please provide your name and contact details:

9. Please use this space to let us know if you have any particular area of interest (e.g. cancer, stroke, diabetes, mental health)

From: [removed for confidentiality]
Sent: 29 January 2016 15:22
To: Brian McMillan
Subject: Re: Gestational Diabetes interview

Hi Brian,

I've filled out each answer in the email, hope that's OK and good luck with the study!

1. What was the name of the researcher who asked you to be involved?

Dr Brian McMillan

2. Please describe briefly what you were asked to do by the researcher?

Listen to his proposal for his study and give my opinions on different aspects of it, then any suggestions I might have to help.

3. Did the researcher tell you how they would use your input in their grant application? (Please delete as appropriate)

Yes

4. Do you know if your contribution has made a difference to the research? (Please delete as appropriate)

Yes

5. Did you enjoy the experience of assisting the researcher with their research? (Please delete as appropriate)

Yes

6. Can you let us know in what ways, if any, the researcher could have improved your experience?

It was above and beyond what I expected anyway as I was given Meadowhall vouchers. And it was during a time when I would have been very bored, so it was helpful to do it then! (during glucose fasting blood test)

7. Thinking about your experience, would you be willing to take part in similar activities in the future to help other researchers develop their ideas and their research proposals? (Please delete as appropriate)

Yes

8. If you would be interested in finding out about other involvement opportunities in the future, please provide your name and contact details:

9. Please use this space to let us know if you have any particular area of interest (e.g. cancer, stroke, diabetes, mental health)