

MYDIABBY: TELEMEDICINE FOLLOW-UP OF GESTATIONAL DIABETES FOR DEPRIVED WOMEN AS A CONTRIBUTION TO THE PREVENTION OF EPIDEMIC TYPE 2 DIABETES

Line Kleinebreil MD¹, Jean-Jacques Altman MD,PhD^{2,3}, Anastasia Pichereau PhD³, Pierre-Camille Altman³

¹ UNFM (Université Numérique Francophone mondiale), Saint Maurice, France

² Hôpital Européen Georges Pompidou et Université René Descartes Paris V, Paris France

³ Be4Life, Issy les Moulineaux, France

Abstract

Gestational Diabetes Mellitus (GDM) is a condition in which pregnant women without known diabetes exhibit high blood glucose. When untreated, babies are at risk of being large for gestational age (above 4,000g) which may lead to delivery complications. The efficacy of treatment is assessed by self-monitoring of blood glucose. GDM is growing in prevalence, and limited medical resources exacerbate the situation. GDM affects 10% of pregnancies, but up to 20% in deprived populations, the homeless, migrants, and underdeveloped countries. In Paris, a University hospital used a telehealth intervention to successfully control 95% of patients in a suburb area, where the deprived population nears 100%. Many women succeeded in exchanging a computerised logbook with the medical team via the Internet. "MyDiabby" is an improved tool, which includes colour coding to help understand glucose concentrations, and an algorithm to help their interpretation. Tailored for novices, the application is appropriate for many populations. Telehealth is valuable for the management of GDM. It is reliable for: clinical, biological, and therapeutic situations; time and money saving; appreciated by patients and clinicians; and improves quality of care. It also improves equity of access, regardless of geographical and socio-economic situations, and contributes to prevention of the worldwide Type 2 diabetes epidemic. This program is the first step of an educational process to help prevent diabetes which is expected to increase seven fold in this population. within the next 10 years.

Keywords: gestational diabetes; telemedicine; myDiabby; type 2 diabetes; prevention; mHealth.

Introduction

Just imagine you are a healthy woman, so happy to be pregnant. You may be slightly overweight but you feel well, with no particular adverse symptoms. Suddenly, your blue sky disappears, the gynaecologist or midwife has monitored your blood glucose and diagnosed gestational diabetes mellitus (GDM). You are asked to make an appointment as soon as possible with a diabetologist. Diabetes, what is that? You have heard things: your grandmother was diabetic; needing insulin injections several times a day; baby malformations; amputations, ... you feel lost and the Internet is your first resource to answer your questions. The gynaecologist gave you a number of reference websites, including the website of myDiabby. Briefly, this is what you are going to discover:

GDM is a condition in which women without previously known diabetes exhibit high blood glucose levels, mainly during their third trimester. The condition is related to the inability of the pancreas to produce the increased production of endogenous insulin required during pregnancy. GDM generally has no symptoms and it is most commonly diagnosed by the systematic screening you just had: inappropriately high levels of glucose in blood samples. GDM affects 10% of pregnancies. Depending on the population studied, it can reach 20%, typically in deprived populations. Babies born to mothers with untreated GDM are at increased risk of problems such as being large for gestational age, which may lead to delivery complications. GDM is a treatable condition and women who have adequate control of glucose levels can effectively decrease these risks. A food plan is often the first recommended action for management of GDM, as well as moderate physical activity. The goal is to manage and maintain the blood glucose level at around

0.90 g/l before meals, and about 1.20 g/l after meals. This requires self-monitoring of blood glucose concentrations and correct interpretation. In 40 to 60% of cases, insulin may be necessary until delivery. Women with GDM are at increased risk of developing Type 2 Diabetes Mellitus after pregnancy: the risk can be lessened by a healthy lifestyle: weight control, balanced diet and regular exercise.¹

Method

There are three challenges to addressing of GDM: 1) the large increase in the number of patients, 2) limited (or incorrect) knowledge of the disease and how to manage it, 3) the short time, around 3 months, to identify and control all the aspects of the situation.²

To address some of these challenges, a previous telehealth program, based on email exchanges between patients and medical staff, was successfully implemented for 4,000 patients from 2006 in a university hospital of Paris. Optimal glycaemic control, obtained in 95% of women, led to a normal delivery term (on average 39 weeks) where only 5% of large babies were noted. Patient satisfaction was very high, reducing stress at home, and requiring appointments with a diabetologist only if needed.²

The program was extended to a suburb, Saint-Denis, where almost all people are considered deprived. This location has the highest level of destitution in France, with poverty, unemployment, homelessness, foreign and unofficial migrants, unwanted pregnancy and single mothers. Because of many risk factors, including obesity, the prevalence of GDM is 18%. The vast majority cannot write French and have limited comprehension of the language. The goal of the study was to establish the percentage of women who could successfully use a computerised log book and exchange information with the medical team via the Internet. This was 30%, as opposed to 95% in the university hospital study. It was believed that this already fair result could be improved upon by using a better tool, tailored for deprived people, and a better communication approach to the pregnant women, making the application available and applicable for a very disadvantaged population. Most tutorials are videos avoiding the problem of understanding of French writing.

myDiabby

Using the Internet-based experience from the Paris suburb, a new program - myDiabby, has been established this year.^{2,3} It is a simple and very friendly online mobile platform, and is the first tool specifically dedicated to the handling of GDM in a multicultural environment. The messages are easy to understand and to use. myDiabby gathers in one place all the necessary tools to quickly find all the answers for GDM. It includes an electronic log book to record the necessary daily self-monitoring of blood glucose concentration. The system shows the data with a colour code (red, orange, green) to help the women understand if they are doing well and includes an algorithm to help interpretation.³ On top of this data management system, there is a set of video clips to explain how to manage the disease. This learning experience, on nutrition, sugar intake, and weight control during pregnancy, is important for the future of these women. This approach is the first step of an educational process intended to contribute to the prevention of a 7-fold increase in Type 2 Diabetes Mellitus in this population over the next 10 years if nothing is done.

Discussion

Telemedicine is particularly good for the management of GDM due to the reproducibility of the clinical, biological and therapeutic situation of the patients. This approach, time and money saving, appreciated by patients and the medical team is a model of improvement in quality of care. It provides equity of access, independent of geographical and socio-economic situations and a link to contribute to the prevention of the worldwide epidemic type 2 diabetes.⁴

Corresponding author:

Line Kleinebreil

UNFM

Saint Maurice

France.

Email: Line.kleinebreil@orange.fr

Conflict of interest: Line Kleinebreil has no conflict of interest related to this paper. Jean-Jacques Altman, Anastasia Pichereau, and Pierre-Camille Altman are scientific director, assistant and president of Be4Life.

References

1. Janin C, Ducloux R, Fontanié M, Altman J-J. Consultation diabétologique du postpartum après diabète gestationnel : un exemple d'amélioration des pratiques *MmM* 2014;8:169-175.
2. Altman JJ, Altman PC. MyDiabby, la solution de télésuivi du Diabète Gestationnel. Quand le parcours de soins devient mobile. La mobilité au service de la continuité des soins dans le suivi du diabète gestationnel. SFT Antel, 2014.
3. Altman PC, Calvet H, Sarda B, Altman J-J My-Diabby : De la prise en charge télé-médicale du Diabète Gestationnel à la prévention du diabète de type 2. Savoir évaluer un besoin de télé-médecine chez les femmes atteintes d'un diabète gestationnel SFT Antel, 2014 et site de l'Antel, www.congres-antel.com et *European Research in Telemedicine*, 2014;3: 190-191.
4. Be4Life. Available at: <http://mydiabby.fr/> accessed 23 March 2015.