Gestational diabetes mellitus (GDM) is a condition that occurs during pregnancy for some women. Hormones produced during pregnancy may lead to insulin resistance resulting in higher than normal blood glucose levels. GDM is becoming more common in Australia with known risk factors including: increasing maternal age, maternal obesity, ethnicity, previous diagnosis of GDM, Polycystic Ovarian Syndrome, early testing and lower diagnostic criteria. In Australia, GDM now affects around 10% of pregnancies but can occur in up to 30% in high-risk populations.

**The problem:**

GDM is associated with an increased risk of complications in pregnancy and birth, as well as a greater likelihood of mother and child developing type 2 diabetes later in life. There have been huge advances in the knowledge about the management and treatment of GDM and the importance of a healthy lifestyle in keeping gestational diabetes and its complications under control. Scientific evidence is beginning to show that controlling glucose levels can result in less serious foetal complications (such as macrosomia) and increased maternal quality of life (Chilelli et al., 2014). However, due to the dwindling economic resources allocated to health services, access to specialised healthcare facilities is becoming more difficult.

In addition:

- An increasing number of pregnant women are diagnosed, which leads to increasing numbers in clinics
- Health care costs are increasing:
  - costs of outpatient visits to primary and secondary care, cost of inpatient hospital care before and after delivery, the use of insulin, delivery costs and baby's stay in the neonatal intensive care unit (Kolu et al., 2012)
- It is often inconvenient for pregnant women to travel to a clinic living far away, or with no independent means of transportation, or needing to rest to avoid preterm delivery (Chilelli et al., 2014)
- This leads to poor attendance and adherence (Mukerji et al., 2015)
- Diagnosed individuals need to closely monitor their blood glucose levels multiple times during the day, to see if their levels are on target.

**The solution:**

Leveraging from a validated design that links post heart attack patients to clinicians throughout a cardiac rehabilitation program (Varnfield et al., 2014), an innovative platform comprised of a smartphone app and web portal was developed. Known as M♡THer, it will support women with GDM through their gestational period. The M♡THer platform is designed to improve the health and quality of life for women with GDM, but it will also reduce costs to the health system by enabling clinicians to provide more timely interventions when deteriorating health is detected.

The smartphone app accompanies and guide GDM women through every step of their gestational period by monitoring health measures, delivering simple interactive questionnaires and provision of educational multimedia content. The web-portal enables clinical care providers to view their client's progress and provide individualised feedback and/or early care intervention. Functional requirements and features for both the app and portal have been developed from workshops with clinicians and client representatives as part of the user-centred design process.

After being diagnosed with GDM, clients are able to monitor symptoms and health indicators such as blood glucose level, dietary intake, body weight and exercise through the smartphone app. When
women take their blood glucose levels (BGLs) via finger prick testing, the results from their glucose monitor can upload automatically, via Bluetooth, to the App on their smartphone. The entries on the app will be automatically updated to the web portal, whereby clinicians can view the results during clinic or multi-disciplinary team reviews. The app provides visual (graphical) and textual progress reports, and motivational messages and information to assist individuals in the management of their GDM.

This project has brought together the Metro South Hospital and Health Service (MSHHS) and Australian e-Health Research Centre (AEHRC) at CSIRO, who have devised an engaging platform to meet the needs of GDM clients and their clinicians. CSIRO engineers built a smartphone app (Android and iOS), and a web portal, which has now been evaluated through a small pilot study, to ascertain levels of program efficacy, successful health related outcomes and user satisfaction.

References


Aims & Goals:

To provide women with gestational diabetes a technology based solution to monitor and manage their Gestational Diabetes Mellitus.

Evaluation/outcomes:

- Health Round Table, July 2017. Winning presentation in the "Improving Self-Care" category.
- 2018 MSH Board Chair's Award. Category winner for "Innovation Through Digital Technology Award".
- 2018 International Hospital Federation Awards. "Gold" award for "Quality and Safety in Patient-Centred Care".
- Entry accepted to the 2018 Observatory of Public Sector Innovation. [https://oecd-opsi.org/innovations/m%E2%99%A1ther-support-for-women-with-...](https://oecd-opsi.org/innovations/m%E2%99%A1ther-support-for-women-with-...
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