Development & Evaluation of OnTrack Diabetes: An Automated, Web-based Type 2 Diabetes & Dysphoria Program

Mandy Cassimatis, Prof David Kavanagh, Prof Andrew Hills, A/Prof Anthony Smith, Prof Paul Scuffham, A/Prof Judy Bauer
Type 2 diabetes

- Blindness
- End-stage renal disease
- Amputation
- Cardiovascular disease

$848 million/ year

3.8% of Australians

Queensland University of Technology

The Wesley Research Institute
Making a difference today
Dysphoria & Type 2 Diabetes

**Dysphoria**: Depression, anxiety, diabetes-specific distress.

- 2- to 3-fold prevalence in people with diabetes c.f. general population\(^1,2\).

**Meta-analyses:**

- Sub-clinical depression\(^3\) & anxiety\(^4\) more common than clinical cases.

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1. Anderson et al. 2001
4. Grigsby et al. 2002
Dysphoria & Type 2 Diabetes

Impacts

Significantly higher:

- Physical inactivity\(^1\),
- Inadequate nutrition\(^1\),
- Reduced diabetes self-care – medication-taking\(^2\), & blood glucose self-monitoring\(^3\),
- Glycaemic control\(^4,5\),
- Complications\(^6\), and
- Mortality\(^7\)

Need for Support

• Regular, ongoing self-management support essential\(^1\).

Barriers:

• *Personal* – motivation, cost, non-acceptance

• *Systemic* – Health system services/ professionals

• *Rural/ regional* - Poor health service access & availability.

- 20% of Primary Health Care providers serve c. 1/3 population

\(^1\) Fisher et al. 2007
OnTrack Diabetes Project

Development and evaluation of a...

- Web-based
- Self-guided
- Automated
- Interactive...

Type 2 diabetes self-management & dysphoria support program.
Online Diabetes Support

• User autonomy

• Anonymous

• Accessible – 72% of Australian households had internet access 2008-09 (MPHS)

• 24-hour availability

• Ongoing support, as needed

• Potential cost-effectiveness
Study 1
Qualitative Interviews
- People with Type 2 diabetes
- General Practitioners

Development of OnTrack Diabetes
- Research
- Theme/content development
  - Written content
  - I.T. Programming
  - Graphic design
  - Live to air

Study 2
Pilot RCT of OnTrack Diabetes
*Sample: N ≥ 60; T2D, 18 - 75, live in Australia*

Study 3
Main RCT of OnTrack Diabetes
*Sample: N ≥ 300; T2D, 18 - 75, live in Australia*
Study 1 Method

Aims:

1) To explore perceived experience of living with & managing Type 2 diabetes with
   (a) People with Type 2 diabetes and
   (b) General Practitioners (GPs),
   using Qualitative Interviews, &

2) To obtain suggestions for online support program inclusions.
Study 1 Method

Study Sample

*Study 1a.* Selection criteria: T2D, 18-75, live in Brisbane

*Study 1b.* Selection criteria: Practice in Brisbane, treat T2D

Study Setting

*Study 1a.* Wesley Research Institute; IHBI, QUT Kelvin Grove.

*Study 1b.* GP medical practice, or by phone.

Measures

Qualitative, Semi-structured interview

*Study 1a.* + Demographics and Kessler-10 scale
Study 1 Method

Interview Questions

I. Enablers & barriers to optimum T2D self-care,
II. Emotional challenges related to T2D,
III. Perceived requirements for additional support,
IV. Suggested online program inclusions, and
V. Features that would encourage program use/GP referral to program.

Study 1a. + Demographics and Kessler-10 scale
Study 1 Sample

Sample Characteristics

Study 1a. $N=13$, (46% male)
- Mean age = 57.09 ($SD=7.77$)
- Type 2 diabetes duration $M=7.23$ y ($SD=3.77$)
- 85% on diabetes medications, >50% on insulin
- >65% - GP main diabetes management support
- Average K-10 score: 16.3 ($SD=5.42$; Range=8-24)
- Diabetes control – 53.8% fairly/mostly unstable

Study 1b. $N=12$, (70% male)
- Duration treating Type 2 diabetes $M=13$ y.
## Study 1 Results

### Enablers of Effective Type 2 Diabetes Self-Care

<table>
<thead>
<tr>
<th>Study 1a</th>
<th>Study 1b</th>
</tr>
</thead>
<tbody>
<tr>
<td>(People with Type 2 diabetes)</td>
<td>(GPs)</td>
</tr>
<tr>
<td>1) Self-monitoring/ awareness</td>
<td>1) Self-monitoring</td>
</tr>
<tr>
<td>2) Informational support</td>
<td>2) Informational support</td>
</tr>
<tr>
<td>3) Accountability and support from HCPs - “Reminders”</td>
<td>3) Regular follow-up with and support from HCPs</td>
</tr>
<tr>
<td>4) Routine</td>
<td>4) Make consequences of poor glycaemic control “real”</td>
</tr>
<tr>
<td>5) Goal-setting</td>
<td>5) Help patients identify and overcome barriers; give reasons to change.</td>
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<tr>
<td>6) Positive feedback</td>
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<tr>
<td>7) Social support</td>
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<tr>
<td>8) Holidays</td>
<td></td>
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</tbody>
</table>
### Study 1 Results

#### Table 2.

*Barriers to Effective Type 2 Diabetes Self-Care*

<table>
<thead>
<tr>
<th>Study 1a</th>
<th>Study 1b</th>
</tr>
</thead>
<tbody>
<tr>
<td>(People with Type 2 diabetes)</td>
<td>(GPs)</td>
</tr>
</tbody>
</table>

1) **Eating difficulties**  
   - Self-control of type and quantity of food, restrictions eating out  
2) **Lack of consistent dietary information**  
3) **Functional limitations – Physical activity**  
4) **Diabetes medication issues**  
   - Fear of going on medications, side-effects  
5) **Stress**  
6) **“Fitting in” Type 2 diabetes self-care**  
7) **Chronicity**  
   - Motivation lapse  

1) **Boundaries/ Restrictions**  
2) **Lack of consistent Type 2 diabetes self-management information**  
3) **Functional limitations - Physical activity**  
4) **Diabetes medication issues**  
   - Reluctance to commence  
5) **Complexity of treatment regime**  
   - “Fitting in” Type 2 diabetes self-care
Study 1 Results

Table 3. *Emotional Challenges Related To Type 2 Diabetes*

<table>
<thead>
<tr>
<th>Study 1a</th>
<th>Study 1b</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(People with Type 2 diabetes)</em></td>
<td><em>(GPs)</em></td>
</tr>
<tr>
<td>1) Fear – Initial diagnosis, chronicity, medications</td>
<td>1) Grief - Complications</td>
</tr>
<tr>
<td>2) Worry/ Anxiety – Blood glucose fluctuations, mystery of impact, boundaries, going on insulin</td>
<td>1) Worry – Going on insulin</td>
</tr>
<tr>
<td>3) Depression – Complications, helplessness</td>
<td>1) Fear – Threat of boundaries</td>
</tr>
<tr>
<td>4) Frustration – “Constant battle”, loss of control/independence</td>
<td></td>
</tr>
</tbody>
</table>
## Study 1 Results

Table 4. **Suggestions For Online Type 2 Diabetes Support Program Components**

<table>
<thead>
<tr>
<th>Study 1a (People with Type 2 diabetes)</th>
<th>Study 1b (GPs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Informational support</td>
<td>1) Informational support</td>
</tr>
<tr>
<td>- Nutrition, medications, physical</td>
<td>- Effects of diabetes on the body,</td>
</tr>
<tr>
<td>activity, general Type 2 diabetes</td>
<td>complications</td>
</tr>
<tr>
<td>2) Monitoring tools</td>
<td>- Medication</td>
</tr>
<tr>
<td>- Blood glucose, HbA1c, diet,</td>
<td>- Foot care</td>
</tr>
<tr>
<td>exercise</td>
<td>- Worksheets</td>
</tr>
<tr>
<td>3) Motivational support</td>
<td>2) Monitoring tools</td>
</tr>
<tr>
<td>- Feedback on progress towards</td>
<td>- Blood glucose, diet,</td>
</tr>
<tr>
<td>goals</td>
<td>exercise, weight,</td>
</tr>
<tr>
<td>- Help with “the psychology of it”</td>
<td>clinical parameters</td>
</tr>
<tr>
<td>4) Emotional support modules</td>
<td>3) Motivational support</td>
</tr>
<tr>
<td>5) Social support</td>
<td>- Exercise suggestions, feedback</td>
</tr>
<tr>
<td>- Chat room/ forums</td>
<td>reinforcement</td>
</tr>
</tbody>
</table>
Study 1 Conclusions

- Overall support for online Type 2 diabetes program
  - Take into account: possible age limitations, time constraints

- Need for information, motivational support, diabetes education, self-monitoring support...

- Revealed nature of emotional challenges related to Type 2 diabetes.

- Need recognition of dysphoria and impacts on Type 2 diabetes self-care.
Study 1
Qualitative Interviews
• People with Type 2 diabetes
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OnTrack Diabetes

• Social Cognitive Theory basis
  • Self-efficacy, mastery experiences, outcome expectancies
  • Cognitive-behavioural therapy techniques

• Cognitive Skills training
  • Goal-attainment scaling
  • Planning
  • Role modelling

• Motivational skills training
  • Motivational interviewing
  • Implementation intentions
  • Guided imagery
  • Creative visualisation
OnTrack Diabetes Live Demo

www.ontrack.org.au/diabetes/
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Study 2

Pilot RCT of OnTrack Diabetes.

Aims:
I. To test program functionality,
II. Preliminary indication of effectiveness, &
III. Indication of user uptake, acceptability, satisfaction.
Study 1
Qualitative Interviews
- People with Type 2 diabetes
- General Practitioners

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Study 3
Main RCT of OnTrack Diabetes
Sample: $N \geq 300$; T2D, 18 -75, live in Australia
Study 3

Aims:

I. To evaluate effectiveness of OnTrack Diabetes in improving clinical, psychological, behavioural, psychosocial outcomes,

II. To evaluate acceptability, usability, utility and implementation feasibility of OnTrack Diabetes, &

III. To determine program cost-effectiveness.
Study 3

Method

**Sample.** *Inclusion criteria:* type 2 diabetes diagnosis ≥ 3 mths; 18-75y; live in Australia; ≥weekly access to computer with internet; stable medication dosage ≥4 wks & dose ≥ 3 mths; contactable by phone.

*Exclusion criteria:* mental condition other than depression/anxiety; suicidal ideation; taking corticosteroids; pregnant/ breast-feeding; physical impairment.
Study 3

Design
Randomised Controlled Trial; participant is the unit of randomisation.

• Two study arms:

(1) Delayed-Intervention
Usual Care only: baseline - 3 months
→full program access: 3 months - trial endpoint

(2) Intervention
Full program access: baseline - trial endpoint
Study 3

Primary Outcomes:

(i) HbA1c level (lab value)
(ii) Depression, anxiety (DASS-21); diabetes-specific distress (Diabetes Distress Scale)

Secondary Outcomes:

(i) Diabetes self-care (AUSDIAB measures; SDSCA survey)
(ii) Physical activity (Active Australia Survey; Timeline Follow-back interview)
(iii) Nutritional intake (Timeline Follow-back interview)
(iv) Quality of life (EQ-5D & SF-36)
(v) Self-efficacy (for diabetes self-care) (Diabetes Self-efficacy Scale)
(vi) Cost-effectiveness (Health Service Use Survey)
(vii) User satisfaction, perceived usability, implementation feasibility (Evaluation questionnaire)
Study 3

Measures: Baseline, 3, 6, & 12 mths; optional 5-yr follow-up.

Predictions

1. Intervention arm will show significant reductions in primary outcomes - HbA1c and mood - c.f. Delayed-Intervention arm - baseline to 3-months.

2. Intervention arm will show significant improvements in secondary outcomes - physical activity participation, diabetes self-care behaviours, and quality of life - c.f. the Delayed-Intervention arm, from baseline to 3-month follow-up.
Special Thanks

Wesley Research Institute

Mitsubishi Development Pty Ltd

QUT School of Psychology & Counselling

David Kavanagh & the OnTrack team
Thank you!

For information, visit:

www.ontrack.org.au/diabetes

Contact details:

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Phone: (07)3721 1703
Welcome to OnTrack Using the Program

As you go through My Journey, a guidebook tells you how to use tools and resources to work on your goals. Sections in My Journey are called signposts. The Journey Map on the right will help you to keep track of where you are.

Where do I start?
Look at the Journey Map now. You are in "Welcome"

The rest of the program is in 5 signposts. You can choose the order you do them, but don’t forget to come back and do things you miss.

We suggest you start with Keeping Active and Feeling Great. That will boost your mood, as well as helping you stay fit.

But if you want to start with Eating Well and Feeling Healthy, go straight to that.

For some people, the most urgent problem is remembering to check blood glucose or take medication. If that is you, go to Health Routines first.

Do the fifth signpost, Keeping On Track, last. It will help you to keep going with your goals.

When can I do it... and how fast can I go?
You can log into the program from any computer, any time... and you can do a signpost in one session, or split it over a few days. You are in charge... but for best results, pace yourself through the program. Give yourself a few days to try out things you learn, before you try something else.
Interactive Tools

**Ideas About Fun Activity**

Let's look at a few options for physical activities you'd enjoy doing.

Click on the activities you may want to try.

This isn't so you can make a plan. For now, it's just about finding something you like doing, or you may want to try.

Choose one thing for now - you can come back later and redo this section if you want.

<table>
<thead>
<tr>
<th>Fun Physical Activity Ideas</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fun Activities</strong></td>
</tr>
<tr>
<td>Brisk Walking</td>
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<tr>
<td>Walking in the sand</td>
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<tr>
<td>Cycling</td>
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<tr>
<td>Boxing</td>
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<tr>
<td>Dancing</td>
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<tr>
<td>Body boarding</td>
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<tr>
<td>Aerobics / gym class</td>
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<tr>
<td>Swiss ball workout</td>
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<tr>
<td>Yoga</td>
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<tr>
<td>Sailing</td>
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<tr>
<td>Bush Walking</td>
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<td>Running</td>
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<td>Swimming</td>
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<td>Rowing</td>
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<td>Surfing</td>
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<td>Golf</td>
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<td>Pilates</td>
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<td>Skipping rope</td>
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<td>Ice skating</td>
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<td>Horse riding</td>
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<tr>
<th>Team Sports</th>
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<tbody>
<tr>
<td>Football</td>
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<tr>
<td>Soccer</td>
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<tr>
<td>Table tennis</td>
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<tr>
<td>Cricket</td>
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<td>Basketball</td>
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<td>Waterpolo</td>
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<td>Bowling</td>
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<td>Touch football</td>
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<td>Tennis</td>
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<td>Squash</td>
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<td>Netball</td>
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<tr>
<td>Hockey</td>
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<td>Volleyball</td>
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</tbody>
</table>
Thinking Well & Feeling Fine Introduction

Welcome to the Thinking Well and Feeling Fine signpost!

Feeling well emotionally is helpful for reaching your goals. Having your feelings in balance can help you feel more positive about changes and also persist through challenges. It's also important to make sure there's plenty of fun and pleasure in your life.

This signpost:

- Helps you think of ways you can add more enjoyment to your life
- Teaches you ways you can deal with stress, like Mindfulness
- Gives you some skills to use if you feel down about your diabetes

We hope you have fun with the tools and resources in this signpost and that you get enjoyment practicing ways you can add more pleasure to your life!
**Ideas About Fun Activity**

**Summary**

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**My Summary**

---

**Skydiving**

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**Good Things About My Idea**

- Clearer thinking
- More energy
- More physically fit
- Stronger
- Sleeping better

**Obstacles or downsides to the activity**

- Requires a whole day
- Costs quite a lot to do it
- Takes time to organise

---

**Solutions To My Obstacles**

- Requires a whole day but I could schedule around them
- Costs quite a lot to do it but I could save up some more elsewhere
- Takes time to organise but I could book well in advance

---

Each time you do the activity:

- Imagine the good things that will happen. Make them as vivid as you can.
- Try to think of an actual event, to make them more real. Play out new events each time you think of the good things, to keep them fresh.
- Make an image of beating any obstacles and finishing the activity.
- Go into the future in imagination - think about how it will be if you do the activity regularly.
- Picture ways to help you keep going.

If you feel like giving up, make those good things come alive in your mind. Remember how good you will feel. Hold onto those images - they will help you keep going, even when it’s hard.
Monitoring
Blood Glucose Levels
Progress Tracking

### How I'm Doing

<table>
<thead>
<tr>
<th>Mood</th>
<th>Glucose</th>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekly</td>
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</tbody>
</table>

#### Daily Mood

This graph shows your best mood and worst mood for each day in the last 4 weeks.

- Your best mood
- Your worst mood

If there are gaps in your graph, go back to My Diary and record your best and worst moods for the missing days.