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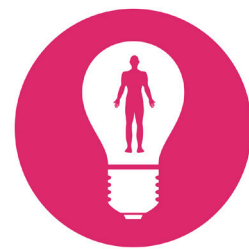
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DWELL

Evaluation Study of the Diabetes and WELLbeing



REPORT 1: Evaluation Methodology



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FOREWARD

The Diabetes and Well Being in Europe (DWELL) project was funded by the INTERREG 2 Seas Mers Zeeën Programme and ran between 2016 and March 2023. The overall aim of the project was to empower people living with Type 2 Diabetes Mellitus (T2DM) to enhance self-management of illness through a co-produced 12-week educational programme, and to improve targeted aspects of individual health and wellbeing. The project involved partners in the UK, France, Netherlands and Belgium.

Canterbury Christ Church University ('CCCU') led Work Package 4: Evaluation of the DWELL programme, which commenced delivery in 2018. The evaluation comprised four key areas: patient outcomes; system/process benefits of the programme; staff training; cost benefits of the programme.

For Output 4.1 of this Work Package, we present a set of four final project reports which relate to DWELL programme evaluation. These are as follows:

- **REPORT 1:** Evaluation Methodology
- **REPORT 2:** Participant Outcomes
- **REPORT 3:** Process Evaluation
- **REPORT 4:** Workforce training and Cost Effectiveness

Report 1 describes the Evaluation Methodology of the DWELL programme. The COVID-19 pandemic, which commenced in March 2020 as the project was still 'live', had an impact on the programme's delivery and evaluation activities; this impact is discussed where relevant throughout the reports.

We would like to acknowledge colleagues for their valuable contribution as researchers and advisors at earlier stages of the evaluation study: Dr Marlize De Vivo and Prof Kate Springett, Canterbury Christ Church University; and, Dr Katrina Taylor, University of Kent.

We are grateful to all DWELL programme participants in the four project countries for their significant contributions and support in evaluating the DWELL programme at all its stages.

We would like to thank all our project partners for their invaluable help in data collection and in particular:

UK - Julie Webster, Anne Eltringham-Cox and Jane Redding, Medway Community Healthcare; Nathalie Belmas and Sue Shaw, Blackthorn Trust; Stephen Cochrane, Kent County Council

Belgium - Ruben Vanbosseghem, Anelien Callens and Veerle Luyens, Arteveldehogeschool

France - Marie Duezcalzada, Jerome Cazier and Dr Véronique Averous, Centre Hospitalier de Douai

The Netherlands - Maarten Gijssels, Linda van Wijk, and Melvin Franken, Kinetic Analysis

This work was funded by the European Regional Development Fund under the Interreg 2 Seas Mers Zeeën Programme [2S01-058].

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1. THE DWELL PROGRAMME

1.1. Background

The World Health Organisation (WHO) defines diabetes as:

"...a chronic disease, which occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces. This leads to an increased concentration of glucose in the blood. Type 2 diabetes (non-insulin-dependent) is caused by the body's ineffective use of insulin. It often results from excess body weight and physical inactivity." (WHO, 2016; National Institute for Health Research, 2021).

Non-communicable diseases such as diabetes are the most common cause of death and disability in the EU, accounting for 86% of deaths and 77% of the disease burden. Diabetes is a long-term non-communicable disease of significant societal and economic concern, and therefore not merely a clinical issue. Ninety per cent of T2DM patients have onset generally in later life. Healthy lifestyle choices help in the management of T2DM. Research shows that consistent, careful self-management is required for patients to achieve the best outcomes, yet there is currently no standard approach for T2DM patients. This is in part due to the wide differences in response to methods of encouraging diabetes care. Furthermore, issues that impact on an individual's ability to self-manage the condition are multifactorial, including education, communication with healthcare providers, personal circumstances, provider issues and support (Wilkinson, Whitehead and Ritchie, 2014). Initiatives to increase effective, low-cost self-management are essential to the sustainability of treatment, such as education programmes that allow for incremental knowledge gain and experiential and vicarious learning and the provision of culturally sensitive care (Wilkinson, Whitehead and Ritchie, 2014).

An early evaluation of 'DESMOND', a UK structured group education programme, indicated that, for individuals newly diagnosed with type 2 diabetes, the programme changed key illness beliefs and these changes predicted quality of life and metabolic control at three-month follow-up (Skinner et al., 2006). Later on, evaluation research on the DESMOND programme showed improvements in weight loss and smoking cessation and positive improvements in beliefs about illness, however there was no difference in HbA1c levels up to 12 months after diagnosis (Davies et al., 2008). Another UK structured education programme, 'X-PERT', which has patient-centred focus based on theories of empowerment and discovery learning, showed at a 14-month follow-up that participation led to improved glycaemic control, reduced total cholesterol level, body weight, BMI and waist circumference, reduced requirement for diabetes medication, increased consumption of fruit and vegetables, enjoyment of food, knowledge of diabetes, self-empowerment, self-management skills and treatment satisfaction (Deakin et al., 2005).

Elsewhere in Europe, evaluation results from a Belgian evaluation of a community level empowerment-based group self-management education pilot programme focussed on diet and exercise, showed that BMI decreased, HbA1c declined and emotional distress scores diminished (Bastiaens et al., 2009). However, these changes were only partly sustained at an 18-month follow-up, and actual behaviour only changed modestly. In addition, a study in France has shown significant positive physiological results for patients from an intervention which incorporated integrative care models and enabled participants to have access to psychologist sessions and community support free-of-charge (Mollet, 2010).

In the Netherlands, evaluation of a psycho-educational intervention, 'BeweegKuur', suggested that both healthcare professionals and patients were motivated to participate and that the programme was designed in accordance with their needs. Amongst the barriers highlighted was lack of time, specifically regarding the fact that motivational interviewing took more time than traditional counselling techniques and required intensive training and practice support. Other impeding factors were financial, since health insurance did not fully cover the costs, as well as self-efficacy perceptions as some patients were not convinced that they could maintain their healthy lifestyle after the programme. The multidisciplinary approach and the combination of physical activity and dietary behaviour change was felt to contribute to the success of the intervention as long as the impeding factors identified were overcome (Helmink, 2012).

Despite the array of studies from across the European countries involved in the DWELL project, the UK National Institute for Health Research (NICE) reports that there still remains limited robust evidence of the effectiveness of structured educational programmes for people with type 2 diabetes (NICE, 2015) and therefore points to the need for further evaluation work needed to be done in this area.

1.2. DWELL project aim and objectives

The DWELL project had the aim to develop and deliver a self-management programme for people living with T2DM, which employed personalised, effective ways of managing their condition and improving their wellbeing. This was going to be achieved through tailored support delivered by healthcare professionals and co-produced by patients.

Main objectives of the DWELL project were to:

- Co-develop a 12-week programme that would enable people with T2DM to self-manage their condition, co-produced with current patients ('DWELL ambassadors'1),
- Devise a training programme for staff and include DWELL ambassadors to deliver the 12-week support programme effectively,
- Evaluate the programme to demonstrate patient benefits as well as impact of the training on staff and DWELL ambassadors who will deliver the patient support programme,
- Develop online support systems to enhance sustainability of the changes achieved during the 12-week programme.

1.3. The 12-week DWELL programme

The DWELL programme involved participants with T2DM across five delivery sites - two in the UK, and one in Belgium, one in France and one in the Netherlands. The 12-week programme was co-developed and designed by partner organisations and people living with diabetes.

The final programme comprised four key areas: Education; Nutrition; Physical activity and Wellbeing (Figure 1). As well as core sessions in each of the four areas, participants were signposted to further 'pick and mix options' that they could undertake outside of the programme, for example local gyms or yoga classes. The programme was underpinned by peer support and self-management theories, along with motivational interviewing to ensure that content was tailored to individuals and their circumstances. The sessions and lesson plans were developed based on adult learning principles.

Participants were able to self-refer to 12-week DWELL programme or were referred by GPs and healthcare professionals involved in their care. Particularly motivated participants of the 12-week programme were recruited to become trained DWELL ambassadors. These individuals were involved in providing ongoing support to further intakes of DWELL participants, for example through motivating others, sharing their own experiences, and receiving training to co-deliver some elements of the programme alongside DWELL staff. Full details of the 12-week DWELL programme and its practical organisation can be found in the booklet 'DWELL Diabetes & Wellbeing' (Vanbosseghem, Callens and Luyens, 2020).



Figure 1. The DWELL 12-week programme

1 Further details regarding the DWELL ambassador role can be found in the '12-week DWELL programme' section that follows, and in Report 3: Process Evaluation

1.3.1. The DWELL Logic Model

Logic models represent the theory of change for complex interventions, namely how an intervention produces its outcomes (Moore et al, 2015), and they inform the development of an evaluation strategy for such interventions. The DWELL Logic Model was developed to help prioritise and structure data collection and analysis of the main aspects of the DWELL intervention and relationships between them.

Table 1. The DWELL Logic Model

CONTEXT – Type 2 diabetes mellitus (T2DM) is a long-term non-communicable disease of societal and economic concern. Consistent, careful self-management is required for people living with T2DM to make lifestyle changes and achieve the best outcomes. Initiatives to increase effective, low-cost self-management are therefore essential to the sustainability of treatment. The Diabetes and WELLbeing ('DWELL') 12-week psychoeducational programme aims to empower people with T2DM to better self-manage their condition and improve individual health and wellbeing, tailored to individuals and their circumstances, incorporating motivational interviewing and peer support. The programme will be delivered and evaluated across four countries - UK, Belgium, France, and the Netherlands, in different settings (hospital, community, etc.). It is also impacted by country-specific guidelines for diabetes care.	
GOALS (context)	• Empowerment of people with T2DM to access tailored support and engage effectively with treatment/care • Improvement of health and wellbeing • Enhanced self-management of condition • Economic benefits to health services
INPUTS (mechanisms of impact)	• Collaborative/co-creation approach (people with T2DM working with experts and facilitators) • Drawing on examples of good practice self-management programmes (e.g. X-PERT) • Knowledge-sharing between experts-by-experience and professionals • Motivational Interviewing • Peer Support • Empowerment Strategies • Self-Management Theories
ACTIVITIES (implementation)	• Workforce Training Needs Analysis • Programme Co-Design (people with T2DM working with professionals) • Pilot of 12-week programme • Recruitment strategies • Evaluation Design (outcomes, process, cost effectiveness) • Review and refinement on iterative basis
OUTPUTS (implementation)	• Workforce Training to fill identified needs • Delivery of 12-week programme (4 areas - education, nutrition, physical activity, wellbeing) • Motivational Interviewing and Peer support • DWELL ambassador role • Online support tool • Evaluation data collection (4 time points - Assessment Form, DWELL Tool, focus groups, interviews, MI forms, Goals forms) • Development of 'DWELL community' of participants, staff, DWELL ambassadors
OUTCOMES	• Improved metabolic health • Improved diabetes illness perceptions • Improved patient empowerment • Improved physical health • Improved eating behaviour • Improved self-care • Improved mental wellbeing • Improved quality of life • Positive 'lived' experiences of participants, staff and DWELL ambassadors
IMPACTS (short, medium, long-term)	• Immediate/short term – Learning. People with T2DM have greater understanding of condition • Intermediate/ medium-term - Behavioural Change. People with T2DM are empowered to better self-manage their condition and have improved self-care behaviours • Post-intermediate /medium-term – Metabolic Health improvements • Long-term – improved health and wellbeing; DWELL model to be applied to self-management of other long-term conditions

2. Evaluation Study of the DWELL programme

2.1 Evaluation Study Questions

The DWELL Evaluation Study aimed to assess outcomes, process, and cost effectiveness of the 12-week programme delivered in the five programme sites. The evaluation questions were:

- What was the impact of the programme in terms of metabolic health indicators, quality of life, levels of physical activity and care for people with Type 2 diabetes?
- What was the impact of the programme on self-management of diabetes in terms of attitudes and behaviours of people with Type 2 diabetes?
- How did participants people with Type 2 diabetes, staff and ambassadors view their experiences with the programme?
- What is the incremental cost-effectiveness of the programme compared with standard care?

In light of the delays caused by the COVID-19 pandemic, the project (and evaluation study) was extended, which allowed the team to collect 'legacy' longitudinal qualitative data to explore participant experiences up to 4 years after they had completed the DWELL programme, addressing the following questions:

- What was the sustainable impact of the programme in terms of quality of life, levels of physical activity and care for T2DM patients?
- What was the sustainable impact of the programme on self-management of diabetes in terms of patient attitudes and behaviours?

2.2 Evaluation Study Design

The DWELL evaluation study adopted a quasi-experimental, longitudinal, mixed-methods approach to assess change over time and effect of intervention. Pre-post intervention measures were taken at four time points: Baseline (T0), End-of-Programme (T1), 6-month Follow-up (T2) and 12-month Follow-up (T3). Also, process evaluation data were collected during the project and 'legacy' longitudinal data were collected from evaluation study participants 24 months or more after they had completed the DWELL programme. A diagram of the overall evaluation design is shown in Figure 2.

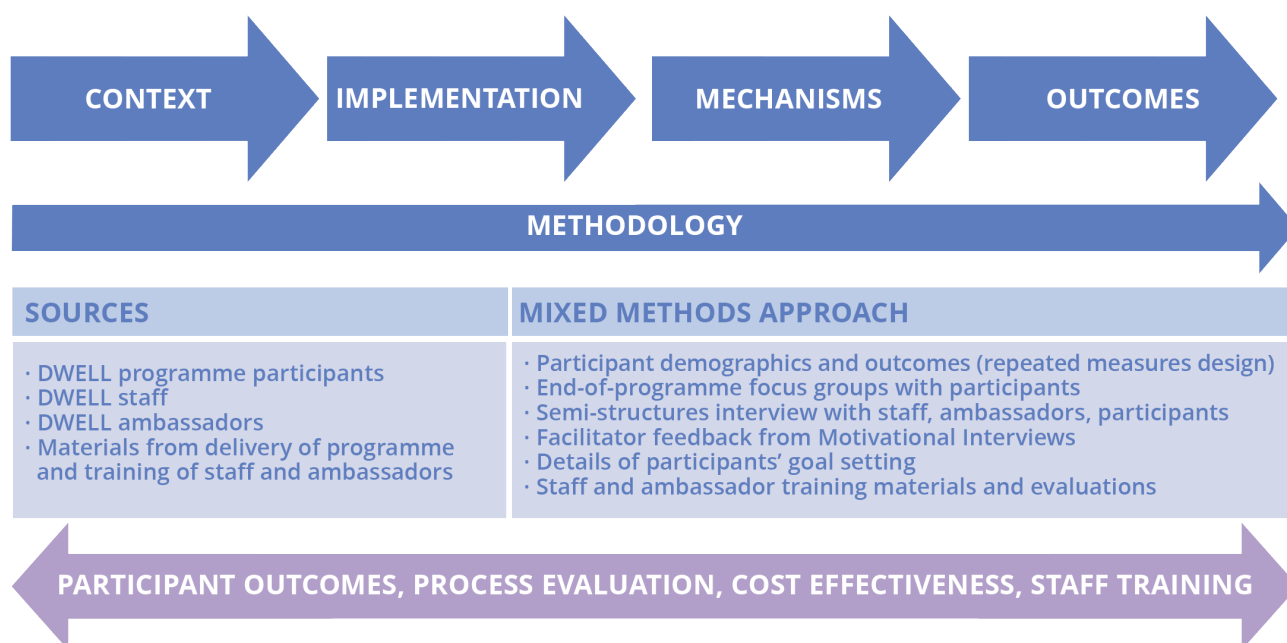


Figure 2. DWELL Evaluation Study Design

2.2.1 Participant Outcomes

Participant outcome measures relating to metabolic health, behaviours and wellbeing were collected either via staff members (metabolic health and assessment at referral) or via self-completed questionnaires which were administered with the use of the DWELL Tool at the evaluation time points as required (Table 2).

Table 2. Timeline of Participant Outcome Measures

	T0 Baseline	T1 End of DWELL Programme - At 3 months	T2 1 st Follow-up At 6 months post-DWELL	T3 2 nd Follow-up At 12 months post-DWELL
ASSESSMENT AT REFERRAL				
Duration of Diabetes	✓			
Demographic information	✓			
METABOLIC MEASURES				
HbA1C	✓	✓	✓	✓
Weight	✓	✓	✓	✓
Height	✓			
BMI	✓	✓	✓	✓
Waist circumference	✓	✓	✓	✓
SELF-REPORTED MEASURES				
Levels of Physical Activity	✓	✓	✓	✓
Diabetes Care	✓	✓	✓	✓
Quality of Life	✓	✓	✓	✓
Attitudes and Behaviours	✓	✓	✓	✓

A brief description of the outcome measures is presented below.

Metabolic Health

Metabolic outcome measures included weight, BMI, waist circumference and glycated haemoglobin (HbA1c). These were measured by a DWELL facilitator at the start and the end of the DWELL programme, as well as two follow-ups: six-months and 12-months later. Where a trained DWELL facilitator was not available for collection of HbA1c via blood test, participants were asked to obtain this information from their General Practitioner (GP)/physician.

The DWELL Tool

The DWELL Tool was comprised of five parts: Background, Attitudes and Behaviours, Physical Health, Self-

Care, and Health Status. In the Background, participant demographic information was collected, including age, time since diagnosis, relevant health history, information on household composition, employment, and income. In the remaining parts, self-completed psychometric scales assessed participant physical activity, diabetes perceptions, self-care behaviours, wellbeing, and quality of life (Figure 3). Measures in the DWELL Tool were selected to be cross-nationally validated and translated in the partner language. The English version of the DWELL Tool is presented in Appendix 1.

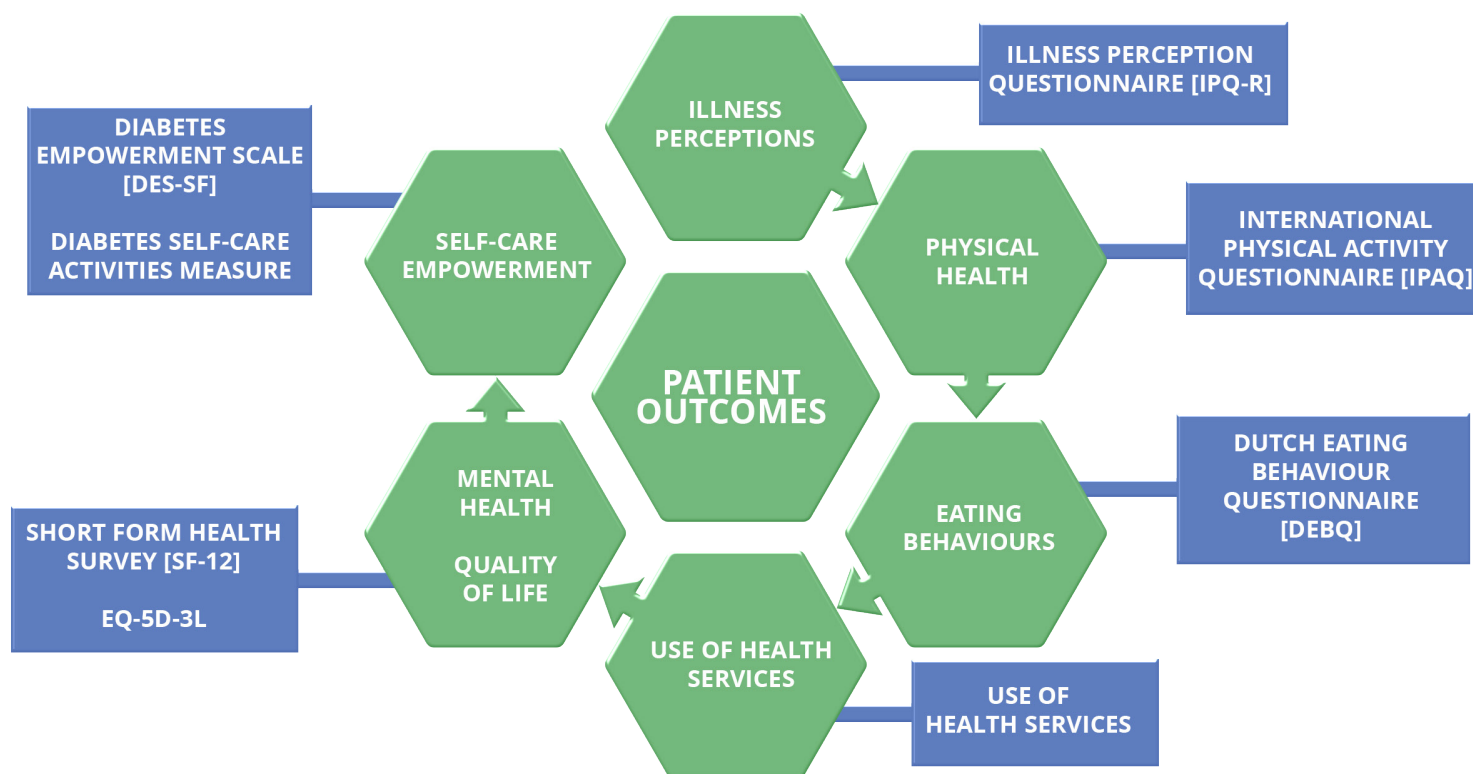


Figure 3. Participant Outcome Measures

2.2.2. Process Evaluation

Process evaluation aims to understand the functioning of an intervention, by examining three key components - implementation, mechanisms of impact, and contextual factors (Moore et al., 2015). The key components of the DWELL programme were assessed by collecting and analysing data from individuals or areas involved in the intervention. Figure 4 shows how the aspects of context, implementation and mechanisms of impact of the programme were assessed in the DWELL Evaluation Study.

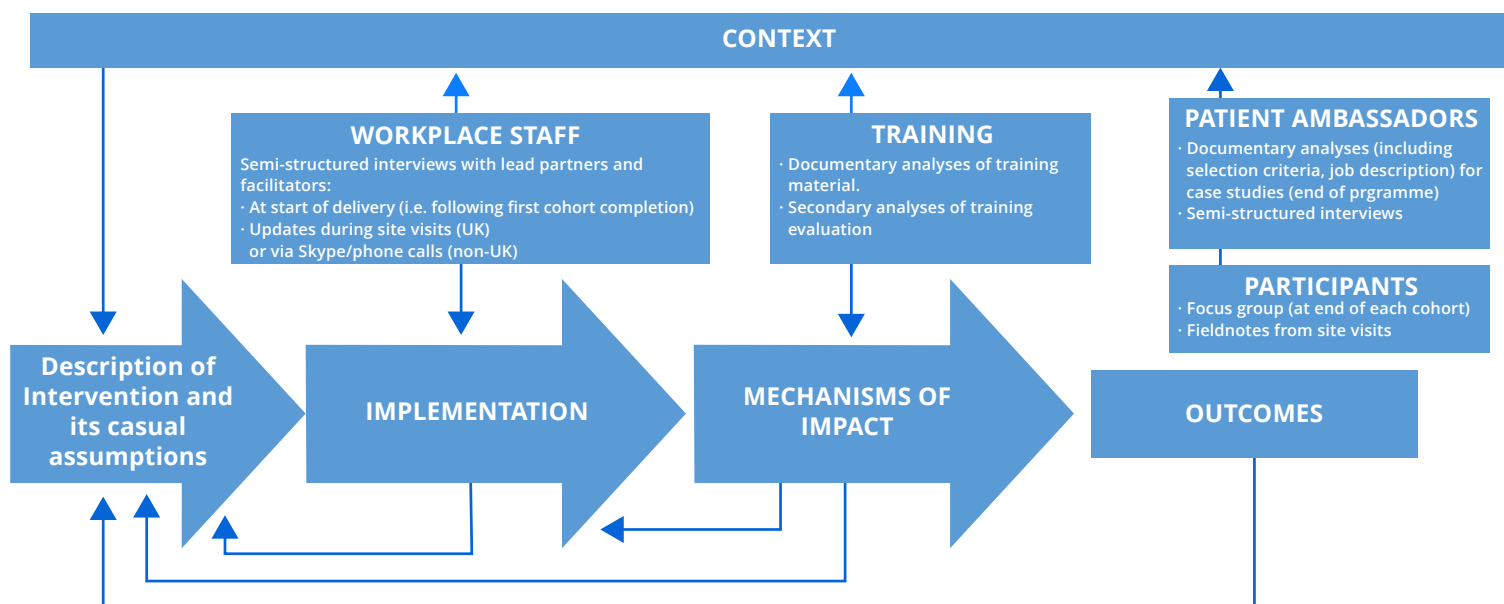


Figure 4. DWELL Process Evaluation

Data was collected from various sources via a range of methods.

Participant experiences with the programme were explored by conducting focus groups at the end of the programme for each cohort per delivery site in all countries. Focus groups were conducted by the CCCU team in the UK and by staff independent of the DWELL project at non-UK sites, to ensure participants did not feel restricted in providing their feedback. Discussions could last up to one hour and were audio recorded for analysis. The same focus group schedule was used across sites to ensure consistency of questions asked. Following focus groups, relevant anonymised feedback was provided to DWELL facilitators to ensure that changes suggested by participants could be considered and incorporated into programme delivery going forward.

In relation to key mechanisms of the programme delivery, a Motivational Interview (MI) form was developed by the research team, which was completed by DWELL facilitators following each MI with each participant to capture application of MI principles and examples of participant responses (a copy can be found in Appendix 2). The MI principles, adapted from Miller and Rollnick (1991), used in the DWELL programme are:

- Establish individual's willingness to engage in the process
- Express empathy through reflective listening
- Evoke the intrinsic motivation of the participant
- Use affirmations to acknowledge circumstances or progress of participant.
- Address ambivalence/ discrepancy between participant goals or values and current behaviour
- Adjust to participant resistance rather than oppose directly.

Also, a Goal Setting form was designed by the team to capture details of goals set by participants at their MI meetings at the start and end of each 12-week programme.

Staff experiences were explored through semi-structured interviews which at the start and towards the end of the evaluation period to explore their experiences of the implementation of the DWELL programme and its delivery. Semi-structured interviews were also conducted with site leads and DWELL ambassadors at the end of the programme delivery to understand their role and experiences.

To assess training feedback, secondary data from partner organisations, including training materials and evaluations, were collected to understand its impact on the programme. A training evaluation form was developed by the CCCU team based on the Kirkpatrick and Kirkpatrick (2016) Levels of Training Evaluation model to ensure that consistent data was captured.

Sustainability of the programme impact was also explored through Longitudinal Qualitative Interviews (LQIs), an important method to study how people experience, interpret and respond to change (Hermanowicz, 2013). An interview schedule was developed, covering the areas of the DWELL Tool and the end-of-programme focus group schedule. DWELL site staff contacted participants who had finished the programme between 2018 and March 2020 (i.e. prior to the COVID-19 pandemic) to ask if they wanted to be involved in a further interview to explore their experiences since the end of the programme. Participants who volunteered contacted the research team and were interviewed. Interviews were conducted either in-person (at the DWELL site) or via a video call, according to the preference of the participant. LQIs were only conducted in the UK and Netherlands, as in Belgium, there was a small evaluation sample which made it difficult to identify participants, and in France, there was lack of staff capacity and resources at the DWELL site.

Process evaluation tools were translated in partners' own language to ensure ease of use.

2.2.3. Cost Effectiveness

To facilitate a cost-effectiveness analysis of DWELL, a non-intervention (control) group was recruited in all countries apart from France, due to the difficulty in obtaining ethical approval for this element of the evaluation. The control group consisted of T2DM patients over the age of 18 and receiving the usual

standard care (i.e. not exposed to the DWELL programme).

Control group participants completed an adapted version of the DWELL Tool questionnaire at two time points, six months apart, to align with the follow-up time points (T2 and T3) of the intervention group. The questionnaire asked participants for demographic data and information about their use of health services, and contained validated surveys in relation to physical health, diabetes care and health status.

In the UK, initially participants were recruited via a local existing educational programme (X-PERT), which type 2 diabetes patients in the UK are routinely referred to in the UK (i.e. standard care) in order to help them make lifestyle choices to manage their blood glucose levels more effectively. The X-PERT facilitator informed programme participants of the control group study, and those who were interested in participating passed on their details for forwarding to the CCCU team, who contacted them with participant information. In September 2019, following a slow recruitment period over the summer and low numbers attending the X-PERT Programme, UK 2 posted letters regarding the DWELL programme and control group to 1000+ patients in their database who lived in the local area and had type 2 diabetes.

Additionally, further information was collated from all delivery sites in relation to the cost of each element of the intervention, including details of those involved in the programme (role, number of sessions delivered, duration of sessions, salary) and costs of venue hire, resources and consumables related to delivery.

2.2.4. Recruitment of Participants

Individuals attending the DWELL programme were invited to be part of the evaluation study at baseline, before the start of the 12-week programme. Written informed consent to participate was sought by all agreed to take part in the evaluation. The criteria for inclusion in the evaluation study were: to have diagnosis of Type 2 diabetes, be over the age of 18 and participate in the DWELL programme.

2.2.5. Ethical approval

An evaluation protocol and ethics application were developed by the CCCU team and approval to carry out the evaluation study was sought either via national/local research ethics committees or organisational management at each delivery site. For the two UK sites, the evaluation study received a favourable ethical opinion from the London – London Bridge Research Ethics Committee (REC reference: 17/LO/1480). In France and Belgium, research ethics approval was obtained by the national research ethics committees. In Netherlands, a management approval was obtained by the delivery site.

2.2.6. Data Analysis

Participant Outcomes

Participant outcome data management included data cleaning and screening, with missing data being removed, except in cases where there was specific guidance for alternative methods of treating missing cases in particular measures. Composite scores were calculated where required and tests were applied for internal consistency of measures as well as tests for normality. Non-parametric tests were used for the statistical analysis of data with SPSS v27 software. For effectiveness of the intervention at each site, paired comparisons of T0-T1 were conducted to allow analysis with maximum number of participants, unaffected by attrition at later time points. To test sustainability of changes, other comparisons of T2-T3 were conducted such as multiple regression analysis.

In practice, there were challenges experienced by the research team during collection of participant outcomes data. The evaluation protocol generated a large volume of both quantitative and qualitative data, which was subsequently associated with demands in data processing and management. Moreover, complexities of the data collection process, associated to organisational change, such as high staff turnover in some sites, led to limited oversight of data collection, stockpiling of data at partner sites, need to repeat evaluation training for staff, and additional effort to ensure accurate and prompt data collection at the four countries. These difficulties were exacerbated during the COVID-19 pandemic when some delivery sites were co-opted to help provide medical cover which impacted on their capacity to support the evaluation data collection.

Process Evaluation

Analysis of process evaluation was conducted depending on type of data collected. Interview data was transcribed, and themes were derived using the Template Analysis approach (Brooks et al, 2015; King, 2002; King, 1998), whereby a coding template was set up comprising pre-determined themes that had been identified as particularly salient to the aims of the evaluation. Separate 'analysis grids' were developed to collate workforce/staff and DWELL ambassador interview data, to ensure that key views and experiences in alignment with the process evaluation elements (context, implementation and mechanisms) could be captured. New columns were added to the grid to capture any unexpected by pertinent themes.

End-of-programme focus groups were transcribed and then coded using NVivo 12 software to enable thematic content analysis. Through successive reading and interpretation of transcripts, provisional codes were modified and added to (Gibbs and King, 2002). Gradually, codes were grouped, ungrouped and relabelled (intermediate coding), before identifying key elements in relation to theory (selective coding). The resulting list of codes was reviewed and agreed by two members of the research team, who agreed on groupings and sub-themes. From these sub-themes, the overall themes were developed.

An analysis grid was developed to collate data from the MI Forms from each site. The qualitative data was read thoroughly and repeatedly to elicit key themes, which informed the development of MI vignettes to illustrate themes. MI techniques and facilitators were also coded to enable quantitative analysis.

Goals data was added to the MI analysis grid for each participant, and a thematic analysis approach (Clarke and Braun, 2014) was adopted. T0 goals were coded and each code provided a label which captured its meaning. A further step to iteratively adjust codes was undertaken by a second member of the CCCU team to ensure they fully reflected the participant's meaning. Goals were then further combined to ensure themes were specific and concise. This process reduced the number of goal codes to 59. Using the same iterative process, these goals were then clustered into 11 sub-themes and finally four over-arching main themes.

Details relating to content and materials of DWELL staff and DWELL ambassador training were descriptively analysed. Training evaluations were collated and subject to quantitative and qualitative content analysis. Relevant details from interview data were also extracted from the aforementioned analysis grid. Analysis was cross-referenced with the DWELL staff competency framework, developed by DWELL partner Kent County Council.

Cost Effectiveness

The approach to determining the cost effectiveness of the DWELL 12-week programme differed by partner site. In order to determine cost effectiveness of the UK sites, all sessions delivered by a mix of experts, research, admin (including expert trainers, motivational interviewers, chefs, a resource group leader and finance officer) and supervision staff and any one-off equipment, education-related or other associated costs, such as, room hire, one-off costs for HbA1c machines, cooking ingredients and expert books, were costed, with all costs reported in 2019 prices. Cost effectiveness was calculated by the total cost of delivery per DWELL participant, for a group of 10 participants per programme on average.

In Belgium DWELL programme was delivered by a facilitator (with support from a coach or supervisor, where required) and an expert in the respective DWELL themes (nutrition, physical activity, education, wellbeing). These employees prepared the necessary material and equipment prior to the sessions. Additional costs incurred during that time included the production of relevant material (e.g. handouts) and catering. Because of the absence of a detailed record of staff costs for all involved in the programme delivery, the costs reported were based on the Artevelde University of Health Sciences rate and average based on national legal pay scales 'Loonbarema Paritair Comité 330'. To examine potential variation in staff experience for each cohort, costs were calculated for working staff with experience which varied from 0 years to 25 years. All costs are reported in 2020 prices.

In France the total cost of delivering the DWELL 12-week programme included all sessions delivered by facilitators with different expertise, including diabetes, physical activity, diet and wellbeing, and supervision of those staff, as well as one-off costs of resources required for each session. Cost effectiveness was calculated per participant for a group of 20 participants per programme on average, with all costs reported in 2019 prices.

In the Netherlands all sessions delivered by professionals including specialised nurses, activity providers, educators and group dynamics trainers (including supervision) and any one-off equipment or promotional material were costed per participant, for a group of 40 participants per programme on average, all costs are reported in 2019 prices.

The large amount of incomplete cost and health-related quality of life data over the duration of the study prevented a full cost-effectiveness analysis. However, the estimated intervention costs can be used as a base to determine the cost-effectiveness of the DWELL programme compared with standard care in future studies.

2.3. DWELL Delivery Sites

Each site delivered the 12-week DWELL programme within the confines of their individual context, in relation to venue, capacity, environment and resources. This meant that a multi-disciplinary team was responsible for the collection of evaluation data, including researchers, academics and practitioners, and ranged from experienced researchers to those who had not been involved in research previously. Below are details of the DWELL delivery sites, which help to give context to the evaluation study.



Country	UK (1)
Site Name	Blackthorn Trust - https://www.blackthorn.org.uk/
Brief Description	A charity which provides a social therapeutic environment in which people can recover, grow and develop. Specialist person-centred therapies and rehabilitation are offered via facilities including a biodynamic garden, vegetarian café and kitchen, craft studios and therapy rooms. Work is based on the premise that community, meaningful work, therapeutic and peer support, and daily routine are required in addition to medication to affect positive change in people. This philosophy and approach was applied to the DWELL programme.
DWELL delivery	Group sessions took place on-site (meeting rooms, craft room, kitchen). Individual MI meetings and the recording of measurements took place in meeting rooms at the site.
DWELL team	Trained X-PERT facilitators, a movement-based therapist who delivered group wellbeing sessions, and a chef who delivered practical cooking sessions. Core facilitators were also involved in conducting individual MI meetings, recording measurements and collecting evaluation data, in addition to a member of staff who just conducted MIs.



Country	UK (2)
Site Name	Medway Community Healthcare - https://www.medwaycommunityhealthcare.nhs.uk/
Brief Description	A social enterprise and Community Interest Company providing a wide range of NHS and non-NHS community services across health and social care.
DWELL delivery	A local community healthcare day centre for adults with physical and mental health conditions, with additional clinical facilities including occupational therapy, physiotherapy, speech and language therapy, podiatry and stroke services. DWELL groups, individual MI meetings and recording of measurements took place in meeting or clinical rooms at the centre. In early 2020, a room in a local church was sourced as an additional venue, and this was used instead of the community day centre when groups recommenced following the easing of COVID-19 lockdown restrictions. Late 2022/early 2023 the groups moved again from the church to a hall adjacent to the church which had been refurbished for such use.
DWELL team	Led by a diabetes specialist dietitian and educator who set up and coordinated the programme and delivered it to early groups. A diabetes educator with a background in public health then took over the facilitation of the group and individual sessions and managed evaluation activities. External providers delivered group some activities for some sessions, including wellbeing activities and foot care.

Country	Belgium
Site Name	Arteveldehogeschool (Artevelde University of Applied Sciences) - https://www.arteveldehogeschool.be/
Brief Description	Arteveldehogeschool is a university college located in Ghent.
DWELL delivery	AArtevelde partnered with local public health insurances organisations, who offer benefits and services related to health promotion, in order to recruit to and deliver the DWELL Programme. DWELL group sessions as well as individual motivational interview (MI) meetings and the recording of measurements took place in meeting rooms on the premises of the public health insurance organisations, with the exception of the cooking workshop which took place at an external venue.
DWELL team	Two nursing lecturers developed and co-led the programme and conducted MI meetings and evaluation activities. A diabetes educator delivered the group education sessions and helped with MI meetings. Nutrition group sessions were delivered by a specialist, a private personal coach facilitated physical activity sessions, and a podiatrist delivered the foot care session.



Country	France
Site Name	Centre Hospitalier de Douai - https://www.ch-douai.fr/
Brief Description	Part of the Groupement Hospitalier de Territoire (GHT), the Douai Hospital Center is the pivotal establishment of the nearby Douaisis area. It carries out its public hospital services in a sector of 64 municipalities with a population of nearly 260,000 inhabitants, with a capacity of 874 beds. It is the largest public employer in Douaisis, employing 2,300 people in the medical, paramedical, administrative and logistics fields.
DWELL delivery	DWELL participants attended initial sessions with medical staff at the hospital for individual MI meetings and recording of measurements, and were then allocated to one of four community-based sites in Douai and Aniche regions to attend the weekly group sessions.
DWELL team	Led by a Project Manager. A specialist doctor delivered the group education module, a psychologist delivered the group nutrition and wellbeing modules, a podiatrist delivered a foot care session, and a physical activity educator facilitated those sessions. A nurse was responsible for managing the MI meetings and evaluation activities.

Country	Netherlands
Site Name	Kinetic Analysis - https://www.kinetic-analysis.com/
Brief Description	Specialises in human motion data using next generation sensors and customised measurement tools, resulting in highly accurate input in order to improve lives.
DWELL delivery	Mode of delivery differed from other sites initially - in partnership with Amphia Hospital in Breda where people with type 2 diabetes are routinely seen if first line care (GP) is not successful for them. Participants referred to DWELL by the hospital endocrinologist, then attended initial sessions with research and diabetes nurses at the hospital for individual MI meetings and recording of measurements. Participants were then signposted to external providers depending on their individual goals. Although initially participants did not go through the programme as a group, from October 2019, cohorts were set up whereby participants progressed through the DWELL programme as a group.
DWELL team	Project manager in partnership with hospital consultant, diabetes nurses, and local activity providers specialising in the four areas of DWELL.

3. Conclusion

The DWELL programme was a multi-country intervention which aimed to empower people living with type 2 diabetes to enhance self-management of their illness. The purpose of this report was to present briefly the DWELL Evaluation Study Methodology, which applied a number of strategies and elements to capture the effectiveness of the intervention and determine whether it had the anticipated success, and also to refine it for future implementation. Evaluation was embedded in all stages of the project and comprised four main elements: participant outcomes and experiences; process evaluation; cost effectiveness; and staff training.

Throughout the course of the DWELL project, the CCCU team presented interim findings at national and international conferences and events, as part of the dissemination process; these included the UK Diabetes Professional Care Conference 2019 (Manship et al., 2019) and the World Congress on Public Health Conference 2020 (Hatzidimitriadou et al., 2020; Manship et al., 2020; Morris et al., 2020).

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Appendix 1 – The DWELL Tool



EVALUATION OF DIABETES AND WELLBEING (DWELL) PROGRAMME

- EVALUATION TOOL FOR PARTICIPANTS -

Thank you for taking part in the evaluation of the DWELL Programme. The questions that follow are designed to capture individual information around the key areas of DWELL (education, nutrition, physical activity and wellbeing). You will be asked to complete a version of this Evaluation Tool at the end of the DWELL Programme, and again at one or two follow-up times.

Your answers will feed into the overall evaluation of the programme and are therefore of great value to the project. If you have any queries as you complete the questions, please ask the DWELL staff member who is with you for guidance.

If you are about to start the DWELL Programme, please complete all parts of this Evaluation Tool. If you are completing this following participation in the 12-week DWELL Programme, please complete from Part 2 (page 4) onwards.

Please state date of completion here:

____________ (DD\MM\YY)

For DWELL staff completion/office use:

Participant ID: _____

Time point: T0 T1 T2 T3

PART 1: BACKGROUND

(to be completed at the start of the DWELL Programme...if you are completing after the programme, please go straight PART 2: Attitudes and Behaviours on page 4)

1. Total number of persons living in your household, including yourself? <i>(if you live alone, please go to question 6)</i>	
2. With whom do you live? <i>(please list all – partner, children, housemate, etc.)</i>	
3. Do you have children at home?	1 - Yes 2 - No
4. What is your education? <i>(please tick/circle one)</i>	1 - Cannot read or write 2 - Less than primary school 3 - Primary school/similar 4 - Secondary education/middle/high school 5 - University/similar 6 - Other _____ <i>(please specify)</i>
5. Do you do paid work?	1- Yes 2 - No <i>(go to question 10)</i> 3 - Never worked <i>(go to question 11)</i>
6. If you do paid work, how many hours do you work per week approximately?	
7. If you work (paid work), have you been on sick-leave in the past year?	1 - Yes 2 - No If yes, how long? _____ <i>(days)</i>
8. What is/was your main job? <i>(please tick one or specify under 'Other')</i>	

1 - Manager (e.g. chief executive, administrative manager) 2 - Professional (e.g. science and engineering, health, teaching professional) 3 - Technician/associate professional (e.g. science and engineering associate professional) 4 - Clerical support worker (e.g. general and keyboard clerk, customer service clerk) 5 - Service and sales worker (e.g. personal care worker, sales worker) 6 - Skilled agricultural, forestry and fishery worker (e.g. market-oriented skilled agricultural worker, subsistence farmer) 7 - Craft and related trades worker (e.g. building and related trades worker, handcraft and printing worker) 8 - Plant and machine operator and assembler (e.g. stationary plant and machine operator, assembler) 9 - Occupation with lesser level of skills and qualifications required (e.g. cleaner and helper/carer, labourer in construction industry or mining) 10 - Housewife/househusband 11 - Armed forces occupation 12 - Student 13 - Other _____	
9. What is your present main source of income? (please tick one)	1 - Work 2 - Early retirement pension 3 - Disability pension 4 - Age pension 5 - Sick leave benefits 6 - Unemployment benefits 7 - Social help/social support benefits 8 - Widow(er) pension 9 - Private income 10 - No financial support 11 - Other _____ <i>(please specify)</i>
10. How often are you worried about the daily expenses (e.g. buying food)?	1 - Never 2 - Sometimes 3 - Always
11. Are you involved in any current research, or have you been involved in any research prior to this study?	1 - Yes 2 - No If yes, please specify: _____

PART 2: ATTITUDES AND BEHAVIOURS

We are interested in your own personal views of how you now see your diabetes. Please indicate how much you agree or disagree with the following statements about your diabetes by ticking the appropriate box.

	VIEWS ABOUT YOUR DIABETES	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
1.	My diabetes will last a short time					
2.	My diabetes is likely to be permanent rather than temporary					
3.	My diabetes will last for a long time					
4.	This diabetes will pass quickly					
5.	I expect to have diabetes for the rest of my life					
6.	My diabetes is a serious condition					
7.	My diabetes has major consequences on my life					
8.	My diabetes does not have much effect on my life					
9.	My diabetes strongly affects the way others see me					
10.	My diabetes has serious financial consequences					
11.	My diabetes causes difficulties for those who are close to me					
12.	There is a lot that I can do to control my symptoms					
13.	What I do can determine whether my diabetes gets better or worse					

	VIEWS ABOUT YOUR DIABETES	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
14.	The course of my diabetes depends on me					
15.	Nothing I do will affect my diabetes					
16.	I have the power to influence my diabetes					
17.	My actions will have no affect on the outcome of my diabetes					
18.	My diabetes will improve in time					
19.	There is very little that can be done to improve my diabetes					
20.	My treatment will be effective in curing my diabetes					
21.	The negative effects of my diabetes can be prevented (avoided) by my treatment					
22.	My treatment can control my diabetes					
23.	There is nothing which can help my diabetes					
24.	The symptoms of my diabetes are puzzling to me					
25.	My diabetes is a mystery to me					
26.	I don't understand my diabetes					
27.	My diabetes doesn't make any sense to me					
28.	I have a clear picture or understanding of my diabetes					

	VIEWS ABOUT YOUR DIABETES	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
29.	The symptoms of my diabetes change a great deal from day to day					
30.	My symptoms come and go in cycles					
31.	My diabetes is very unpredictable					
32.	I go through cycles in which my diabetes gets better and worse					
33.	I get depressed when I think about my diabetes					
34.	When I think about my diabetes I get upset					
35.	My diabetes makes me feel angry					
36.	My diabetes does not worry me					
37.	Having this diabetes makes me feel anxious					
38.	My diabetes makes me feel afraid					

In this part of the questionnaire, please circle the number in the box that gives the best answer for you.

In general, I believe that:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
1. I know what part(s) of taking care of my diabetes that I am dissatisfied with	1	2	3	4	5
2. I am able to turn my diabetes goals into a workable plan	1	2	3	4	5

3. I can try out different ways of overcoming barriers to my diabetes goals	1	2	3	4	5
4. I can find ways to feel better about having diabetes	1	2	3	4	5
5. I know the positive ways I cope with diabetes-related stress	1	2	3	4	5
6. I can ask for support for having and caring for my diabetes when I need it	1	2	3	4	5
7. I know what helps me stay motivated to care for my diabetes.	1	2	3	4	5
8. I know enough about myself as a person to make diabetes care choices that are right for me.	1	2	3	4	5

PART 3: PHYSICAL HEALTH

These questions ask you about the time you spent being physically active in the **last 7 days**.

Please answer each question even if you do not consider yourself to be an active person.

Please think about the activities you do at work, as part of your housework, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

1. During the last 7 days , on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?	_____ days per week No vigorous physical activities (skip to question 3)
2. How much time did you usually spend doing vigorous physical activities on one of those days?	_____ hours per day _____ minutes per day Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at

_____ **days per week**

No moderate physical activities
(skip to question 5)

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

_____ **days per week**

No walking
(skip to question 7)

6. How much time did you usually spend **walking** on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the **last 7 days**, how much time did you spend **sitting** on a **week day**?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

USE OF HEALTH SERVICES FOR YOUR DIABETES

1. How often do you see the doctor (GP/Advanced Nurse Practitioner) for your diabetes? <i>(tick or circle)</i>	a. Every month b. Every 3 months c. Twice a year d. Once a year e. Never
2. During the visit to the GP/ Advanced Nurse Practitioner, you discuss <i>(tick all that apply)</i>	a. Diet b. Treatment c. Tobacco consumption d. Alcohol consumption e. Physical activity f. Mental Wellbeing g. Symptoms and how do you feel h. Capillary blood glucose results i. Other _____ <i>(please specify)</i>
3. Over the last 12 months, have a doctor or a nurse or a podiatrist examined your bare feet?	a. Yes b. No
4. How often do you see the dentist?	a. More than once a year b. Less than once a year c. Never
5. How often do you see the ophthalmologist? <i>(or have a retinal screening (for the UK))?</i>	a. More than once a year b. Less than once a year c. Never
6. How often do you see the cardiologist?	a. More than once a year b. Less than once a year c. Never
7. Do you see other specialists for your diabetes?	a. Yes b. No If yes, please specify specialist and how often you see them _____

PART 4: SELF-CARE

The following questions are about your general eating behaviours. Please indicate your answer by ticking the appropriate box

	Never	Seldom	Some- times	Often	Very often
Restrained eating					
1. If you have put on weight, do you eat less than you usually do?					
2. Do you try to eat less at mealtimes than you would like to eat?					
3. How often do you refuse food or drink offered because you are concerned about your weight?					
4. Do you watch exactly what you eat?					
5. Do you deliberately eat foods that are slimming?					
6. When you have eaten too much, do you eat less the following days?					
7. Do you deliberately eat less in order not to become heavier?					
8. How often do you try not to eat between meals because you are watching your weight?					
9. How often in the evening do you try not to eat because you are watching your weight?					
10. Do you take into account your weight with what you eat?					
Emotional eating					
11. Do you have the desire to eat when you are irritated?					
12. Do you have a desire to eat when you have nothing to do?					
13. Do you have a desire to eat when you are depressed or discouraged?					
14. Do you have a desire to eat when you are feeling lonely?					
15. Do you have a desire to eat when somebody lets you down?					

	Never	Seldom	Some- times	Often	Very often
16. Do you have a desire to eat when you are cross?					
17. Do you have a desire to eat when something unpleasant is due to happen?					
18. Do you get the desire to eat when you are anxious, worried or tense?					
19. Do you have a desire to eat when things are going against you or when things have gone wrong?					
20. Do you have a desire to eat when you are frightened?					
21. Do you have a desire to eat when you are disappointed?					
22. Do you have a desire to eat when you are emotionally upset?					
23. Do you have a desire to eat when you are bored or restless?					
External eating					
24. If food tastes good to you, do you eat more than usual?					
25. If food smells and looks good, do you eat more than usual?					
26. If you see or smell something delicious, do you have a desire to eat it?					
27. If you have something delicious to eat, do you eat it straight away?					
28. If you walk past the baker, do you have the desire to buy something delicious?					
29. If you walk past a snack bar or a cafe, do you have the desire to buy something delicious?					
30. If you see others eating, do you also have the desire to eat?					
31. Can you resist eating delicious foods?					
32. Do you eat more than usual when you see others eating?					
33. When preparing a meal, are you inclined to eat something?					

The following questions are about your self-care activities

1. Which of the following has your health care team (doctor, nurse, dietitian, or diabetes educator) advised you to do? (please tick/circle all that apply)	a. Follow a low-fat eating plan b. Follow a complex carbohydrate diet c. Reduce the number of calories you eat to lose weight d. Eat lots of food high in dietary fiber e. Eat lots (at least 5 servings per day) of fruits and vegetables f. Eat very few sweets (for example: desserts, non-diet sodas, candy bars) g. Other (specify): _____ h. I have not been given any advice about my diet by my health care team
2. Which of the following has your health care team (doctor, nurse, dietitian or diabetes educator) advised you to do? (please tick/circle all that apply)	a. Get low level exercise (such as walking) on a daily basis b. Exercise continuously for a least 20 minutes at least 3 times a week c. Fit exercise into your daily routine (for example, take stairs instead of elevators, park a block away and walk, etc.) d. Engage in a specific amount, type, duration and level of exercise e. Other (specify): _____ f. I have not been given any advice about exercise by my health care team
3. Which of the following has your health care team (doctor, nurse, dietitian, or diabetes educator) advised you to do? (please tick/circle all that apply)	a. Test your blood sugar using a drop of blood from your finger and a colour chart b. Test your blood sugar using a machine to read the results c. Test your urine for sugar d. Other (specify): _____ e. I have not been given any advice either about testing my blood or urine sugar level by my health care team
4. Which of the following medications for your diabetes has your doctor prescribed? (please tick/circle all that apply)	a. An insulin shot 1 or 2 times a day b. An insulin shot 3 or more times a day c. Diabetes pills to control my blood sugar level d. Other (specify): _____ e. I have not been prescribed either insulin or pills for my diabetes

Diet 5. On how many of the last SEVEN DAYS did you space carbohydrates evenly through the day?	0 1 2 3 4 5 6 7
Medications 6. On how many of the last SEVEN DAYS , did you take your recommended diabetes medication? OR On how many of the last SEVEN DAYS did you take your recommended insulin injections? 7. On how many of the last SEVEN DAYS did you take your recommended number of diabetes pills?	0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7
Foot Care 8. On how many of the last SEVEN DAYS did you wash your feet? 9. On how many of the last SEVEN DAYS did you soak your feet? 10. On how many of the last SEVEN DAYS did you dry between your toes after washing?	0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7

PART 5: HEALTH STATUS

Please answer every question about your general health. Some questions may look like others, but each one is different. Please take the time to read and answer each question carefully by circling the option that best represents your response.

1. In general, would you say your health is (<i>please tick/circle one</i>)	1 - Excellent 2 - Very good 3 - Good 4 - Fair 5 - Poor
The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?	

	Yes, limited a lot	Yes, limited a little	No, not limited at all		
2. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	1	2	3		
3. Climbing several flights of stairs	1	2	3		
During the past 4 weeks , have you had any of the following problems with your work or other regular daily activities as a result of your physical health ?					
4. Accomplished less than you would like	1 - Yes 2 - No				
5. Were limited in the kind of work or other activities	1 - Yes 2 - No				
During the past 4 weeks , have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?					
6. Accomplished less than you would like	1 - Yes 2 - No				
7. Did work or activities less carefully than usual	1 - Yes 2 - No				
8. During the past 4 weeks , how much did pain interfere with your normal work (including work outside the home and housework)?	1 - Not at all 2 - A little bit 3 - Moderately 4 - Quite a bit 5 - Extremely				
These questions are about how you have been feeling during the past 4 weeks . For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks ...					
	All of the time	Most of the time	A good bit of the time	A little of the time	None of the time
9. Did you feel calm and peaceful?	1	2	3	4	5
10. Did you have a lot of energy?	1	2	3	4	5
11. Have you felt down-hearted and blue	1	2	3	4	5
12. During the past 4 weeks , how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?	1 - All of the time 2 - Most of the time 3 - Some of the time 4 - A little of the time 5 - None of the time				

By placing a tick in one box in each group below, please indicate which statements best describe your own **health state today**

Mobility	
I have no problems in walking about	
I have some problems in walking about	
I am confined to bed	
Self-Care	
I have no problems with self-care	
I have some problems with washing or dressing myself	
I am unable to wash or dress myself	
Usual Activities (e.g. work, study, housework, family or leisure activities)	
I have no problems with performing my usual activities	
I have some problems with performing my usual activities	
I am unable to perform my usual activities	
Pain / Discomfort	
I have no pain or discomfort	
I have moderate pain or discomfort	
I have extreme pain or discomfort	
Anxiety / Depression	
I am not anxious or depressed	
I am moderately anxious or depressed	
I am extremely anxious or depressed	

Visual Analogue Scale

Please indicate on this scale how good or bad your own health state is today.

The best health state you can imagine is marked 100 and the worst health state you can imagine is marked 0.

Please draw a line from the box to the point on the scale that indicates how good or bad your health state is today.

Your
own
health
state
today

Best imaginable
health state



Worst imaginable
health state

Now, please write the number you marked on the scale in the box below.

YOUR HEALTH TODAY =

**WE WOULD LIKE TO THANK YOU VERY MUCH FOR YOUR PARTICIPATION
YOUR ANSWERS WILL ASSIST US TO UNDERSTAND BETTER THE IMPACT OF
DIABETES ON QUALITY OF LIFE AND WELLBEING**

