An exploration of interventions for supported self-management and behaviour change delivered as routine clinical care for people living with long-term health conditions.

MCCALLUM, M.

2023

List of Constituent Public Outputs

This file contains just the document that was produced to contextualise the public outputs (which form the main body of this thesis). The public outputs are listed in several parts of the document and the list below is simply intended to provide them in accordance with OpenAIR's citation style:

I. MCCALLUM, M. and BRUCE, S. 2016. Evaluation of intensive support for people with type 1 diabetes. *Health psychology update* [online], 25(2). Available from: https://doi.org/10.53841/bpshpu.2016.25.2.25

II. MATTHEWS, L., KIRK, A., MCCALLUM, M., MUTRIE, N., GOLD, A. and KEEN, A. 2017. The feasibility of a physical activity intervention for adults within routine diabetes care: a process evaluation. *Practical diabetes* [online], 34(1), pages 7-12a. Available from: https://doi.org/10.1002/pdi.2069

III. MOFFAT, H., CAMPBELL, F., DONALD, C., INSCH, P., LITTLE, S., LOGAN, S. and MCCALLUM, M. 2019. Evaluation of Weigh Forward: a group intervention delivered by dietitians and psychologists within a National Health Service specialist weight management service. *Clinical obesity* [online], 9(2), article number e12291. Available from: https://doi.org/10.1111/cob.12291

IV. MCCALLUM, M., COOPER, B., MATSON, S. and RENWICK. B. 2020. Service evaluation of a health behaviour change intervention for patients with peripheral arterial disease. *Health psychology update* [online], 29(1). Available from: https://doi.org/10.53841/bpshpu.2020.29.1.17

V. MCCALLUM, M., DUNDAS, P. and MUKHOPADHYA, A. 2023. Multidisciplinary pathway to support lifestyle change: tangible benefits in physical and mental health for patients with nonalcoholic fatty liver disease (NAFLD). *Clinical liver disease* [online], 21(2), pages 60-65. Available from: https://doi.org/10.1097/CLD.0000000000000017

An exploration of interventions for Supported Self-Management and behaviour change delivered as routine clinical care for people living with Long-Term Health Conditions:

PhD by public works

Mary McCallum

A thesis submitted by public output in fulfilment of the requirements of Robert Gordon University,
for the award of Doctor of Philosophy

September 2023

An exploration of interventions for Supported Self-Management and behaviour change delivered as routine clinical care for people living with Long-Term Health Conditions:

Declaration

I declare that this thesis, apart from due acknowledgments, is entirely my own work. My contribution to each of the academic papers, on which this thesis is based, is outlined in Table 1.

Name of author: Mary McCallum

Degree for which thesis is submitted: Doctor of Philosophy

Title of the thesis:

An exploration of interventions for Supported Self-Management and behaviour change delivered as routine clinical care for people living with Long-Term Health Conditions:

Abstract

Background

With our ageing, increasingly overweight and sedentary population, the National Health Service faces many challenges, not least the unprecedented rise in chronic Long-Term Conditions. The first line treatment for such conditions is lifestyle change, including weight loss, smoking cessation and increasing physical activity. Current NHS policy emphasises that people should be supported to self-manage and yet there is sparse information available about how to achieve this in everyday clinical practice.

Body of work

My thesis by public output provides original insights by contributing to a gap in the literature detailing the specific components of interventions I have found effective to support self-management when delivered as part of routine care and what is valued by participants and health care professionals. This thesis includes five of my published and co-authored papers which provide descriptions of interventions for people living with diabetes, obesity, peripheral arterial disease, and non-alcoholic fatty liver disease. It also refers to a further nine papers I have published in the field of supported self-management and behaviour change which have influenced the construction of this thesis (Appendix 1).

My research question was "what are the specific components of successful psychological interventions delivered in routine clinical practice to support self

management for people with long-term health conditions in secondary care contexts".

Contribution to knowledge in the field of supported self-care management

This thesis contributes to an evidence-based rationale for how to deliver supported self management interventions as part of routine care. Key themes run through works (I-V) conducted in outpatient clinics in a hospital setting. They describe how lifestyle support was incorporated into everyday clinical practice using a multi-disciplinary approach with input from health psychology, dietetic and nursing colleagues. They focus on effective process and intervention components highlighted by participants and clinicians.

Effective process components included: good integration of the intervention with other aspects of routine care, ease of referral, expertise of the Psychologist delivering the intervention, flexible follow-up depending on patient preference.

Effective intervention components included a theory informed, collaborative person-centred approach; the use of motivational interviewing skills to support participants to develop a tailored plan; specific behaviour change techniques (from the behaviour change technique taxonomy v1); provision of quality resources to facilitate lifestyle change including self-monitoring tools; and linking in with third sector. These components are summarised in a guiding template, and mapped onto theoretical constructs and specific behaviour change techniques. The ethos of my approach was person-centred.

Conclusions

This thesis is relevant for health care policy and practice in that it has demonstrated promising results for participants who engaged in the supported self-management (SSM) interventions across works (I-V) with statistically

significant improvements in clinical markers (such as blood glucose readings) and mood, quality of life and physical activity.

Recommendations for future research are made including the need for longer term follow up; a holistic approach to evaluation beyond the narrow focus on biomedical markers and conventional clinical outcomes; and the need for organisational buy-in to allow training and time for Health Care Professionals to effectively implement supported self-management in routine care.

This thesis provides a clearer picture about what works to support people to better self-manage within a routine health care consultation.

Table 1 Author's original contribution of research presented within the portfolio [1]

Roman Numeral	Title	Authors	Journal	Rationale for inclusion
I.	Evaluation of intensive support for people with type 1 diabetes (2016)	McCallum M and Bruce S.	Health Psychology Update, Volume 25, Issue 2, Autumn 2016 © The British Psychological Society	Demonstrates relevance to golden thread in terms of what works to support self-management in routine care in diabetes outpatient clinic.
II.	The feasibility of a physical activity intervention for adults within routine diabetes care: a process evaluation (2017)	Matthews L, Kirk A, McCallum M, Gold A, Keen A.	Practical Diabetes (2017) Vol 34 No. 1 https://doi.org/10.1002/pdi.2069	Demonstrates relevance to golden thread in terms of what works to support self-management in routine care in diabetes outpatient clinic.
III.	Evaluation of Weigh Forward: A	Moffat H, Campbell F, Donald C,	Journal of Clinical Obesity 2018; e12291.	Demonstrates relevance to golden thread in terms of

[1] The papers will be referred to by their Roman numerals throughout this thesis

Roman Numeral	Title	Authors	Journal	Rationale for inclusion
	group intervention delivered by dietitians and psychologists within a National Health Service specialist weight management service (2018)	Insch P, Little S, Logan S McCallum M.	https://doi.org/10.1111/cob.12291	what works to support self-management in routine care in a specialist adult weight management service running one to one sessions and co-delivered group sessions for participants.
IV.	Service evaluation of a health behaviour change intervention for patients with peripheral arterial disease (2020)	McCallum M, Cooper B, Matson S, Renwick B/	Health Psychology Update Vol 29 No 1 Spring 2020© The British Psychological Society	Demonstrates relevance to golden thread in terms of what works to support self-management in routine care in Vascular outpatient clinic.
V.	Supported Self-management – tangible	McCallum M, Dundas P Mukhopadhya A.	Clinical Liver Disease 21(2): p 60-65, February 2023.	Demonstrates relevance to golden thread in terms of what works to

Roman Numeral	Title	Authors	Journal	Rationale for inclusion
	benefits in physical and mental health for patients with Non-alcoholic fatty liver disease (NAFLD) (2023)		DOI: 10.1097/CLD.0000000000000017	support self-management in routine care in Gastroenterology outpatient clinic. Shows progression in thinking from previous papers.

Full list of author's publications in Appendix 1

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Also would like to acknowledge input and support from Professor Mutrie (an authority on the psychology of physical activity) since starting my M.App Sci at the University of Glasgow, Nanette set me on a career path in supporting people to self-manage.

Finally, I would like to thank my wonderful husband, daughters, Mum and Dad, siblings and friends, for all you do! A note of special thanks to Fiona Francey, Rosie Dawes and Rebecca Mackenzie for their eagle eyed editing skills.

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List of Abbreviations

ACT	Acceptance and Commitment Therapy
BCT	Behaviour Change Technique
BCW	Behaviour Change Wheel
BMI	Body Mass Index
BOCF	Baseline Observation Carried Forward
CFT	Compassion Focussed Therapy
CBT	Cognitive Behavioural Therapy
HADS	Hospital Anxiety and Depression Scale
HPC	Health Care Professional
IPAQ-S	Physical Activity Questionnaire-Short Version
LTCs	Long-Term Conditions
MDT	Multi-Disciplinary Team
MI	Motivational Interviewing
NAFLD	Non-Alcoholic Fatty Liver Disease
NES	NHS Education Scotland
NHS	National Health Service
PAC	Physical Activity Consultation
PAD	Peripheral Arterial Disease
RCT	Randomized Controlled Trial
SCI-DC	Scottish Care Information Diabetes
SES	Socioeconomic Status
SIMD	Scottish Index of Multiple Deprivation
SSM	Supported Self-Management

Chapter 1 Introduction

1.1 Introduction

This chapter introduces the original insights of my thesis by public output which aims to provide a clearer understanding of what works in routine care to support people living with Long-Term Conditions (LTCs). It summarises the challenges faced by the National Health Service (NHS) as the number of people with LTCs grows. It provides the background and context for my works (I-V), outlining how my thesis makes a contribution to the extensive field of supported self-management (SSM) and addresses a gap in the literature around the lack of detail of effective components of SSM interventions delivered as part of routine care.

The focus of works (I-V) is evaluation of five SSM interventions delivered in busy hospital outpatient clinics. My research question was "what are the specific components of successful psychological interventions delivered in routine clinical practice to support self management for people with long-term health conditions in secondary care contexts".

This thesis describes the specific components of SSM interventions I found effective (working as an Applied Psychologist) to support people to make and sustain lifestyle change in routine care and what was valued by participants and clinical colleagues.

This chapter details the aims and objectives of this thesis and introduces the researcher, explaining how this portfolio of public output was developed.

1.2 Original insights of thesis

This thesis provides an original contribution to the field of SSM and behaviour change. Evidence from my five published and co-authored papers (I-V) document three key areas that contribute to our knowledge around what works when delivering SSM in routine care in a secondary care setting.

- Specific components of SSM interventions I found effective when tested in real world context to support people living with a range of LTCs.
- Knowledge about how to operationalise SSM as an integral part of routine clinical practice and embed it within a multi-disciplinary team (MDT) pathway, working alongside other HCPs, such as diabetes specialist nurses in hospital outpatient clinics.
- Participant and Health Care Professional feedback on what they valued about the SSM interventions and quantitative outcome data on different aspects of health and wellbeing.

1.3 Background

1.3.1 NHS context

The NHS faces many challenges including, an ageing, increasingly overweight and sedentary population, resulting in a rise in chronic LTCs, compounded by the COVID-19 pandemic and economic downturn (The Lancet Editorial 2022).

As health care advances increasing numbers of adults are living with LTCs such as cancer, obesity and heart disease for longer periods of time. In Scotland, around two million people are living with a LTC (Nicklas et al.,2022) and are twice as likely to be admitted and stay in hospital longer (Gold 2020).

The concept of SSM attracts significant interest from Government and Health Care policy makers, not least because caring for people with LTCs contributes to a substantial amount of NHS expenditure across primary and secondary care settings. Nicklas et al (2022) highlight that people living with LTCs account for 50% of all GP appointments, 64% of all outpatient appointments, and 70% of all inpatient bed days. Yet there exists a gap between research, policy, and practice.

1.3.2 Challenges of lifestyle change

Lifestyle change including weight loss, smoking cessation and increasing physical activity are first line treatment in clinical guidelines and quality standards for LTCs (McPherson et al., 2022), However, evidence suggests many of us struggle to make and sustain changes in lifestyle. This endeavour is often further exacerbated due to a range of intersecting factors, not least people living with LTCs disproportionately live in low socioeconomic status (SES) areas and have less access to resources of all kinds (Das et al., 2016).

To provide context, participants in my works (I-V) had longstanding difficulties in changing behaviours, including: multiple co-morbidities; poly pharmacy; sedentary lifestyles; high body mass index (BMI) and low self-confidence to change health behaviours. A key aspect of my works was around developing participant's belief that they could change behaviour within the context of their everyday lives.

Working as an Applied Psychologist and delivering services in a secondary care hospital setting to support people living with LTCs determined my underpinning theoretical rationale and pragmatic approach to intervention design and evaluation. My focus was on the use of the most appropriate methods to answer my research question whilst delivering a service in a real world clinical setting. My overall approach was person-centred and motivation-focused.

1.4 Definition of Supported Self-Management

Self-management has been defined in the literature as "what people living with LTCs do every day: decide what to eat, whether to exercise, if and when they will monitor their health or take medications" (Hibbard 2016 pg.5). However, I judge this view of self-management as narrow, with its focus on increasing a person's knowledge and skills. Throughout this thesis, I argue there is a need to keep a broader view of self-management based on the biopsychosocial model of health (see Chapter 2) which recognises that people often face challenges when living with LTCs, many unrelated to health and clinical outcomes. Research by (Lorig et al., 2013) highlights people with chronic conditions live 99 percent of the time outside of the health care system and what they do in that time largely determines their quality of life, health and utilization of the health care system.

The use of the term SSM describes a more holistic approach described in the literature as "structured to help people manage the physical, psychological and social consequences of living with a condition and increase the level of "patient activation" (Lorig and Holman, 2003; Grady and Gough, 2014; Kidd et al., 2022).

SSM encompasses a person-centred view of self-management which is about empowering people to learn more about their condition, problem solve and develop a skill set to enable them to 'live well' with LTCs (Grady and Gough, 2014). This definition of SSM underpins the works (I-V) included in this thesis.

1.5 Wider determinants of health

The primary focus of much of the self-management literature to date has stressed educational or instructional interventions targeting perceived individual cognitive deficits and has tended to ignore or downplay social and economic considerations in people's lives (Douglas et al., 2020). People attempting to self-manage LTCs often experience multiple stressors which may include caring responsibilities, working long shifts (if they are in work) managing the requirements of their benefits eligibility and how to apportion available income to household costs (food, fuel, transport) which is particularly relevant now with the

cost-of-living crisis (Hote at al., 2022; Hojjat 2021). For example, approximately 1 in 5 people living with LTCs in Scotland were noted to be food insecure (Scottish Government, 2017). Such stressors can severely impact the efficacy of self-management and should be considered by HCPs (Douglas et al., 2020).

1.6 Mind the gap

The importance of the context in which people live is starkly illustrated by the 19-year life expectancy gap between the most and least deprived parts of the UK (Hohn et al., 2022). The reasons for this life expectancy gap are complex. Income and health are interconnected (Marmot 2005). Financial security allows people to access the necessities for health, including adequate housing, warmth, and food. Yet, Benzeval et al (2001) argue income affects health in far wider ways including the ability to feel in control, ameliorate the stress of living with uncertainty, have a meaningful job and be able to afford to make healthier choices.

1.7 Fully engaged

SSM is not a new concept, clinical experts have long recognised the importance of supporting people to live well with LTCs and actively involving people in decisions about their health and wellbeing (Eaton et al., 2015). However, despite good examples of person-centred approaches being implemented in frontline practice (Kosmala-Anderson 2014), it is my contention that it's still far from being 'the way we do things' within health care services. Research evidence highlights those living with LTCs should be an integral part of all SSM developments yet, their views are often missed (Wood 2019).

1.8 Translational research

There is minimal information available on how SSM interventions work when adapted and implemented within everyday practice (Estabrooks and Glasgow 2006; French et al., 2012; Plotnikoff et al., 2012). Much of the current work around SSM focuses on the efficacy/effectiveness of interventions delivered in a research setting, as opposed to routine care (Matthews et al., 2017). There is a gap between 'what we know' and 'what we do', known as 'translational research' (work II background section). This point is explored further in Chapter 2.4 'How do we implement SSM in routine care'.

1.9 Aims and objectives

The primary aim of this thesis by public output is to contribute to the evidence base of how to deliver SSM and behaviour change as routine clinical practice in a secondary care setting for adults living with LTCs.

The objectives are to:

- Present a synthesis of my published works and position this within the broader field of SSM and behaviour change evidence, highlighting gaps in knowledge in the current literature.
- Provide explicit details of SSM interventions that I have developed and tested in real world contexts to support people living with a range of LTCs, in collaboration with practitioners and other researchers.
- Generate knowledge about how to operationalise SSM as an integral part of routine clinical practice.

1.10 Thesis structure

This thesis is presented as a PhD by publication, it draws upon fourteen papers (Appendix 1) and has a focus on five papers I have written, and co-authored which detail SSM interventions delivered as part of clinical practice in hospital

outpatient clinics. All my papers including works (I-V) have been published in peer reviewed journals, Table 1.

This thesis is comprised of four chapters:

Chapter 1: Introduces the research and the researcher, provides a definition of SSM and frames the overarching inquiry.

Chapter 2: Describes the current policy drivers around SSM for adults living with LTCs, highlighting gaps between rhetoric and reality. It provides a synthesis of the literature around what works to support self management in routine care. It details systematic reviews of the literature which were conducted before developing each SSM intervention to explore what worked to support self-management for the specific clinical population targeted (e.g. adults with type 2 diabetes). It summarises and critiques the theoretical frameworks which underpin this thesis and considers barriers and facilitators to using a person-centred approach in routine care.

Chapter 3: Is the main chapter of this thesis, tabling all five works, extracting and synthesising the golden thread. It provides a synthesis of the key findings across works (I-V) of the research significance, methods, results and conclusions. It highlights emergent themes about what was valued by participants and HCPs involved in delivery of care. It summarises the person-centred ethos of my approach which acknowledged that ability to self manage is ingrained with a person's context, life circumstances and related capacities for change.

Chapter 4: Positions the contribution this thesis makes to advancement in the field of SSM and behaviour change and how it demonstrates independent and original insights. To address a gap in the knowledge, the effective components of the SSM interventions delivered across five clinics are summarised into a guiding template and mapped onto underpinning theoretical constructs and behaviour change techniques. This chapter highlights strengths and limitations of works (I-V) and makes recommendations for future research and implementation of SSM

in everyday practice. It concludes with a personal reflection about my progression in thinking whilst writing this thesis by publication.

My thesis concludes with a complete reference list followed by several appendices containing relevant papers published by the researcher and information regarding resources used in the works submitted.

I use the term people rather than patients throughout to reinforce that people living with LTCs are stakeholders in their own health care. I highlight for clinical, economic and quality of life reasons the increasing number of people living with LTCs represents a public health issue that requires urgent action (Hajat and Stein. 2018 and Hote et al., 2022).

1.11 Contribution to knowledge

This thesis contributes to the evidence base regarding SSM interventions delivered in routine care for adults living with LTCs. It describes SSM interventions developed and delivered whilst working as an Applied Health Psychologist for adults with a range of LTCs within different hospital-based outpatient clinics. It describes specific effective components of the interventions which were delivered within different hospital-based outpatient clinics. It outlines use of a motivational interviewing approach and details evidence-based behaviour change techniques within a guiding template (Table 15) to provide a framework to support participants using a replicable approach. It describes key enablers and barriers encountered when delivering SSM in routine care. It shows promising results in terms of statistically significant changes in clinical and quality of life markers and provides new insights via qualitative feedback into what matters to people with lived experience of LTCs.

1.12 Introduction to the researcher

I have worked in the field of SSM in the NHS and local authority settings for over thirty years. I am a Chartered Psychologist and have been registered with the Health Care Professions Council (HCPC) as a Health Psychologist and a Sport and Exercise Psychologist since 2005. I am also registered as a Public Health

Specialist (Generalist) with the UK Public Health Register (since 2009) and have been a Fellow of the Faculty of Public Health since 2010. I currently work within the Adult Clinical Health Psychology team in NHS Grampian spanning gastroenterology, weight management, diabetes, and vascular services in Aberdeen Royal Infirmary.

My most recent published works include my contribution to UK quality standards and recommendations on the management of non-alcoholic fatty liver disease (NAFLD). This work was published in the Lancet and has informed the rationale and evidence base for this thesis (detailed in Appendix 1). My colleagues and I were highly commended by the British Society of Gastroenterology in 2022 for developing a new multidisciplinary pathway to support self-management for people with NAFLD.

The Tier 3 Specialist Weight Management (SWMS) service I helped set up and worked in achieved excellent outcomes (weight loss, increased activity, and emotional wellbeing) and gained 2016 Best Practice Award by the UK Association for the Study of Obesity. The SSM intervention I set up whilst working in the diabetes service won a Quality in Care Award 2014. As a result of papers published and conference presentations about this intervention, I was invited to Oman to deliver training for primary and secondary health care professionals involved in the "'MOVE diabetes'" intervention (Alghafri et al., 2018).

I was motivated to complete this body of work after identifying a gap in knowledge around what works to SSM for people living with LTCs when delivered as part of routine care.

I started my career working in communities of low socioeconomic status (SES) in Drumchapel and North West Kilmarnock, developing interventions to promote physical activity levels (McCallum nee Farnham and Mutrie 1998). This experience shaped my thinking and awareness that people's living environment, community infrastructure and support is key when developing SSM interventions.

I moved to Grampian to promote physical activity in primary care and won a British Medical Association Award for a Walk to Health intervention I developed with General Practitioners. After gaining Public Health Specialist status, I wrote

strategy working with Aberdeenshire Council to address rural health inequalities. I also worked with Community Food Initiative North East to secure Big Lottery Funding.

However, I reached a point in my career when I began to seek new challenges. I decided to go back to my roots in psychology. I gained Chartered Health Psychologist status and was successfully recruited into the Clinical Health Psychology team. I began in earnest to build a portfolio of evidence-based practice to support self-management in routine care using innovative approaches. I approached the Clinical Lead and Head of Acute Psychology in NHS Grampian and outlined my proposal for a PhD by public output. My proposal was supported, and I was granted 50% funding from the Grampian Area Partnership Forum endowment fund to complete it.

Chapter 2 Policy and literature review

2.1 Introduction to the chapter

The previous chapter described the aims and objectives of this thesis, outlining its structure and describing the context for my work.

In chapter 2, my focus is on the relevant policy, drivers, literature, and theory which informed the SSM interventions described in this thesis (I-V, table 1). Despite substantial evidence around why we should support self- management, the literature on how we implement SSM in routine care is sparse (French et al., 2012) (work II background section).

This chapter describes how systematic reviews of the literature were conducted (prior to developing each SSM intervention highlighted in this thesis) and updated with a review of research on implementation of SSM in routine care since 2020. It critiques a number of health psychology theories, models and frameworks and details the underpinning theoretical rationale for the interventions described.

This chapter considers how my works contribute to advancement in the field of SSM and behaviour change.

2.2 A synthesis of current policy and drivers

As highlighted in Chapter 1.3, the concept of SSM continues to attract significant interest from Government and Health Care policy makers. Table 2 details key policy documents that have been published, at different levels from UK wide to local delivery plans that emphasise the role of SSM and are of relevance to this thesis.

There is some evidence of the benefits of SSM for people living with a wide range of LTCs across cultural, demographic and healthcare settings (Pinnock et al., 2017). These benefits include:

- Improved clinical outcomes and satisfaction with care received (Dineen Griffen et al., 2019).

- Reduced hospitalisations, less accident and emergency attendances, less unscheduled consultations, improved markers of control and quality of life for people (Pinnock et al., 2017).
- Improvements in physical symptoms, mood, self-efficacy, and coping skills (Boger et al., 2015).

Table 2 Key policy documents

UK Wide Policy:	Several policy documents published by the Kings Fund towards providing greater support for people to manage their own health and live well with LTCs, including: Self-management for Long-term Conditions | The King's Fund (kingsfund.org.uk) accessed 09.11.2022 Shared decision making, patient activation, patient and public involvement are emphasised and represent a shift from the traditional provider–patient relationship to a paradigm in which individuals play a key role in guiding their care (The King's Fund, 2014).
The Scottish Government:	**Gaun Yersel! Self-Management Strategy for LTCs (2008)** "*Self-management is the successful outcome of the person and all appropriate individuals and services working together to support him or her to deal with the real implications of living the rest of their lives with one or more LTCs".* (Gaun Yersel! p. 5, 2008). **Realistic Medicine (2016)** Key theme is encouraging dialogue between HCPs and people living with LTCs to work together to enable living well with LTCs. **Health and Social Care Delivery Plan (2016)**

	Emphasises equal importance of mental and physical health conditions. A key area of focus is on prevention, anticipation and supported self-management.
Scottish Intercollegiate guidelines (SIGN) Guidelines:	SIGN guidelines (e.g. 116 Guidance for management of diabetes) emphasise reducing the role 'of HCP as expert' , instead, encouraging responsibility of the person living with LTCs to be an active partner in their health care and management of LTCs (Sacks et al., 2017).
Local policy:	Local NHS clinical strategies, including NHS Grampian Plan for the Future (2022) emphasise the importance of empowering individuals to manage the physical, psychological and social consequences of living with chronic condition such as diabetes, heart disease, and stroke and lung disease

Despite substantial policy stipulating the need to support people to manage their LTCs in the UK, arguably there is a mismatch between rhetoric and what is delivered in practice as discussed below.

2.3 Does policy rhetoric match reality?

In theory, SSM offers an opportunity to break away from traditional biomedical models of care (Kidd et al., 2022). Yet in reality, as Vassilev et al (2013) highlight, too much responsibility is still placed on the 'patient' to adhere to HCP advice with little acknowledgement of how their ability to self-manage is influenced by wider determinants of health including access to resources, living environment, community infrastructure, policies, and planning.

2.3.1 The importance of context

Arguably there exists a bias in the literature towards defining SSM precisely in behavioural terms. A central tenet of my thesis is acknowledgment of the wider determinants of health (chapter 1.5 and 1.6) that may impact on an individual's ability to self-manage, including, social and emotional health, financial and food insecurity.

2.3.2 Avoiding weight stigma and shame

Wider influences on health are often out-with an individual's control, if people feel unable to make the lifestyle changes HCPs recommend (work III, background section) this can manifest in feelings of stigma, failure, and shame. As (Swinburn et al., 2019) highlight, HCPs should acknowledge that it's hard to achieve lifestyle changes such as a healthy diet when the obesogenic environment we live in offers unhealthy options that are more affordable, easier, and unchallenging (Ogden 2016). The very people we are trying to support are less likely to become involved in managing their own health care and making changes to their lifestyle unless they are supported by compassionate HCPs at the frontline and holistically with policy, legislation and community planning which supports people to live well with LTCs (see Chapter 2.9).

In the next section, reviews of the literature which informed the SSM interventions are considered.

2.4 How do we implement SSM in routine care?

A wide range of theories and empirical evidence were used to inform my SSM interventions and synthesise the specific components I found effective in facilitating behaviour change. My first step involved reviewing the literature to identify what was already known about factors that influence behaviour and previous intervention attempts in routine care with specific clinical populations (Chapter 3, table 6). As highlighted in Chapter 1, I have worked in the field of SMM for a number of years, the interventions described in this thesis drew from earlier work including my contribution to guidelines for delivery of exercise

consultation (Loughlan and Mutrie 1996) (McCallum nee Farnham and Mutrie 1998) updated by Kirk et al, (2009).

Furthermore, evidence was collated from systematic reviews and meta-analysis on how to increase physical activity for people living with LTCs. Hillsdon and Thorogood (1996) conducted an important meta- analysis which informed my approach. Whilst this is now dated, recent reviews (Biddle et al., 2021) highlight the key findings remain unchanged as illustrated in table 3.

Table 3 Key findings of literature on how to increase physical activity

Key findings of literature
• Interventions that encourage walking and do not require attendance at a facility are most likely to lead to sustainable increases in overall physical activity.
• Regular follow up improves adherence to physical activity promotion interventions.
• Programmes that use behaviour modification strategies, such as goal setting and self-monitoring most likely to be successful in motivating change in PA behaviour. • Less may be more. The use of a larger number of behaviour change techniques in interventions is not necessarily related to better outcomes. • Self-monitoring is a key behaviour change technique.

In addition, the literature was searched on the specific components of effective SSM. A meta-review which informed my approach was conducted by Taylor et al, (2014) who identified self-management characteristics of many LTCs, (including stroke, asthma, and diabetes). They synthesised the data and developed a taxonomy of the potential components of SSM detailed in Table 4.

Table 4 Components of Self-Management Support

Components of Self-Management Support (Taylor et al., 2014)
Provision of education about LTCs, recognising the importance of understanding patients' pre-existing knowledge and beliefs about their LTCs.
Psychological strategies to support adjustment to life with LTCs.
Strategies specifically to support adherence to treatments.
Practical support tailored to the specific LTC, including support around activities of daily living for disabling conditions, action plans in conditions subject to marked exacerbations, intensive disease-specific training to enable self-management of specific clinical tasks,
Social support as appropriate.

Taylor et al (2014), synthesis of the evidence from reviews of RCTs suggest effective SSM:

- interventions have many different components, should be tailored to the individual, their context, values and beliefs;
- should target a specific LTC and position on the disease trajectory;
- should be underpinned by a collaborative/communicative relationship between the person living with LTCs and HCPs within the context of a health-care organisation that actively promotes self-management;
- implementation requires a whole-systems, MDT approach which intervenes at the levels of the person living with LTCs, the HCP and the organisation;
- the health-care organisation is responsible for providing training and resources to enable HCPs to implement appropriate SSM-focused interventions, and people living with LTCs to benefit from them and;
- there is a societal need to address public understanding of LTCs and all that impacts a person's ability and capacity to make lifestyle changes.

In addition to this broad overview, I systematically reviewed the literature prior to developing and delivering each SSM intervention.

2.4.1 Literature review

Prior to developing each SSM intervention described in works (I-V) systematic reviews of the literature were conducted to explore specific components of successful interventions for the target clinical group. This approach was taken as I was working as an Applied Psychologist and was primarily interested in setting up an effective service as part of routine care.

For example prior to work II, my co-authors systematic review of the evidence on the implementation of physical activity interventions for management of type 2 diabetes was utilised. An extensive search of electronic databases and grey literature was performed to locate relevant publications. Included articles were analysed using the RE-AIM framework (Reach Effectiveness Adoption Implementation Maintenance) for evaluation of interventions in a clinical and community practice setting.

Of 3237 identified articles, 50 full-text articles were independently reviewed, with 12 articles meeting the inclusion criteria. Seven (58.3%) interventions showed an increase in levels of physical activity, each associated with different factors including: individual and group based interventions; clinic, primary care and community settings; and intervention delivery by peers, research staff and health professionals. This review concluded that, increased levels of physical activity was achievable in practice using theory-based interventions and multiple BCTs. Several factors play an important role in implementation, including;

- Tailoring the intervention to the target population of people living with diabetes [2]

[2] For example, in terms of tailoring the intervention for people living with diabetes a potential barrier to increasing physical activity may be fear of hypos, which differs from a

- Having a network of external organisations to support behaviour change in communities.
- Providing staff with the skills and developing confidence to deliver behaviour change interventions.
- Many interventions were of short duration and lacked long-term follow-up data.

Prior to developing work IV, I worked with an Assistant Psychologist within the clinical health team to conduct a systematic review of the literature around effective health behaviour change interventions to improve uptake and adherence to physical activity programmes for patients with peripheral arterial disease and intermittent claudication.

The main data bases used were Ovid Medline, PsycINFO and Cochrane Library. Key words included: peripheral arterial disease, cardiovascular diseases, intermittent claudication, behaviour change intervention, physical activity, physical exercise, exercise programme and home based exercise combined with specific search terms and strategies for each database. Reference lists of identified studies were also searched.

Systematic literature review searches initially identified 22 studies including both qualitative and quantitative studies. Three of these studies were not included in the final review as they looked at the opinions of clinicians, rather than outcome measure, or were not yet completed. This review concluded that:

- more definitive multi centre RCT trials are needed to determine effectiveness of health behaviour change interventions for patients with PAD in a clinical setting.
- future interventions should consider feasibility and cost effectiveness of health behaviour change interventions for patients with PAD.

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potential barrier for people living with peripheral arterial disease which may be fear of cramps or claudication after walking a short distance.

- future evaluations should report on patients' experiences and perceptions of the health behaviour change intervention.

2.4.2 Updated literature review

As some of the literature reviews are dated (due to when the interventions were developed) an updated review of the literature was conducted to explore new developments in the field from 2020 onwards. A range of databases were searched including CINAHL, EMBASE, MEDLINE/PUBMED, PsycINFO , Cochrane, Scopus and Google Scholar using key words and search terms ('implementation science' OR 'health psychology") and (LTC OR 'long term condition' OR 'physical health' OR illness). This search generated 616 results (from 2020 onwards) which were screened and narrowed down to 40 papers. The results of this updated review are summarised below.

2.4.2 Gaps in the literature

My synthesis of the literature and updated review highlighted that most evidence has been conducted within a controlled research environment using resource intensive methods (Matthews et al., 2017), (Taylor et al., 2014) (Czosnek et al.,2020) see Chapter 1.8. The gap between theory and practice is wide. There is a lack of translational research which identifies elements for successful implementation under real-world conditions (Kirk et al., 2010). Much is known about the 'science of health behaviour change'. However, readiness for implementation, evaluation and use in routine practice by practitioners supporting people to change their behaviour remains unclear (Presseau at al., 2021, Hall et al., 2022). There is a gap in knowledge around the fine-grain detail of intervention content and the specific behavioural or psychological components of SSM interventions (work III introduction).

A further finding was the heterogeneity in outcomes across interventions with limited clarity around what makes one intervention more effective than another, thus making it difficult to compare and pool results. Reasons underpinning this

variability and lack of progress are unclear, in part due to poor description of: the active components of interventions (i.e. the how, what, and where); the specific behaviour change techniques (BCTs) utilised and because SSM interventions have been designed and implemented in various ways, often lacking explicit rationale or theory (Colquhoun et al., 2017).

Furthermore, my review highlighted a gap in the knowledge about what is valued about SSM interventions for people with lived experience of LTCs, their needs and preferences are often overlooked. This point is illustrated by Franklin et al, (2018) and Boger et al, (2015) who document concern that the SSM approach is largely professionally, and policy driven as opposed to being determined by the stakeholders who are intended to benefit from SSM interventions.

Additionally, there is a gap in knowledge around how to address barriers faced by HCPs whilst supporting people to change behaviour in the time pressured environment of clinical care (work II, discussion).

2.5 Barriers faced by HCPs to supporting people to change behaviour

The literature highlights that supporting people to change their behaviour is challenging. It takes time and skill to understand when people are ready to change, how to manage difficult conversations and which behaviour change tools to use (Matlinsky and Swanson, 2020). Organisational constraints, including limited time of an average appointment, lack of resources and excessive administration all make it difficult to deliver person- centred care to facilitate SSM in routine care.

In my clinical practice I've found whilst HCPs generally feel SSM is important, there can be disparity between their intentions to engage people in conversations about SSM and their confidence in their own skills and knowledge (Bull and Dale 2021, Franklin et al., 2018). Furthermore, it's not uncommon for HCPs to shy away from having difficult conversations or asking about emotions for fear of opening up 'a can of worms' or feeling unqualified to manage people's response (Unni et al., 2022). This point is illustrated in a study by (Douglas et al., 2018),

who highlighted uncertainty amongst HCPs about how to raise issues such as food insecurity during a routine consultation.

Additionally, there may be confusion amongst HCPs regarding whose responsibility it is to discuss lifestyle and behaviour change (work II). HCPs often struggle to prioritise different aspects of care within routine consultations. This point is further exacerbated, particularly in secondary care, by a lack of continuity with the same HCP. People report having to "tell their story" many times to different HCPs involved in their care (Gallacher et al., 2019).

The next section considers how I used the gaps identified in my literature review to inform my works (I-V).

2.6 Developing my SSM interventions in routine care

As detailed in Chapter 1.10 and wider published works (appendix 1) my interest in behaviour change, in particular physical activity is longstanding. McCallum (nee Farnham) and Mutrie (1998); McCallum (nee Farnham) and Mutrie (2003); McCallum et al (2013).

I have included my personal reflections (appendix 3) of how I used my research and clinical experience to develop the SSM interventions described in this thesis.

2.7 Theoretical frameworks which informed this thesis

Research highlights that interventions underpinned by a sound theoretical framework are more likely to be effective (work II background section). Good theory gives us an integrating framework to allow a clearer picture to emerge and to better understand the underlying processes that drive an intervention. Yet the complex psychological, social, environmental and biological influences on our behaviour (Chapter 1.5) highlight the difficulty of singling out one theory or approach (particularly for a clinician as opposed to an academic researcher).

Therefore the SSM interventions in my thesis are theory informed rather than truly theory based.

Having worked in this field for over thirty years, I found it a challenge to select a single theory that underpinned my works, theory is rarely static and theoretical models of health psychology move on. In my early career, social learning theories such as Locus of Control Theory (Rotter 1954) were current in the literature and social cognition theories, such as Theory of self-efficacy (Bandura 1976), Theory of reasoned action (Ajzen, 1991) and Theory of planned behaviour (Fishbein and Ajzen, 1975) were popular. However, these theories were criticised by researchers in the field, mainly due to the uni-directional nature of the models with their focus on the individual and their cognitions, limiting their external validity (Sniehotta et al.,2014) and their lack of acknowledgment of wider influences (such as physical and social environment) on behaviour.

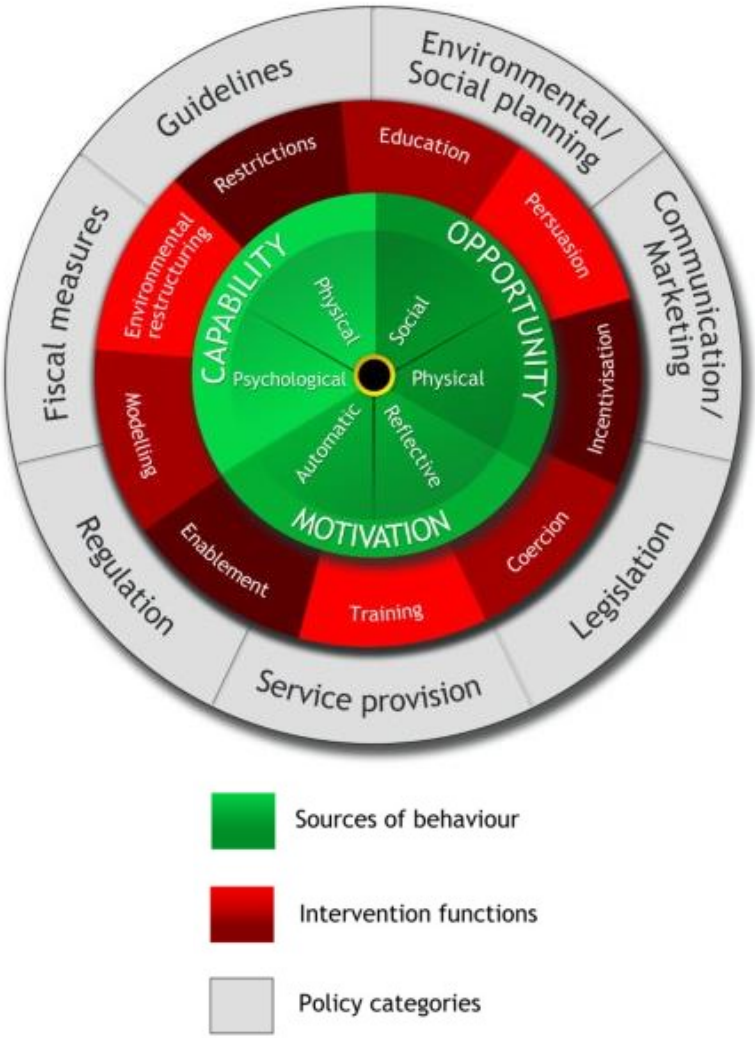
In the 1990s, stages of change, Transtheoretical models (TTM) (Prochaska et al., 1992) began to emerge, describing change as a cyclical process through different stages: Preparation; Contemplation; Preparation; Action and Maintenance. I found elements of the TTM useful as an Applied Psychologist because it allowed conceptualisation of where a person might be on their behaviour change journey and encouraged interventions to be tailored to the individual according to their stage of change. However, I agree with critique of the TTM which highlights that the journey through stages can be hard to define and predict and it has not shown consistent success as a theoretical basis of behaviour change interventions.

Latterly, Health Psychologists including Michie et al (2011), have recognised overlap between theories and attempted to converge several theoretical approaches into one overarching framework. The Behaviour Change Wheel (BCW) and COMB model is one such integrative framework with key constructs drawn from different theoretical models.

2.8 The Behaviour Change Wheel and COMB model

The BCW was synthesised by Michie et al (2013) from 19 different theoretical frameworks including some of the earlier theories listed above such as self-efficacy theory (Bandura 1976), theory of planned behaviour (Ajzen, 1991), the theory of reasoned action (Fishbein and Ajzen, 1975) and transtheoretical model (Prochaska and Velicer, 1997). At the centre of the BCW sits a 'behaviour system', termed the COM-B model of behaviour change (Figure 1 BCW and COM B model.

A strength of the BCW and COM B framework is that it has a wider focus than the individual, acknowledging that organisations, environments, communities and society all influence our behaviour.



3

Figure 1 BCW and COM B model.

Michie, S., Atkins, A. & West, R. (2014) The Behaviour Change Wheel: A guide to designing interventions. ISBN-10: 1912141000

The BCW and COM B framework allows intervention developers to ask, "*Who needs to do what differently, when, where and how".* Key to the BCW is understanding the behaviour within the context in which it occurs.

The COMB model at the centre of the BCW propose that for behaviour change to occur, three criteria are involved (Michie et al., 2011).

Firstly, the person must have capability/self-efficacy to perform the behaviour (drawing from Banduras self-efficacy theory). This has been defined by (Michie et al., 2011) as '*the individual's psychological and physical capacity to engage in the activity concerned, including having the necessary knowledge and skills*.'

Secondly, the person must be motivated. Thirdly, the person must have opportunity defined by (Michie et al., 2011) as '*all factors that lie outside the individual that make the behaviour possible or prompt it*.'

Whilst I believe this convergence of theories approach makes sense, I argue alongside other researchers and academics in the field there are limitations with using the BCW/COM B model in routine clinical care. Not least, I find it a complex framework which can be difficult to explain to HCPs who are not familiar with the terminology used by academics and psychologists. Much of the work to demonstrate feasibility of using the BCW has been conducted in a controlled research environment with targeted groups, for example, NHS staff, where behaviours are clearly defined and considered in isolation, such as hand hygiene, condom use or dental hygiene (Newton and Asimakopoulou., 2015). Participants in controlled feasibility studies, have fewer competing demands, than participants living in their own social context (Steinmo et al., 2015). Ogden 2016, concluded much of the research using the BCW to date has not considered the complex and reciprocal way behaviours impact upon another and feed into the process of managing life.

Whilst the goal of the BCW/COMB (to reduce theory variability and identify a systemised approach which can be used for all behaviours) is laudable I agree with critics that the BCW framework may become a box which constrains the way in which complex interventions are developed; leading to a particular style and type of intervention which does not question the paradigm from which it was created (Ogden, 2016). I believe we need to be wary about overly systematising the practice of behaviour change. In reality, people behave in a myriad of ways depending on variables such as mood, context, inter personal effects. When actually dealing with a patient in a clinic with complex issues it's not that easy, 'patients are tricky' (Ogden 2016).

However in defence of the BCW/COMB, Michie et al (2013) acknowledge that it is a relatively new framework and highlight it is not a 'magic bullet' for intervention design, it may need adaptation for use with different populations and contexts.

2.9 Biopsychosocial model

As highlighted in Chapter 1.4, living with one or more LTC is associated with several challenges for individuals at multiple levels (Grady and Gough, 2014). HCPs need to be aware of the wider determinants of health, and the stressors that may impact on people's ability to self-manage. Thus, the Bio psychosocial model of health is one of the theoretical models which informed works (I-V). It is a key model in Health Psychology which challenges the pervasive biomedical model and recognises the complex interconnections between psychological, social, environmental, and biological influences on our behaviour. Specifically, the model's key principles include recognition of:

i) the link between the social and psychological factors that influence health,
ii) the fact that individuals do not exist in isolation; but live in communities, which in turn, exert influence on their health,
iii) people as unique individuals within that wider set of influences (the holistic standpoint) as illustrated in table 4.

Table 4 **Biopsychosocial model**

BIOPSYCHOSOCIAL	**INFLUENCES**
BIO/BIOLOGY Genetics and physical factors influence health.	Physical influences on health include: mobility, levels of energy and fatigue, feelings of pain and discomfort, medications, sleep patterns.
PSYCH/PSYCHOLOGY Thoughts, feelings, and emotions influence health	Health beliefs and emotions influence health. (Feelings of control, self-efficacy, and sense of self) are all commonly affected when living with LTCs. The way people think about their health can be powerful. Our thoughts and feelings can produce physical sensations in our body. Our feelings and impact on what we do, e.g., feeling low may stop us from doing physical activity.
SOCIAL The context in which people lives influences health	Key relationships and support influence health. Maintaining dignity, autonomy and independence is valued by people living with LTCs as are wider influences such as employment status, suitable housing and access to services/facilities including transport, shops, and schools.

However, I highlight that the Biopsychosocial model has limitations, not least, its lack of emphasis on higher level influences including government policy and economic environment, wider community, institutions, and organisations (see Chapter 2.3). A further model which resonated is the socio-ecological model of health (Dahlgren and Whitehead, 2021) which recognises the wider social, organizational and policy environment that determine our behaviour to a large extent.

Despite limitations, I found theoretical frameworks useful in terms of thinking through design, delivery and evaluation of my interventions. Table 15 (chapter 4) illustrates how I mapped theoretical constructs onto a guiding template to deliver each SSM intervention to help facilitate replicability and generalisability.

2.10 Specific components of my SSM interventions

As highlighted in chapter 2.4.1, I identified a gap in the literature, with few studies detailing the specific replicable components of SSM interventions or 'active ingredients' to help support lifestyle change in routine care.

2.10.1 Evidence based behaviour change techniques

Whilst developing the interventions described in this thesis, I was interested in extracting which specific behaviour change techniques were useful to help people to change physical activity and healthy eating behaviours. I was involved as a trained coder (one in a group of 109 coders) from 2010-2013, in the Behaviour Change Techniques Taxonomy project and the continued development of Abraham and Michies (2008) Behaviour Change Technique Taxonomy (BCTT v1). Using a process of systematic review Abraham and Michie (2008) identified core components of physical activity and healthy eating behaviour interventions. The resulting 'Coventry, Aberdeen and London- Refined' (CALO-RE) taxonomy built on the original taxonomy (26 BCTs) and described 40 BCTs with a definition of each technique (Michie et al., 2011). Table 5 provides a summary of the eleven BCTs used most often in my SSM interventions and a definition of what they mean so they can be replicated by other researchers.

Table 5 Key BCTs and definitions

BCT	***Definition (agreed by trained coders)***
Goal setting (behaviour)	The person is encouraged to make a behavioural resolution (e.g., take more exercise next week). This

BCT	***Definition (agreed by trained coders)***
	is directed toward encouraging people to decide to make or maintain change.
Action planning	Involves detailed planning of what the person will do, including as a minimum, when, in which situation and/or where to act. When may describe frequency, such as how many times a day/week or duration e.g. for how long.
Set graded tasks	Breaking down the target behaviour into smaller, easier to achieve tasks and enabling the person to build on small successes to achieve target behaviour. This may include increments towards a target behaviour or incremental increases from baseline behaviour.
Prompt focus on past success	Involves asking the person to think about or list previous successes in performing the behaviour (or parts of it).
Prompt of self-monitoring of behaviour	The person is asked to keep a specific record of specified behaviours as a method for changing behaviour. This could take the form of a diary or completed questionnaire about their behaviour in terms of type, frequency, duration and or intensity.
Prompt self-monitoring of behavioural outcome	The person is asked to keep a record of specified measures expected to be influenced by the behaviour change (e.g., blood glucose, blood pressure, weight loss, physical fitness/step count).

BCT	***Definition (agreed by trained coders)***
Prompt review of behavioural goals	Involves a review or analysis of the extent to which previously set outcome goals (e.g., reduce blood pressure, blood glucose, lose/maintain weight) were achieved.
Barrier identification/problem solving	This presumes having formed an initial plan to change behaviour. The person is prompted to think about potential barriers and identify ways of overcoming them. Examples of barriers may include behavioural, cognitive, emotional, environmental, social and or physical barriers.
Provide information on where and when to perform the behaviour	Involves telling the person when and where they might be able to perform the behaviour (e.g., places and times of local exercise classes) this can be in written or verbal form.
Use of follow up prompts	Intervention components are gradually reduced in intensity duration and frequency over time (e.g., emails or telephone calls) instead of face to face and or provided at longer time intervals
Plan social support/ social change	Involves prompting the person to plan how to elicit social support from other people to help them achieve their target behaviour/outcome.

2.11 Conclusion to Chapter 2

In conclusion, this chapter has provided a summary of how I reviewed the literature to understand what previous researchers had found worked (or not) in a clinical setting with my target population and to identify gaps in the knowledge base. I drew from a range of theories to understand the factors that might influence behaviour and to underpin the techniques I used to change behaviour. I refined a guiding template (Table 15, chapter 4) to provide a practical framework for HCPs to support people with LTCs change behaviour and mapped specific components to theoretical constructs.

This chapter concluded with a summary of the evidence based BCTs that informed the interventions I developed which are now described in more detail in the following chapter.

Chapter 3, describes my published works and provides a synthesis of findings across all five interventions comparing and contrasting intervention processes and components. Thematic analysis of my qualitative data highlights new insights about what matters to people with lived experience of LTCs and barriers and enablers identified by HCPs when delivering SSM in routine care.

Chapter 3 Golden thread of works presented

3.0 Introduction

In this chapter I now present a description of the five works I have published (and co-authored) in peer reviewed journals from 2016 to 2022 (Appendix 6). In addition, this thesis draws on a further nine of my co-authored works that contribute to the overall findings by contextualising and supporting the key contentions of this thesis (Appendix 1). This chapter provides a summary of the characteristics of the participants who engaged in SSM interventions (I-V). It details the specific components of the SSM interventions including, methods, development of a guiding template and motivational interviewing approach. Thematic analysis of qualitative data provides new insights into what was valued about the SSM interventions to participants and what HCPS felt worked or not. This chapter highlights the contribution this thesis makes to the field of SSM delivered in routine care.

3.1 Five core works:

I. Evaluation of intensive support for people with type 1 diabetes.
II. The feasibility of a physical activity intervention for adults within routine diabetes care: a process evaluation.
III. Evaluation of Weigh Forward: A group intervention delivered by dietitians and psychologists within a National Health Service Specialist Weight Management Service.
IV. Improving health behaviours in patients with peripheral arterial disease - A pilot study of supported self-management.
V. Supported Self-management – tangible benefits in physical and mental health for patients with non-alcoholic fatty liver disease (NAFLD).

The rationale I used for inclusion of the five studies above was based on three criteria:

- relevance of the themes in the works selected to the central tenet, what works and matters to people living with LTCs in terms of SSM delivered in routine clinical practice.
- demonstration of progression in thinking around what works to support self-management for people living with LTCs in routine care, and
- originality of the works and their contribution the field of SSM and behaviour change in clinical practice.

3.2 Overview of included works

The selected works detailed in table 6 describe SSM interventions which are person centred in their approach, use motivational interviewing skills, emphasise physical activity and are integrated as part of routine delivery in hospital outpatient clinics.

Table 6 provides detail on the proportion of work I personally undertook for co-produced outputs. This contribution has been verified by each co-author/contributor.

Table 6 Summary of published works selected

Work I.	**McCallum M and Bruce S. Evaluation of intensive support for people with type 1 diabetes (2016) Health Psychology Update, Volume 25, Issue 2, Autumn 2016 The British Psychological Society**
My role **85%**	I was responsible for the design, conduct, analysis, and write-up of this intervention. Co-author Sarah Bruce

	(Diabetes Specialist Nurse) provided feedback upon the manuscript prior to submission.
Introduction	The burden of living with type 1 diabetes (T1DM) can be an ongoing challenge. Learning how to manage blood glucose is complex and requires consideration of a multitude of factors including: activity levels; carbohydrate requirements; and insulin dose adjustments. Many people find it difficult to adhere to the lifestyle, behavioural and psychological changes necessary to effectively manage their condition. Feelings of hopelessness and low self-esteem/self-efficacy are often highlighted.
Research significance	The pilot project was established as part of routine care of the diabetes service in NHS Grampian, the intervention aimed to support people (n=19) attending the diabetes secondary care clinic. The key aim of the pilot was to support people to improve self-management of their T1DM.
Methods	The target population was adults who were struggling to manage their T1DM but willing to engage with the service and ready to make changes. Intensive one-to-one support was offered to patients with high average blood glucose levels (HbA1C>75mmol/mol). The support was led by a Health Psychologist and a Diabetes Specialist Nurse (DSN). Support was offered once a week, if required, over an eight-week period. Psychology support included work around adjustment to diagnosis and coping strategies for day to day living. Nurse support included practical information such as when and how to monitor blood glucose levels, changing needle injection sites and methods for needle disposal when out and about. Delivery was based on a Cognitive Behavioural Therapy (CBT) Framework, which was tailored to suit each individual

	around their specific difficulties and barriers to self-management, such as, negative attitude towards living with diabetes, feelings of hopelessness and low self-esteem/self-efficacy.
Results	Average age of participants was 40 years (range 17 to 63 years) and 58% (n=11) were female. Patient feedback was gathered throughout the intervention both informally and via questionnaires. Participants reported an increased frequency of self-monitoring of blood glucose and improvement in knowledge and confidence in the management of their diabetes. Qualitative feedback highlighted increased self-esteem and strategies to help cope in difficult situations. An important outcome of intensive support sessions was around improved self-confidence/self-efficacy.
Conclusion	Research highlights that the burden of living with T1DM can be an ongoing challenge for individuals and their support network (Jones et al., 2015). Many people find it difficult to adhere to the lifestyle, behavioural and psychological changes necessary to effectively manage their condition. Regular physical activity has specific benefits, reducing the long-term risk of developing cardiovascular disease; increasing insulin sensitivity preserving lean body mass (Kirk et al., 2009). Diagnosis is highlighted as a time when people realise they have to change established behaviours and develop new ones. However, research highlights the need for ongoing dialogue and support around lifestyle change throughout a person's journey with T1DM (Kirk et al., 2009). Psychological problems including anxiety, depression, and psychosocial difficulties (including hostility, anger, and sleep disturbance) can emerge following the diagnosis of

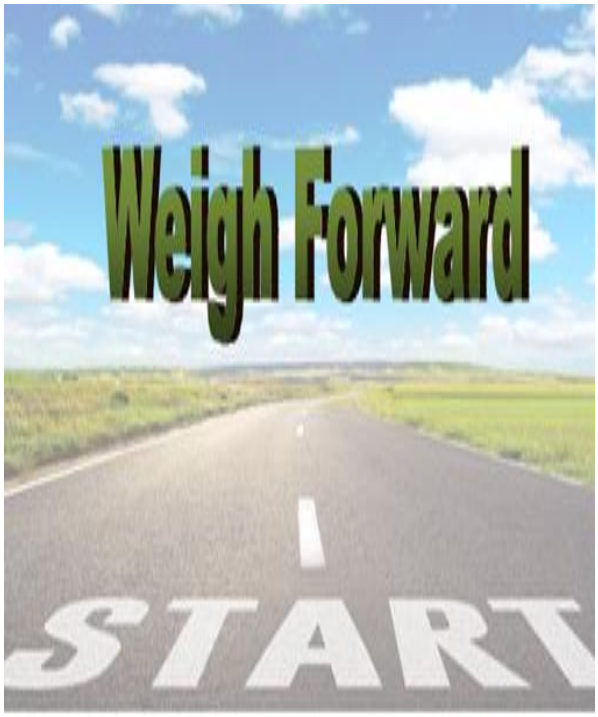
	T1DM (Jones et al.,2015). One of the reasons postulated for negative mental health impact is the change in identity that results from living with an LTC such as diabetes (Wilson and Stock 2019). There are anxieties unique to diabetes, including fear of complications, hypoglycaemia, and invasive procedures. Worry about the possibility of serious, long-term complications is often rated as the most distressing aspect of both T1DM and Type 2 diabetes (T2DM) (Snoek et al., 2000). For people living with T1DM, there is a clear role for a whole team approach including psychological intervention around lifestyle change within diabetes care. Ongoing support to provide tailored management plans which reflect day-to-day life of the person living with T1DM diabetes were shown to be effective in this study.
What does this study add	This study adds to the evidence base in highlighting a multi-disciplinary approach (with specialist nurse and psychologist input), was an important component of success when delivering this intervention in routine care. Tailored one to one support was also an important component in reports of behaviour change over a six-month time period. Limitations include small sample size as it was hard to identify suitable patients willing to change their behaviour due to the multiple challenges people living with T1DM face. Future research could target primary care sites as well as secondary care clinics to increase numbers attending. The service could also be offered to patients with T2DM who struggle to manage their condition. Results of this study highlight positive outcomes in terms of increasing participant's self-esteem and strategies to help cope with their condition in difficult situations. The

	intervention was integrated with other aspects of routine diabetes care such as advice on continuous glucose monitoring. It did not operate as a 'stand-alone' service. This study contributes to the evidence base on the importance of taking peoples everyday lives, fears, concerns and worries into account when trying to facilitate living well with T1DM.
Work II.	**Matthews, L., Kirk, A., McCallum, M., Mutrie, N., Gold, A. and Keen, A., 2017. The feasibility of a physical activity intervention for adults within routine diabetes care: a process evaluation. *Practical Diabetes*, *34*(1), pp.7-12a**
My role **60%**	I was responsible for the design and conduct of the SSM intervention. I engaged with the lead author (academic) and co-authored the manuscript and critical revisions of manuscript before and after submission.
Introduction	Physical activity is an important factor in diabetes management but is rarely implemented within routine diabetes care.
Research significance	Most published interventions have been performed in a controlled research setting, with resource intensive methods, short duration, and lack of long-term follow-up. Minimal information is available on how these interventions work within everyday practice (Plotnikoff et al., 2012). The purpose of this process evaluation was to explore the feasibility of a 12-month pilot physical activity consultation (PAC) intervention delivered for 89 people with diabetes attending a secondary care diabetes clinic.
Methods	Participants received an initial one to one assessment with a health psychologist. Questions focused on why health was important to them, what they could change and what they wanted to be different in 6 months' time. A

	Motivational Interviewing (MI) approach was used to help participants evoke their own reasons for changing behaviour. Participants received an activity tracker to record daily step count. Regular follow up was scheduled for a period of 12 weeks to provide support, motivation, and relapse prevention by phone call, email or face to face depending on participant's preference. Multiple process evaluation measures were conducted with participants living with diabetes including interviews, email communication, online survey, and intervention session summaries. Additional outcomes explored adherence and the feasibility of collecting measurable outcomes for physical activity, body mass index (BMI), and glycated haemoglobin test (HbA1c) and psychological wellbeing. Methods and outcomes were adapted to facilitate implementation in a 'real-world' setting, as opposed to typical research settings.
Results	A total of 89 participants attended, 51% of those were men, a group usually disinclined to engage with services. Average age was 59.5 years (±11.3 years). Of the participants, 82% (n=73) had type 2 diabetes (T2DM) and 18.0% (n=16) had type 1 diabetes (T1DM). The majority (58%) had multiple comorbidities, and the mean duration since diagnoses was 11.4 years. The attrition rate was low at 9% over the 12-month timeframe. At 12 month follow up, 78% of people met Scottish Government physical activity targets whereas only 14% did so before attending the intervention. Significant improvements were seen at follow-up in HADS depression scores ($p = 0.006$) and positive and negative affect scores (PANAS) wellbeing scores ($p = 0.018$), no significant change was found in HbA1c. Although not

	reaching statistical significance, findings suggest improvements in BMI and several aspects of psychological wellbeing.
Conclusion	The intervention was feasible with high adoption by staff, and positive participant feedback. The role of 'champions' (consultant and two health psychologists) was identified as a key factor in the positive evaluation of the intervention. Changes were made to the intervention to address the support needs of the sample. Initially 30 minutes was allocated for each assessment appointment, but this had to be increased to 45 minutes to give adequate time to hear each patients' story. Challenges were also identified with collecting questionnaire data within the time allocation of consultations. Participants with diabetes highlighted they found the person-centred collaborative, one-to-one support beneficial in terms of feeling heard and understood. Participants enjoyed the opportunity to gain ongoing support in a group environment by attending the diabetes exercise classes or health walks. Participants valued autonomy and flexibility in the method of follow up. It was concluded that PAC is a feasible method of promoting physical activity to adults with diabetes in routine diabetes care. The challenge lies in the translation of physical activity interventions for everyday practice.
What does this study add	This study was the first process evaluation performed in the UK exploring the implementation of a PAC intervention within routine diabetes care. It adds to the limited number of studies published in this field as it provides details of components of the intervention, barriers and motivators and effective methods of intervention delivery. It adds to the evidence base for PAC as a feasible method of

	supporting people with diabetes and multiple co-morbidities to live well with diabetes. This study informed further translational research to evaluate effectiveness of interventions delivered within routine diabetes care. Specifically informed Move Diabetes training programme in Oman.
Work III.	**Moffat, H., Campbell, F., Donald, C., Insch, P., Little, S., Logan, S. and McCallum, M (2019), "Evaluation of weigh forward: a group intervention delivered by dietitians and psychologists within a National Health Service specialist weight management service", Clinical Obesity, Vol. 9 No. 2, pp. e12291.**
My role **65%**	I was responsible for support with paper conception and design. I led on review of the literature, co-authored draft of manuscript and critical revisions of manuscript.
Introduction	Living with obesity is a complex, chronic problem. However, the evidence for effectiveness of interventions based on diet and physical activity alone is poor (Hughes 2015). Obesity has many contributing factors but, effective interventions include ways to address underlying issues such as emotional factors that can contribute to obesity. Clinical guidance (NICE, SIGN and Cochrane) indicates that healthy weight management interventions are most likely to be effective when they incorporate psychological components as part of a structured multi-disciplinary approach. Specialist weight management services for adults are generally offered to individuals with a body mass index (BMI) of 35 kg/m2 or above, who have struggled via other structured interventions.
Research significance	There is limited evidence of the effectiveness of non-surgical interventions for severe obesity (Moffat et al 2018). The behavioural or psychological components of

	interventions are not well defined. Clear description of process used in interventions delivered as part of routine care are needed. Comparisons of effectiveness are compromised by using different core data sets, lack of long-term follow-up data and the medical and psychological complexity of the population. People living with obesity often have to deal with multiple challenges associated with their living conditions and circumstances. The aim of the paper was to evaluate a group intervention delivered by a NHS specialist weight management service to contribute to the evidence base and inform the development of future services. 
Methods	Participants (n=166) in this prospective cohort study were attending NHS Grampian Specialist Weight Management Services. The intervention was an interactive 12-session group programme based on an evidence-based psychological model, with combined dietetic and psychological support provided. The primary outcome was

	mean weight change at the end of the intervention and after 12-month follow-up (including programme completers, baseline observation carried forward [BOCF] Secondary outcome measures included mood, anxiety, binge eating and quality of life.
Results	A total of 166 participants (80% females) accepted a place on the group programme. Mean body mass index was 48.9 kg/m2. Mean weight loss at 6 months was 5.6 kg and 35.2% of those who completed the group (n = 88) lost ≥5% of their initial body weight. Using BOCF, 18.7% lost ≥5% of their initial body weight at 6 months. Those who remained in the programme 48.1% maintained their weight loss 12 and 18 months after the start of the intervention. Statistically significant improvements were also found in psychological variables, including reduced depression, anxiety, binge eating and improved emotion regulation. Feedback from participants was positive about the group experience with 100% of participants saying they would recommend the group to others. The collaborative, person centred approach was highly valued by many participants (in particular compassionate support and acknowledgement of emotional needs alongside physical symptoms).
Conclusion	This real-world evaluation of an NHS intervention for people with severe obesity suggests that individuals who engaged in the programme achieved a moderate weight loss, which most maintained a year later. The limitations of this study include setting, time frame and two-year funding, which meant the service ceased. Longer-term follow-up of a larger group would strengthen conclusions. In addition, more than one-third of participants did not complete the intervention. The challenge of high rates of

	attrition in weight management interventions is widely reported, including drop-out rates higher than 30%. There is a need for further research to understand motivational factors, participant expectations, referral/assessment processes and practical considerations relevant to attrition, as well as how these can be addressed to increase reach and effectiveness of SSM interventions in a clinical setting.
What does this study add	This study adds an evaluation of a specific treatment modality in a real-world clinical setting. It adds to the limited published data around a 'person centred' approach to living with obesity by providing detail on components of the intervention, barriers and motivators and effective methods of intervention delivery. It describes a group intervention with a multi-disciplinary team (MDT) approach integrating dietary and physical activity grounded in a psychological framework resulted in weight loss of > than 5% of initial body weight, which is an important outcome for many LTCs. The results also highlight significant changes in other variables, including mood, binge eating, emotional regulation, increased physical activity, reduced medication and less frequent outpatient and GP appointments. This study highlights the need for robust evaluation and sharing of good practice to continue to improve the effectiveness of SSM interventions in routine care for people living with severe and complex obesity. Participants highlighted they would value longer term follow up and continuation of a holistic understanding of the challenges they faced living with severe obesity (including shame and stigma).
Work IV.	**McCallum M, Cooper B, Matson S, Renwick B, Messeder SJ.(2021) Improving health behaviours in**

	patients with peripheral arterial disease - A pilot study of supported self-management J Vasc Nurs. 2021. Available from: doi: 0.1016/j.jvn.2020.10.001
My role **85%**	I was responsible for the design, conduct, analysis and write-up of the intervention. Co-authors (clinicians) Ben Cooper, Bryce Renwick and Sarah Messeder provided guidance on the design and conduct of the review and provided feedback upon the manuscript prior to submission.
Introduction	The population in the UK is ageing and increasingly sedentary, multi-morbidity is common and medical management is complex. Many adults (42%) in Scotland have one or more long term conditions (LTCs) and 23% are multi-morbid (Barnett 2012). This incidence of morbidity has been shown to considerably increase with age and lower socioeconomic status (Scottish Government, 2015). Peripheral arterial disease (PAD) affects 20% of the UK population aged between 55-75 years (Ratchford 2017). PAD is caused by narrowing of the arteries, leading to poor blood flow causing pain and cramp mainly in the calf. Without proper blood flow, people with PAD are at high risk of developing serious health problems, including heart attack, stroke, and amputation. Increasing physical activity and smoking cessation are recommended for first line treatment for individuals suffering from PAD to improve walking distance and quality of life. The cohort typically seen in the vascular outpatient clinic are those defined as 'hard to reach' with low self-confidence to change health behaviours and long-standing health issues contributing to their diagnosis of PAD such as a history of depression and or anxiety. Over 50% of those seen in the outpatient clinic were smoking, on average, nine cigarettes

	a day at baseline. An important aim of the SSM intervention was to build self-confidence/self-efficacy around living well with PAD.
Research significance	Innovative solutions are required for people with complex health needs who struggle to change their health-related behaviour following information and advice alone. Clear descriptions of process and evaluation methods used in interventions delivered as part of routine care are needed. This pilot study reports the feasibility of a future randomized controlled trial (RCT) investigating the effect of supported self-management through low-intensity psychological intervention for people with PAD.
Methods	The feasibility of the study protocol, measurement instrument, data collection, and analysis were evaluated. Both quantitative and qualitative data were collected to evaluate participant experience and the clinical impact of a supported self-management intervention delivered in a routine clinical setting. Participants (n=41) received an initial one-to-one assessment with the researcher, a health psychologist. 11 participants who were assessed were either not eligible to take part or opted out of taking part in the study. Demographic data and baseline clinical outcome measures were recorded. These included Hospital Anxiety and Depression Scale score (HADS), health-related quality of life questionnaire (EQ-5D-3 L), number of cigarettes smoked daily and weight/BMI. In addition, participants each received an activity tracker to record daily step count and were followed up weekly to provide psychological input, including goal setting, overcoming barriers, and preventing relapse. Quantitative data collection was scheduled at baseline, 3 and 6 months (final follow-up). At the final follow-up, participants provided

	qualitative feedback reflecting upon their experience of the intervention and its impact. Descriptive statistical analysis and simple paired samples t-test were employed in data evaluation.
Results	The sample size was small (n =30). Twenty-three participants were followed up to 6 months. Depression scores improved with statistical significance from baseline to 6-month follow-up, 8 participants stopped smoking (47% reduction) and a further (n=9) greatly reduced their smoking. A borderline statistically significant increase of daily step count was achieved between baseline and 6-month follow up. In addition, positive weight loss trends were observed in a predominantly overweight cohort. The qualitative feedback highlighted participants valued the collaborative way the HCP delivered information regarding lifestyle. Majority of intervention participants living with PAD highlighted they appreciated person centred information with provision of ongoing support and follow-up. Participants were able to link bespoke action plans with what mattered to them, within the context of their everyday life.
Conclusion	This study describes person-centred approach to support self-management which enabled participants to be better able to maintain their health and to manage periods of ill-health. The study highlights key elements of the intervention including, motivational interviewing approach, evidence based behavioural change techniques, provision of ongoing support and follow up.
What does this study add	This study adds to the evidence base by providing detail on components of the intervention, barriers and motivators and effective methods of intervention delivery. This study highlights encouraging results in clinical

	outcome measures including depression and anxiety, smoking cessation, activity (step count), weight and quality of life. It shows the importance participants place on development of a collaborative and trusting relationship with an HCP and the need to facilitate sustainable changes in 'meaningful activity' to the participant.
Work V.	**McCallum M, Dundas P, Mukhopadhya A; Clinical Liver Disease Supported Self-management – tangible benefits in physical and mental health for patients with non- alcoholic fatty liver disease (NAFLD)–2023**
My role 85%	I was responsible for the design, conduct, analysis and write-up of the intervention. Co-authors (clinicians) Pauline Dundas and Ashis Mukhopadhya provided guidance on the design and conduct of the review and provided feedback upon the manuscript prior to submission.
Introduction	NAFLD is a spectrum of liver pathology, strongly associated with obesity, insulin resistance, hyperglycaemia and high levels of fat in the blood. It affects 25%-30% of the population in many developed countries (Dyson et al., 2014). People with NAFLD have increased cardiovascular-related morbidity and mortality, largely because of the association between NAFLD and metabolic syndrome (Hagström et al., 2017). This paper describes a new pathway with a multi-disciplinary approach in a Gastroenterology outpatient setting.
Research significance	The increased morbidity and mortality associated with NAFLD makes it a formidable disease, and one that requires more in-depth analysis (Perumpail et al., 2017). NAFLD has no specific treatment. Lifestyle change aimed at weight loss is the mainstay of clinical management guidelines for NAFLD (McPherson et al., 2022). Yet,

	evidence highlights providing information and advice alone to make lasting lifestyle behaviour change is an insufficient intervention. However, there is very limited evidence of what works in a clinical setting (Rieger et al., 2017).
Methods	One stop/MDT clinic **Primary care input:** GPs carried out chronic liver disease screen, ultrasound and FIB 4. Eligible (Fib 4>1.45) NAFLD patients were offered an appointment at the one stop/MDT clinic. **Liver Nurse Specialist input:** Each patient was seen by Liver Nurse for a fibroscan and advised on treatment of associated metabolic risk factors (diabetes, hypertension and dyslipidaemia). Visual prompts and 3D normal or fatty liver and cirrhosis models were used to make patients aware of how their liver looked. Consultants saw patients at highest risk of developing progressive liver disease. Specialist Liver nurses referred patients for health psychology assessment in the same clinic slot. **Health Psychology input:** Patients underwent an initial 40-45-minute assessment. The session focused on what changes were important to the patient. A person centred/collaborative approach was used to help evoke participant's confidence and autonomy around changing lifestyle behaviours. A tailored plan was developed and self-monitoring strategies including step counters (FITBITs) and goal setting materials were provided. Regular follow up was scheduled over twelve weeks to provide support, motivation, and relapse prevention by phone or email. **Dietetic input:** Tailored dietetic support was available by appointment. The aim of dietetic support was to promote 5-10% reduction of initial body weight.

	Following the initial appointment, patients were only brought back into clinic if they required more tests, a repeat fibroscan and 6-month medical review. Participants completed a baseline questionnaire Hospital Anxiety and Depression Scale (HADS)
Results	From Jan 2020 – Dec 2021, 147 patients, (51% Males and 49% Females), average age 66 years, BMI 41, participated in the one stop/MDT clinic. Majority of patients were sedentary and presented with two or more Long-Term Conditions alongside NAFLD including: Type 2 Diabetes (48%), hypertension (47%), anxiety/depression (34%), chronic pain (16%), fibromyalgia (15%), asthma (10%), and fertility issues (10%), sleep apnoea (9%). In December 2021, 101 patients attended their 3- and 6-month reviews (a dropout rate of 32%). Due to COVID-19 the majority of review appointments were virtual to reduce footfall through the clinic. However, for those, repeat fibroscan and blood results were carried out, (n=51, 50%)) significant decreases in fibroscan, aminotransferases (ALT and AST), HbA1c, fasting glucose, cholesterol measures, anxiety/depression scores and a significant increase in daily step count were noted.
Conclusion	The one stop/MDT pathway was beneficial in terms of improvements in liver and cardiovascular outcomes. The pathway identified people at risk of developing health related problems and ensured they were seen more quickly. The one stop approach brought together a range of health care professionals with different skill sets. A strong emphasis was placed on developing a collaborative relationship with participants. Participants highlighted they valued the person-centred approach of delivery. They reported feeling 'heard and understood' without

	'judgement or blame' for cycles of weight loss and gain. The benefits of this approach included the majority of participants reporting an increase in self-confidence/ efficacy in terms of making lifestyle changes. The majority of participants reported that they found the step counter useful and enjoyed monitoring and reporting back their 7-day average step count to the Health Psychologist. They cited being a sense of being 'in control' and being held accountable for their activity levels was helpful. The benefits of increasing physical activity without associated weight loss should not be underestimated in terms of cardiorespiratory fitness, wellbeing and quality of life. Participants reported that the addition of a Health Psychologist led to more sustainable change than information and advice alone. The key skills of the Health Psychologist included: good communication, reflective listening skills and empathy for patients; current knowledge about CVD risk factors, healthy lifestyle recommendations and contraindications for particular groups; understanding of theories of behaviour change and contextual factors that influence behaviour change.
What does this study add	This study adds to the evidence of what works to support self-management in routine care. There is paucity of research in NALFD to examine the efficacy of lifestyle intervention. This study highlights tailored advice and regular follow up should be provided using a collaborative approach and with a focus on building a relationship with the participant. This study highlights the need for longer term follow-up, with a qualitative focus on what matters to people living with NAFLD to help them better self-manage and cope with their LTCs.

More detail is provided in the following section.

3.3 Developing and describing the SSM interventions

3.3.1 Characteristics of participants

Typically participants who engaged in the SSM interventions across works (I-V) had longstanding difficulties to changing behaviour, including two or three co-morbid LTCs, poly pharmacy, sedentary lifestyles, high body mass index (BMI) and low self- confidence to change health behaviours. They often reported having tried and failed to make changes many times and feeling 'stuck'.

The mean age of patients referred was 55 years with a BMI >35. The majority of participants lived in Aberdeen City (60%) with 33% from Aberdeenshire and 7% from Moray. The distribution of referrals across Scottish Index Multiple Deprivation (SMID) areas is shown in Figure 2 below. Fewer referrals come from the most deprived SMID area 1 than expected, however, this broadly reflects the socioeconomic distribution of the population and the rural nature of Grampian as a whole.

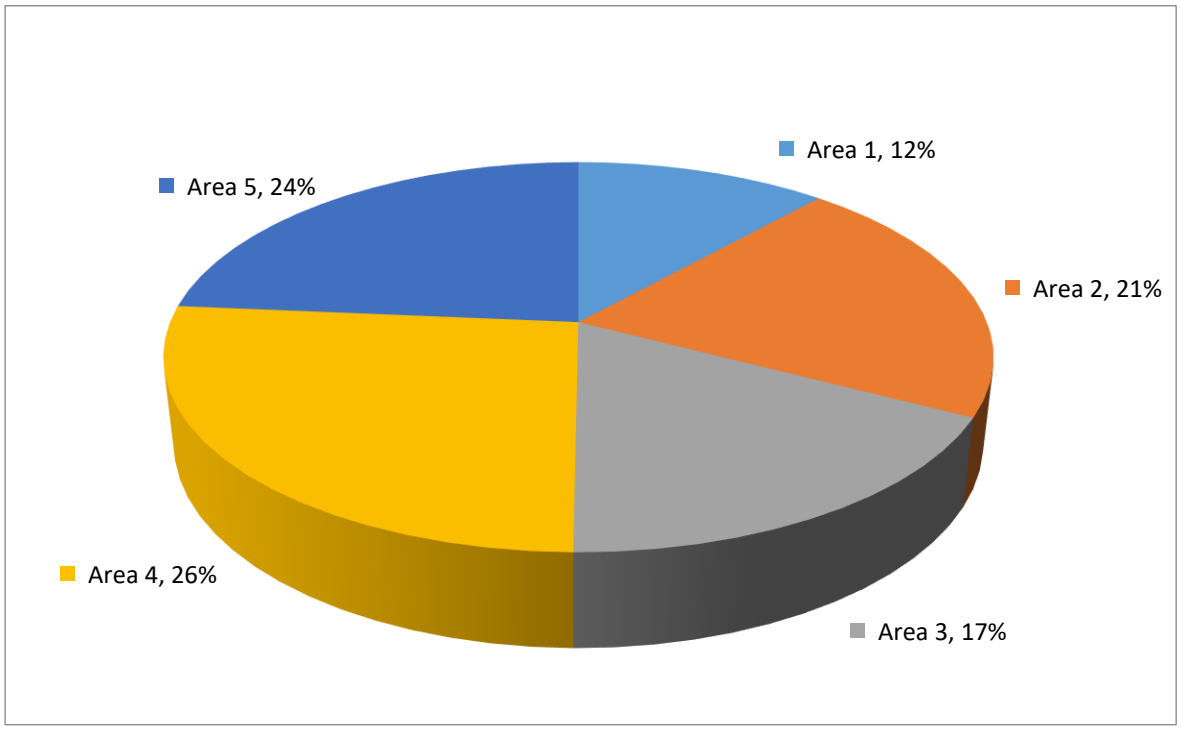


Figure 2 Areas of referal, Scottish Index of Mutiple Deprivation

3.3.2 Embedding SSM intervention in routine care

The approach was embedded as part of routine care using a similar pathway in each service: Diabetes, vascular, weight management and gastroenterology (work V new pathway section). Figure 3 provides an example of the non-alcoholic fatty liver disease pathway.

The key common elements of the pathway were initial assessment with each participant to ensure they needed and, crucially, wanted ongoing self-management support. Methods of contact and periods thereafter varied across each of the works but always included developing a tailored plan for each participant; scheduling in time for follow up/review and repeat of baseline measures.

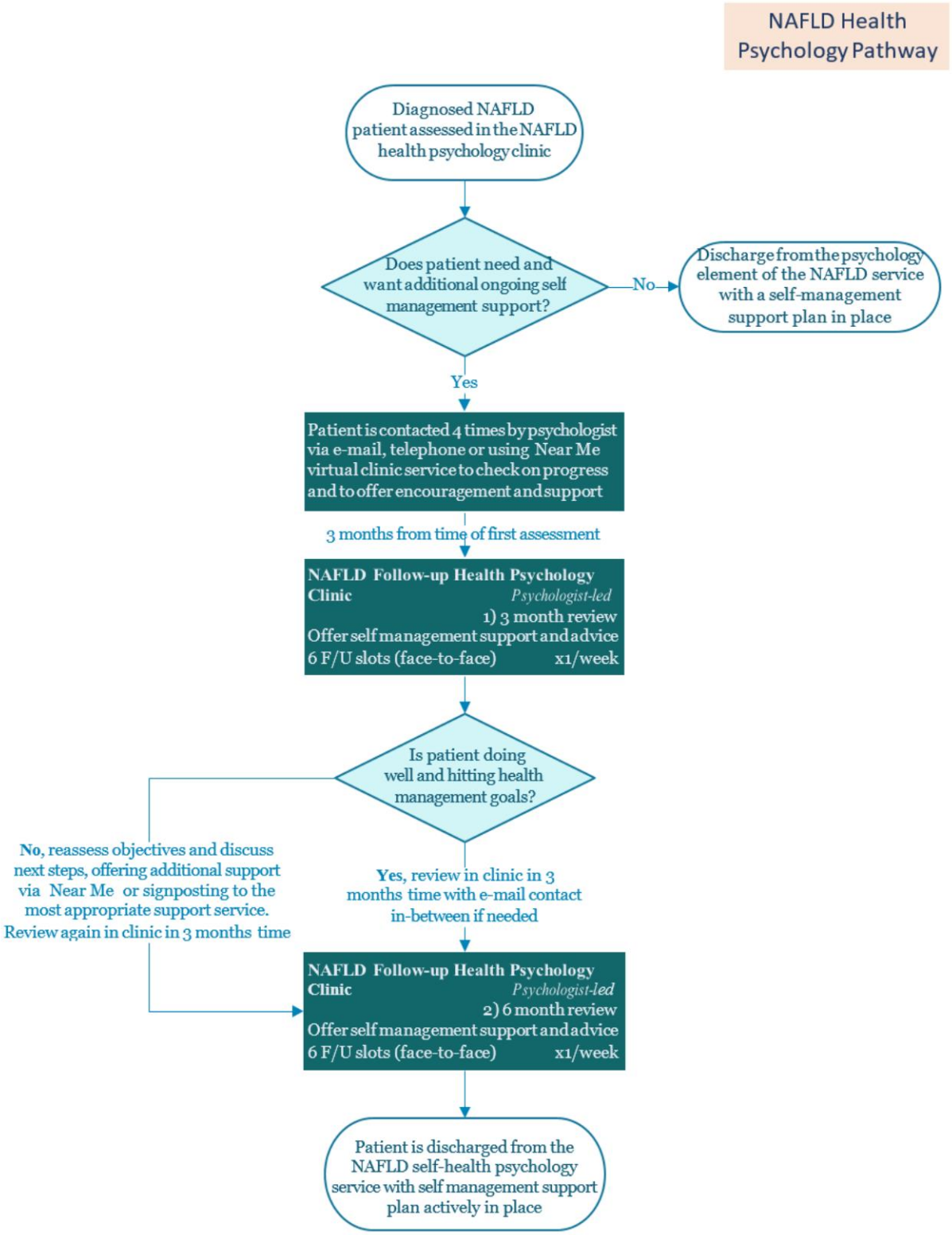


Figure 3 SSM intervention pathway - Gastroenterology

3.4 Methods

In works I, II, IV and V (table 6) I developed and refined a guiding template for assessment appointments and follow-up to ensure consistency for each participant and to enable other HCPs to replicate my approach.

This template was designed as a guide to be flexible and adaptable to the needs of the participant. It drew from exercise consultation guidelines and practice Loughlan and Mutrie., (1996); McCallum, nee Farnham and Mutrie (1998) and subsequent updated physical activity consultation guidelines (Kirk et al., 2009). (Work II, description of physical activity consultation service). I refined the format for each of the SSM interventions I delivered across different hospital-based outpatient clinics. Further discussion of what this adds to the field of SSM is explored in chapter 4.3 and 4.4.

3.5 Mode of delivery

I conducted each one-to-one assessment appointment (lasting around 45 minutes) with participants, I am a qualified Health Psychologist trained in motivational interviewing, safeguarding and psychological skills. In works (I-IV) all assessments were in person at hospital-based outpatient clinics. In work (V) appointments were online (due to Covid-19 restrictions).

The initial assessment consultation was followed by on average four shorter follow-up consultations delivered via participants' chosen method of contact (face-to-face, video call, telephone, or email)

Follow-up consultations were participant-led and varied in format and duration (approximately 20 minutes per follow up) depending on stage of change and the level of support required.

These follow-up appointments were offered every two to three weeks with decreasing frequency of contact over time, depending on individual needs. During these appointments, I reviewed participants' progress and goal setting, discussed strategies for motivation, and explored strategies to cope with any difficulties or barriers arising in the context of behaviour change. I tailored the

sessions around the requirements of each individual, and considered their specific circumstances. These included social and economic issues, complex physical and mental health co-morbidities, low self-esteem, poor body image, relationship difficulties and the impact of time constraints on lifestyle changes. Throughout these appointments, elements from Acceptance and Commitment Therapy (ACT) Compassion Focussed Therapy (CFT) and Cognitive Behavioural Therapy (CBT) (Gilbert et al 2014; Jurascio et al., 2010) were utilised, including values, choice points, metaphors and mindfulness techniques psycho-education and self-management advice were also offered when appropriate (See table 15, Chapter 4). After each appointment, a short letter was sent to the patients' GP in order to provide them with an update on their patient's progress.

3.6 **Follow up and support**

In works (I-V) I provided regular follow-up to check in with participants and review their progress, provide support, motivation, and relapse prevention.
To ensure messages on modifiable risk factors were understood, I sent follow-up emails to each participant with links to a website developed in-house (by dietitians and with input from myself and psychology colleagues) to support weight loss and physical activity[4]:
I developed a goal booklet (alongside psychology colleagues and graphics team) which was posted to patients with additional information as required e.g., smoking cessation services for smokers, or local opportunities to be active.
Novel strategies were used to encourage active participation which included digital resources such as visual clips, videos, workbooks and, food and mood diaries (see work V lifestyle/health psychology input section).

[4] Healthy Weight Grampian webpage
https://www.healthyweightgrampian.scot.nhs.uk.

3.7 Resources

Across works (II-V) participants were given a step counter to aid self-monitoring of daily activity. Step counters were funded via NHS Grampian Charity Endowment Funding and Paths for all funding (see work II and IV resources section).

3.8 Community support

Strong links were established with local third sector providers across Grampian, in particular, Sport Aberdeen, Aberdeen Football Club Community Trust, Grampian Cardiac Rehab Association, Moray Leisure and Community Food Initiative North East (CFINE). Participants were signposted to physical activity opportunities and food co-operatives within their community as appropriate (work II issues regarding implementation section and work III patient pathway section).

3.9 Evaluation

A robust model of evaluation was established for each of the works, an example of the logic modelling approach used for work III is detailed in Appendix 5.

A mixed methods approach was utilized to gather quantitative and qualitative data to provide more confidence in outcomes and allow consideration of the wider context of people's lives (chapter 4.4.4).

As highlighted in Chapters 1 and 2 and table 6, there is a paucity of research from the perspective of people living with LTCs. Thematic analysis of qualitative feedback from works (I-V) gathered lived experience and reflected upon what matters to people living with LTCs. Quantitative data was used to compare results across different cohorts. Quantitative data was used to compare results across different cohorts.

The next sections detail the quantitative and qualitative measures, methods of analysis and results.

3.10 Outcome measures

The outcome measures selected, were linked to relevant clinical targets in diabetes, weight management, vascular and gastroenterology services, which helped to facilitate 'buy in' from relevant HCPs and consultant colleagues. For example, HbA1c blood glucose outcomes were recorded (works II and V) and fibroscan scores (V). The evidence was reviewed to select appropriate measures of psychological functioning and wellbeing.

3.11 Results

Table 7 provides a synthesis of results across the five studies and compares data for common measures or behaviours. It specifies which studies are included and the number of individual participants who completed repeat measures at 6 months.

Table 7 Synthesis of results across works (I-V)

Measure	**Work 1**	**Work II**	**Work III**	**Work IV**	**Work V**
Numbers completing measures (6 months)	9	40	60	23	51
HADs Anxiety (Mean and SD)	Pre 7 Post 5.5	Pre 5.6 (3.8) Post 4.7 (3.2)	Pre 9.4 (3.91) 7.6 (3.83)	Pre 5 Post 3	Pre 8.3 (7.7) Post 6.3 (4.2)
Significance P<0.05	No data	No data	P= 0.001	P=0.15	P=0.00

Measure	**Work 1**	**Work II**	**Work III**	**Work IV**	**Work V**
HADs Depression (Mean and SD)	Pre 4 Post 4	Pre 5.1 (3.7) Post (2.7 (2.1)	Pre 8.0 (3.75) Post 5.3 3.66)	Pre 3 Post 2	Pre 6.1 (10.6) Post 3.9 (6.3)
Significance P<0.05	No data	No data	P =0.001	P=0.03	P=0.01
Hba1c (Mean and SD)	Pre 89 Post 80	62.6 (15.5) 61.4 (16.4)	No data	No data	60.0 (15.5) 55.0 (13.7)
Significance P<0.05	No data	No data	No data	No data	P=0.06
Daily step count	No data	No data	No data	4200 (median) 5125 (IQR) 5000 (median) 5518 (IQR)	2234 6193
Significance P<0.05	No data	No data	No data	P=0.09	P=0.00

Positive changes in psychological and well-being outcomes were noted in works I-V. Of note was a significant decrease in average anxiety and depression scores pre and post intervention across works (III-V), apart from anxiety scores in work IV.

3.11.1 Psychological and quality of life measures

Standardised measures to record changes in psychological distress, self-efficacy, emotional regulation and quality of life were used across works (I-V) during the assessment phase and at the end of the intervention. Full descriptions of all the measures used and why are included in Appendix 4.

3.11.2 Clinical markers

Clinical markers were measured as appropriate for each of the studies as illustrated in Table 7 & 8.

Clinical markers were monitored by tracking changes in blood results taken routinely in primary or secondary care. If blood results were not undertaken as part of routine care within 3 months of the start or end of the programme, participants were asked to request a blood test from their GP practice. Inevitably this meant information was not as consistently available or reliable as it would have been if blood tests were undertaken within the outpatient clinics. However despite smaller numbers with repeat measures than intended, the results suggest significant improvements in clinical markers.

Table 8 Clinical markers

Work	Markers	Baseline (mean & SD)	6 months (mean & SD)	Significance P=<0.05
Work V	Liver stiffness (kPA)	14.8 (14.0)	11.25(8.7)	P=0.07
Work V	Aminotransferases	ALT 72.6 (39.4) AST 50.2 (23.1)	ALT 48.9(22.8) AST 39.6 (17.3)	P=0.02 P=0.004

3.11.3 Statistical analysis

Statistical analysis (paired t test) were performed using SPPS version 16.0 and the criterion for statistical significance was p <0.05. However, the studies were not powered to detect effect, as they were pilot studies in a real world clinical setting for exploration and evaluation.

3.11.4 Self reported weight

Self-reported weight decreased across four of the works but not to statistical significance, see table 9.

Table 9 **Self reported weight**

Work	Work I	Work II	Work III	Work IV	Work V
Self-reported weight Baseline & 6 month follow-up	No data	96.5 kg (19.7) 86.4 kg (29.4)	133.9 kg (32.02) 133.7 kg (33.01)	86kg 85kg	113.6 kg (25.7) 107.7 kg (23.4)

3.11.5 Dietary changes

Participants were regularly asked to record and report dietary changes. The majority reported:

- Reduced portion sizes (69% in work III.).
- Change to meal planning/regular meal pattern (61% in work III).
- Increased fruit and vegetable intake (43% in work III).

Other reported dietary changes include reading food labels, increased water intake, changed shopping habits, planning healthier snacks, reduced takeaways, cooking more from fresh, increased variety in diet, reduced alcohol, reduced fat intake and reduced sugar intake.

3.11.6 Smoking status

Number of cigarettes smoked daily was only recorded in work IV (as smoking is a key modifiable risk factor for PAD). The number of cigarettes smoked daily reduced significantly from 6 to 0 (p=0.01).

3.11.7 Physical activity

A noteworthy outcome across all works (I to V) was a statistical increase in physical activity as highlighted in table 10.

Table 10 Physical activity outcomes

Work	Physical activity outcomes reported by participants
1	Increase in self-reported physical activity in each case study.
II	Percentage of participants meeting physical activity recommendation increased from 14.6% at baseline to 68.8% at 6 month follow-up and 78% at 12 month follow-up.
III	93% of participants reported that their activity level had increased since starting the programme at the end of 6 month, and 80% continued to say this at 12 months.
IV & V	Increases in daily step count were recorded and reported to the Health Psychologist from 4200 to 5000 daily steps (between 3 and 6 months in work 4 and from 2234 at baseline to 6193 daily steps in work V.

Further discussion of these results is provided in Chapter 4.2.4.

3.11.8 Adherence

I recorded drop-out rates (see table 11) because despite the evidence on the potential benefits of SSM, not enough people living with LTCs engage in interventions and when they do drop-out rates are high.

3.11.9 Summary of intervention processes across works I-V

A summary of the intervention processes across works I-V is provided in table 11. This includes information on; participant characteristics, recruitment; study engagement including number and duration of appointments, drop-out and follow-up.

Table 11 Summary of intervention components across works (I-V)

Intervention Component	**Work I**	**Work II**	**Work III**	**Work IV**	**Work V**
Participant characteristics	Adults T1DM	Adults T2DM	Adults Obesity	Adults PAD	Adults NAFLD
Average age (in years)	40	59.5	47.5	60.5	66
Gender M male F Female	42% M 58% F	51% M 49% F	20% M 80% F	70% M 30% F	51% M 49% F
Setting in secondary care	Diabetes outpatient clinic	Diabetes outpatient clinic	Specialist Weight Management Service	Vascular outpatient clinic	Gastroenterology outpatient clinic
Method of recruitment	Leaflets and posters in clinic DSN and Consultant in clinic and self-referral	Leaflets and posters in clinic and 2 GP practices, newspaper and radio Self-referral	Referral by HCPs (GPs & secondary care)	Leaflets and posters in clinic Vascular nurses and Consultant in clinic	One stop clinic referral by Liver nurses and consultants
Mode of delivery	One to one	One to one	One to one & group	One to one	One to one

Intervention Component	**Work I**	**Work II**	**Work III**	**Work IV**	**Work V**
Style of delivery of initial assessment	Face to face (F2F)	F2F	F2F	F2F	F2F & virtual
Length of initial appt	45 mins	30 mins (increased to 45 mins)	45-60 mins	50 mins	45-60 mins
Frequency, length of follow-up appts	Patient led Weekly 7 sessions 30 mins each	Patient led Monthly 5 sessions 10 mins each	Group sessions Fortnightly 12 x 2 hour group sessions	Patient led Weekly then decreasing in frequency 4-8 sessions 30 mins each	Patient led Weekly then decreasing in frequency 4-8 sessions 30 mins each
Review and repeat of baseline measures	8 weeks	6 & 12 months	6 &12 months	6 months	6 months
Duration of intervention	8 weeks	12 months	12 months	6 months	6 months
Mode of follow-up	Face to face (F2F)	F2F & telephone	F2F & telephone	F2F, telephone & email	F2F, telephone & email
MDT input	Diabetes specialist nurse and Health Psych	Health Psych & nurses in clinic	Health and Clinical Psych & Dietitians & Physiotherapist	Vascular nurse specialist and	Liver Nurse Specialists dietitian and Health Psych

Intervention Component	Work I	Work II	Work III	Work IV	Work V
				Health Psych	
Number attending assessment appointment	19	92	353	41	147
Number engaged in at least 2 sessions	17	89	166	30	147
Number completed 4-8 sessions	14	81	98	23	*101
Drop-out rate	47%	12%	59%	47%	31%

*This number was lower than anticipated but due to Covid-19 the majority of review appointments were virtual and repeat measures including fibroscan and blood results were not being done in clinic.

3.12 Feedback from participants and HCPs

Feedback from participants was gathered independently by assistant psychologists and research assistants via focus groups, interviews and Care Opinion. Prior to commencement of each focus group, participants were informed the interviews would be tape-recorded, but any information given would be confidential and would not affect their future care with the NHS in any way. HCPs (including GPs, service leads, specialist nurses, consultants, dieticians, trainee Health Psychologists and trainee Clinical Psychologists) were also interviewed independently by assistant psychologists and research assistants (via telephone interview or face to face) to gather feedback about why they felt the interventions worked (or not) when delivered in routine care.

Braun and Clarkes (2006) process of thematic analysis was followed to analyse qualitative data. This analysis adopted an inductive approach whereby themes and sub-themes were generated from the data and were not composed through

a particular theoretical lens. (See work II description of the process evaluation; work III data collection; work IV data analysis).

Table 12, 13 and 14 details emergent themes from participants and HCPs.

Table 12 Emergent themes from participants about what they thought worked

PARENT THEME	SUB-THEME	QUOTES ABOUT WHAT WORKED
Feeling heard and understood	Telling their story	"Clearly it was being taken very seriously. It was being recognised that this is actually deep-rooted, it's psychological in nature, not just physical" (work III). "I think the first thing you did was make me feel comfortable, the pressure was taken off" (Macdonald- Gibb et al., 2021 in Appendix 1. "Really positive and felt it was helpful talking things through with people who understand more than family" (work I).
Moving on from feeling stuck	Feeling a sense of hopelessness and loss of control	"Em, I just had so much problems going on, that I didn't know how to cope with, and eating was the only comfort I had" (work III). "I mean…just sheer desperation, going to GP in tears, "Please help me" sort of thing" (work III). My Dad's diabetic, I'm now diabetic, on insulin…and I've seen my Dad, he's lost a leg with his diabetes. I can see me like that

PARENT THEME	SUB-THEME	QUOTES ABOUT WHAT WORKED
		now in 5 or 6 years' time if I keep going the way I was and I can't do it. I've got two new granddaughters and I want to see them grow up. And I just thought "Nope" (work IV). I'm thinking, "How am I going to approach this in the New Year? What am I gonna do? Is it going to be Scottish Slimmer's again? Or Slimming World? What is it gonna be?" I'm starting to feel out of control" (work V).
Increased confidence to change behaviour having tried and failed many times before	Not feeling judged	"It has made feel more confident and that I'm not alone in having weight issues that go beyond the 'try to eat less and exercise more'" (work V). I was not being belittled and judged and patronised, it was more about your relationship with food...making me think and giving me more awareness" (work III). "Helped improve my confidence and self-esteem, I feel there has been a vast improvement in all angles" (work I). "My situation hasn't changed, but I know that I can cope with them, without it affecting….times are difficult, but then you just think, "Well, you get past stages, and it's just life, you've got to cope with things".

PARENT THEME	SUB-THEME	QUOTES ABOUT WHAT WORKED
		But I know that when I'm able to, I'm fine and I get going. When I can't….I just don't beat myself up about it now" (work III). "You may go off the rails a little bit or something, but you can get back on them again. Before you'd feel guilty" "But the difference is, now, I can manage to look at it as "I'm going through a bad time; things'll get better, and when things get better, I can take control of myself again". I can see that, whereas I would've just gone completely down before" (work III).
Building a shared way forward	Using humour to cope and think about their strengths	"I'm on twa (two) Asda bags full of pills" (work II). "It helped me become more confident, went over concerns of mine. Made me feel I could stand up for myself, know strategies to help myself" (work I).
MDT/ combined approach	Psychology working with other members of the team	"I liked the dietary / psychology mix, very insightful" (work III). "I thought it was very educational, the Dietitian I spoke to went through all the sugars and the carbs, and then the psychology as well, really worked for me" (work V). "I think for me personally, with the issues I was coming with….there was more about the psychology and the behavioural change and

PARENT THEME	SUB-THEME	QUOTES ABOUT WHAT WORKED
		the thought processes that I found very, very useful" (work III).
Flexible follow-up allowing participants autonomy over their preference for support	Follow-up via phone call, email, face to face to video call	"If I needed to, I'd just ask, and they would send me out an email, so I could contact them at any time" (work III). "For me it was a lifeline, it helped me a lot" (work IV).
Provision of resources including step counters and being held accountable	Step counters, step diaries and reporting back 7 day average step count to Health Psychologist was thought to be informative and motivational	"You learn more about yourself. I didn't realise I did that, that's a habit, you don't realise the habits you've been doing for years" (work I). "While I used to neglect myself, now I shower daily and get dressed instead of staying in my pyjamas... speaking with you helped me to be more accountable and reflect on my emotions and behaviours rather than ignoring them" (work V).
Signposting to community resources	Helpful to know what was available in my community	"I walk more than I used to I am much more disciplined about going to the gym" (work V). "I focus on its (activity) importance" as a result of the programme" (work IV).
Good quality resources and materials	Goal booklets, handbooks, food and mood diaries, Healthy Weight Grampian	"Yeah, they're good to look back on. I look at mine now and again. I think its good quality, its good quality print. I work in education, you feel valued you know what I mean when you get a decent book! When you get old photocopied handouts, you tend

PARENT THEME	SUB-THEME	QUOTES ABOUT WHAT WORKED
	website were all considered useful	not to keep them the same but with something good, you tend to go back to it" (work III).
Relationship with the Health Psychologist, their skills and expertise.	Approachability and helpfulness of person delivering the intervention such as friendliness and empathy	"She was a lovely woman, so nice and made me comfortable to open up. She got to the root of my problems" (work IV). "Very much worked for me. Only a good thing as far as I can see. I am grateful for it, it really hit home. The psychologist has been my sounding board. Being able to share what I was thinking and feeling was genuinely cathartic. I couldn't talk so openly with anyone else not even my sister or nieces" (work IV). "To be able to talk to someone was really helpful. I felt I had good rapport with the psychologist, it's genuinely been of benefit to me" (work V). "She helps you realise what's troubling you" (work IV). "I've got loads of really close friends, but no-one else gets it. There's no-one around me that gets it" (work III).
Length of intervention	Just right	"Everything I wanted to know was covered. The length of meetings was just right" (work III).

PARENT THEME	SUB-THEME	QUOTES ABOUT WHAT WORKED
Ease of referral		"So while I was at the rehab, the exercise part, after you've had a heart attack, they suggested Weigh Forward, and they actually referred me" (work III). It was actually last September it hit me I needed to do something, and I went to see my doctor again and I got someone to consider putting me forward…something to help me lose the weight. And she goes "Yeah, no problem" and she knew about Weigh Forward and she put me forward for it. So it was good" (work III). "I just got told I could come along by the nurse in the clinic" (work V.

Table 13 Emergent themes from participants about what did not work

PARENT THEME	SUB-THEME	QUOTES ABOUT WHAT DIDN'T WORK
Length of intervention	Not long enough	"I would have liked to have sessions carrying on for longer than 6 months because it's not something that was a quick fix, when that has been your way of life, it takes a long time to shift

		your mind set about it" (work III).
Parking		"I turned up for the session, but had to go away again as I could not find anywhere to park at the hospital" (work III). "Parking was a nightmare" (work IV).
Timing	Hard to get to face to face sessions	"I think it was just time…Last week I was working Saturday, Sunday, then Tuesday, Wednesday, Thursday, Friday, so it's really hard getting that time to do it. And when I'm off, I'm too tired" (work III).
Short term funding		"This is the first thing that's helped me…and I feel like my lifeline is gone now. Feel like I'm treading water now, cos there's nowhere else to go" (work III). "I'm just gutted that it's finished cos, there's somewhere to go if you've got a drink

		problem and people that've got a drug problem...and you've got people like me, where food is their escape, and that's being taken away" (work III).

Table 14 Emergent themes from HCPs about what they thought about the SSM interventions

PARENT THEME	QUOTES ABOUT WHAT WORKED
High quality of SSM intervention	"The pilot has been of highly significant benefit to NHS Grampian patients, we have found the patients who have engaged to be much better prepared for bariatric surgery than those who have not gone through Weigh Forward. Patients have had the opportunity to address the underlying issues associated with them having become obese, and are in a better position to take on board the significant lifestyle changes that bariatric surgery entails. Furthermore, for those patients who do not progress to bariatric surgery, engagement with the Weigh Forward service offered a very beneficial intervention in its own right, allowing patients the opportunity to make long term changes to lifestyle, improving not only their weight but also other measures of health, especially around psychological wellbeing". (Clinical Lead)
Provided service where previously there had been a gap	"Before the service existed, we received large numbers of referrals for patients who were being referred simply because, having engaged with what Community

PARENT THEME	QUOTES ABOUT WHAT WORKED
	Dietetics has to offer, there was nowhere else for them to be referred if they required more intensive support. Many of these patients often came to our service without having had the opportunity to address the underlying issues that led to them becoming and remaining obese" (Clinical Lead)
Good integration within service and with other aspects of routine care	"The service integrated well with current diabetes care" (Consultant Diabetologist) "Mary shadowed key members of the team and got to know us all, she attend regular staff meetings in primary and secondary care." (Consultant Diabetologist) "It did not operate as a stand-alone service" (Nurse)
Expertise of person delivering the intervention	The clinic provided a structured, safe space to information-gather and guide patients towards making individualised, tangible health-related goals to work upon between sessions. Motivation was built by inviting patients to think about why they wanted to make these changes. The sessions were clearly productive in defining goals and providing accountability to follow up with these health behavioural changes: through review sessions and check-in emails (Trainee Clinical Psychologist)
Increased knowledge and confidence of wider MDT about SSM	"Positive patient feedback was received" (Nurse) "One to one support delivered in person was beneficial for individuals requiring additional support to change their behaviour" (Vascular Consultant) "I am aware of the need to promote physical activity and provide tailored information but I often struggle in short diabetes consultations and I don't have the

PARENT THEME	QUOTES ABOUT WHAT WORKED
	confidence to do it effectively"(Diabetes Specialist Nurse)
Ease of referral	"Referral to the service was not time consuming" (Diabetes Specialist Nurse)
Flexible follow-up	" The flexible follow-up by telephone or email or face to face allowed patients to have autonomy over their preference for support and allowed recruitment to the service to continue at a comfortable rate without creating a back-log of participants waiting for face to face appointments" (Health Psychologist)
Quality resources	Comprehensive patient handbooks were developed covering dietary, psychological and physical activity components to support both group and individual interventions. Fitbits and pedometers were purchased to help patients self monitor activity levels (Dietitian)
Good links with third sector organisations	Strong links were established with local third sector providers across Grampian, in particular, Sport Aberdeen, Aberdeen Football Club Community Trust, Grampian Cardiac Rehab Association and Moray Leisure. Physical activity components were included within the session. For example a physiotherapist was filmed demonstrating a seated exercise routine so a 'virtual physio' could be used during group sessions. Staff from Sport Aberdeen and Moray Leisure attended some group sessions to provide information about classes and GP referral schemes available. Patients were signposted to physical activity opportunities within their community. (Dietician)

3.12.1 Recognising participants strengths and assets

Participants cited increased confidence in their ability to make and sustain lifestyle changes and cope with the challenges of living with LTCs.

> "I learned about being good to myself, and to take control of my life".

> "You gave us choices, not reprimands". (Work III).

Working alongside an individual, recognising their strengths/assets and acknowledging their context and challenges was a key theme and is discussed further in Chapter 4.2.

Building a shared way forward also applies to HCPs as illustrated by these quotes from a dietitian and a GP who referred people to work III.

> "I have found it really useful being able to refer onto psychology, the letters she writes back are very useful to me to get a real feel of what is going on with the patient." (Dietitian)

> "Obesity and its complications underpin a very high proportion of Primary Care activity. Disease specificity includes Type 2 diabetes mellitus, hypertension, musculoskeletal problems and mental health problems such as anxiety and depression. It also impacts more generally with regards to adverse health outcomes through negative impact on wider well-being factors such as physical activity and employability. For many people, the adverse effects are compounded by co-existence of these impacts resulting in a spiral downwards in their health and subsequent high level of health and care needs. Whilst lower level inputs to support weight management need to be prioritised (particularly at an early stage), there will always be a cohort of patients for whom these have limited benefit. Within this group there are a smaller, but increasing number with more severe obesity who consume considerable Primary Care resource currently and for whom the trajectory of need rises with time. A significant proportion of this group struggle to make progress with weight management due to a combination of the physical debility already experienced and of significant psychological difficulties either arising from, or contributing to their obesity. Management

of these psychological aspects, within a focus of self -empowerment, doesn't just help weight management but also co-existent health and well-being difficulties" (GP).

In summary, participants and referring clinicians valued the holistic approach which offered compassionate support and acknowledged emotional needs alongside physical symptoms.

3.13 Summary of chapter 3

Chapter 3 is the key chapter of my thesis which provides a synthesis of how works (I-V) connect. All works were conducted in busy outpatient clinics in a hospital setting, each describe SSM interventions which are person-centred and collaborative in their approach, using motivational interviewing skills to develop participants' confidence and coping skills.

Table 6 provides details extracted from each of the works around research significance, methods, results and what each study adds to the field of SSM in routine care. This chapter provides a consolidation of components I found effective whilst delivering successful SSM in real world clinical settings.

My works evidence evoking participants own reasons for making changes using a motivational interviewing approach was effective in facilitating lifestyle change despite many challenges faced by participants. Statistically significant change across a range of outcomes including clinical markers, psychological wellbeing and quality of life was demonstrated. A notable outcome was developing self-efficacy around increasing physical activity levels.
Works (I-V) also describe how I successfully embedded SSM as part of routine care in busy outpatient clinics and highlights specific components of the interventions including evidence based BCTs and a guiding template I would replicate in further research.

In the final chapter 4, I draw my narrative to a close with discussion and synthesis of the common themes of works (I-V) and my wider works (appendix 1). I highlight strengths and limitations of the works and make recommendations for future practice and research to help people live well with their LTCs.

Chapter 4 Discussion

4.1 Introduction

The previous chapter outlined the golden thread of works (I-V) highlighting how they were embedded in routine care and detailed specific effective components. This chapter synthesises the findings of all five studies and the original contribution to knowledge this PhD by public output has provided. It pulls together the answer to my research question and details the guiding template I developed (alongside colleagues) which maps effective components of my interventions onto theoretical constructs and behaviour change techniques (table 15). It discusses strengths and limitations of the works and makes recommendations for future research and practice. It concludes with my personal reflection of completing this thesis and the works within.

4.2 Synthesis of findings

Across works (I-V) several common themes were observed.

4.2.1 Person-centred approach

Across interventions (I-V) working alongside the individual, acknowledging their strengths and their contextual issues, including socio-economic and personal factors was key to facilitating specific behaviour change (such as increased physical activity levels). It was important to start with what each person felt they had the capacity to change, even if that was just getting showered and dressed each morning. Feedback from participants highlighted being heard, understood and having the full context of their lives considered, not just their health condition, was important. Taking time to formulate/explore the reasons people were feeling stuck, encouraging them to generate their own solutions for change and developing a tailored plan with follow-up and support. Participants cited they valued ongoing dialogue and support around lifestyle change which reflected their lived experience and unique challenges of living with LTCs.

In essence this approach, defined by (Entwistle et al., 2018) as the 'capabilities approach' is about treating 'patients' as people, acknowledging their sense of self, taking their values, beliefs, social context and living environment into account. In my experience people rarely respond positively to feeling forced, coerced, or shamed into changing behaviour. It's not just about being able to listen but also about asking the right questions to allow a person to articulate their story. The capabilities approach has been supported widely in the literature because it places the participant at the centre, as an expert of their own experience and equal partner in the planning of their care and support. (Moos and Holohan 2007; Entwistle et al., 2018; Cunningham et al., 2014).

4.2.2 Developing self-efficacy to change behaviour

As highlighted in Chapter 2, developing self-efficacy is a core concept for most behaviour change frameworks (Bandura 1977). Self-efficacy can be defined as, "a person's belief in their capabilities to successfully complete a course of action such as increasing their activity levels or changing eating habits" (McAuley and Blissmer, 2000).

When someone is adjusting to having a LTC their confidence can be low. They may feel they have lost their sense of self (Entwistle et al., 2018). Particularly if they are unable to work or carry out roles they used to do, which leads to the importance of context.

4.2.3 Importance of context

Evidence highlights (see chapter 1.5 and 1.6) that people living in lower socioeconomic communities are more likely to be living with LTCs and maybe struggling with complex and interconnected challenges which can lead to difficulty in adhering to advice from HCPs, pushing lifestyle change to the bottom of their priority list (Chapter 1.5 and 1.6).

4.2.4 Motivational interviewing

Across interventions (I-V), I used motivational interviewing (MI) skills to evoke participants own reasons for changing behaviour. MI is defined by Miller and Rollnick (2022) as a client centred counselling style for eliciting behaviour change by helping people to explore and resolve ambivalence. Key skills include: understanding a person's reasons for change; listening to their barriers or solutions for change; empowering people to believe they can change (De Almeida Neto 2017).

Miller and Rollnick (2022) highlight that people are far more likely to believe something if they hear themselves say it. In the guiding template (table 15) key questions included: Why do you want to change? What do you hope to be different in six months' time? What solutions can you think of to overcome barriers? Thus asking the participant to think about their own reasons and solutions for change.

4.2.5 Physical activity

A notable outcome across works (I-V) was a statistical increase in physical activity levels (Chapter 3.11.7). This finding is worth highlighting because many participants had significant barriers to increasing their physical activity, for example at a wider structural level, lack of opportunities to be active with limited access to community sport facilities and at an individual level weight and mobility issues (work III, participants had an average BMI 48; average weight 133kg (21 stones) and maximum weight 276kg (42 stones).

Plans to increase activity levels were tailored around each individual. Evidence from the literature and works (I-V) suggest that personalised plans are more effective in producing behaviour change than generic.

In practice, walking was the most common activity promoted in works (I-V). As highlighted in Chapter 2, walking is a convenient, safe activity which most people can do, without requiring expensive equipment or use of facilities.

4.3 Original insights of this thesis

This section refers back to the primary aim of this thesis (Chapter 1.9) which was to contribute to the evidence base of how to deliver behaviour change and SSM as routine clinical practice in a secondary care setting and my research question "what are the specific components of successful psychological interventions delivered in routine clinical practice to support self-management for people with long-term health conditions in secondary care contexts".

Works (I-V) evidence the specific components I found effective whilst delivering SSM in real world clinical settings. Firstly, I found a person-centred approach was a key enabler to effective SSM. My works demonstrate I had greater success in changing behaviour when I tuned into what matters with each participant and drew out reasons for making changes using a MI approach. Secondly, measuring outcomes that mattered to participants was important, whilst behaviour change is without doubt challenging, I was able to demonstrate significant change across clinical, psychological wellbeing and quality of life outcomes. Of note was development of self-efficacy around increasing physical activity levels. Thirdly my works describe which specific theory based components I found effective and how I worked alongside HCPs to integrate health psychology into an MDT pathway to embed SSM as part of routine care.

4.4 How this thesis adds to the body of knowledge

The next section summarises how this thesis adds to the body of knowledge about how to embed SSM in a meaningful and sustainable way. A guiding template was developed to help deliver the interventions. This is detailed below and describes the specific components I found effective in routine care. To aid generalisability these components are mapped onto underpinning theoretical constructs and behaviour change techniques.

Table 15 Guiding template for SSM interventions delivered in routine care with techniques

Template questions	**Techniques**
Introduce self, thanks for coming along, today is really an information gathering exercise. We are going to talk about what we can do to help you to self-manage better? Before we do that I just want to find out a little about you.	Using Motivational Interviewing (MI) skills to establish rapport. Using Cognitive Behavioural Therapy (CBT) to set an agenda with patient, what do they want to talk about?
<u>Health</u> What's your health like in general? How many years since diagnosis? Have you any related complications e.g., diabetes? Any medical problems which would stop you being active? E.g., angina, foot problems? What medications do you currently take?	Listening and being interested in the person. Encouraging them to speak and verbalise change/sustain talk.
<u>Current Functioning</u> Lifestyle issues; smoking/alcohol use/do you manage 3 regular meals or do you snack and graze? What is a regular day like?	Self-Efficacy theory and capabilities approach. Understanding person's behaviour from their own perspective, starting where person is at and establishing context and salient beliefs using open ended questions.
<u>Lifestyle</u> What do you do? Are you still working? Who's in your family? What's your home life like e.g., busy? Retired?	Acceptance and Commitment Therapy (ACT) to establish what's important to the person, what do they value? Being aware of context to develop tailored plan.
<u>Presenting issues</u> What are you here to see me about? Is it about increasing your activity levels? To lose weight? To stop smoking? To help you get motivated? What are your thoughts and feelings about the above? What are you already doing to try and address the issue? Start of problems? Previous attempts to lose weight/change behaviour, what worked/didn't? If you don't want to be weighed can you estimate your weight for me?	Using CBT approach setting an agenda establishing what the person wants support to change & introducing links between thoughts & feelings. BCTs prompt focus on past success: Ask person to think about or list previous successes in performing the behaviour (or parts of it). Topic of weight introduced gently to avoid shame/blame.

Template questions	**Techniques**
Psychological history Significant life events in childhood/events associated with behaviour? Family/home life/experience at school? Has behaviour been a coping mechanism? How have they coped with difficult experiences in the past? Brief mental history; anxiety/depression/any previous diagnosis?	COM B and Combination of CBT and MI techniques: Socratic questioning to identify persons salient beliefs, explore psychological ability to change behaviour, challenge vicious cycle between thoughts and behaviours. CFT (Compassion Focussed Therapy). Focus on building self-efficacy/self affirmation theory.
How can we tailor these sessions to support you? What will be difficult for you?	BCTs: barrier identification/problem solving. Person is prompted to think about potential barriers and identify ways of overcoming them. Examples of barriers may include behavioural, cognitive, emotional, environmental, social and or physical barriers.
How does changing behaviour fit with what you value in life? E.g. What sorts of physical activity do you enjoy or have you enjoyed in the past? What sort of regular activity could you imagine yourself being able to do now? What would you like to do and think you could fit in to your routine?	Capabilities approach BCTs: habit formation; mental rehearsal of successful performance, pros and cons, focus on past success.
Pros and cons to changing behaviour What do you think the benefits of being more active/eating more healthily/ smoking cessation would be for you? What are the obstacles now? (E.g. pain when walking; time; weather; energy; expense ;) What solutions can you think of to overcome these obstacles?	BCTs: pros and cons, Barrier identification/problem solving, Habit formation, social support, discrepancy between current behaviour and goal. Set graded tasks. Self-efficacy theory CBT and MI skills (rolling with resistance and generating change talk).
What will help you remain positive and confident that you can change?	
Social Support Do you have anyone who would be able to help you stick to your plan?	BCTs: Social support, practical and emotional and social change.

Template questions	Techniques
Will you tell your friends and family that you are trying to change your behaviour and ask them to help you?	
Goal setting What are your goals over the next week e.g. to be more active? What are your goals over the few months? What do you want to be different in six months' time?	BCTs: goal setting behaviour and outcome, action planning. Set graded tasks. Prompt focus on past success. Prompt of self-monitoring of behaviour and behavioural outcome. Provide information on where and when to perform the behaviour.
Summarise session and ask patient to write out what they are going to do in their own words on goal card. Patient Goal Card What am I going to do? Where and when am I going to do this? Is there anything that might get in the way of my plan and how will I overcome this? Establish mode and frequency of follow-up.	CBT and MI skills (summarising, listening, chunking, reflection). BCTs: behavioural contract and review outcome goals. BCTs: action planning and self-monitoring. Barrier ID/problem solving. Goal setting behaviour and outcome. Action planning. Set graded tasks. Social support.
Follow-up sessions Check in establish agenda, patient led.	CBT and MI skills (encouraging change and sustain talk). BCTs: review goals, discrepancy between current behaviour and goal, Self-monitoring of behaviour, reward (outcome). Barrier identification/problem solving. Action planning. Use of follow-up prompts. Goal setting and action planning.

4.5.5. Application of guiding template in practice

Use of the guiding template allowed the conversation to flow naturally whilst providing a structure to facilitate the delivery of a replicable intervention for each

participant without getting side tracked, the guiding template allowed me to gently pull the conversation back to the specific components of the intervention.

This quote by a trainee Clinical Psychologist who observed my clinics describes use of the guiding template in practice.
"*Mary brought a warm and compassionate approach to sessions at the NAFLD clinic that built strong rapport and set patients at ease to disclose their journeys. This compassionate approach invited patients to feel able to disclose painful things often associated with secrecy, guilt and shame: typically underpinning and maintaining the unhelpful cycle. The clinic provided a structured, safe space to information-gather and guide patients towards making individualised, tangible health-related goals to work upon between sessions. Motivation was built by inviting patients to think about why they wanted to make these changes, as well as a reminder of how they have been able to instil health behavioural change in the past: bringing these aspects to the forefront of effective goal-setting. The sessions were clearly productive in defining goals and providing accountability to follow up with these health behavioural changes: through review sessions and check-in emails".*

Works (I-V) document effective intervention and process components that participants and Health Care Professionals highlighted worked.

Effective intervention components included: a collaborative person-centred approach; the use of motivational interviewing skills to support participants to develop a tailored plan; specific behaviour change techniques (from the behaviour change technique taxonomy v1); provision of quality resources to facilitate lifestyle change including self-monitoring tools and linking in with third sector.

Effective process components included: good integration of the intervention with other aspects of routine care, ease of referral, expertise of the Psychologist delivering the intervention, flexible follow-up depending on patient preference.

The interventions described are theory informed and add to understanding what mattered to participants who engaged in the interventions, highlighting the need for holistic outcomes and qualitative feedback to demonstrate impact.

4.4.1 Evidence based

As highlighted in chapter 2.7 I conducted systematic reviews of the literature to see what had worked (or not) to change behaviour with specific clinical groups in a routine setting. In works (I-V) I built on this evidence base using the taxonomy of behaviour change techniques (Kirk et al., 2010, Jackson 2007), see Chapter 2.11.1.

I identified techniques such as goal setting, enhancing self-efficacy, problem solving and self-monitoring as important facilitators of behaviour change (work II, background section). I developed a guiding template, based on physical activity consultation guidelines which incorporated these techniques (table 15 and work II, physical activity consultation section).
I tested and refined this guiding template with different cohorts of people living with different LTCs (including diabetes, obesity, non-alcoholic fatty liver disease and peripheral arterial disease) across MDT pathways in hospital outpatient clinics. To aid generalisability and replicability I mapped the components of the guiding template onto health psychology theoretical constructs including self-efficacy theory, motivational interviewing and cognitive behavioural therapy.

My template provides a practical and flexible tool to enable HCPs to have conversations about SSM and support people with LTCs to self-manage (work II protocol fidelity section).

4.4.2 Theory informed

As highlighted in chapter 2.8, interventions underpinned by theory are more likely to be effective. Whilst I acknowledge I found it difficult to choose one theory to underpin my works, the BCW and COMB model and biopsychosocial

approach provided a useful framework and a clearer picture of the complex process of behaviour change whilst developing my interventions. I found theoretical frameworks useful in terms of planning intervention design, delivery and evaluation, the BCW in particular highlighted the importance of using replicable techniques (Chapter 2.4.1) which led to my development of a guiding template (appendix 2).

As highlighted in chapter 2.9 a key strength of the BCW and COM B framework is that it's an integrative framework with key constructs synthesised from a range of well researched social psychology models. Furthermore, both BCW and biopsychosocial models acknowledge wider influences on health than cognitions alone, which is a major criticism of some of the earlier health psychology theories (Sniehotta et al., 2014). However as outlined in chapter 2.8, alongside other researchers, I have reservations about the BCW and COM B framework in particular and its attempt to overly systemise something as variable as human behaviour and one to one interaction between a patient and HCP (Ogden 2016). Throughout my years in clinical practice I concur with Ogden that 'patient variability is tricky' and there is a science and an art to supporting people to change behaviour. Much of the art is about building an empathic and trusting relationship with the person in front of you, as illustrated by this quote from a participant in work III.

> "I just found it so supportive that people could understand, the first time in 40 years, how I felt."

This important aspect is not fully explored in the BCW and COM B framework or biopsychosocial model. Ogden (2016) highlights there isn't a 'one size fits all' intervention, in addition HCP practice is variable and often led by a person's particular needs at a specific point in time, my clinical experience reflects this. Thus the guiding template I developed (alongside colleagues) aimed to provide a flexible tool to allow HCPs to ask patient-centred questions whilst following a replicable format which incorporated evidence based behaviour change techniques and was delivered using an MI approach.

4.4.3 Insights from participants who engaged

Across works (I-V) participants reported high satisfaction with the interventions and identified factors that contributed to their positive experience. They valued:

- feeling heard and understood by HCPs involved in their care.
- building a shared way forward with a tailored plan and follow up (Chapter 3.12).
- being held accountable for their activity levels by reporting back their 7-day average step count to the Health Psychologist.

Being held accountable is supported in the literature which documents that the use of wearable devices including step-counters promotes an average increase in activity levels of around 2000-2500 steps per day (Hamasaki 2016, Matthews et al., 2013, McCallum et al., 2021). Wearable devices appear to be particularly effective when their use is linked to behaviour change strategies including building confidence, goal setting, self-monitoring, problem-solving (adapting walking behaviour to suit weather and setting), social support and feedback (Hamasaki 2016, Matthews et al., 2014, McCallum et al., 2021).

When asked what they valued about increasing physical activity levels participants reported it was helpful for mood regulation, being able to continue doing normal activities and maintaining a sense of living well with LTCs.

4.4.4 Holistic outcomes

I query throughout this thesis that if we stay narrowly defined by biomedical markers and disease control (including weight and HbA1c) we may fail to evidence impact of SSM interventions, particularly when we consider that a person's well-being is influenced by more than clinical measures. This thesis highlights the importance of measuring outcomes which reflect a wider holistic view (such as, quality of life and ability to live independently).

Chapter 3.11 evidences significant change in outcomes related to wellbeing (reduced anxiety and depression scores), physical activity and function (ability to walk further) whilst other variables such as weight loss didn't reach significance

(Chapter 3.11.4). To successfully demonstrate the impact of SMM, I recommend using wider outcomes which reflect what matters to people with lived experience of LTCs. Across works (I-V), when participants were asked, "*why do you want to change*?" answers were not about disease control but about quality of life. "*I want to be able to walk in the park with my grandchildren*". Yet, routinely HCPs tend to focus on outcomes such as "*Is your diabetes better controlled/ have you lost weight/ have blood test results improved?"* (Entwistle et al., 2018).

Whilst measuring improvements in clinical outcomes is important, I argue, alongside other researchers, measuring broader outcomes valued by participants, is of equal importance (Morgan et al., 2016).

4.5 Strengths and limitations of this thesis

In this next section I discuss the strengths and limitations of this thesis, highlighting that some of its strengths may be seen as limitations and vice versa. I make recommendations for how future researchers could try and address limitations.

4.5.1 Consistent approach delivered in one health board area

My method of using a common approach across works (I-V) implemented in one health board area balances a strength and potential limitation of this thesis. Implementation by one researcher across five different clinics in one hospital adds to the consistency and strength of findings. It allows patterns to emerge which contribute to our knowledge base of what works to support SSM in the time pressured environment of routine care (work IV materials and methods section). However, I acknowledge that implementation in one Health Board area limits my findings in terms of wider generalisability. A priority of research conducted in real world or clinical settings is to understand why an intervention is successful in one context (and possibly not others). I would recommend that if this approach was to be replicated it would be beneficial to deliver interventions across multiple sites and health board areas.

4.5.2 Therapist effect

A further limitation linked to the above is that of therapist effect. Apart from work III, I was the sole psychological therapist in works (I-V). The effect of the individual delivering a psychology intervention is known as the therapist effect. It is a challenge in this field of work to separate how much is due to individual factors such as way of working, training, experience and how much is due to the intervention and adherence to the protocol. Further research could compare intervention outcomes looking at a range of variables including delivery of the interventions by different HCPs. I would argue that a person-centred approach and use of motivational interviewing skills are not just the domain of Psychologists. Such approaches are used by a wide range of HCPs. Whilst it must be acknowledged there are many barriers to HCPs using these skills in routine care due to lack of time, resource, dedicated training and confidence. Resources and training packages (such as MAP) are available and I would argue the benefits of providing resource and time to support person-centred skills for HCPs are tangible (see section 4.7.1).

4.5.3 Number of participants who engaged

A further limitation of this thesis is sample size. I acknowledge that the number of participants who engaged in each individual study might be considered low. However cumulatively over the five studies over 300 participants engaged, and common themes were observed by using the same guiding template (appendix 2) and approach across different cohorts of participants. As with any development process, changes were made to the intervention design in each iteration. For example, work II describes the length of time allotted for assessment was increased from 30 to 45 minutes as participants highlighted they needed more time to tell their story. Increased time was factored in for assessments in each of my subsequent works. This PhD thesis has demonstrated across five studies that drop-out rates across all the interventions were lower than those reported elsewhere in the literature (Logue et al., 2014, Brown et al., 2015) which suggest delivery of the interventions was well received and appropriate, for example work II discusses specific components thought to link to

why drop-out rates were low including that participants felt heard, they appreciated the flexible follow-up and personalised approach.

The cumulative numbers of participants who engaged over the five studies combined with low drop-out rates balanced a possible limitation and added to the strength of findings of this thesis.

4.5.4 Lack of longer term follow-up

The lack of longer-term follow-up (of more than one year) is a notable limitation. As with many SSM interventions implemented in routine care, funding for each of my interventions was time limited to two years. Longer term funding and follow-up would greatly help to strengthen conclusions, particularly as there is evidence that SSM interventions face a decline in success rates over the longer term (Hall and Kahan ., 2018).

4.6 Implications for future research

There is clearly a need for robust, long-term follow-up of SSM interventions in routine care. NHS clinicians and patients/participants should be actively encouraged to work closely with academic colleagues to design, develop, deliver and evaluate SSM interventions.

As a gold standard the American Look AHEAD diabetes study (Salvia ., 2017), was a large and long-term randomized trial which evaluated the impact of an intensive lifestyle intervention on health outcomes, following up participants for an average of eight years. Funding to carry out such research is hard to achieve, however I conclude in works (I-V) more research is required to evaluate impact of SSM over the longer-term and to explore the health economic impact of SSM in routine care (Nicklas et al., 2022).

Furthermore, my works have identified a need for future research to determine the validity of measures to assess change in perceived quality of life, physical function and ability to live independently, thus reporting on wider outcomes than

clinical markers alone and reflecting what matters to people with lived experience of LTCs.

Finally, my works have demonstrated statistical increases in physical activity levels were achievable for participants whilst other variables (such as self-reported weight did not reach significance). Further exploring the mechanisms behind this significant increase in physical activity would be a logical next step for future research.

4.7 Recommendations for implementation in practice

As highlighted in Chapters 1 2 and 3 there is an identified need for SSM interventions in routine care. This thesis contributes to the knowledge about how to embed SSM as part of everyday practice and makes two recommendations to take this forward which centre on training HCPs and scalability of SSM in routine care.

4.7.1 Training for HCPs

Although improved health care can be facilitated at different levels of the health system, one important approach is to support HCPs modify their clinical behaviour (French et al., 2012). I focus on this level because much of the SSM I described in works (I-V) was delivered in the context of an encounter between a HCP and a patient. As detailed in chapter 2.4, evidence suggests many HCPs lack confidence in their ability to modify their clinical practice and deliver behaviour change interventions.

I recommend the MAP model as a useful framework for training HCPs, developed as part of the Health Behaviour Change Competency Framework, (HBCCF) Dixon and Johnson (2020). MAP describes three routes to behaviour change: Motivation development; Action on motivation; and prompted or cued routes. MAP is focussed on developing HCP competencies and skills in using behaviour change techniques and has a strong emphasis on developing meaningful strategies with participants to affect lifestyle change.

4.7.2 Scalable solutions to rolling out SSM for people living with LTCs

Increasingly, the use of digital solutions such as mobile apps for longer-term follow-up, repeat contacts and self-monitoring has emerged. Mobile platforms offer the potential to reach large numbers of people at lower cost and more efficiently than face to face or telephone approaches (Maddison et al., 2019). They also reduce the need for travel which is a common barrier to attending appointments cited by patients (in large rural areas such as Grampian). I have been involved in the development of a virtual SSM app alongside the Digital Health Institute. We will pilot the use of this app with people with type 2 diabetes and NAFLD in Grampian and gather feedback from participants to see if they find the two-way messaging and regular follow-up via the app useful. However robust research will be required to see if the desired outcomes in SSM are met.

4.8 Personal reflections:

As highlighted in chapter 1.11 my thinking and approach has developed throughout my career working first in public health and latterly as a Health Psychologist in busy outpatient clinics in a hospital setting. At the start of my career, I had a keen interest in the promotion of physical activity and was involved in developing and delivering interventions with a focus on increasing individual activity levels. The evidence is clear that increasing physical activity is important for health and wellbeing. However, I suggest, it is not the panacea, works (I-V) highlight significant change across a broad range of outcomes including psychological wellbeing, quality of life and physical function. The longer I have worked in clinical practice with people with a range of LTCs, I realise people only make changes to their behaviour if it matters to them. Paying heed to the context in which people live and providing the support they need is key to facilitating sustainable change. Developing a tailored plan (reflecting participant's unique challenges) and providing regular follow-up and support was overall effective in the works (I-V). However it's important to acknowledge that organisational buy-in is required to allow HCPs time and training to be able to competently deliver this approach as part of routine care.

4.9 Conclusion

In conclusion, despite the considerable policy rhetoric which indicates we should be supporting people with LTCs to self-manage their conditions and make lifestyle changes there is a gap in our knowledge about how to implement SSM in routine care.

Robust evaluation of SSM interventions and the sharing of effective clinical practice are essential to continue to improve services for those living with LTCs. This thesis contributes to the knowledge base and identifies key elements of SSM interventions developed and delivered in routine care that have successfully supported participants who engaged to make improvements across a range of outcomes related to health, quality of life and psychological well-being, thus better self-manage their LTCs.

This thesis could be used to inform future healthcare policy and practice. The potential gains for focussing more of NHS resource toward '*prevention rather than cure'* appear significant. There is much work we could be doing to embed SSM into routine care, including training HCPs in skills and techniques on how to listen to patients empathically and acknowledge the contextual factors which influence people's ability to change.

My research was conducted in secondary care settings. However it's clear we could be targeting this approach in primary care settings too. Promising work using my guiding template (and evidence from works I-V) is currently being used nationally by the Scottish Digital Health Institute, to create a virtual SSM platform for NAFLD and weight management and locally in primary care settings targeting people with pre-diabetes. There is a need for more joined work, with academics working in implementation science to explore specific components of successful interventions when delivered as part of routine care. There have been great strides made around what works in theory, we now need to embed what works in practice.

As chronic conditions emerge as a major public health concern, SSM will continue to grow as a crucial approach to managing these conditions, preventing illness,

and promoting wellness (Grady and Gough 2014). SSM research translated into practice can offer those living with LTCs a means to maintain or improve their capacity to live well over the course of their lives.

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Appendix 1: Authors contribution to research

Contribution to research papers McCallum M (nee Farnham)

No	Title	Authors	Journal	Contribution of thesis author (MM) to the paper
1	Supported Self-management – tangible benefits in physical and mental health for patients with non-alcoholic fatty liver disease (NAFLD)	McCallum M, Dundas P, Mukhopadya A.	Clinical Liver Disease 21(2): p 60-65, February 2023. | DOI: 10.1097/CLD.0000000000000017	Demonstrates relevance to golden thread in terms of what works to support self-management in routine care and shows progression in thinking from previous papers.
2	Quality Standards for the Management of NAFLD: Consensus Recommendations from the British Association for the Study of the Liver (BASL) and British	McPherson S, Armstrong MJ, Cobbald JF, Corless,L, Anstee QM, Aspinall RJ, Barclay ST,Brennan PN, Cacciottolo TM,	The Lancet Gastroenterology and Hepatology April 2022 DOI: https://doi.org/10.1016/S2468-	Contributed to BASL SIG NAFLD Standards working group MM Contributed to Delphi rounds, with area of interest and expertise stated as behaviour change and health promotion MM Contributed to critical revisions of standards MM.

No	Title	Authors	Journal	Contribution of thesis author (MM) to the paper
	Society of Gastroenterology (BSG) NAFLD Special Interest Group	Goldin RD, Hallsworth K, Hebditch V, Jarvis H, Jack K, Johnson J, Wenhao Li, McCallum M, Mukhopadhya A, Ross V, Rowe I A, Srivastava A, Thiagarajan P, Tomlinson J, Tsochatzis EA, Yeoman A, Alazawi W:	1253(22)00061-9	
3	"Knowledge, Beliefs and Practices of People diagnosed with Type-1 Diabetes towards	Raman S, Naguib H, McCallum M	Archives of Surgery and Clinical Case Reports 4: 160.	Training for Oman Health Care Professionals on Health Behaviour Change and Diabetes MM Support with paper conception and design MM Help with drafting of manuscript MM

No	Title	Authors	Journal	Contribution of thesis author (MM) to the paper
	Diabetes Mellitus and Diabetic Foot Syndrome" (2021)		DOI: https://doi.org/10.29011/2689-0526.100160	Critical revisions of manuscript MM
4	Improving health behaviours in patients with peripheral arterial disease - A pilot study of supported self-management (2021)	McCallum M, Cooper B, Matson S, Renwick B, Messeder SJ.	J Vasc Nurs. 2021. doi: 10.1016/j.jvn.2020.10.001	Paper conception and design MM with specialist nurse BC. Review of literature lead MM. Drafting of manuscript MM Critical revisions of manuscript MM with specialist nurse BC. Final preparation and editing of manuscript and submission to journal MM.
5	Service evaluation of a pilot psychology clinic including psychological intervention within a Tier 2 community adult weight management service.	MacDonald-Gibb K, McCallum M, Young K, Pittendreigh J, Campbell F.	Health Psychology Update Volume 30, Issue 1, Spring 2021	Supervision of Assistant Psychologist with paper conception and design MM Drafting of manuscript with Assistant Psychologist MM Critical revisions of manuscript MM Final preparation and editing of manuscript and submission to journal MM.

No	Title	Authors	Journal	Contribution of thesis author (MM) to the paper
6	Service evaluation of a health behaviour change intervention for patients with peripheral arterial disease (2020)	McCallum M, Cooper B, Matson S, Renwick B	Health Psychology Update Vol 29 No 1 Spring 2020© The British Psychological Society	Paper conception and design MM with specialist nurse BC. Review of literature lead MM. Drafting of manuscript MM Critical revisions of manuscript MM with specialist nurse BC. Final preparation and editing of manuscript and submission to journal MM.
7	Evaluation of Weigh Forward: A group intervention delivered by dietitians and psychologists within a National Health Service specialist weight management service (2018)	Moffat H, Campbell F, Donald C, Insch P, Little S, Logan S McCallum M.	Journal of Clinical Obesity 2018; e12291. https://doi.org/10.1111/cob.12291	Support with paper conception and design MM with HM Review of literature lead MM Help with drafting of manuscript MM Critical revisions of manuscript MM with HM

No	Title	Authors	Journal	Contribution of thesis author (MM) to the paper
8	The feasibility of a physical activity intervention for adults within routine diabetes care: a process evaluation (2017)	Matthews L, Kirk A, McCallum M, Gold A, Keen A.	Practical Diabetes (2017) Vol 34 No. 1 https://doi.org/10.1002/pdi.2069	Support with paper conception and design MM with lead author LM Review of literature lead MM Help with drafting of manuscript MM Critical revisions of manuscript MM with supervisor AK.
9	Evaluation of intensive support for people with type 1 diabetes (2016)	McCallum M and Bruce S.	Health Psychology Update, Volume 25, Issue 2, Autumn 2016 © The British Psychological Society	Paper conception and design MM with supervisor AK. Review of literature lead MM. Drafting of manuscript MM Critical revisions of manuscript MM with supervisor AK. Final preparation and editing of manuscript and submission to journal MM.
10	Relationships of lifestyle and risky behaviours with mental	Aucott L, Monyei E, McCallum M, Poobalan A.	International Journal of Public Health Research	Support with paper conception and design MM with LA Help with drafting of manuscript MM Critical revisions of manuscript MM with LA

No	Title	Authors	Journal	Contribution of thesis author (MM) to the paper
	well-being for emerging adults: an exploration in 18–25 year-olds (2014)		Vol 4 No 1 2014, pp (431-440)	
11	Implementation of a physical activity consultation service for adults with Diabetes (2013)	McCallum M, Matthews L, Gold A, Keen, A Kirk A Mutrie N.	*Diabetic Medicine*, Vol. 30, pp. 107-107. https://doi.org/10.1111/dme.12091_2	Drafting of presentation MM Critical revisions of presentation MM with supervisor AK. Final preparation and editing of presentation and delivery at conference MM.
12	Development and evaluation of interactive educational tool for primary care researchers (2004)	Shaw S, Kerr R and Carter Y, Beck L, Farnham M	Medical Teacher, 26:5, 483-486 DOI: 10.1080/01421590410001679037	Support with paper conception and design MM with SS Help with drafting of manuscript MM Critical revisions of manuscript MM with SS
13	The Potential Benefits of Outdoor Development for	Farnham M Mutrie N	British Journal of Special Education	Paper conception and design MM with supervisor NM Review of literature lead MM. Drafting of manuscript MM

No	Title	Authors	Journal	Contribution of thesis author (MM) to the paper
	Children with Special Needs (2003)		https://doi.org/10.1111/1467-8527.00008	Critical revisions of manuscript MM with supervisor NM. Final preparation and editing of manuscript and submission to journal MM.
14	An evaluation of exercise consultation in a community setting (1998)	Farnham M and Mutrie N	International Journal of Health Promotion and Education, January 1998 36(1):4-8 doi/abs/10.1080/14635240.1998.10806046	Paper conception and design MM with supervisor NM Review of literature lead MM. Drafting of manuscript MM Critical revisions of manuscript MM with supervisor NM. Final preparation and editing of manuscript and submission to journal MM.

Appendix 2: Guiding Template for SSM intervention

REGISTRATION DETAILS

Patients name ……

Patients contact details (phone /email)…….

Patients postcode…….....

Date of first appointment…….....

Location of first appointment…….....

GP Name and address…….....

Age…….....

Date of Birth…….....

Gender……..

Marital status……

How did you hear of the service (leaflet/clinic/self referral?)

SESSION 1: ASSESSMENT

Introduce self, thanks for coming along, today is really an information gathering exercise. We are going to talk about what we can do to help you to self manage better?

Before we do that just want to find out a little about you.

Can you tell me a little bit about yourself?

An exploration of interventions for Supported Self-Management and behaviour change delivered as routine clinical care for people living with Long Term Health Conditions:

Health

What's your health like in general?

How many years since diagnosis? …….

Have you any related complications e.g. diabetes? ……

Any medical problems which would stop you being active?

E.g. angina, foot problems?

What medications do you currently take?

Lifestyle

What do you do? Are you still working?

Who's in your family? What's your home life like e.g. busy? Retired?

.....

Presenting issues

What are you here to see me about? Is it about increasing your activity levels? To lose weight? To help you get motivated?

.....

What are your thoughts and feelings about the above?

What are you already doing to try and address the issue?

If you don't want to be weighed can you estimate your weight for me?

What sorts of physical activity do you enjoy?

How does being active fit in with what you value in life?

What sorts of physical activity do you enjoy or have you enjoyed in the past?

What have you done in terms of being physically active over the past 7 days?

Are you meeting physical activity guidelines (150 minutes per week)?

What sort of regular exercise could you imagine yourself being able to do now?

What would you like to do and think you could fit in to your routine?

Pros and cons to increasing activity

What do you think the benefits of being more active would be for you?

What are the obstacles to you being active now? (Pain when walking; Time; weather; energy; expense ;)

What solutions can you think of to overcome these obstacles?

What will help you remain positive and confident that you can increase your physical activity levels?

Social Support

Do you have anyone who would be able to help you stick to being more active?

Will you tell your friends and family that you are trying to be more active and ask them to help you?

Goal setting

What are your goals over the next week to be more active?

Monday	
Tuesday	
Wednesday	

Thursday	
Friday	
Saturday	
Sunday	

What are your goals over the few months?

1 month	3 months	6 months
1.		
2.		
3.		
4.		
5.		

Do you have any questions?

Follow up and support

What is your preference for follow up? (E mail, telephone call, text)

Would you like to be contacted again to see how you are getting on?

Summary and reinforcement of assessment session 1.

Summarise session and ask patient to write out what they are going to do in their own words on goal card.

Patient Goal Card

What am I going to do?

Where and when am I going to do this?

Is there anything that might get in the way of my plan and how will I overcome this?

SESSION 2: FOLLOW UP SESSIONS

Check in how has patient been doing?

How are they feeling today and what would they like to talk about?

Brief summary of session 1, presenting issues and goals agreed.

How have you got on with increasing your activity levels? Losing Weight? Healthy eating? Smoking cessation?

What have you done in terms of being physically active over the past 7 days?

Are you meeting physical activity guidelines (150 minutes per week)?

Offer positive reinforcement for any changes to lifestyle?

Explore barriers

Goal setting

What are your goals over the next week to be more active?

Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	

Follow up and support

Would you still like to be contacted next month to see how you are getting on?

Appendix 3: Personal reflections and use of the evidence base to inform my interventions

My interest in the area of interventions to promote physical activity began whilst completing my master's degree in Sport and Exercise Science. I was employed as a research assistant at Cross House Hospital in Kilmarnock in 1993 to deliver exercise consultation sessions for NHS staff. This work contributed to the development of guidelines for delivery of exercise consultation (Loughlan and Mutrie 1996; Kirk et al 2009.,) which have informed my approach in delivering the SSM interventions described in this thesis.

Loughlan and Mutrie (1996) guidelines document key skills for HCPs delivering exercise consultation:

1) excellent communication and reflective listening skills and empathy for people seeking help;
2) good knowledge about PA for general population including current PA recommendation and contraindications for particular groups; and
3) understanding of theories of behaviour change and various factors that influence whether or not someone will become more active.

I continued my interest in the field of SSM and behaviour change developing and delivering and exercise consultation project in a community of low socioeconomic status (SES in East Ayrshire (McCallum (nee Farnham) and Mutrie, 1998). Then I moved to NHS Grampian to take up a role promoting physical activity in primary care and developing and evaluating the Walk to Health initiative.

Appendix 4: Quantitative outcomes selected and why

Table 16 details the key quantitative outcome measures I used across all interventions and the reason why the measure was selected.

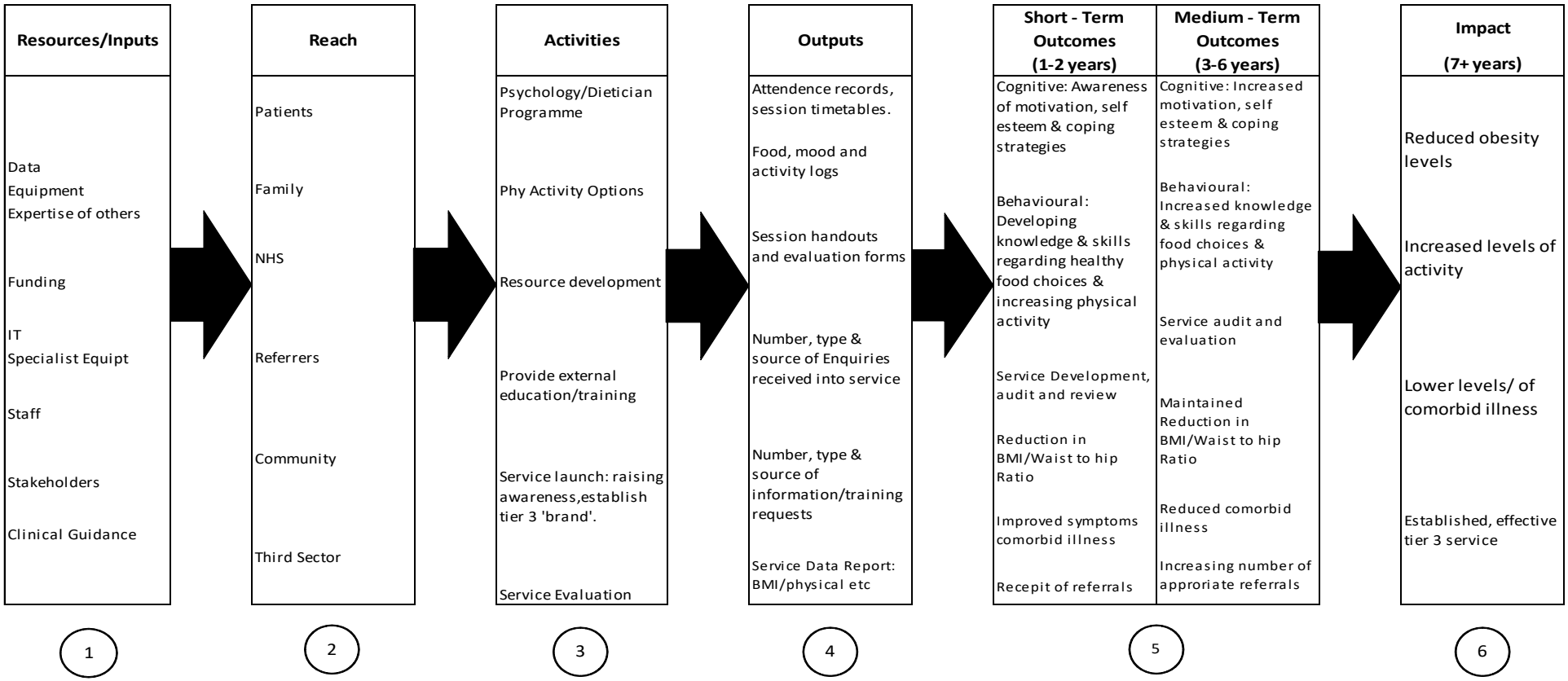
Table 16 Quantitative outcome measures

Intervention	Outcome measures	Description	Reason used
I-V	Weight/BMI and Physical activity self-report	Measured in clinic or self-report	To assess changes in physical health markers.
I-V	Hospital Anxiety and Depression Scale (HADs). Snaith and Zigmond (1993)	14 item question	To detect changes in psychological distress.
I-V	Binge Eating Scale Gormally et al 1982	16-item questionnaire	To assess if individuals were engaging in compulsive binge eating behaviours which may be indicative of an eating disorder, emotional distress and loss of control overeating.

Intervention	Outcome measures	Description	Reason used
I.	Problem Area in Diabetes Questionnaire (PAID) (Snoek et al., 2000).	20-item questionnaire	To measure diabetes-related emotional distress. Patients rate the extent in which an item is currently problematic on a six-point Likert scale, from 0 (no problem) to 5 (serious problem)
II.	Positive and Negative Affect Scale (PANAS) (Watson et al 1988)	20- item questionnaire	To measure mood or emotion, with 10 items measuring positive affect (e.g., excited, inspired) and 10 items measuring negative affect (e.g., upset, afraid).
III.	General Self Efficacy Scale (Jerusalem and Schwarzer (1981)	10-item psychometric scale	To assess optimistic self-beliefs to cope with daily activities and stressful life events through self-perceived efficacy.
III.	Difficulties in Emotion Regulation Scale (DERS) (Gratz & Roemer, 2003).	36 items self-report scale	To measure emotion regulation problems. Given that successful emotion regulation is a key

Intervention	Outcome measures	Description	Reason used
			aspect of personal well-being, difficulties in emotion regulation are theorised to be a trans diagnostic risk for the onset and maintenance across psychopathologies
III.	WHOQOL –BREF WHO (1995)	26 item self-administered questionnaire	To assess quality of life and an individual's perceptions of their health and well-being.
IV.	EQ-5D3L EuroQol Group (1990 EQ-5D-3L – EQ-5D (euroqol.org))	Consists of 2 pages: the EQ-5D descriptive system and the EQ visual analogue scale (EQ VAS) which records individuals self-rated health on a scale where the endpoints are labelled 'Best imaginable health state' and 'Worst imaginable health state'.	To assess quality of life of individuals before and after undergoing interventions.

Appendix 5: Logic model for work III



Appendix 6: Publications Included in Thesis

Roman Numeral	Title
I.	Evaluation of intensive support for people with type 1 diabetes (2016)
II.	The feasibility of a physical activity intervention for adults within routine diabetes care: a process evaluation (2017)
III.	Evaluation of Weigh Forward: A group intervention delivered by dietitians and psychologists within a National Health Service specialist weight management service (2018)
IV.	Service evaluation of a health behaviour change intervention for patients with peripheral arterial disease (2020)
V.	Supported Self-management – tangible benefits in physical and mental health for patients with Non- alcoholic fatty liver disease (NAFLD) (2023)