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*The Nutrition Society Irish Section Conference 2023 hosted for the first time by the Technological University of the Shannon on 14–16 June 2023*

## **Conference on ‘Understanding the role of sex and gender in nutrition research’ Symposium three: Sex- and gender-specific considerations across the life course**

### **Menopause as a window of opportunity: the benefits of designing more effective theory-driven behaviour change interventions to promote healthier lifestyle choices at midlife**

Ellen Elizabeth Anne Simpson<sup>1\*</sup>, Julie Doherty<sup>2</sup> and Deirdre Timlin<sup>3</sup>

<sup>1</sup>*Psychology Research Institute, Ulster University, Cromore Road, Coleraine, County Londonderry, Northern Ireland, UK*

<sup>2</sup>*School of Nursing & Midwifery, Queens University Belfast, Belfast, Northern Ireland, UK*

<sup>3</sup>*Department of Psychology, Rockhampton Hospital, Queensland Health, Rockhampton, Australia*

Menopause is a natural developmental phase that all women go through from their early forties to mid-fifties, marking the transition from the reproductive to the non-reproductive years. This is characterised as the permanent cessation of menses due to progressive ovarian failure. Each woman’s experience of the menopause is unique. Biopsychosocial changes occur during this time with some symptoms affecting up to 80% of women and lasting for 4–5 years from the peri- to post-menopause. Reduced oestrogen may predispose some women to health issues following menopause, such as heart disease, diabetes, stroke and cognitive decline. It is vital to understand how to promote health and well-being to reduce the risk of developing chronic conditions in later life. Increased symptoms and concerns about health during the menopausal transition can be cues to action for some women to actively maintain their health. Menopause represents a window of opportunity to promote health, and to support women to make healthier lifestyle choices, part of the National Institute for Clinical Excellence guidelines for menopause management. Identifying appropriate strategies to change behaviour is less clear. Theories of behaviour change can provide frameworks to gain more insight into the facilitators and barriers to behaviour and can inform the researcher on what needs to change. This information can be used to inform the design, content, implementation and evaluation of a lifestyle intervention. This review paper will explore the impact of menopause on health and well-being generally, and the benefits of designing more effective theory-driven behaviour change interventions for menopause.

#### **Menopause transition: Menopausal symptoms: Behaviour change theories: Mapping interventions from design: Implementation and evaluation**

**Abbreviations:** COM-B, capabilities, opportunities, motivation and behaviour; MIND, Mediterranean-dietary approaches to stop hypertension diet intervention for neurodegenerative delay; TDF, theoretical domains framework; TPB, theory of planned behaviour.

**\*Corresponding author:** Ellen Elizabeth Anne Simpson, email [eea.simpson@ulster.ac.uk](mailto:eea.simpson@ulster.ac.uk)

Globally, there are about 985 million women over 50 years<sup>(1)</sup>, accounting for 26% of all women and girls; these numbers are set to rise further in the next few decades with increased longevity<sup>(2)</sup>. Consequently, the WHO has recognised women's health as a global health priority<sup>(3)</sup>. It was estimated that there will be 1.2 billion menopausal women in the world by 2030<sup>(4)</sup>. Within the UK, it is estimated that there are 13 million menopausal women<sup>(5)</sup>, and 571 000 menopausal women in Ireland<sup>(6)</sup>, who are peri- and post-menopause. With 75–80% of these women reported to be experiencing menopausal symptoms which have the potential to impact negatively on their quality of life and well-being at this time<sup>(7–9)</sup>. Therefore, better menopause management and greater options for women to promote their own health and well-being is needed<sup>(10–12)</sup>, and recommended for menopause management<sup>(13,14)</sup>. This review paper will provide an overview of what the menopause is, its impact on health and well-being and how it provides 'a window of opportunity' to promote health through lifestyle change<sup>(15)</sup>, with a focus on designing more appropriate theory-driven behaviour change interventions. More research is needed to fully understand the impact of such lifestyle interventions on menopausal symptoms and health<sup>(16,17)</sup>.

### What is menopause?

Menopause literally means last period and is defined as 'the permanent cessation of menstruation following loss of ovarian follicular activity'<sup>(18)</sup>. Ovarian production of oestrogens begins to decline in the fourth or fifth decade of life, marking the beginning of the menopausal transition with perimenopause. This is coupled with increases in follicular stimulating hormone and luteinising hormone as the body tries to stimulate the ovaries into reproductive action<sup>(19)</sup>, these two hormones control ovulation and reproductive oestradiol levels during the menstrual cycle<sup>(20)</sup>. These hormonal changes, including a decline in progesterone<sup>(21)</sup>, lead to the emergence of menopausal symptoms such as hot flushes and night sweats<sup>(22)</sup>. Post-menopause is diagnosed retrospectively as 12 months of spontaneous amenorrhoea<sup>(14)</sup>. Generally, women in the UK and Ireland are living longer with a life expectancy of about 83 years<sup>(23)</sup>, meaning they will be post-menopausal for over one-third of their lives<sup>(24)</sup>.

In Ireland the mean age of menopause is 51 years, with most women experiencing their menopausal transition between 45 and 55 years<sup>(25,26)</sup>. For the majority of women it is a natural transition from the reproductive to the non-reproductive years in a woman's life. Natural menopause is regarded as a transition because fluctuations and changes in hormone levels can last on average for 4–5 years<sup>(27)</sup>, with some women experiencing persistent symptoms for 8–10 years into the post-menopause<sup>(28)</sup>. Menopause for some women does not fit this pattern and can be defined in relation to when and how it occurs and includes premature, early and surgical menopause. Anyone experiencing menopause

below the age of 40 years is regarded as going through premature menopause, affecting 3% of women<sup>(29)</sup>, and can be down to genetic or environmental factors. Early menopause occurs in women aged 40–44 years, affecting 10% of this age range<sup>(30)</sup>. Some women will experience induced menopause because of surgery, injury or disease. In surgical menopause women will have both ovaries removed prior to the onset of natural menopause, usually to combat diseases such as ovarian cancer<sup>(31)</sup>. The ovaries can become damaged because of chemotherapy or radio therapy in the treatment of some other forms of cancer and will stop functioning, so the patient will experience instant menopause<sup>(32)</sup>. A woman's experience of menopause is as individual as she is, and management of menopause needs to reflect diversity in this transition<sup>(33)</sup> and promote healthy ageing through positive lifestyle change<sup>(29)</sup>.

### Biopsychosocial changes during the menopause transition

Most menopausal symptoms or changes that occur during the menopause can be divided into vasomotor (hot flushes, night sweats, vaginal dryness), somatic (tiredness, muscle and joint pains), psychological (depression, anxiety and memory problems) and social (loss of fertility, empty nest, divorce and bereavement). Women will vary in their experience of these types of symptoms, but they have the potential to impact their quality of life and well-being<sup>(9)</sup>. More recently there has been a focus on looking at what types of symptoms women find most bothersome. The British Menopause Society recognise about thirty-eight menopausal symptoms in total, with hot flushes (79%), night sweats (70%), sleep problems (57%), change in menstrual cycle (54%), low mood (52%), weight gain (47%) and low-energy levels (47%) being the top ones reported by menopausal women<sup>(34)</sup>, and are comparable to more recent studies looking at the prevalence and severity of symptoms<sup>(7)</sup>. There can be interactions and a domino effect for women experiencing multiple menopausal symptoms and they have potential to lead to a decline in quality of life and well-being<sup>(35)</sup>. Hot flushes and night sweats may mediate the impact of some symptoms such as memory, mood and general well-being<sup>(36)</sup> but more research is needed to fully understand the relationships between symptoms and how we can intervene to improve health and well-being during this time.

### Menopause impact on health and the need for health promotion

The British Menopause Society in their mission statement 'conditions associated with the menopause impact on all health care systems – not just gynaecology'<sup>(14)</sup>. Health status declines across the lifespan and reduced oestrogen can lead to an increased risk of a range of health conditions for some women such as heart disease, stroke, metabolic syndrome, type 2 diabetes, osteoporosis, dementia and cognitive decline and some cancers

such as ovarian and cervical (especially if exposed to additional oestrogens)<sup>(28,37)</sup>. These long-term conditions may emerge 10–12 years following the last menstrual period<sup>(29)</sup>, so it is important to identify mediating factors to enhance prevention<sup>(38)</sup>. There is a need and a drive to better understand ageing in the female and how to maintain health, increase quality of later years and functional independence for longer. The National Institute for Clinical Excellence guidelines<sup>(13)</sup> for menopause management sets out that women are entitled to advice about lifestyle and diet to manage their menopause more effectively. Increased symptoms and bodily changes may act as cues to action for some women and identify a need to promote their own health and well-being at this time<sup>(11)</sup> and making it an optimal for health promotion<sup>(39,40)</sup>.

### Lifestyle and behaviour change for menopause

Behaviour is central to health and well-being; health promotion and public health campaigns have focused on health-related behaviours as mediators of long-term conditions for many years<sup>(41)</sup>. Health-related behaviours such as smoking, physical activity and diet are related to mortality and morbidity rates and longevity<sup>(42,43)</sup>, with women reporting poorer health in comparison to men, linked directly to chronic conditions<sup>(44)</sup>. Lifestyle choices or health-related behaviour can be divided into two categories, those that are health promoting (such as eating five portions of fruit and vegetable daily or following a Mediterranean diet) and health compromising (such as high consumption of processed foods that are higher in fat, sugar and salt or alcohol above the recommended amount of fourteen units per week, spread out across three or more days per week)<sup>(45)</sup>. Some health behaviours can be resistant to change such as smoking or reducing sugar intake. Very often people are aware of the harmful effects of some behaviours and what they need to do to promote their health, but do not follow through with a change in behaviour. There is a need to focus on how to bring about a more effective change in behaviour, and to establish what strategies are most effective in achieving behaviour change<sup>(46)</sup>. Health psychologists can be instrumental in supporting and informing the development and design of behaviour change interventions, through the application of theoretical frameworks that inform this process. Strategies aimed at changing attitudes and ultimately behaviour is more effective when guided by theory<sup>(47)</sup>.

### Theories of behaviour change

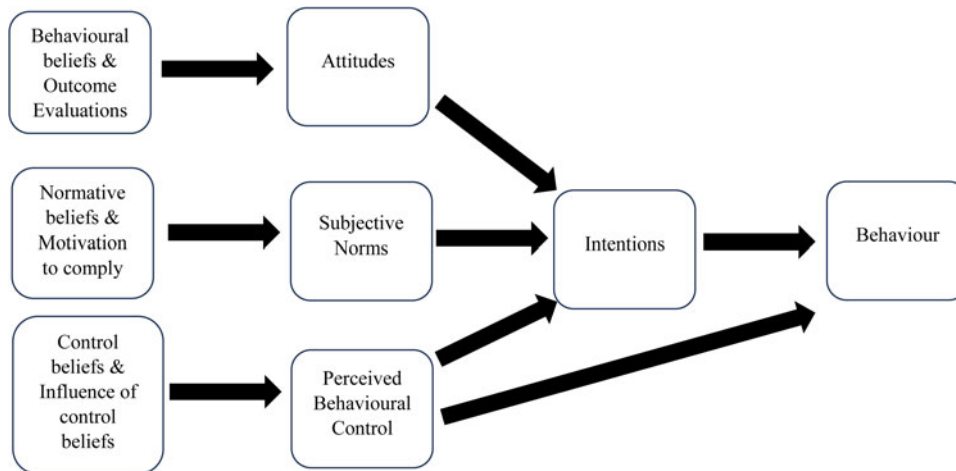
Theories of behaviour change have been around for over 60 years and attempt to explain health-related behaviours by considering the cognitions or thoughts that are held by a person about the behaviour, the circumstances that make the behaviour more likely to occur and social influences on the behaviour. This information is used to manipulate these factors to bring about behaviour change. Theories of behaviour change can be

divided into three main types. Continuum models which place the person along a range that reflects how likely they are to change their behaviour, based on the presence or absence of a number of predictor variables. These types of theories tend to focus on intention to engage or not with a particular behaviour, rather than looking at what predicts the actual behaviour<sup>(12)</sup>. Examples of such theories include the health beliefs model<sup>(48)</sup> and the theory of planned behaviour (TPB)<sup>(49)</sup>. Stage models of behaviour change suggest change occurs over a number of distinctive stages, thus depending on which stage of change (not thinking about changing a behaviour, considering a need to change, planning a change in behaviour) the person is at, will impact the likelihood of behaviour change and the strategies used to bring about change. Such theories suggest a person must move through the stages to bring about behaviour change. An example of a stage model is the transtheoretical model of behaviour change<sup>(50)</sup>. As a result of many of the issues with continuum and stage models of behaviour change, integrative models of behaviour change have been developed. Integrative models attempted to establish constructs that were common across a range of theories and combine these to better understand the underlying mechanisms that influence a particular behaviour. The capabilities, opportunities, motivation and behaviour (COM-B) model is an example of this type of theory<sup>(51)</sup>.

All behaviour change theories attempt to explain or predict behaviour based on a range of constructs specific to each theory. The extent to which they succeed in this respect varies and it is worth noting that no one theory can explain 100 % of behaviour<sup>(52)</sup>, even those based on integrative theories. It has been noted that some theories are more successful at explaining intentions to engage with a target behaviour but less so for the actual behaviour itself, sometimes referred to as the intention behaviour gap<sup>(52,53)</sup>. Some improvements in accounting for the variance in behaviour has been achieved by combining theories<sup>(54)</sup> or adding and extending them to include additional variables<sup>(55)</sup> that may be relevant to engagement with a given behaviour such as past behaviour<sup>(56)</sup>, anticipated regret<sup>(57)</sup> or including sociodemographic variables<sup>(12,58)</sup>. It is also worth noting that theories are not always employed in the way that they should be to gain an understanding of behaviour and the main facilitators and barriers, which is essential for identifying what needs to change<sup>(59)</sup>. What is relatively new over the last 10 years is the drive to use this information to design more effective behaviour change interventions, also to standardise psychological intervention components and their description to better understand what the active agent of behaviour change are within an intervention and for this to translate into evidence-based policy and practice<sup>(60,61)</sup>.

### Using theories to design interventions: two worked examples

Interventions designed within a theoretical framework provide a basis for understanding the main facilitators



**Fig. 1.** Theory of planned behaviour (TPB) model<sup>(76)</sup>.

and barriers to the target behaviour. It provides an opportunity to gain a better insight into the underlying mechanisms of action controlling the behaviour and to identify the most effective intervention components to bring about behaviour change<sup>(51,62)</sup>. There is some evidence to suggest that interventions designed using a theory are more effective<sup>(63)</sup>; however, not all reviews support this<sup>(64)</sup> and others report mixed findings<sup>(65)</sup>.

We have highlighted a need to address lifestyle modification at menopause, in order to promote health and well-being. Credence to this comes from the clinical guidelines that all menopausal women should receive advice and support on lifestyle change, and that theoretical models should be implemented for intervention design but there is a paucity of research on the effectiveness of such interventions. Also, there is a need to understand how to create lasting lifestyle change, where behaviour change becomes habitual<sup>(66)</sup>, running well beyond the duration of an intervention.

Interventions in relation to menopause management are starting to emerge, in response to the need for a greater understanding of menopause and how to support women with lifestyle changes<sup>(14)</sup>. There is evidence from systematic reviews that the application of theories to behaviour change interventions at midlife is weak and inconsistent<sup>(59,67)</sup>. Some researchers have used theories as a framework for intervention design in menopause focusing on management of menopausal symptoms such as vaginal dryness<sup>(68)</sup>, others have looked intentions to change lifestyle behaviours such as exercise and physical activity<sup>(69,70)</sup>, and dietary intake<sup>(71,72)</sup>. Some interventions target menopausal symptoms, diet and physical activity employing a health education approach<sup>(40)</sup>. More research is needed on what works best and the effectiveness and acceptability of such interventions for menopausal women.

The next section will explore in more detail how two theories of behaviour change were used to design interventions to promote physical activity in menopausal women and the promotion of the Mediterranean-

dietary approaches to stop hypertension diet intervention for neurodegenerative delay (MIND) diet at midlife.

### **Example one: using the theory of planned behaviour to better understand engagement with the physical activity guidelines in pre-, peri- and post-menopausal women<sup>(10)</sup>**

#### *Background and theory*

This was in response to research findings that women tend to engage in less physical activity across the lifespan compared to men and that this declines further with age<sup>(73)</sup>. More recently, just over half of women are not meeting the recommended guidelines for moderate physical activity in Northern Ireland<sup>(74)</sup>, even fewer (14%) are engaging in muscle-strengthening activities<sup>(75)</sup>. Menopausal transition provided a good way to compare the difference between women pre, peri and post in relation to those meeting the physical activity guidelines. This example provides an overview of the methods employed to promote understanding of two target behaviours within the physical activity guidelines, 150 min of moderate physical activity per week and muscle strengthening activities on at least 2 days per week. It is the latter behaviour that formed the basis of the intervention outlined later.

The TPB<sup>(76)</sup> enhances understanding of health behaviours and underlying cognitive decision-making processes, see Fig. 1. Attitudes to the behaviour (e-cigarette use) include the perceived benefits or risks of engaging in the behaviour. Subjective norms are the influence of important others such as family or friends in the decision to engage with a behaviour. Perceived behavioural control is the belief about how easy or difficult it is to engage with the behaviour. A consistent approach to the measurement of these constructs enables the TPB to explain or account for variation in intentions to use e-cigarettes (EC)<sup>(77,78)</sup>.

The TPB proposes a sequential structure using mixed methodology (both qualitative and quantitative methods) for conducting research to inform intervention



**Table 1.** Mapping the TPB onto intervention components and implementation examples

TPB construct	Behaviour change techniques		Accompanying materials
Attitudes	Information on health consequences	Action planning	Information leaflet about MSA
Self-efficacy	Instructions on how to perform MSA Review of behavioural goals	Goal setting Self-monitoring of behaviour	Menopause fact sheet Behaviour change diary
Intentions	Pros and cons of engaging with MSA on at least two days weekly	Prompts and cues	physical activity (PA) assessment – objective and subjective
Subjective norms	Practical social support	Demonstration of the behaviour Modelling	

MSA, muscle strengthening activities; TPB, theory of planned behaviour.

design, this is outlined in part in the manual for using the TPB to design research to understand a behaviour<sup>(79)</sup> and Ajzen’s website for designing interventions using this model. It involves three sequential stages.

*Stage one*

Stage one or using the TPB involves an elicitation study, a qualitative study using interviews, focus groups and open-ended questionnaires (minimum of twenty-five participants) to determine the salient beliefs (attitudes, subjective norms and perceived behavioural control, outlined in the Frances manual, that relate to the target behaviour). Data gathered during this stage are analysed using content and summative analysis. The top 75 % of responses representing each construct in the theory is used to form the basis of a TPB questionnaire, for use in stage two.

*Stage two*

Stage two involves conducting a TPB survey, to determine the most significant predictors of the target behaviour. The development and format of questions, relating to direct and indirect measures of the TPB constructs, are clearly described within the Frances manual. In keeping with the TPB protocol, we included direct measures of intentions, attitudes, subjective norms, perceived behavioural control and subjective measures of the target behaviours<sup>(79)</sup>. Also, indirect measures of behavioural beliefs and outcome evaluations, normative beliefs and motivation to comply and control belief were included in the questionnaire. Alongside the TPB items, measures of menopausal status and sociodemographic variables were included. Stages one and two combined provide a comprehensive understanding of the target behaviour and the underlying cognitive processes mediating this behaviour and what needs to change in future interventions.

*Stage three*

Stage three is feasibility and acceptability study on the design, implementation and evaluation of the intervention. Data gathered from stages one and two informed what needed to change and the predictors to be targeted to optimise behaviour change in the desired direction. Using this information to design an intervention is

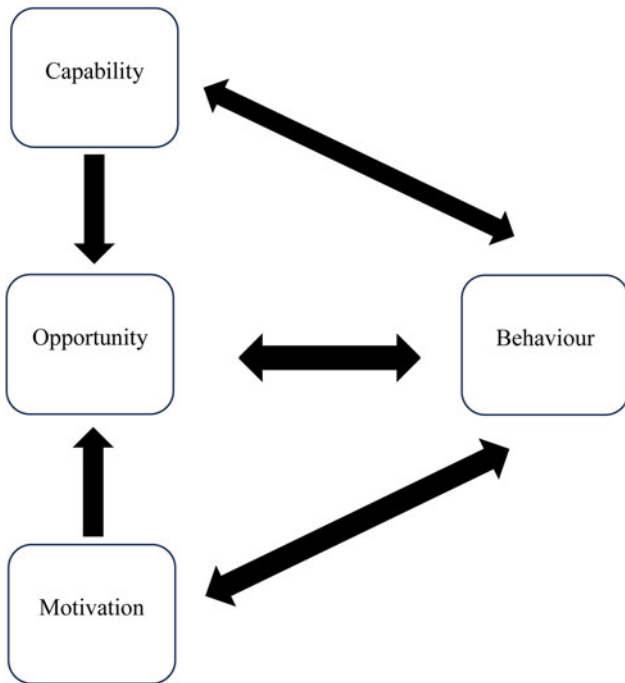
where the TPB becomes less clear on how to use this information to bring about behaviour change<sup>(80,81)</sup>. However, this research was guided by the Medical Research Council guidelines for developing and evaluating interventions<sup>(82,83)</sup> and the taxonomy of behaviour change<sup>(84)</sup> to identify and standardise the reporting of the behaviour change techniques, thus the focus was on determining the acceptability and feasibility of an intervention to promote physical activity guidelines in women in the first instance, that could be further improved upon. In keeping with previous research, this involved a mixed methods approach<sup>(85)</sup>, first a randomised controlled feasibility trial and secondly, evaluation of process (behaviour change techniques) via interviews with participants, and outcome (pre- and post-intervention), changes in target behaviour and TPB constructs.

The intervention was a 4-week intervention, which included a leaflet to explain what muscle strengthening activities were and how to perform them and how many repetitions were required. Each week the participants met with the researcher, discussed progress and reviewed goals, were encouraged using the TPB constructs to complete the muscle strengthening activities each week and to build on this via a range of behaviour change techniques such as goal setting, self-monitoring, information provision, social support and rewards, these were mapped to key theoretical constructs identified in stages one and two as being important for the uptake of muscle strengthening activities, see **Table 1** for some examples.

**Example two: developing a dietary intervention to encourage uptake of the Mediterranean-dietary approaches to stop hypertension diet intervention for neurodegenerative delay diet in healthy midlife adults, aged 40–55 years employing the behaviour change wheel<sup>(86)</sup>**

*Background and theory*

The behaviour change wheel was developed to combat many of the issues and problems with early theories of behaviour change, to combine many of the constructs within the previous research, and to address issues with mapping theory into intervention design, standardising



**Fig. 2.** Capabilities, opportunities, motivation and behaviour (COM-B) model<sup>(87)</sup>.

descriptions and components of intervention to aid replication and identify good practice<sup>(87)</sup>. It provides a theoretical framework for the research, again there are three stages, which will outline the methodology conducted using the theory in this worked example to determine facilitators and barriers to the uptake of the MIND diet<sup>(88)</sup> in adults at midlife.

The behaviour change wheel provides a research framework for designing, implementing and evaluating interventions, at its core is the COM-B model, which reflects capabilities (C), opportunities (O), motivation (M) and behaviour (B), see Fig. 2<sup>(87)</sup>. The model claims that opportunity and capability influences motivation, which then determines engagement with a target behaviour, thus opportunity and capability both have the potential to influence behaviour directly and indirectly. In order to change behaviour, according to the COM-B model, one of the constructs must be targeted, this will be dependent on an understanding of what is driving the behaviour, which is determined in stage one of the theoretical framework.

#### *Stage one: understanding the behaviour*

Stage one was achieved by conducting a systematic review to establish the use of behaviour change theories in whole-diet interventions<sup>(59)</sup>, one of the first systematic reviews to look at this. Nine studies were identified, most reported a theoretical framework but were not applying the theory rigorously to mapping the intervention and there were gaps in checking fidelity of the intervention delivery, which impacts the effectiveness of the components of the intervention and replicability of results.

This sets the context and rationale for the need for a theory-driven dietary intervention. Also as part of stage one, a behavioural diagnosis was carried out by conducting focus groups and interviews with twenty-five male and female participants aged 40–55 years<sup>(86)</sup>. The questions used for the behavioural diagnosis were based on the COM-B and the theoretical domains framework (TDF)<sup>(89)</sup>, in keeping with the recommendations for using the behaviour change wheel to design interventions. Data collected provided information on the facilitators and barriers to the uptake of the MIND diet in this sample and which of the theoretical domains were important for promoting this.

#### *Stage two: identifying intervention options*

Stage two is identifying intervention options or general functions that may be used to change behaviour, that are linked to TDF. The data from the behavioural diagnosis linked to eight out of fourteen TDF, including environmental context and resources; beliefs about capabilities; knowledge; memory attention and decision making; behaviour regulation; social influences; skills and emotion. Six of the nine intervention functions were able to map onto the COM-B and the TDF, these included education, training, persuasion, modelling, environmental restructuring and enablement. When considering intervention functions and how appropriate they would be to implement within an intervention, the affordability, practicality, effectiveness, acceptability, safety and equity criteria<sup>(87)</sup> was applied to each of the six intervention functions in turn, to enhance the appropriateness and suitability of the intervention components<sup>(90)</sup>.

#### *Stage three: identify content and implementation options*

All six intervention functions were deemed suitable, and this marked the start of stage three, which involved identifying content and implementation options for the intervention. This was guided in part by the next step to select the most appropriate behaviour change techniques (BCT) for each of the intervention functions. Within the TDF, twelve domains and their corresponding intervention functions, have been linked to fifty-nine behaviour change techniques defined by the behaviour change techniques taxonomy v 1<sup>(84,91)</sup> and the theory techniques tool<sup>(92)</sup>. Prior research provided evidence to support the most frequently used behaviour change techniques to successfully target each intervention function, and their corresponding mechanism of action on the target behaviour<sup>(62,93)</sup>. In this study, twenty-four BCT were selected for the dietary intervention that could be mapped directly to the COM-B, using the taxonomy of behaviour change provided standardised descriptions of the components included in the intervention, making it more replicable in further studies, this approach is considered good practice<sup>(84)</sup>. Table 2 shows how some BCT were mapped to the COM-B model.

The implementation of the intervention was a 12-week feasibility randomised controlled trial (RCT) with adults aged 40–55 years living in Northern Ireland. There were

**Table 2.** COM-B constructs mapped to examples of the BCT employed in the MIND diet intervention

COM-B	BCT
Capability	<ul style="list-style-type: none"> <li>Information on how to preform behaviour,</li> <li>Self-monitoring</li> <li>information on health consequences</li> </ul>
Opportunity	<ul style="list-style-type: none"> <li>Peer support</li> <li>Restructuring the physical environment</li> <li>Prompts and cues</li> <li>Behaviour substitution</li> </ul>
Motivation	<ul style="list-style-type: none"> <li>Positive self-talk</li> <li>Self-monitoring</li> <li>Action planning</li> </ul>

COM-B, capabilities, opportunities, motivation and behaviour; MIND, Mediterranean-dietary approaches to stop hypertension diet intervention for neurodegenerative delay.

three groups, a control group that received the current physical activity guidelines, MIND diet only group who were given information about the MIND diet and the MIND diet plus support group who had access to a website with additional resources based on data from stages one and two (educational material on benefits of MIND diet, recipes, self-monitoring resources and social support) to promote adherence to the MIND diet. An evaluation of the intervention, focusing on outcome and process was carried out in keeping with guidelines. This provided a very structured approach to intervention design and the evaluation of process provided an opportunity to determine what worked and didn't work in this sample and how this could be improved for a larger RCT.

### Conclusions and recommendations

In order to change a behaviour, you need to have a good understanding of that behaviour, when, where and why it occurs, and what needs to change to promote health and well-being. Adopting a theoretical framework will provide researchers with guidance on how to collect this key information, which can be used to inform the design, implementation and evaluation of both process and outcome in an intervention. To effectively target and change the behaviour using theory is considered good practice<sup>(13)</sup>. Many of the theories are flexible, in that additional variables can also be added, or theories can be combined to try to account for a greater amount of the variance in both intentions and actual behaviour. It is worth noting that few studies employ such theories in the way that they are intended to be used for intervention design. This may account for the variation in success of such interventions in changing behaviour. Other issues that need to be addressed in future lifestyle interventions are the poorly described methods and intervention components, this is partly due to the failure to map the theory onto the intervention functions, and clearly define the active components of the intervention (behaviour change techniques), and to fully explain mechanisms of action. This makes it impossible for replication of interventions

and to make recommendations for good practice. To combat these issues theoretical frameworks could be used in conjunction with the TDF and the taxonomy of behaviour change, to standardise intervention design. Many interventions do not include a process evaluation and fidelity checking, making it impossible to fully understand the acceptability and feasibility of an intervention<sup>(94)</sup>. Some researchers are developing evaluation frameworks to support and inform researchers what they need to do<sup>(95)</sup>, providing us with a better understanding of how to change a specific behaviour and providing evidence to support practice and policy in some cases. Behaviour change interventions for menopause need to be theory driven, employ standard mapping procedures of components of the intervention and the behaviour change techniques through to implementation. As post-menopause lasts for 20–30 years, more research needs to focus on habitual behaviour change and how this can be achieved within interventions<sup>(66)</sup> in order to optimise health benefits and reduce the harmful effects of oestrogen deficiency for women in later life.

### Acknowledgements

The authors would like to thank all the participants who took part in these studies and also the advisory teams that we worked with on each project.

### Financial Support

The Department for the Economy (DfE) sponsored the research reported in this review paper.

### Conflict of Interest

None.

### Authorship

E. E. A. S. gave the talk for the ISNS and prepared this review paper based on the presentation given. The two examples of studies given in this review paper were managed by J. D. and D. T. Both J. D. and D. T. project managed the work for these studies, they designed the respective interventions based on the chosen theoretical frameworks and preliminary work completed and outlined in the review paper. E. E. A. S., J. D. and D. T. revised and edited the manuscript critically for intellectual content. All authors read and approved the final manuscript.

### Ethical standard

Both studies one and two presented within this manuscript had ethical approval, obtained from the School of Psychology Staff & Postgraduate Filter Committee, Ulster University, which is in accordance with The Code of Ethics of the World Medical Association



(Declaration of Helsinki). Consent was provided by all participants.

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