



# Theory-informed strategies to address factors anticipated to influence implementation and people's participation in community pharmacy-based diabetes prevention services

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## ABSTRACT

**Background:** Early identification of non-diabetic hyperglycaemia and implementation of diet and lifestyle changes can prevent type 2 diabetes. However, low participation in diabetes prevention services remains a problem in the UK. The community pharmacy, one of the most accessible healthcare settings in the UK, could provide one solution to improving participation.

**Aim:** To prioritize factors that could influence delivery of, and people-participation in, community pharmacy-based diabetes prevention services, and to identify strategies to facilitate successful implementation.

**Methods:** A mixed-methods, primary care-based study, comprising of two stages: 1- Prioritizing key influences of participation and delivery using a structured Nominal Group Technique with people with non-diabetic hyperglycemia, and other stakeholders; 2 – Identifying theory informed strategies to facilitate successful implementation using framework analysis. This involved mapping prioritized influences and qualitative data from the Nominal Group Technique onto the Behaviour Change Wheel theoretical framework. The study was conducted in February 2019, in Norfolk, UK and ethical approval obtained prior to research commencing.

**Results:** Fifteen participants (five people with non-diabetic hyperglycaemia, nine community pharmacy and general practice staff and one commissioner) participated. Participants prioritized “awareness” and “service integration” as key factors likely to influence participation and “the provision of information about health consequences e.g., leaflets” and “action planning e.g. general practice referral of patients to prevention services” as key strategies to facilitate participation. “Training”, “staffing levels” and “workload” were amongst the key factors prioritized as most likely to influence delivery. Strategies identified to facilitate implementation included “instructions of how to perform the behaviour e.g. standard operating procedures” and “reward e.g. funding”.

**Conclusions:** This research provides theory informed strategies needed to facilitate successful implementation of community pharmacy-based diabetes prevention services. The findings of this study should inform the design of future diabetes prevention services to ensure participation and sustainability.

## 1. Introduction

In England, 4.4 million people are estimated to be living with type 2 diabetes mellitus (T2DM),<sup>1</sup> a figure that has doubled in the past 15 years. The management of diabetes and its complications currently costs the National

Health Service (NHS) over £1.5 million an hour; approximately 10% of the total annual budget.<sup>2</sup>

Non-diabetic hyperglycemia denotes blood glucose levels above the normal range, but not in the diabetic range (HbA1c 42–47 mmol/mol (6.0–6.4%) or fasting plasma glucose 5.5–6.9 mmol/l).<sup>3</sup> Approximately

*Abbreviations:* COM-B, Capability, Opportunity and Motivation for undertaking a Behaviour; CPPE, Centre for Pharmacy Postgraduate Education; GP, General Practice; HCAs, Healthcare Assistants; NDH, Non-diabetic hyperglycaemia; NHS, National Health Service; NHS DPP, National Health Service Diabetes Prevention Programme; T2DM, Type-2 Diabetes Mellitus.

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5–10% of people with non-diabetic hyperglycemia develop T2DM annually, although this may vary with population characteristics and definitions.<sup>4,5</sup> Early identification of non-diabetic hyperglycemia and subsequent implementation of diet and physical activity behaviour change can significantly reduce progression to T2DM.<sup>6,7</sup>

In 2016, with approximately five million people estimated to have non-diabetic hyperglycemia in England, a national diabetes prevention programme (NHS DPP) was implemented to tackle the increased prevalence of T2DM.<sup>7,8</sup> The national programme identifies people with non-diabetic hyperglycemia and refers them to a 9-month group-based behavioural change intervention primarily consisting of diabetes and lifestyle education and support to increase physical activity.<sup>9,10</sup> The programme is funded by NHS England and is delivered nationally by framework providers selected through a national commercial procurement process conducted every four years.<sup>9</sup> The programme can be delivered by both primary care providers (e.g., community pharmacy) and non-healthcare providers (e.g., voluntary or private sector organisations).<sup>11</sup> Currently the programme is being delivered by four private sector organisations (Xyla Health and Wellbeing; Living Well Taking Control; Reed Wellbeing and Thrive Tribe).<sup>12</sup> However, progress reports of the NHS DPP indicate poor participation amongst people with non-diabetic hyperglycemia; suggesting that 47% of people referred into the programme decline participation and of those who enroll; 53% attend an initial assessment; 36% attend at least one group-based session; and 19% complete the intervention (attend >60% of sessions).<sup>13</sup>

Our previous research has identified accessibility (e.g., inconvenient session times and locations) as a key barrier to participation in the NHS DPP,<sup>14</sup> a finding which aligns with literature investigating participation in similar preventative interventions in Australia and the USA.<sup>15,16</sup> We have also previously explored community pharmacy as a potential setting for increasing accessibility, and identified a number of factors that could increase participation (e.g. flexible session times)<sup>14</sup> and facilitate the implementation of diabetes prevention services (e.g. training).<sup>17</sup> Community pharmacies, offering convenient locations and extended opening hours,<sup>18</sup> can offer opportunities to support behaviour change interventions such as the NHS DPP by directly addressing some of the barriers to participation.

Whilst our previous research has generated a list of factors that may influence participation in and delivery of community pharmacy-based diabetes prevention services,<sup>14</sup> there is a need to prioritize these factors and develop strategies that could facilitate both participation and implementation. Therefore, building on our previous research, the first objective of the study presented in this paper was to prioritize key influences of participation and delivery of community pharmacy-based diabetes prevention services. Following prioritization, the second objective of the study was to identify strategies that can target the key influences, in order to facilitate implementation.

To meet the first objective, the study adopted a Nominal Group Technique method; a structured face-to-face consensus method that aims to achieve a general agreement or convergence of opinion around a particular topic.<sup>19</sup> The Nominal Group Technique is often used in health services research to explore opinions of health professionals, lay people and carers' views.<sup>20,21</sup> The original method comprises of four key stages: 1. Silent generation of ideas, 2. Round robin (discussion), 3. Clarification and 4. Voting.<sup>22</sup> Over the years, variations in the use of the Nominal Group Technique have been adopted, including re-ranking<sup>23</sup> and the exclusion of 'generation of ideas' due to the availability of adequate ideas from preliminary qualitative research or surveys.<sup>23</sup> This study used an adapted Nominal Group Technique<sup>23</sup> which, in contrast with the original method, replaced the silent generation stage with the initial ranking of ideas. As this study was built on previous research findings which already identified factors to be prioritized, the generation of ideas was deemed unnecessary. Additionally, due to the inclusion of multiple stakeholders, re-ranking was considered important in determining how discussions would alter participant views.

To meet the second objective, the study employed a theoretical framework known as the Behaviour Change Wheel.<sup>24,25</sup> This framework

incorporates a system to help understand targeted behaviours (in this case participation in and delivery of diabetes prevention services) and also facilitates the identification of key strategies (also known as Behaviour Change Techniques) to bring about the desired behaviour change.<sup>26,27</sup> The system which facilitates understanding of behaviour forms the central hub of the wheel, known as the COM-B, is a model whose central principle is that for any 'behaviour(B)' to occur there must be 'capability (C)' to do it; 'opportunity (O)' for it to occur; and enough 'motivation (M)' to perform it. Following understanding of the behaviour, the Behaviour Change Wheel incorporates a system to guide the selection of effective strategies. The Behaviour Change Wheel framework was selected for use in this study due to its incorporation of both; a system from which potentially effective and evidence-based strategies can be identified, and a rational system for matching them to the behavioural target (COM-B).

## 2. Methods

### 2.1. Study design

This mixed methods study focused on two distinct behaviours: 1) potential participation in community pharmacy-based diabetes prevention services by people with non-diabetic hyperglycemia; and 2) delivery of diabetes prevention services by community pharmacy staff. The study consisted of two stages: 1- A structured Nominal Group Technique to firstly prioritize factors (identified in our previous research)<sup>14,17</sup> likely to influence these two behaviours. The Nominal Group Technique produces both quantitative data through ranking and qualitative data through discussions. 2- The Behaviour Change Wheel was then employed to identify strategies that could facilitate implementation.<sup>24,25</sup> This process firstly involved mapping factors prioritized in step 1 including the qualitative data from the discussions onto the categories of the COM-B<sup>14,17</sup>. Secondly, populated COM-B categories were used to guide the selection of appropriate intervention functions (broad categories of means by which an intervention can change behaviour) before selecting appropriate strategies from a taxonomy of 93 Behaviour Change Techniques.<sup>24,25,28</sup> The Behaviour Change Wheel and its components are expanded upon in Table 1.

The research was conducted between February and March 2019 and ethics approval was obtained from the Health Research Authority (IRAS project ID: 227930 and 233,631) and the Faculty of Medicine and Health Sciences Research Ethics committee at the University of East Anglia.

### 2.2. Setting

The study was conducted in Norfolk, UK, at a time when the NHS DPP was undergoing implementation in primary and community settings across the nation. However, although part of primary care,<sup>30</sup> community pharmacy has not yet received funding to deliver the NHS DPP.

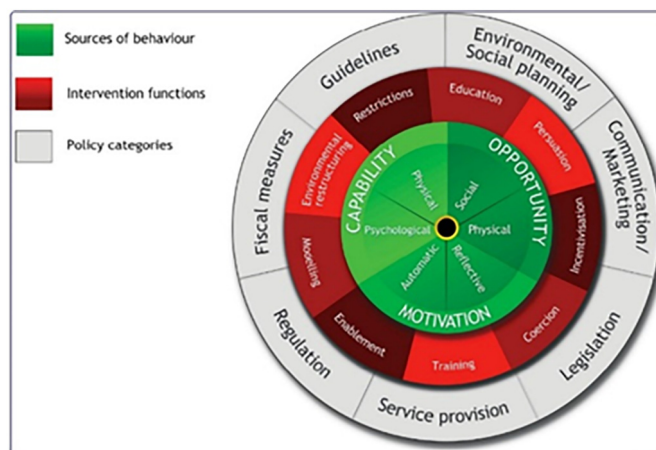
### 2.3. Participants

This study involved people with non-diabetic hyperglycemia recruited from general practices (GPs) which were participating in screening and referral to the NHS DPP. Other stakeholders included healthcare personnel (community pharmacists, pharmacy technicians, healthcare assistants, general practitioners and nurses) and local service commissioners. Including multiple stakeholders facilitated the building of a comprehensive model for implementing community pharmacy-based diabetes prevention services.

### 2.4. Sampling and sample size

For the Nominal Group Technique, two separate group discussions, one with people with non-diabetic hyperglycemia and another with healthcare personnel and commissioners, were planned with the aim to obtain groups of 5 to 12 participants, ensuring diversity.<sup>19,31</sup> People with non-diabetic hyperglycemia were initially purposively sampled, with priority given to

**Table 1**  
The behaviour change wheel and its components.



Michie S, Atkins L, West R. (2014) *The Behaviour Change Wheel: A Guide to Designing Interventions*. London: Silverback Publishing.

**The Behaviour Change Wheel:** A theoretical framework that can be applied systematically by researchers to understand influences of behaviours, and to identify effective interventions that can be implemented to change these behaviours. The Behaviour Change Wheel = consists of three components:

1. **The COM-B:** The first part of the framework presented as the green inner core, also referred to as the framework's behavioural equation:  $B = COM$  i.e., an individual's behaviour (B) is a function of their capability (C), opportunity (O) and motivation (M).
  2. **Intervention functions:** The second part of the framework shown as a red ring around the core. This part of the model is comprised of nine intervention functions which are broad categories of means by which an intervention can change behaviour. Each of the nine intervention functions has a role to play when designing a behaviour change intervention and can affect one or more of the underlying factors of behaviour (COM). E.g., Education can increase an individual's psychological and physical Capability, as well as their reflective Motivation.
- Behaviour Change Techniques:** These nine intervention functions, although largely broad, can be used to select appropriate interventions (strategies) to change behaviour as they are specifically linked to a taxonomy of 93 Behaviour Change Techniques.<sup>29</sup>
3. **Policy categories:** The third and final part of the model shown as the grey outer ring of the wheel. This section is comprised of seven categories of policy that could be used to enable interventions that affect behaviour and can each support one or more of the intervention functions. In this paper, we do not consider policy categories since they are designed with national policy in mind and delivering Diabetes Prevention Intervention is already part of the NHS LongTerm Plan.

those who had not engaged with the NHS DPP. However, due to the low response rates, participants were subsequently conveniently sampled. Other stakeholders were purposively sampled to ensure a mix of professional backgrounds within primary care.

## 2.5. Data collection

The Nominal Group Technique consisted of three main stages: initial individual ranking, group discussion and individual re-ranking.

### a) Initial individual ranking

Potential influencers of participation in and delivery of community pharmacy-based diabetes prevention services identified from our previous research<sup>14,17</sup> were first summarized in an electronic questionnaire (Appendix 1) and emailed to all participants one week before the discussion. As these influencers had been previously mapped onto one of three COM-B categories, for the first behaviour (participation in community pharmacy-based diabetes prevention services), participants were asked to select one factor out of the six that they perceived to be most important for influencing participation, irrespective of the COM-B category. For the second behaviour (delivery of diabetes prevention services by community pharmacy staff) which had nineteen influencing factors identified from previous research, participants were asked to select one factor from each COM-B category that they perceived to be most important for influencing delivery.

### b) Group discussion

Anonymised responses to the questionnaire were presented at the group discussion to identify statements on which consensus had been reached and therefore which required less discussion. At the discussion, topics (as outlined in the questionnaire) were introduced and discussed in turn.

Participants were asked to expand on their responses/viewpoints and discuss the rationale behind their ranking with the group.<sup>22,23</sup> Discussions were held at the University of East Anglia and facilitated by two members of the research team (TKC and MT)<sup>21</sup>. Discussions were digitally audio recorded and lasted approximately 50 min.

### c) Individual re-ranking

Following discussions, participants re-ranked the influences and in consideration of other participants' views. The re-ranking process was anonymous and took approximately five to ten minutes to complete.

## 2.6. Analysis

Stage 1 analysis: Prioritizing potential influencers of participation in and delivery of community pharmacy-based diabetes prevention services.

A descriptive analysis of participant demographics and quantitative data from the ranking was conducted using SPSS statistics (version 23; IBM Corp). Ranking was described in percentages with highest percentages identified as most important influencing factors'.

Stage 2 analysis: Selecting strategies (Behaviour Change Techniques) to facilitate implementation of community pharmacy-based diabetes prevention services: The Behaviour Change Wheel.

Qualitative data from the discussion was transcribed verbatim and analysed using NVivo software. A framework analysis was adopted,<sup>32</sup> whereby data were initially inductively coded by a member of the research team (TKC) to identify views regarding the factors that were ranked, before being mapped onto relevant COM-B categories of the Behaviour Change Wheel Framework.<sup>24,25</sup> Additionally, suggested strategies for behaviour change were separately coded from the qualitative data and together with the mapped influences, used to facilitate the identification of intervention functions and Behaviour Change Techniques following the guidance

provided by Michie et al.<sup>25</sup> The mapping and selection process was conducted independently by two members of the research team (TKC and MT) and was then jointly discussed. The final selection was then further analysed by another member of the research team (HF) with a background in health psychology. Any disagreements were resolved by discussion, referring to the original data.

### 3. Results

Fifteen participants completed the questionnaire in the initial individual ranking, twelve of whom participated in the group discussions and questionnaire re-ranking. Three participants, two people with non-diabetic hyperglycemia and one nurse, did not attend the discussion.

Two group discussions were conducted, one with people with non-diabetic hyperglycemia ( $n = 3$ ) and another with healthcare personnel and commissioners ( $n = 9$ ). Participant characteristics are detailed in Table 2. The group discussion with healthcare personnel and commissioners consisted of a mixture of community pharmacy and GP personnel, and one commissioner. Participants had a median (IQs) working experience of 8.6 (1.8, 9) years. NHS DPP participation characteristics included waiting for an initial screening assessment, programme completion and drop-out.

#### 3.1. Stage 1 - Prioritization of potential influences of participation in and delivery of community pharmacy-based diabetes prevention services: The Nominal Group Technique

##### 3.1.1. Stage 1a: Influences of participation in diabetes prevention services

Six factors were identified by previous research to have potential for influencing participation in community pharmacy-based diabetes prevention services by people with non-diabetic hyperglycemia.<sup>14</sup> Table 3 documents the ranking of these factors (presented under their COM-B categories) before and after the Nominal Group Technique discussions. Views of participants did not change following the group discussion. From the ranking, awareness/promotion of community pharmacy-based diabetes prevention services and the integration of diabetes prevention services between community pharmacies and GP's were identified as the most important potential influences of participation. These factors were mapped onto COM-B categories psychological capability, social opportunity, and reflective motivation.

From the discussions, participants felt that awareness was important due to a perception of a lack of knowledge of non-medicine related services delivered in community pharmacies. Participants felt that as well as informing both patients and the public of the availability of community pharmacy-based diabetes prevention services, promotional messages

**Table 2**  
Participant characteristics.

Demographic profile	Measure	Stage 1 (Initial individual ranking)	Stage 3 (re-ranking)
		$N = 15$	$N = 12$
<b>Gender</b>			
Female	N (%)	13 (86.7)	10 (83.3)
<b>Healthcare providers and commissioners</b>			
Pharmacist	N (%)	3 (20)	3 (30)
Technician		1 (6.7)	1 (8.3)
Dispenser		1 (6.7)	1 (8.3)
General practitioner		1 (6.7)	1 (8.3)
Nurse		2 (13.3)	1 (8.3)
Healthcare assistant		1 (6.7)	1 (8.3)
Commissioner		1 (6.7)	1 (8.3)
<b>People with non-diabetic hyperglycemia (NHS DPP participation status)</b>			
Waiting	N (%)	2 (13.3)	1 (8.3)
Completed		2 (13.3)	1 (8.3)
Dropped out		1 (6.7)	1 (8.3)

NHS DPP: National diabetes prevention programme.

would need to raise awareness of the teams' training and experience in order to increase patient trust and likelihood of participation.

“Well in my doctors' surgery they've got certificates up on the wall showing who does what and what qualifications they've got. I mean they don't necessarily have to have a qualification but they could have something up to say that they've met these competencies i.e. can take a blood pressure, take blood,…”

[P1, NDH patient]

Strategies suggested by participants to raise awareness were mainly in relation to the content of messages used when promoting the services. Participants felt that promotional messages would need to raise awareness of T2DM risk factors. This was due to participants with non-diabetic hyperglycemia perceiving their diagnosis to be coincidental, with most of them associating their diagnosis with visiting the GP for ‘something else’.

“It's raising awareness because had I not have been for my ‘MOT’ as [P1] called it, I wouldn't have ever thought about the fact that I might have [pre-] diabetes”

[P3, NDH patient]

Participants reported that promotional messages could be conveyed through simple means including posters and leaflets displayed both in primary care settings including community pharmacies and GP. The inclusion of diabetes prevention services as an option in referral letters from GP was also recommended.

“It's almost like there ought to be hand-outs, leaflets almost to give to people or even a poster in the doctors surgery that says are you aware that you can be tested for diabetes at your local [name of pharmacy multiple] chemist or whatever”

[P1, NDH patient]

Strategies for enhancing collaboration between community pharmacy and GP were mainly related to referrals and communication. Participants expressed that collaboration would avoid current multiple screening appointments that occur between community pharmacy and GP, hence saving both patients' time and increasing the likelihood of participation. Considering this, communication was regarded crucial, not only for integrating services and maintaining complete and up-to-date medical records, but also for instilling patient trust and facilitating participation.

“Obviously most patients they do listen to their GP's and they do listen to them very well. So I'd just say if they were to refer them to the service I think people would definitely come if they were being made aware that... you can go to a community pharmacist if you can get an appointment then people would, they generally come and use us”. [P5, pharmacist]

##### 3.1.2. Stage 1b: Influences of delivery of diabetes prevention services

Twenty one factors were identified from previous research to have potential for influencing delivery of community pharmacy-based diabetes prevention services.<sup>17</sup> Two factors, time and funding, were identified as central for implementation (thus likely to be raised in the discussions) and thus were excluded from the ranking processes on the basis that community pharmacy would have to obtain national funding to deliver diabetes prevention services. Table 4 presents the ranking of the nineteen factors (presented under their COM-B categories) before and after the discussion. From the ranking, five factors: training (knowledge of non-diabetic hyperglycemia and its management); adequate staffing levels; demonstration of impact; skill mix; and workload, were identified as most important in influencing delivery.

Views of participants concerning training requirements for community pharmacy did not alter following discussion. However, following the discussions, participants' ranking changed in favour of staffing levels, workload, skill mix and the importance of demonstrating impact. This indicates

**Table 3**  
Ranking of factors influencing potential participation in community pharmacy-based diabetes prevention services.

Factors and survey statement of influences of participation (COM-B category)	Number (%) of participants selecting statement as priority in the Initial ranking (N = 15)	Number (%) of participants selecting statement as priority in the Re- ranking (N = 12)	Selected for step 2
1. <b>Knowledge of support</b> - knowing that community pharmacy is an appropriate place to access the service options ( <b>Psychological capability</b> )	3 (20%)	2 (16.7%)	<input type="checkbox"/>
2*. <b>Awareness/promotion</b> - being aware that the services are available in community pharmacies ( <b>Psychological capability and reflective motivation</b> )	6 (40%)	5 (41.7%)	<input checked="" type="checkbox"/>
3. <b>Suitable consultation rooms</b> - Having the assurance that the service would be private and confidential ( <b>physical opportunity</b> )	1 (6.7%)	–	<input type="checkbox"/>
4. <b>Integration/collaboration with GP</b> - Making sure that the service is provided in collaboration with GP ( <b>Social opportunity and reflective motivation</b> )	5 (33.3%)	5 (41.7%)	<input checked="" type="checkbox"/>
5. <b>Healthcare professionals</b> - Having a recommendation from a general practitioner or nurse ( <b>reflective motivation</b> )	0	0	<input type="checkbox"/>
6. <b>Experience with community pharmacy services</b> - Having received a good service from community pharmacy previously ( <b>reflective motivation</b> )	0	0	<input type="checkbox"/>

GP: General Practice.

\* Awareness/promotion has been mapped onto both psychological capability and reflective motivation.

the influence of the discussion in instilling understanding of the importance of these factors for community pharmacy staff.

From the discussions theoretical knowledge of non-diabetic hyperglycemia and its management was perceived to be important for enhancing the capability of community pharmacy teams to implement preventative services. Participants felt that training would need to be targeted at all team members including healthcare assistants (HCAs). This was due to the key patient facing role that HCAs play in promoting community pharmacy services. Suggested strategies for the provision of training included the use of online training platforms to minimise cost and maximise flexibility. Standardisation of training across primary care and the provision of regular updates was also identified as important for ensuring the delivery of up-to-date and collaborative services.

“You obviously do need the training cos you all need to sing off the same hymn sheet...within the sort of GP land we all sort of pretty much sing off the same hymn sheet because we all have the same guidelines that we're following so I think that's something [could be] expanded out to community [pharmacy]”

[P10, nurse]

Adequate staffing levels was identified as key for increasing the opportunity of community pharmacy teams to deliver diabetes prevention

services. Participants relayed that although the services would be beneficial for patients and would take the ‘strain off’ GP, community pharmacy would require appropriate investment in people resources to carry this out. Pharmacists, who described feeling ‘under pressure’ with the delivery of current services including dispensing, reported that the provision of future interventions requiring minimal pharmacist involvement would increase likelihood of delivery. Therefore, the availability of multiple trained team members was identified as a key motivation for the provision of services by pharmacists and central for service delivery and maintaining the accessibility of community pharmacy services.

“... having everybody in the team trained... would mean that you have so many people available to do the service”

[P4, pharmacist]

“I think any of those could do it [Health Care Assistants, Pharmacy advisors, Dispensers and Technicians] if they've had the training because obviously when you're in hospital although you've got the trained nurse in the background it's usually the health care assistant that comes and does your blood pressure while you're in bed”

[P2, patient]

**Table 4**  
Ranking of factors influencing potential delivery of community pharmacy-based diabetes prevention services.

COM-B category	Factors influencing implementation of community pharmacy-based diabetes prevention services	Number (%) of participants selecting statement as priority in the Initial ranking (N = 15)	Number (%) of participants selecting statement as priority in the Re- ranking (N = 12)	Selected for step 2
Capability	1. Training (practical)	2 (13.3%)	1 (8.3%)	<input type="checkbox"/>
	2. Training (theoretical knowledge)	11 (73.3%)	9 (75%)	<input checked="" type="checkbox"/>
	3. Training (communication skills)	0	0	<input type="checkbox"/>
	4. Experience (service delivery)	2 (13.3%)	2 (16.7%)	<input type="checkbox"/>
Physical opportunity	5. Suitable consultation rooms (space)	3 (20%)	1 (8.3%)	<input type="checkbox"/>
	6. Access to patient medical records	1 (6.7%)	1 (8.3%)	<input type="checkbox"/>
	7. Adequate staffing levels	10 (66.7%)	10 (83.3%)	<input checked="" type="checkbox"/>
	8. Merged IT facilities	1 (6.7%)	0	<input type="checkbox"/>
Social opportunity	9. Demonstration of impact (positive health outcomes)	7 (46.7%)	9 (75%)	<input checked="" type="checkbox"/>
	10. Competing interests	4 (26.7%)	2 (16.7%)	<input type="checkbox"/>
	11. General practice workload (not creating extra workload)	1 (6.7%)	0	<input type="checkbox"/>
	12. General practice workload (reducing general practice workload)	3 (20%)	1 (8.3%)	<input type="checkbox"/>
Motivation	13. Community pharmacy workload (not affecting other services)	0	0	<input type="checkbox"/>
	14. Skill mix	3 (20%)	5 (41.7%)	<input checked="" type="checkbox"/>
	15. Workload (appropriate allocation of resources)	4 (26.7%)	5 (41.7%)	<input checked="" type="checkbox"/>
	16. Self-confidence enhanced by training	3 (20%)	1 (8.3%)	<input type="checkbox"/>
	17. Structure of service delivery	2 (13.3%)	0	<input type="checkbox"/>
	18. General practice support	3 (20%)	1 (8.3%)	<input type="checkbox"/>
	19. Relationships (communication)	0	0	<input type="checkbox"/>

Participants also felt that demonstrating impact, with regards to patient clinical outcomes from community pharmacy-based diabetes prevention services, would strengthen community pharmacy's position to get involved in delivering services. Communication of service clinical outcomes to commissioners was identified as an important determinant of securing funding as was communication of clinical outcomes with GP in increasing patient referrals. Participants also felt that feedback on the progress of people attending the services would also increase motivation of community pharmacy teams to continue delivering the services.

“So that would be good for GPs to collaborate with the pharmacies to share this [clinical] data [about patients who have been identified to have non-diabetic hyperglycemia from community pharmacy and referred to the NHS DPP] cos then they might [think] ah that patient who I referred onto the programme has benefitted from it”

[P12, commissioner]

### 3.2. Stage 2: Selecting strategies (Behaviour Change Techniques) to facilitate implementation of community pharmacy-based diabetes prevention services: The Behaviour Change Wheel

The selection of Behaviour Change Techniques associated with potential participation and delivery was conducted by first mapping of prioritized influences onto the COM-B. Following this, based on guidance provided by Michel et al.<sup>25</sup> appropriate intervention functions and Behaviour Change Techniques were identified, guided by suggested strategies identified from the qualitative data. The suggested strategies together with selected interventions and Behaviour Change Techniques are presented in Table 5.

#### 3.2.1. Stage 2a: Participation in diabetes prevention services

The provision of information about health consequences and adding objects to the environment e.g., posters and leaflets were identified as the most appropriate Behaviour Change Techniques for providing knowledge and understanding of non-diabetic hyperglycaemia and raising awareness of community pharmacy-based diabetes prevention services. The Behaviour Change Technique identified as most appropriate for enhancing a collaborative service was action planning, which involves a prompt and planning of performance of the behaviour. An example of this from the participant discussions would be an encouragement through a referral letter from their general practitioner for the patient to attend community pharmacy diabetes prevention services as part of the management plan for non-diabetic hyperglycemia.

Participants discussed the importance of raising awareness of the qualification of community pharmacy personnel in delivering the services, and reassuring patients that community pharmacy-based diabetes prevention services would be provided in collaboration with GP. Therefore, credibility was seen as an important Behaviour Change Technique in increasing motivation to participate. Examples of ways to increase credibility were displaying certification of community pharmacy personnel delivering diabetes prevention services, patients receiving referrals to community pharmacy diabetes prevention services from GP practices and displaying posters GP settings. Additionally, informing patients concerning a collaborative service was identified as a key Behaviour Change Technique in reassuring patients that the service is collaborative.

#### 3.2.2. Stage 2b: Delivery of diabetes prevention services

Behaviour Change Techniques identified to enable the provision of training for community pharmacy staff to deliver the services were information provision, demonstration of behaviour and instruction of how to perform a behaviour. As suggested by participants, community pharmacy personnel could utilise online training packages to increase knowledge and understanding (education). Additionally, community pharmacy teams could shadow GP personnel as part of their training (modelling).

Adequate staffing levels, using community pharmacy skill mix and workload were considered as key to facilitate the provision of services. As

such material reward i.e., adequate funding was the Behaviour Change Technique identified as key to facilitate delivery and to provide reassurance and encouragement to community pharmacy teams, especially pharmacists, of the ability to manage the workload. The funding also would permit them to train multiple team members to deliver the services. To ensure the appropriate allocation of resources and use of skill mix action planning (Behaviour Change Technique 1.4) by community pharmacy teams, involving consideration of time and staff requirements would need to take place. Additionally, the incorporation of regular reviews of outcomes (Behaviour Change Technique 1.7) of service provision of community pharmacy-based diabetes prevention services was identified as central for ensuring appropriate use of resources.

Self-monitoring and recording of service outcomes by community pharmacy teams (Behaviour Change Technique 2.4) was identified from the discussions to be important for demonstrating impact. Participants felt that such outcomes could also be reported to commissioners, GP and patients to encourage maintenance of funding, collaboration and participation (respectively), and to raise the profile of community pharmacy diabetes prevention services. Biofeedback which involves the provision of information about clinical outcomes e.g., HbA1c readings was also identified as an important Behaviour Change Technique (2.6) for motivating community pharmacy teams to deliver the services.

## 4. Discussion

This research firstly builds on previous research by addressing a key barrier to participating in current diabetes prevention programmes (poor intervention accessibility) through exploring implementation of community pharmacy-based diabetes prevention services. Secondly, this research highlights key Behaviour Change Techniques most likely to facilitate successful participation by people with non-diabetic hyperglycemia and delivery of diabetes prevention services by community pharmacy teams.

Increasing awareness of non-diabetic hyperglycemia and community pharmacy-based diabetes prevention services, and the provision of collaborative services within primary care, have been identified as key influences of participation. Adding objects to the environment (e.g., posters) and providing information about health consequences (e.g., leaflets and posters) have been identified as key Behaviour Change Techniques that could facilitate raising awareness of community pharmacy-based diabetes prevention services. Additionally, action planning (e.g., through referral letters) and provision of reassurance of collaboration with GP were identified as key Behaviour Change Techniques that could facilitate collaborative services.

A recent systematic review exploring pharmacists' and general practitioners' views of community pharmacy services in the UK, also highlighted the lack of awareness of extended services in this setting as a barrier to successful participation.<sup>33</sup> The review also highlighted the need for collaborative working between community pharmacists and general practitioners to achieve better integration within patient primary care pathways. This research goes beyond the findings of the review by Hindi et al. to identify theory informed Behaviour Change Techniques to facilitate raising awareness of community pharmacy-based diabetes prevention services and achieving collaborative service provision in primary care. A key finding in our research is the importance of involvement of a credible source, particularly GP, in both raising awareness and the provision of collaborative services. Our findings suggest that the involvement of GP by displaying posters and leaflets of community pharmacy diabetes prevention services and referring people with non-diabetic hyperglycemia would likely increase participation. Additionally, interventions designed to increase credibility of community pharmacy personnel (e.g., displaying qualification of team members delivering diabetes prevention services) and reassuring patients of collaboration between community pharmacy and GP were identified as important. Previous research suggests that, irrespective of whether recipients are motivated to consider information carefully or not,<sup>34</sup> sources perceived as credible are more persuasive.<sup>35</sup> Credibility of sources is often based on the perception of how trustworthy and expert they are,<sup>36</sup> thus

**Table 5**  
Selection of intervention functions and Behaviour Change Techniques to facilitate participation and delivery.

COM-B domain	Summary statement	Behaviour change strategies generated from group discussion	Selected intervention functions	Selected Behaviour Change Techniques
Behaviour: Participation in community pharmacy-based diabetes prevention services				
Psychological capability	Increasing awareness of community pharmacy services	Raising awareness of availability of community pharmacy-based diabetes prevention services	Education - to increase knowledge and understanding Enablement	5.1 Information about health consequences e.g., using leaflets and consultations to explain the health consequences of non-diabetic hyperglycaemia 12.5 Adding objects to the environment e.g., posters to inform patients and public about the availability of diabetes prevention services
Social opportunity	Making sure that the service is provided in collaboration with GP	GP referral of patients to community pharmacy-based diabetes prevention services	Enablement	1.4 Action planning e.g., GP referral encouraging patient to participate in community pharmacy-based diabetes prevention services as part of non-diabetic hyperglycemia management plan
Reflective motivation	Increasing patient/public trust through increasing awareness and collaborated services	Raising awareness of training and experience of community pharmacy personnel Community pharmacy communicating clinical outcomes to GP	Persuasion Persuasion	9.1 Credible Source e.g., displaying certification of community pharmacy personnel 5.3 Information about social and environmental consequences e.g., communicating to patients that clinical outcomes will be shared with their GP
Behaviour: Delivery of community pharmacy-based diabetes prevention services				
Psychological capability	Training on non-diabetic hyperglycemia and its management	Providing training using online resources	Education	5.1 Information about health consequences e.g., training on non-diabetic hyperglycemia, its causes, and effects 5.3 Information about social and environmental consequences e.g., training on the impact of non-diabetic hyperglycemia on individuals, societies, and nations
		Standardising training across primary care and providing regular updates on training Community pharmacy teams shadowing GP personnel delivering diabetes prevention services	Training Modelling - to provide an example for people to imitate	4.1 Instruction of how to perform the behaviour e.g., Standard operating procedure of measuring blood pressure 6.1 Demonstration of the behaviour e.g., shadowing other service providers
Physical opportunity	Adequate staffing levels (funding related) Using community pharmacy skill mix	Providing adequate resources to enable the delivery of diabetes prevention services	Enablement	1.4 Action planning e.g., plan of how many staff are required to deliver the service
		Ensuring that multiple team members are trained to services in order to increase accessibility or availability		1.7 Review outcome goals e.g., review (and reset where necessary) number of staff required to produce service outcomes
Social opportunity	Demonstration of impact (positive health outcomes)	Self-monitoring and reporting service outcomes to commissioners, GP, and patients	Enablement	2.4 Self-monitoring of outcome (s) of behaviour e.g., community pharmacy teams recording the number of people that have reduced their blood glucose every quatre and highlighting this to commissioners, patients and GP
Motivation	Using community pharmacy skill mix	Delivering community pharmacy services through trained healthcare assistants or technicians	Incentivisation	10.2 Material reward e.g., funding investment from the NHS to ensure adequate resources
	Adequate staffing levels (workload related)	Providing adequate resources so that community pharmacy staff are not overwhelmed with the workload and feel able to take on a new service		10.2 Material reward e.g., funding investment from the NHS to ensure adequate resources
	Demonstration of impact (positive health outcomes)	GP sharing clinical progress data of individuals referred onto the NHS DPP through community pharmacy		2.6 Biofeedback e.g., GP sharing clinical data of how patients referred to the NHS DPP from community pharmacy have progressed

GP: General Practice.

identifying credible sources (e.g. GP teams) and increasing community pharmacy teams' credibility may prove to be effective.

This research also highlights four key influences for the successful implementation of community pharmacy-based diabetes prevention services, including the provision of training, adequate staff levels, the use of community pharmacy skill mix and the demonstration of impact (positive health outcomes). The provision of standardised and up-to-date training across primary care settings delivering diabetes prevention services has also been highlighted. Our previous research has highlighted that standardising community pharmacy services not only facilitates the delivery of quality services but could also improve patient trust.<sup>14,17</sup> The current NHS DPP service specification recommends delivery of interventions by health professionals or suitably trained individuals and that training should align with accredited packages.<sup>11</sup> However, current training for pharmacists and other pharmacy personnel does not include training packages specifically focused on the management of non-diabetic hyperglycemia.<sup>37</sup> Therefore, to deliver diabetes prevention services, community pharmacy would need to identify or develop suitable training packages that meet the standards set out in the service specification.

Incentivisation through financial reward, action planning and reviewing outcome goals have been identified as important Behaviour

Change Techniques for increasing both the opportunity and motivation of community teams to deliver diabetes prevention services by providing adequate staff levels and ensuring the appropriate use of skill mix. This finding resonates with the increased strain on community pharmacies due to the expansion of clinical and public health services provided through this setting.<sup>33,38</sup> A recent review highlighting a key role that community pharmacy has played in the COVID-19 pandemic, has identified the need for adequate reimbursement to help cover the cost for time, legal (including indemnity), regulatory coverage for advanced roles; and clear and consistent guidance for adaptation of services.<sup>39</sup> A report on clinical services provided by community pharmacy has also highlighted the need to develop community pharmacy workforce capacity to include models of practice that best utilise the community pharmacy skill mix.<sup>40</sup> Therefore, the development of community pharmacy teams, restructuring of skills and adequate reimbursement, beyond the current capacity, would need to be undertaken to enable community pharmacy to take on new roles.

The demonstration of behaviour by reporting of clinical outcomes to patients, GP and commissioners has been identified as a key Behaviour Change Techniques for enhancing patient retention, commissioning and integration of community pharmacy-based services in primary care. Previous research indicates a lack of evidence directly linking specific community

pharmacy-based interventions to particular clinical outcomes.<sup>41</sup> With recent commissioning adopting an outcomes-based approach,<sup>42,43</sup> community pharmacy-based diabetes prevention services would be required to determine the best service delivery models to meet the outcomes and cost envelope specified by commissioners.

## 5. Strengths and limitations

Behaviour change theory has been appropriately applied in understanding the key drivers of potential participation in and delivery of community pharmacy-based diabetes prevention services. The involvement of multiple stakeholders, including people with non-diabetic hyperglycemia, in the research process and the use of a comprehensive theory-informed approach, ensured a detailed and thorough development process of recommended implementation strategies. Study limitations include insufficient representation of people not engaging with the NHS DPP. However, because this research builds on previous findings which included people who declined participation in the NHS DPP these findings are relevant.<sup>14</sup> Another limitation was the inclusion of only a small number of participants in conducting the Nominal Group Technique due to time and resource constraints. This precluded further discussion and re-ranking of factors especially where prioritization had altered following discussions. Another limitation is the exclusion of non-English speakers due to limited time and resources to enable translation of research materials. This exclusion limited the ability for the research to explore language as a potential barrier/facilitator for participation. Finally, this research was conducted in Norfolk which largely consists of a white population compared to the rest of England.<sup>44</sup> This therefore limits the generalisability of this research to other parts of England (e.g., London) which have a larger proportion of ethnic minorities.

## 6. Conclusions

This study presents stakeholder led identification of Behaviour Change Techniques, targeted both at people with non-diabetic hyperglycaemia and community pharmacy teams, which should be considered when implementing diabetes prevention services in a community pharmacy setting. Behaviour Change Techniques for people with non-diabetic hyperglycaemia should focus on raising awareness of the services, ensuring an integrated pathway for people with non-diabetic hyperglycaemia and increasing credibility of community pharmacy teams in delivering diabetes prevention services through involvement of GP. Behaviour Change Techniques targeted at community pharmacy teams should focus on providing adequate training and people resources in order to increase capacity and motivation. Further research is needed to test the feasibility of implementing such services in this setting in order to establish a clear role for community pharmacy in diabetes prevention in England.

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## Declaration of Competing Interest

None.

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