Optimising Care Home Nursing Practice in Diabetes Care: Co-Design of a Digital Intervention.





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Background:

Diabetes is a chronic and increasingly prevalent global health issue, affecting approximately 537 million people (10.5% of the global population), with projections rising to 643 million by 2030 and 783 million by 2045, predominantly in low- and middle-income countries (LMICs) where healthcare systems often struggle to manage the burden [1,2]. It is characterised by elevated blood glucose levels due to insufficient insulin production or ineffective insulin use [3,4], and includes Type 1, Type 2, gestational, and rarer forms like monogenic diabetes and latent autoimmune diabetes in adults (LADA) [5]. Type 1 diabetes is autoimmune, while Type 2, accounting for 90–95% of cases, is linked to obesity, inactivity, and unhealthy diets [6,7], and though manageable with lifestyle changes and medication, often leads to serious complications such as cardiovascular disease and kidney problems [3].

The condition imposes a massive economic burden, with diabetes-related healthcare costs reaching USD 966 billion and expected to exceed USD 1 trillion by 2045 [2]; globally, the economic impact exceeds USD 760 billion [8], and individuals with diabetes incur healthcare costs 2.3 times higher than those without the condition [9]. Without effective intervention, the global diabetes burden will continue to grow, demanding coordinated international action to improve healthcare access, encourage healthier lifestyles, and implement preventive strategies [4].

The rise in life expectancy and the growing number of older adults has contributed to the increasing prevalence of diabetes in nursing homes, where up to 25–34% of residents have the condition [10]. Older adults with diabetes are often managing multiple comorbidities, such as cardiovascular disease, neuropathy, nephropathy, and cognitive decline, making diabetes management more complex [11]. In addition, many nursing home residents have diminished functional capacity, frailty, and varying degrees of cognitive impairment, which exacerbate the challenges of diabetes care [12]. This complexity highlights the need for individualised care plans that address not only the medical aspects of diabetes but also the unique needs of each resident, including mobility, nutrition, and cognitive health [13], while recognising the essential role of non-pharmacological interventions in complementing effective medications to support holistic care.

Diabetes management in nursing homes involves regular blood glucose monitoring, appropriate medication administration and tailored nutritional interventions. These strategies are essential not only for preventing acute complications, such as hypoglycaemia and hyperglycaemia, but also for mitigating long-term risks, such as cardiovascular disease and neuropathy [4,14]. Nursing home staff play a critical role in managing diabetes for their residents, yet research has shown that many staff

members lack the necessary education and training to effectively manage the condition [15]. This knowledge gap can lead to suboptimal care and poorer outcomes for residents living with diabetes [16]. Furthermore, the increasing prevalence of diabetes in nursing homes has highlighted the importance of preventive interventions aimed at reducing the onset of diabetes. Lifestyle modifications, such as diet and exercise, have been shown to play a crucial role in maintaining healthy glucose levels and preventing the progression from prediabetes to Type 2 diabetes [17]. For nursing home residents, facilitating regular physical activity and providing nutritious meals tailored to individual dietary needs can significantly improve health outcomes and overall well-being [16].

Despite the known challenges and complexities of diabetes management in nursing homes, there remains a critical need for enhanced diabetes education and training for nursing home staff. Comprehensive education on diabetes can equip staff with the necessary knowledge to administer medications correctly, monitor glucose levels effectively, and respond to changes in residents' health status [18,19]. Additionally, empowering residents to take part in their own diabetes management, where feasible, can promote independence and improve quality of life [20]. Given the growing number of nursing home residents living with diabetes and the associated healthcare challenges, there is an urgent need to develop and implement interventions that support effective diabetes management in these settings [17,21]. In the United Kingdom, nursing homes provide long-term care for older adults with complex health needs, including those with diabetes [22]. Admission to a nursing home typically follows a comprehensive assessment of an individual's medical, functional, and social needs, often initiated by healthcare professionals or social services in consultation with families [23]. Nursing homes are staffed by a multidisciplinary team, including registered nurses, care assistants, managers, and, in some settings, allied health professionals such as occupational therapists and physiotherapists [23]. Staff educational backgrounds vary, with registered nurses holding professional qualifications and care assistants typically having vocational training [24].

A key area of focus is the co-design and testing of digital interventions, which can provide real-time support and education for both nursing home staff and residents. Digital tools hold significant potential to improve diabetes management by facilitating continuous monitoring, delivering tailored educational content, and supporting individualised care plans [25]. By addressing the unique challenges of managing diabetes in nursing homes, these interventions may help optimise the quality of life for residents and improve overall care outcomes. Given the non-clinical nature of this intervention, its effects will be evaluated using validated self-report instruments measuring changes in self-efficacy, knowledge, and communication practices. This approach allows for understanding of behavioural and attitudinal shifts that may result from the educational content. There is a notable paucity of educational interventions specifically designed to support care home staff in managing diabetes, with digital approaches being even more scarce. This study addresses this gap by developing and evaluating a novel, co-designed digital intervention tailored to the unique needs of nursing home settings.

Project Aim and Objectives:

The aim of the study was to co-design and test a digital resource aimed at improving care home staff's knowledge and self-efficacy of caring for residents with diabetes [26]:

The objectives of this study were as follows:

1. To systematically generate a theory that informs the design of a digital intervention to improve diabetes care in care homes, through an integrated, multi-phase process comprising a scoping review, qualitative interviews, and a Delphi study, each contributing evidence, contextual understanding, and stakeholder consensus to ensure relevance, feasibility, and sustainability in real-world settings.
2. Co-design a freely accessible digital intervention: One of the key objectives involved the collaborative design of a freely accessible digital intervention grounded in evidence-based approaches. This resource was specifically tailored for healthcare staff, encompassing nurses and healthcare assistants, responsible for providing care to individuals residing in care homes.
3. Pilot the Digital Intervention: The primary focus of this objective was to assess the effectiveness of the digital intervention. The aim was to ascertain the feasibility of the digital intervention to assess intervention usability, benefits on quality of life for care home residents, care staff experience of implementing the intervention and preliminary efficacy of the intervention for improving staff knowledge of diabetes and self-efficacy in caring for diabetic residents.

Generating a Theory

The process of generating a theory to improve the provision of care for residents living with diabetes in care homes was systematically developed through a multi-phased approach in Workstream 1 (WS1). This approach integrated a scoping review, qualitative interviews, and a Delphi study to construct a grounded understanding of current practice, challenges, and opportunities. By triangulating findings across these phases, the project sought to inform the design of the digital intervention tailored to the needs of care home staff and residents.

Phase 1: Scoping Review [15- under review]:

The foundation for theory generation began with a scoping review of the existing literature, designed to map the breadth and depth of evidence concerning interventions aimed at enhancing diabetes care within care homes. The review addressed three objectives: (i) Summarise the existing educational and training interventions available to staff in care homes regarding diabetes management, (ii) explore the outcomes of educational interventions employed in training staff within care home environments on diabetes care, and (iii) Identify gaps and limitations in current educational interventions for staff in care homes concerning diabetes care. The scoping review was conducted in accordance with the PRISMA-ScR framework [27], the review involved comprehensive searches across CINHAL Plus (EBSCOhost), Medline All (Ovid) and PsychINFO (Ovid), and relevant clinical trial registries. As reported, 10 studies were identified, most of which focused on short-

term educational interventions such as workshops and multimedia modules targeted primarily at care-home staff. These interventions consistently improved staff-level outcomes, including diabetes knowledge, self-efficacy, and interprofessional communication, but did not demonstrate clear improvements in resident outcomes like quality of life or hospitalisation rates. Importantly, staff highlighted that engaging formats such as videos, visuals, and humour enhanced learning, while a lack of contextual tailoring and absence of process evaluations often limited long-term impact. The review also revealed substantial gaps, particularly in the sustainability of interventions and the absence of training such as eye and foot care. These findings not only confirmed the existence and potential of such interventions but also clarified the limitations and contextual factors that must be addressed. As such, the scoping review provided a critical evidence base and theoretical scaffold for the qualitative and consensus phases that followed, ensuring that subsequent work in WS1 was both targeted and grounded in what has and hasn't worked to date.

Phase 2: Qualitative Interviews

Building on the scoping review, Phase 2 comprised semi-structured interviews with care home staff to gain deeper insight into the lived experiences of those providing care for residents with diabetes. This qualitative approach captured perspectives across a wide range of roles including home managers, nurses, senior care assistants, and care assistants ensuring a comprehensive understanding of the care environment. Three key categories emerged: **Training**, **Support**, and **Communication**, all of which were unified under the overarching concept of **Empowerment**. Staff consistently reported a lack of diabetes-specific training, with most education focused on acute or hospital-based care, leaving them ill-prepared for managing diabetes in the care home setting. They also described limited access to specialist support and confusion around escalation pathways, compounded by fragmented communication within care teams and with external providers. Notably, some staff outside of direct care roles (e.g., kitchen or activity staff) were unaware of diabetic-related needs, such as dietary restrictions, which further impacted the consistency of care. These interviews explored the perceived barriers and enablers to intervention delivery and highlighted the emotional and cognitive burden of working without adequate resources or clarity. The thematic analysis of this data allowed patterns and key concepts to emerge inductively, revealing how gaps in knowledge, role clarity, and systemic support mechanisms contribute to disempowerment. These insights were essential for refining the emerging theory of change by highlighting the practical and relational challenges staff face daily and directly informed the development of consensus items for the Delphi study in Phase 3. By capturing contextual nuances often missed in quantitative research, this phase significantly shaped the theoretical propositions guiding the design of an educational intervention tailored to the realities of diabetes care in the care home.

Phase 3: Delphi Study

The final stage of WS1 involved a Delphi study, which synthesised data from the previous scoping review and qualitative interviews through a structured, multi-round consensus-building process. This study engaged a diverse panel of stakeholders across the UK, including care home staff, diabetes practitioners, people living with

diabetes, carers, educators, and representatives from charitable organisations. A total of 68 participants completed Round 1, and 40 completed Round 2. Using a modified Delphi method, participants were asked to rate the importance of 117 educational items grouped across 11 domains. The iterative nature of the Delphi process, with its emphasis on anonymity and structured feedback, enabled participants to reflect on the collective input and refine their views without influence from dominant voices. This approach is especially effective in complex healthcare settings, where multidisciplinary perspectives must be integrated. The top-ranked priorities identified by participants focused on diabetes and comorbidities, nutrition and fluid management, and neuropathy, foot ulcers, and other diabetes-related conditions, where 100% of items achieved consensus. In contrast, lower-ranked items included aetiology and risk factors, and health promotion and public education, with only around 20–22% of items reaching consensus. These results confirmed and sharpened the themes emerging from earlier phases particularly the need for practical, role-relevant content and helped to define the educational focus of the digital intervention to be co-designed in WS2. By translating empirical findings into an agreed set of educational priorities, the Delphi study ensured the emerging theoretical framework is both stakeholder-driven and grounded in real-world care home practice.

Across all three phases, the emphasis was on iterative, evidence-informed theory generation. Each phase contributed distinct insights: the scoping review provided an evidence base, the interviews offered context and depth, and the Delphi study distilled these insights into actionable educational priorities through stakeholder consensus. This integrated approach ensured that the emerging theory is not only academically robust but also practical and relevant to real-world care home settings. Ultimately, the theory generated through WS1 underpinned the development of a co-designed digital intervention aimed at improving the quality of diabetes care in care homes. By grounding this intervention in systematically derived insights and stakeholder input, it was more likely to be effective, acceptable, and sustainable.

Development of the Digital Intervention

The creation of a digital intervention designed to enhance the knowledge and self-efficacy of care home staff in managing residents with diabetes was an extensive and collaborative endeavour. This initiative followed a structured seven-step co-design methodology [28], ensuring the resulting resource was evidence-based, contextually appropriate, and aligned with best practices in digital education for healthcare professionals.

Step 1: Establishing the Co-Design Team

The foundation of the project began with the deliberate assembly of a multidisciplinary co-design team. This group was formed to bring together a diverse range of insights from key stakeholders across the healthcare and care home sectors. Participants included academic researchers, practicing healthcare professionals, care home workers and representatives from local health trusts. In addition, the Royal College of Nursing (RCN) contributed its expertise, ensuring that

nursing standards and frontline care realities were well represented. The breadth of this collaborative group was vital in steering the intervention to address real-world challenges, ensuring the educational resource would be directly relevant to the day-to-day needs of care home staff. Team members were drawn from a variety of disciplines to reflect the complexity of diabetes management in the care home context.

Step 2: Conducting Co-Design Workshops and Creating Content

To shape the structure of the digital intervention, four co-design workshops were carried out. Each session lasted between 90 to 120 minutes and served as a forum for discussion, feedback, and collaborative planning. These workshops were essential in uncovering the current gaps in knowledge, identifying priority content areas, and exploring effective communication and learning strategies. Participants explored the unique challenges posed by diabetes care in care homes, including symptom management, communication with families, and the coordination of multi-disciplinary care. The insights obtained during these sessions were foundational in constructing an initial framework for the educational content, ensuring the intervention was grounded in actual user needs and practice environments.

Step 3: Expert Advisory Team Input

An additional layer of rigour was introduced through the involvement of an expert advisory team. This group included members from the Royal College of Nursing's Older People's Forum Committee, as well as individuals with specialised knowledge in geriatric healthcare, diabetes care and digital resource development. The role of this advisory team was to ensure that all aspects of the digital intervention met the highest standards of professional integrity, legal compliance, and clinical relevance. Their feedback was particularly influential in refining the learning materials and validating the clinical content presented in the modules, thereby strengthening the credibility and utility of the resource.

Step 4: Inclusion of Personal Experiences and Narratives

To enrich the digital intervention with authentic and relatable content, individuals with direct lived experience were engaged in the co-design. This included care home healthcare workers, residents living with diabetes, and their family members. Their personal stories and experiential insights highlighted the emotional, physical, and logistical challenges encountered in care home settings. These perspectives helped to humanise the content, moving beyond theoretical knowledge to include real-world examples and case studies. The integration of such narratives enhanced the resource's engagement factor and fostered empathy among learners, which is especially important in the context of long-term care.

Step 5: Development of the Initial Digital Prototype

The diverse input gathered from the previous stages informed the creation of the first prototype of the digital intervention. The prototype was developed as a web-based application accessible through standard internet browsers, ensuring wide accessibility. It combined multimedia components such as videos, animations,

interactive learning modules, and evidence-based reading material. The design prioritised user-friendliness and engagement, with the aim of supporting varying levels of digital literacy among care home staff. Topics were organised into structured learning modules addressing key areas such as foundations of diabetes, screening and diagnosis, complications and psychosocial considerations.

Step 6: Usability Testing and Iterative Improvement

Following the development of the prototype, a user testing phase was initiated to evaluate its effectiveness and acceptability. A group of care home staff were invited to access the prototype over a set period. Feedback was collected through structured surveys and optional focus groups, focusing on usability, content clarity, perceived relevance, and engagement. This iterative evaluation process was instrumental in identifying both strengths and areas requiring refinement. Thematic analysis of user feedback revealed valuable suggestions regarding navigation, information delivery formats, and the inclusion of more interactive elements. This evidence-informed approach to evaluation allowed for targeted improvements in the final version.

Step 7: Finalisation of the Digital Resource

The insights obtained from user testing were used to guide the development of the final version of the digital intervention. Modifications were implemented collaboratively by the co-design team and the advisory group, ensuring a balanced and comprehensive learning experience. The resulting resource was designed to be accessible, intuitive, and directly aligned with the specific educational needs of care home staff managing residents with diabetes. Key improvements included refined scripting, improved accessibility features, and the incorporation of more diverse case scenarios. The final product emerged as a rigorously developed, context-sensitive digital tool, grounded in clinical evidence and user feedback.

In conclusion, the development of this digital educational intervention exemplifies a methodical, inclusive, and evidence-driven approach to resource creation. The co-design methodology ensured that the intervention was not only professionally sound but also reflective of the real-world contexts in which it would be used. Through meaningful collaboration with stakeholders and end-users, the project produced a valuable resource aimed at enhancing the care provided to residents with diabetes in care homes.

The completed digital resource is accessible at: https://qubdiabetes.focusgames.com



Methodology for Evaluation

Design

The study evaluation was conducted in three sequential phases, each contributing unique insights into the effectiveness and accessibility of the digital intervention in optimising care for residents with diabetes in care homes.

Phase one involved administration of a short questionnaire to determine self-reported self-efficacy in providing care to residents with diabetes before (pre-test) and after three months of using the e-resource (post-test).

Phase two aimed to explore care home staff experiences of implementing the digital intervention, how this e-resource improved, or could improve, quality of life of diabetic residents from the perspectives of healthcare professionals using focus groups and semi-structured interviews.

High Level Summary of Results

Pre- and Post Test Questionnaire (Phase 1)

In Phase 1, a short questionnaire was administered to participants to assess their confidence in supporting individuals with diabetes and their knowledge of the condition. The questionnaire was given both before (pre-post) and after three months of utilising the e-resource (post-test). This phase aimed to gauge the evolution of participants' self-reported abilities following the intervention. The questionnaire was co-designed by our co-design by our co-design group with the input from our expert steering group.

All recruitment was facilitated through the QUB Care Homes Community of Practice network and the Royal College of Nursing's engagement. This approach ensured a robust representation of healthcare professionals.

Phase 2: Qualitative Feedback

Following the completion of Phase 1, Phase 2 aimed to assess the real-world implementation and perceived impact of the digital intervention. Phase 2 focused on exploring care home staff experiences of implementing the intervention and how the e-resource could improve the quality of life for diabetic residents. Healthcare professionals were recruited to take part in online focus groups and semi-structured interviews to share their perspectives on the digital tool's role in enhancing care delivery.

Data Analysis

In Phase 1, quantitative data collected through pre, and post-tests were analysed using SPSS, employing descriptive statistics and appropriate statistical tests (e.g. paired sample t-tests) to determine significant differences in self-efficacy measures.

For Phase 2, all qualitative data were transcribed verbatim and analysed thematically [29] using NVivo11, focusing on identifying recurring themes and patterns in participant responses. This combined analysis approach aimed to assess the impact of the e-resource on practice and its effect on identifying, assessing, and managing diabetes within care home settings.

All aspects of this evaluation received ethical approval from the Faculty of Medicine, Health and Life Sciences Research Ethics Committee (Faculty REC) at Queen's University Belfast. References: MHLS 24_167. Further information regarding the project methodology is available by contacting the authors of this study.

High Level Summary of Results

Phase 1 Knowledge and Self-Efficacy

To assess the impact of the educational e-resource on diabetes knowledge and self-efficacy among participants, we employed rigorous analysis techniques.

1. **Scoring and Scale Calculation**: Two main measures were used to assess changes in knowledge and self-efficacy. Knowledge was measured using the **23-item Diabetes Knowledge Test (DKT)**, which includes two subscales: general diabetes knowledge (14 items) and insulin use (9 items). Correct answers scored one-point, incorrect answers zero. Self-efficacy was assessed using a **23-item Diabetes Self-Efficacy Questionnaire**, scored on a 5-point Likert scale. Subscales included communication and interaction, practical skills, ethical conduct, interdisciplinary collaboration, self-reflection, confidence in diabetes management, and general learning experience.
2. **Statistical Software**: All analyses were performed using **SPSS version 29**.
3. **Descriptive Statistics**: At pre-test, the mean score for overall diabetes knowledge was 8.89 (SD = 4.94), increasing to 18.36 (SD = 5.20) post-test. General knowledge scores rose from 5.63 (SD = 2.81) to 11.75 (SD = 3.21), while insulin use scores improved from 3.28 (SD = 2.54) to 6.61 (SD = 2.37). For self-efficacy, the overall mean increased from 79.80 (SD = 14.80) to 97.55 (SD = 13.17). Subscale improvements included communication and interaction (9.22 → 12.53), practical skills (9.66 → 12.43), and confidence in diabetes management (9.54 → 12.54).
4. **Paired Samples T-Test**: Paired samples t-tests were conducted to examine pre- to post-test changes across all measures for the 161 participants who completed both surveys. Statistically significant improvements were observed across all scales. Overall knowledge increased by an average of 9.48 points ($t(160) = 20.16$, **$p < .001$, $d = 1.59$**). General knowledge rose by 6.16 points ($t(160) = 20.52$, **$p < .001$, $d = 1.62$**), and insulin use knowledge by 3.32 points ($t(160) = 15.69$, **$p < .001$, $d = 1.24$**). Self-efficacy scores increased by 17.88 points ($t(160) = 14.51$, **$p < .001$, $d = 1.15$**). Subscale gains included communication and interaction (+3.31, **$d = 1.24$**), practical skills (+2.77, **$d = 1.06$**), and confidence in knowledge about diabetes management (+3.00, **$d = 1.11$**). All results remained significant under the Bonferroni-adjusted threshold ($\alpha = .004$).

Sample

A total of **174 participants** were recruited to the study. For analysis, **161 cases** were included, with 13 excluded due to missing or unmatched post-test data. Participants were predominantly female (92.0%).

Primary Analysis Results

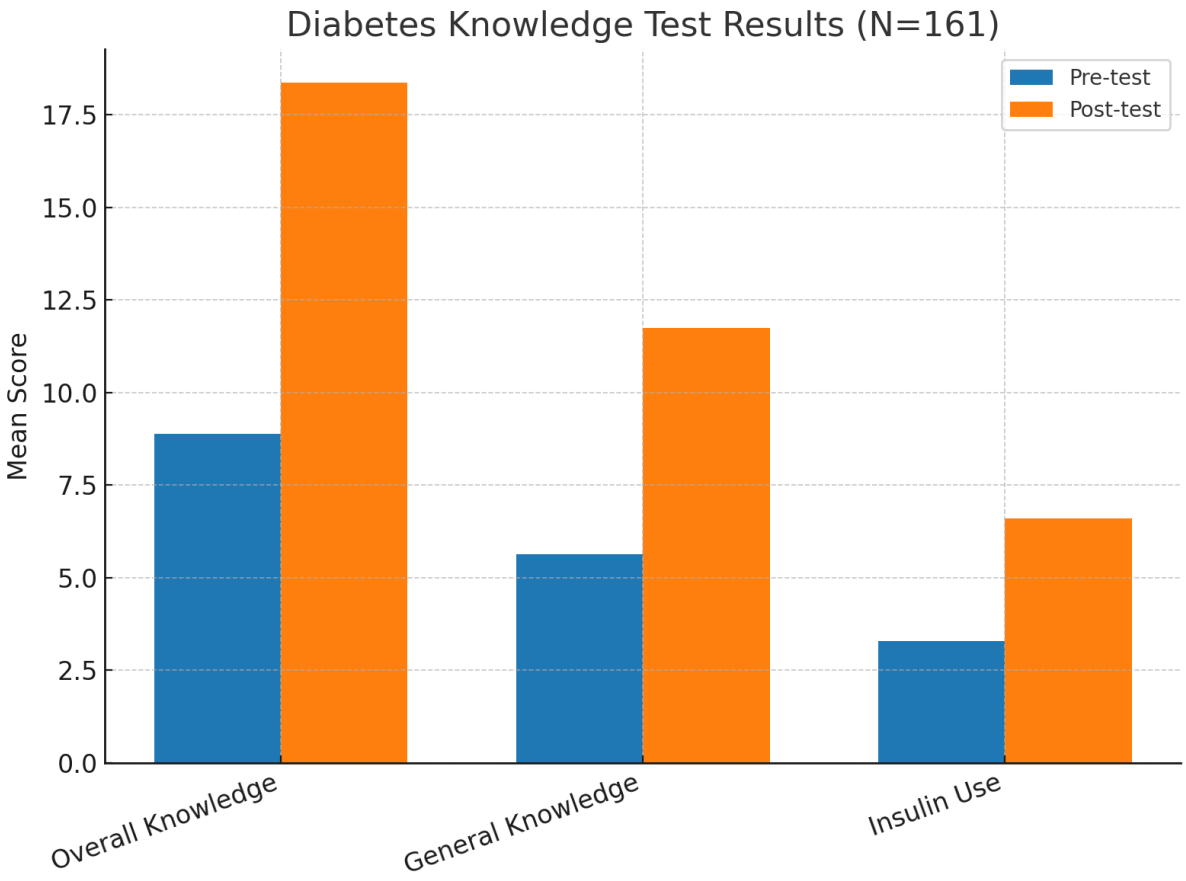
The primary analysis assessed pre- to post-intervention changes in diabetes knowledge and self-efficacy using validated scales. Statistically significant improvements were observed across all measures:

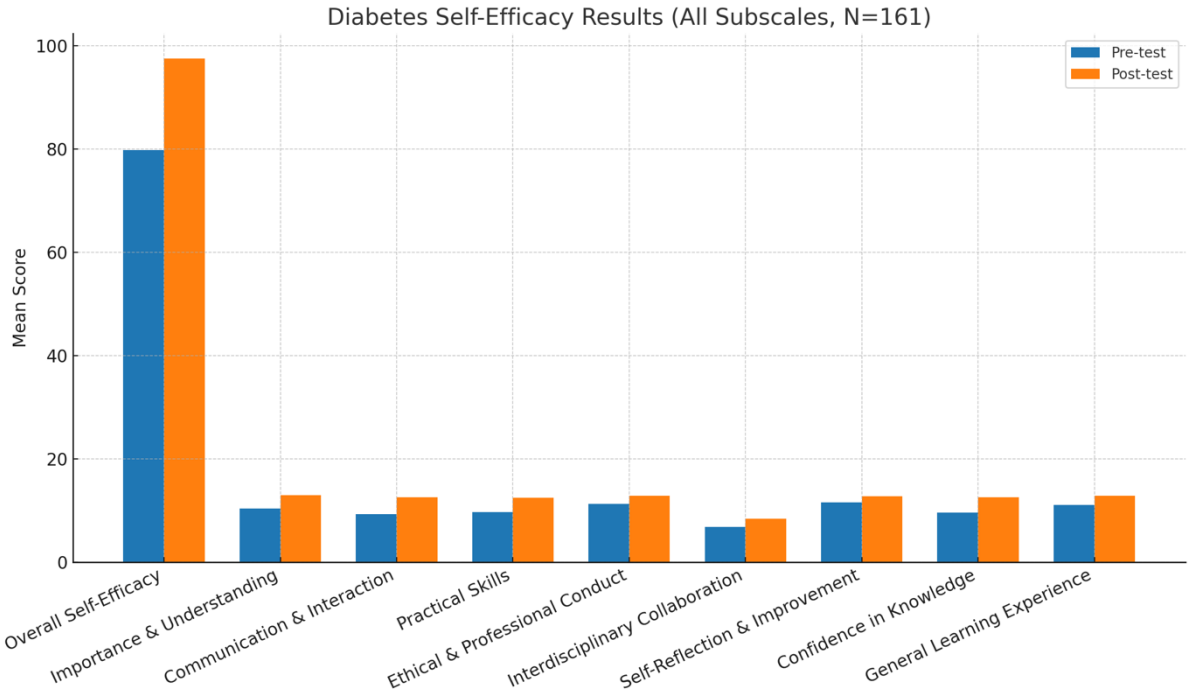
- **Diabetes Knowledge Test (Overall, 23 items):** Pre-test mean = 8.89, Post-test mean = 18.36, $t(160) = 20.16$, **$p < .001$, $d = 1.59$**
- **Subscale A (General Knowledge, 14 items):** Pre = 5.63, Post = 11.75, $t(160) = 20.52$, **$p < .001$, $d = 1.62$**
- **Subscale B (Insulin Use, 9 items):** Pre = 3.28, Post = 6.61, $t(160) = 15.69$, **$p < .001$, $d = 1.24$**
- **Overall Self-Efficacy (23 items):** Pre = 79.80, Post = 97.55, $t(160) = 14.51$, **$p < .001$, $d = 1.15$**
- **Subscale Examples:** Communication & Interaction improved from 9.22 → 12.53 ($d = 1.24$), Practical Skills from 9.66 → 12.43 ($d = 1.06$), Confidence in Diabetes Management from 9.54 → 12.54 ($d = 1.11$).

Evaluation of the Digital Intervention

All participants who completed the post-test rated the intervention's usefulness. Ratings ranged from 3 to 5, with the majority (78.7%) rating it the highest score of 5. The mean usefulness rating was 4.74 (SD = 0.54), indicating a highly favourable response to the educational resource.

In summary, the study demonstrated significant increases in diabetes knowledge and self-efficacy following the digital intervention. Participants not only improved their objective test performance but also reported greater confidence in their communication, practical skills, and ability to manage diabetes care. These findings strongly support the effectiveness of digital learning resources in preparing nurses to support people living with diabetes and highlights the importance of incorporating evidence-based e-resources into nursing education.





Phase 2 Qualitative Interviews with Participants

In the third phase, we explored the experiences of healthcare staff in their engagement with an educational e-resource on diabetes care. Semi-structured

interviews were conducted, generating detailed accounts of participants' perceptions and use of the resource. The analysis was guided by Braun and Clarke's six-step thematic framework, which enabled the identification of three central themes: *Learning: Building Knowledge and Confidence*, *Doing: Driving Practice Enhancement*, and *Sharing: Extending Reach and Influence*. Together, these themes highlight how the resource shaped participants' learning, practice, and dissemination of knowledge.

Theme One
Learning: Building Knowledge and Confidence

The e-resource was described as an engaging and credible tool that supported the development of practical knowledge in diabetes care. Its interactive features and evidence-based design facilitated active engagement and sustained motivation. Endorsement from managers and alignment with continuing professional development (CPD) requirements further encouraged uptake. The credibility of the resource, underpinned by expert involvement in its design, was viewed as particularly valuable. Barriers to engagement were noted, most commonly time pressures and the competing demands of other mandatory training requirements.

Theme Two
Doing: Driving Practice Enhancement

Participants reported that the e-resource contributed to meaningful changes in practice. Nurses described feeling more confident in initiating discussions about lifestyle changes, tailoring patient education, and integrating new approaches into care routines. The resource encouraged the use of practical strategies to support patient self-management and highlighted opportunities to reduce over-reliance on pharmacological solutions by adapting dietary intake, even though final decisions around medication often rested with medical colleagues. These insights highlight the resource's role in enhancing confidence and prompting practical improvements in patient care.

Theme Three
Sharing: Extending Reach and Influence

The resource's influence extended beyond individual use, as participants shared knowledge and strategies with colleagues, creating a ripple effect in practice settings. Its relevance across primary, community, and acute care was emphasised, with participants applying learning to a wide range of patient interactions. However, staff turnover and variation in digital engagement were highlighted as ongoing challenges, sometimes limiting the sustainability of shared learning.

Qualitative Summary

In summary, the diabetes e-resource provided an engaging and credible platform for professional learning, strengthened by managerial endorsement and its contribution to professional development. While time constraints and training overload presented barriers, participants reported clear benefits in terms of increased confidence, improved patient education, and practice transformation. The sharing of knowledge

across teams further extended the resource's impact, though workforce challenges influenced sustainability. Overall, the findings demonstrate the resource's potential to drive both individual development and wider improvements in diabetes care.

Discussion

This project set out to co-design and evaluate a digital intervention to improve diabetes care in nursing homes by enhancing staff knowledge and self-efficacy. The work was structured into three sequential phases; each contributing complementary evidence to inform and assess the intervention. Phase 1 focused on measuring changes in staff knowledge and confidence before and after engaging with the digital resource. Phase 2 examined staff perspectives on implementation, identifying how the resource influenced practice and knowledge-sharing. Together, these phases provided a comprehensive evaluation of the feasibility, acceptability, and effectiveness of a novel digital tool for supporting diabetes care in care homes.

In Phase 1, a pre- and post-test questionnaire was used to assess knowledge of diabetes and self-efficacy in managing the condition. Results showed statistically significant improvements across all measures. Diabetes knowledge scores almost doubled, with marked gains in both general knowledge and insulin use. Self-efficacy also rose significantly, with staff reporting greater confidence in communication, practical skills, and diabetes management. These findings demonstrated the resource's effectiveness in building foundational competencies and highlighted its potential as an accessible training tool to address gaps in diabetes education for care home staff.

Phase 2 examined experiences through semi-structured interviews and focus groups. Three themes emerged: Learning, Doing, and Sharing. Participants described the resource as credible and engaging, with its evidence-based design and alignment to professional development requirements driving uptake. Many reported meaningful practice changes, including greater confidence in supporting lifestyle modifications and more proactive engagement with residents' self-management. Beyond individual benefits, knowledge sharing across teams was evident, extending the intervention's influence. Challenges such as time pressures and workforce turnover were noted, but overall, participants valued the resource as a practical tool that supported professional growth and care quality.

Across all phases, the intervention demonstrated clear benefits. Quantitative evidence showed substantial gains in knowledge and self-efficacy, while qualitative findings highlighted improved practice, resident experiences, and team-level knowledge sharing. The multi-phase approach confirmed that digital learning resources can be feasible, acceptable, and effective in addressing training gaps in care home diabetes management. Importantly, the co-design process ensured that the tool was contextually relevant, user-friendly, and reflective of real-world challenges. The combined findings highlight the potential of digital interventions to transform diabetes care in care homes by empowering staff, enhancing resident wellbeing, and embedding sustainable improvements in practice.

Dissemination

The digital intervention is designed for maximum accessibility and can be used on any computer, tablet, or mobile device with an internet connection. The link can be found here: https://qubdiabetes.focusgames.com



To date the findings have been presented at The Royal College of Nursing 2025 Congress in Liverpool, University of Szeged 1st International Health Sciences Conference, Queen's University Belfast Care Home Conference, Queen's University Belfast Ambition to Success Expo Event and LEVEL UP: Gamification in Nursing Education and Research for the Future of Healthcare Conference in India (Online).



The Royal College of Nursing (RCN) Older People's Forum has also committed to sharing the resource with its membership of over 12,000 professionals who provide care to older people.



The authors have published one manuscript [26] from this study in a high-impact, open-access journals. One paper is currently under review [15], and two additional manuscripts are currently in preparation for submission to leading open-access nursing research journals. One will present qualitative findings from WS1 Phase 2 and results. Upon publication, both manuscripts will be shared with Burdett Trust for Nursing.

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We hope that this educational e-resource on diabetes will empower nurses to drive meaningful change in their practice and support care home residents to live well with diabetes.

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