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A qualitative study of Finnish diabetes specialist nurses' experiences and perceptions of the impacts of cognitive impairment in older adults with type 1 diabetes

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Abstract

***Background*:** Individuals with type 1 diabetes (T1D) are increasingly living into older age, when cognitive impairment (CI) may co-exist. T1D further increases the risk of CI, which can result in physical, psychological, and social impacts in the individual, their families, and/or informal carers. These factors also present professional challenges for the healthcare professionals (HCPs) who support them. Diabetes specialist nurses (DSNs) are well positioned to provide insights on the impact of CI in this group, suggest potential support solutions, and identify care delivery pathways aimed at improving outcomes. Previous research in this area is very limited.

***Methods*:** Data were collected via individual semi-structured interviews with a purposive sample of eight Finnish DSNs, with experience of working with older adults with T1D and CI. Interviews were audio-recorded and transcribed verbatim. Inductive thematic analysis was conducted to analyse the data.

***Findings*:** Four key themes were identified: 1) indicators of CI; 2) impact of CI; 3) professional challenges; 4) solutions and care delivery. Our findings suggest a lack of consistent CI screening practices in this group and multiple impacts on an individual's ability to self-manage. Potential hazards and increased care needs, in turn, affect their families/close social networks, as well as care providers. Participants suggested several solutions, including: the value of a consistent therapeutic nurse/patient/family relationship, non-stigmatising early screening and identification of CI, advanced care planning, and patient education involving the person and their families. Incorporating a multi-disciplinary team approach, and the development of CI-specific education and guidelines for carers, HCPs, and policy makers, were identified as key priorites.

***Conclusion*:** There are several impacts of T1D complicated by CI. However, our participants were able to identify mitigating strategies and solutions that deserve further exploration and implementation. Whilst this study was based in Finland, the results may be applicable to other geographical locations with similarly increasing prevalence rates of CI in T1D.

Keywords: *diabetes mellitus type 1*; *nursing*; *cognitive dysfunction*; *ageing*; *self-management*; *qualitative research*

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Life expectancy for individuals with type 1 diabetes (T1D) has consistently increased since the discovery of insulin, over 100 years ago. Subsequent advances in treatment and care have enabled more people with T1D to reach older ages. This is especially evident in countries with advanced care systems, such as Finland, where T1D prevalence is high.[1–3] Cognitive impairment (CI) is common in older adults and more prevalent in T1D, possibly linked to altered brain glucose metabolism and diabetes-related cardiovascular disease.[4] Effective T1D self-management requires significant executive functioning and reasoning. For example, managing multiple daily insulin injections or pumps, calculating insulin doses, recognising and treating hypoglycaemia, and engaging with healthcare services. CI can impact on an individual's ability to self-manage due to effects on memory, communication, judgement, and physical, psychological, and social functioning. Severe CI such as Alzheimer's disease and dementia can be debilitating on overall functional ability.[5,6] Individuals with T1D and CI are known to experience increased rates of insulin errors, episodes of hypoglycaemia, hyperglycaemia, and life-threatening diabetic ketoacidosis (DKA).[7–9] New technologies such as insulin pumps and continuous glucose monitoring (CGM) are potentially beneficial for this group, for example, setting high or low glucose alarms, and sharing glucose data online with informal carers and health care

professionals (HCPs). However, little is known about their practical use in this group.[10,11] There is a lack of literature exploring the impacts of CI in older adults with T1D. This study explores Finnish DSNs' experinces working with older adults with T1D and CI, offering insights into challenges and potential solutions.

Methods

Design

A literature review utilising the PEO model (Population = older adults, Exposure = T1D, Outcome = CI prevalence)[12] was conducted. Searches in Scopus, PubMed, Embase, and Google Scholar using MeSH terms, keywords, synonyms, Boolean operators, wildcards, and truncation identified 176 articles. Ten full-texts were assessed; six met the inclusion criteria (English-language studies on CI prevalence in older adults with T1D) and were appraised using Joanna Briggs Institute tools.[13] The review informed the development of a topic guide, which was discussed and agreed upon within the research team, local experts, and older adults with T1D. After a successful pilot interview ($n = 8$), individual in-depth, semi-structured interviews were conducted to explore the experiences and perceptions of Finnish DSNs of the impact of CI in older adults with T1D.

Inclusion criteria

Participants were DSNs with at least 2 years' experience working with older adults with CI and T1D in Finland.

Sampling and recruitment

A purposive sample of eight DSNs with 5–40 years of experience working with people with T1D were recruited through the Finnish Diabetes Nurses Association (FDNA) mailing list, Facebook, and Instagram. Participants' clinical working environments and geographical regions of Finland are presented in Table 1. Whilst the total number of DSNs working in Finland is unknown, the FDNA has approximately 930 members, with ~300 consenting to receive research-related emails. The purposive sample linked with the concept of information power,[14] and the diversity of dialogues fulfilled the criteria for sufficient data adequacy and quality of dialogue.

Table 1. Working environments and geographical regions

Participants	Work area	Major regions
P1	Primary care outpatient	Southern Finland
P2	Hospital outpatient	Western Finland
P3	Primary care outpatient	Northern and Eastern Finland
P4	Primary care outpatient	Southern Finland
P5	Primary care outpatient	Helsinki-Uusimaa (Capital)
P6	Primary care outpatient	Western Finland
P7	Primary care outpatient	Helsinki-Uusimaa (Capital)
P8	Primary care outpatient	Southern Finland

Data collection

Interviews were conducted between May and June 2022, lasting 30–65 min, and were audio recorded and transcribed verbatim by the lead researcher (JG). Given the large geographical distances between cities in Finland, participants were offered a choice of face-to-face, telephone, or MS Teams interviews. All interviews were conducted in Finnish. A sample of transcripts were translated into English following World Health Organization (WHO) guidelines for instrument translation (2023),[15] with bilingual team discussions, ensuring linguistic nuances were preserved. Thematic saturation, defined as the point when no new themes or codes emerged, was reached after approximately seven interviews.[16]

Data analysis

Braun and Clarke's 6 Steps of thematic analysis were employed to analyse the data[17–20]: 1) JG and MAT independently immersed themselves in the data via active reading, searching for meanings and patterns which were then compared. 2) JG, AF and MAT inductively generated, reviewed, defined, and named the codes. Data were organised and analysed utilising NVivo (March 2020) software.[21] 3) Potential themes and subthemes were repeatedly discussed by JG, AF and MAT. 4) Initial themes were discussed, adapted, and renamed as interpretations coalesced. 5) The researchers identified characteristics and differences between the data and mapped them to superordinate themes and subthemes, with no significant discrepancies. 6) Write-up. These steps are illustrated in Fig. 1.

Study ethics

Ethical approval from King`s College Research ethics Committee (MRSU-21/22-28566) and research permission from the Finnish DSN Association were granted. All participants gave informed consent. Data were securely managed in keeping with King's College London research data management policy. The Declaration of Helsinki principles were adhered to (2013).[22]

Findings

Four superordinate themes with subthemes were generated and are presented in Fig. 2.

Theme 1. Nurses´ perspectives of indicators of cognitive impairment

Participants identified physical, behavioural, and self-management cues they considered indicators of CI in older adults with T1D. For example, forgetting appointments and failing to bring glucose readings: *P3: '… they forget to*

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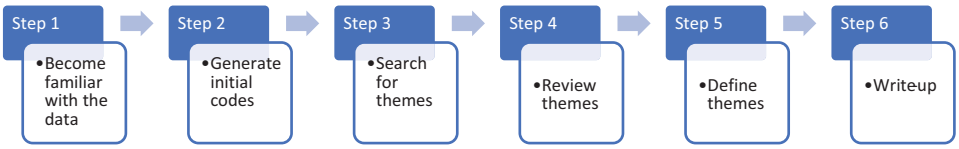

Fig. 1. Data analysis: Adapted from Braun and Clarke`s (2006) six-phase framework of thematic analysis.

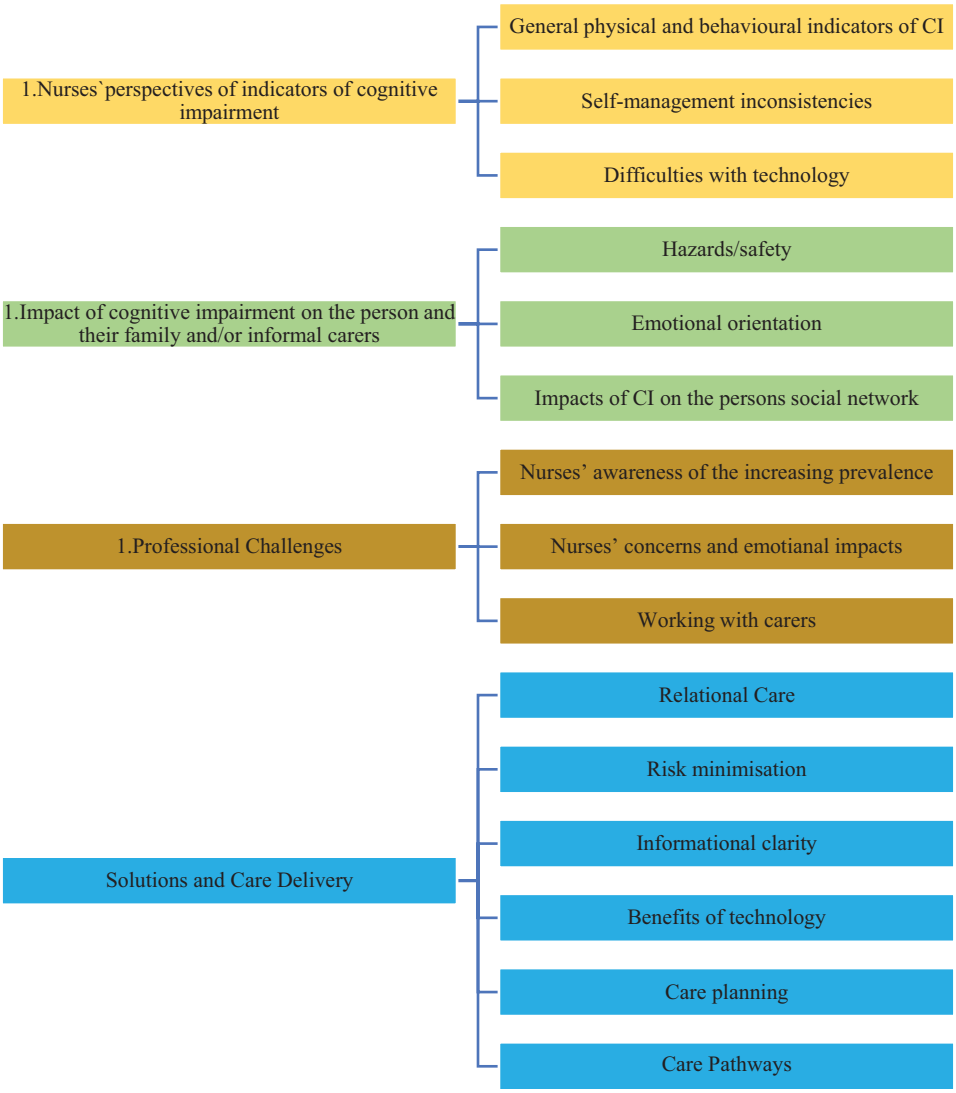

Fig. 2. Superordinate themes and related sub-themes.

come to the agreed visits and then when asked for some kind of follow-up… they do not remember to bring blood glucose readings…'. Repeated conversations, deteriorating attention and changes in grooming were observed as additional cues: *P3: '…and we are talking about the same things over and over again…*'. *P1: '… there are kind of challenges, that you are no longer as groomed as you used to be …'* (see Table 2, Strategy 1). A consistent, therapeutic relationship with the individual was seen as vital in recognising these early cues (see Table 2, Strategy 1).

Several participants described how adapting insulin doses to carbohydrate intake became more difficult in CI, leading to glycaemic instability and weight loss: *P3: '… the ability to estimate carbohydrates somehow deteriorates… same goes for adjusting their insulin doses and the connection between these', P2: '… I watch the weight very carefully…, they lose muscle mass and often the sugars can be high…'* (see Table 2, Strategy 1).

Confusing glucose documentation was observed as a common cue, and despite revised instructions, individuals

Table 2. Practical strategies

Number	Strategy	Rationale
1	Consistency in DSN care and the development of therapeutic relationships with individuals and their families/close social networks.	Enabling timely conversations, early care planning, and respectful navigation of autonomy and denial-related behaviours. Early cues of CI can be identified, e,g., a change in/grooming, unexplained weight loss, forgetting conversations, or forgetting to bring glucose reading to appointments.
2	Establishing simple daily routines	A consistent routine provides structure, aiding self-managemnet.
3	Setting individualised, more relaxed glycaemic targets	Preventing unnecessary hypoglycaemia risk and worry around strict targets
4	A simplified insulin therapy supported by written instructions	Lowers the risk of errors, promotes self management, and supports caregivers.
5	Placing the insulin pen next to the pillbox when insulin has been injected	Acts as a memory aid for both patient and caregivers to prevent missed doses
6	The use of images for both the individual and their caregivers, e.g., understanding the effects of diet and carbohydrates	Visual aids simplify complex information and enhance understanding
7	Color coding of insulin pens	Lowers the risk of errors by clearly distinguishing between types
8	Insulin pens with a memory function	To help verify if insulin was administered and track dosage
9	The use of continuous blood glucose monitoring, ensuring caregivers are able to access the person's glucose levels virtually	Lowers the risk of hypoglycemia or missed doses, promoting safety

Participants also highlighted the need for improved care pathways, as illustrated in Table 3.

often reverted to long-standing treatment routines: *P7: '… he wrote the measurements down, but when I compared it with the blood sugar meter the numbers were nothing alike…'*, (see Table 2, Strategy 1).

Participants noted that individuals with CI struggled not only with established treatment routines but also with diabetes technology. Whilst sensors can aid management, individuals could be distressed by their presence, frequently removing them, forgetting to scan, or being unable to remember how to use them (see Table 2, Strategy 9): *P5: '… They no longer understand or remember what it was and why'. P2: '…it`s like those are totally new things, although it can possibly be that person has had T1D for decades'.*

Theme 2. Impact of cognitive impairment on the person and their family and/or informal carers

Key findings included increased insulin treatment related hazards, a change in emotional orientation, and impacts on family or close social networks, who often became informal carers. Frequent hypo- or hyperglycaemia, due to incorrect timing, doses or missed insulin, was identified as a serious risk for life-threatening diabetes emergencies: *P7: '…insulin is dosed too much or too little…person gets severe hypoglycaemia…or correspondingly end up in the emergency room with ketoacidosis…'* (see Table 2, Strategy 2–9).

Participants also recognised the emotional impact of CI on the individual, including frustration, anger, embarrassment, fear, and denial: *P1: '…a person who has never had irritability and willingness to argue is now starting to have it…'* which also significantly impacted their family. Finns tend to highly value family support. Relatives were often the first to notice early CI signs, such as missed appointments, forgotten medications, or irregular eating (see Table 2, Strategy 1), sometimes causing family friction; *P3: '… many times relatives contact me saying that they do not think it is going well anymore…'. P5: '… relatives are really worried … she denies having any problems…'.*

In Finland, 85% of the population live in cities and it is common for family members to reside some distance apart. Many families relocated relatives with CI closer to them, to provide informal care, often taking on complex diabetes management and insulin treatment for which they felt unprepared (see Table 3, Strategy 5). Involving formal carers helped relieve some of this strain: *P5: '…the daughters…went there to see that mother was eating…how she was …what is the blood glucose level…they were very relieved now when domiciliary care goes and does it…'* (see Table 3, Strategy 4).

In contrast, individuals without family support faced significant self-management challenges as CI progressed, often resulting in inevitable nursing home admission: *P2: '…few cases…they are in the long-term care wards…they can no longer manage at home and they have no one to take care of them…'* (see Table 3, Strategy 4)

Theme 3. Professional challenges

Whilst increased longevity in T1D was seen positively, resulting professional challenges were observed. A key concern was inconsistent CI screening due to the lack of national guidelines (see Table 3, Strategy 2). Some participants conducted Mini Mental State Examinations (MMSE) assessments themselves,[23] whilst others were

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Table 3. Care system strategies

Number	Strategy	Rationale
1	Routine auditing of non-attendance rates in older adults with T1D	Identifies individuals who may be experiencing early memory loss
2	Non-stigmatising early CI screening embedded into routine care	Promotes early detection of CI and reduces fear of testing and risk of stigma
3	Early care planning	Anticipates future needs to ensure that support systems are in place before significant decline occurs
4	Multidisciplinary team (MDT) approach	Brings together skills from, e.g., nursing, medicine, memory nurse/ clinic, occupational health psychology, social work, home carers and nursing home staff, to address complex needs holistically and share responsibility
5	Targeted education	Improves knowledge, build confidence and promote consistent and safe care
6	Recognition of additional time and resources by policy makers	Allocating realistic time and resources and reduces safety risks, improves patient outcomes and improves HCP satisfaction
7	Clear guidelines and protocols	To provide a consistent framework for implementation of screening, referral and review practices, and facilitates quality assurance and audit

able to access memory nurse specialists. Increased caseloads, more frequent appointments, home visits, liaising with other services, and coordinating diabetes, were clearly impactful (see Table 3, Strategy 1&6). As were concerns regarding an individual's ability to live safely at home: *P2: '…Yes , the amount of work increases…these take a lot more time than those independent ones…you need to look for those collaborators who help to enable safe treatment…' P3: '…you can see that something is about to happen…where the line goes…when it is too dangerous to live at home …'* This led to negative emotional impacts on the DSN: *P4: '…It causes me frustration and feelings of inadequacy…'.*

Although domiciliary (home) care was considered helpful (see Table 3, Strategy 4), home carers were often observed to be unprepared or unaware of the importance of, for example, providing regular meals, monitoring medications, and blood glucose checks (see Table 3, Strategy 5). A key hazard was the inability to align care visits with mealtimes and insulin administration: *P8: '…domiciliary care visits are at certain times …patient eats when he eats …then inject the insulin… it is almost like a kind of Russian roulette…'.* In addition, frequent staff turnover was perceived to disrupt in the carer-patient relationship: *P6: '… if they could build that trust and safety…changes are major in domiciliary care…'.* Serious safety concerns were expressed for older adults living alone, who may refuse care: *P8: '…lonely old people… sometimes it may be that someone cancels domiciliary care visits… they do not survive anyway…'.*

Finally, a lack of T1D knowledge in nursing home staff was observed, such as the use of overly simplified insulin regimens. In one reported case, resulting in life-threatening DKA: *P2: '…only basic insulin was injected…once a day…it was thought that it would replace multi-injection treatment…within a few weeks, the patient drifted into ketoacidosis …'.*

Theme 4. Solutions and care delivery

As well as highlighting the impacts associated with T1D and CI in older adults, participants offered several solutions. A sensitive approach to screening and diagnosis of CI was considered key, which participants felt individuals often found difficult to accept*: P7: '…The hardest part probably is… when your suspicion rises about the possibility of… memory illness… then how you are going to tell them… It's a sensitive subject to talk about'* (see Table 2, Strategy 1).

The individual's right to self-determination was considered essential; however, balancing this against the need for safety was expressed as challenging: *P3: '…The right to human self-determination is a big thing; the important thing is where that line goes, when it is too dangerous to live at home…'.* Early advanced care planning was suggested as a strategy to overcome these challenges: *P4: 'I think the sooner we notice it, the sooner we modify… make glucose treatment simpler…'* (see Table 2, Strategy 1–9 & Table 3, Strategy 2–5).

Participants suggested a range of practical strategies that they found helpful when identifying CI, starting conversations, promoting self-management, and minimising risks. These are illustrated in Table 2.

A key gap identified was the absence of national guidelines for screening, education, care and management of older adults with T1D and CI in Finland, *P7:' … [guidelines would help] so that they get good care and that we have the tools for how we guide people, at what stage, and how exactly they are screened…'* (see Table 3, Strategy 7).

Discussion

Finland has one of the highest global prevalence rates of T1D[3] and an ageing population[24] with increasing prevalence rates of CI. Diabetes specialist nurses (DSNs) often serve as primary caregivers for this group and are well-positioned to identify the impacts of CI on individuals with T1D, care challenges, and potential solutions. This study offers useful insights:

Nurses' perspectives of indicators of CI

Previous findings reveal that early CI is frequently subtle in its presentation and often goes unrecognised by individuals, their family members, and clinicians.[25] However, our participants felt they were able to recognise these cues if a sustained, therapeutic relationship with the individual and their family/close social network was fostered (see Table 2, Strategy 1). Discussing CI was, however, often met with anger and denial from the individual. The landmark Finnish Geriatric Intervention Study to Prevent Cognitive Impairment and Disability (FINGER)[26] suggests that early interventions in older adults can reduce risk factors for cognitive decline, supporting the potential benefits of early detection and intervention observed in our study. Our findings also identified intensified denial responses in both individuals and, sometimes, their close family members. This emotional dynamic has received limited attention in previous research on CI in T1D. Thus, our study provides additional insight into how CI may affect both individuals and their broader psychosocial care context, whilst also drawing attention to the increased risk of serious hazards, including hypoglycaemia and DKA, as has been previously documented.[6,7,8]

Screening practices and early care planning

Despite an absence of national policy, when CI was suspected, most participants independently initiated some form of screening, consistent with global observations of cognitive assessment guidelines.[27,28] However, a regional variation and ambiguity was highlighted; some participants reported performing mini memory assessments themselves and good links with memory services, showcasing best practice. However, most reported screening and referral processes that were inconsistent, and not always clear. Participants acknowledged the importance of a non-stigmatising approach to CI and recommended an equitable, national routine screening programme for this group, allowing for early therapeutic conversations and care planning. Ideally, this would be with an HCP they already had a relationship with, which was generally considered to be their DSN.

Impacts of CI on the person, family and/or informal carers

A diagnosis of CI can evoke a range of emotional reactions in individuals affected, including frustration, anger, embarrassment, fear, and denial. Participants in this study further noted that the loss of independence particularly impacted diabetes self-management and earlier need for informal care. A notable finding was the role of family in Finnish cultural values. Older adults in urban areas often live some distance from younger relatives. Declining independence frequently results in relocation closer to their family, resulting in the emergence of new, informal caregiving roles. Participants described how these new responsibilities could quickly become burdensome, becoming 'time-consuming and exhausting'. As well as provoking anxiety around their relative's diabetes specific needs, such as meal preparation/timing, and taking on complex insulin treatment regimens and administration, for which they were not prepared. These observations are consistent with Litchman et al.,[29] who reported that family members assuming caregiving responsibilities for older adults with diabetes may experience stress and role changes, and additional emotional and practical burdens.

Family and social network support needs

In these contexts, participants suggested that providing timely emotional, practical, and social support for individuals affected by CI, and their new caregivers was vital. This underscores the importance of early identification and advanced care planning. Participants also emphasised respecting the autonomy of individuals with CI, enabling clear, mutually agreed plans for future care. Consistent with Sinclair et al.,[30] a collaborative, multidisciplinary approach involving memory services, occupational therapists, dietitians, psychologists, physiotherapists, and social services was seen as essential in this process.

Practical solutions and technology

A range of practical strategies to support self-management and reduce avoidable hazards were identified (see Table 1, Strategy 2–9). Technology, such as low glucose alarms and remote glucose monitoring for caregivers, was considered beneficial, in the right context. In our interviews, several participants reported that while such technology could be helpful, some individuals were reluctant to use it, or experienced distress due to its unfamiliarity. This observation aligns with previous findings by Taboada Gjorup et al.[31] There is arguably a research gap concerning the use of diabetes technology in older adults with CI, which if addressed, could inform strategies to enhance acceptability and usability in this group.

Professional challenges

Participants recognised the growing prevalence of older adults with T1D and CI within their caseloads, accompanied with significant additional professional challenges, such as more frequent appointments, and home visits. Participants also often found themselves central to coordinating care with other agencies, raising their concerns

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about delivering safe, effective care within existing time and resource constraints. This extra responsibility evoked frustration and feelings of inadequacy. Whilst the involvement of formal carers was generally welcomed, their lack of diabetes specific knowledge was seen to introduce risks, such as mismatched mealtimes and insulin. Reflecting Kilvert's[11] findings, which highlighted that carers rarely have the expertise required to manage complex insulin regimens. In addition, working with nursing homes was considered highly problematic. In one case, insufficient staff knowledge led to life-threatening DKA, due to an ill-advised, oversimplified insulin regimen. A recognition of the additional time and resources DSNs require to take a lead role in coordinating MDT-focused diabetes care for this growing group, as well as providing education for informal and formal carers, was observed as essential.

Care system solutions

Participants identified several care system-level solutions, as illustrated in Table 3. Such as monitoring non-attendance rates and implementing early routine early screening for CI for older adults with T1D, which were seen as high impact, low-cost strategies, supporting early therapeutic conversations and advanced care planning with the individual and their family. Whilst long-term development of T1D and CI-specific education and guidelines is essential, and clearly wanted, the practical strategies identified in this study could inform the timely delivery of a simple self-management tool for individuals with CI and T1D, and those who care for them.

Study limitations

Due to the large geographical distances in Finland, most participants could not attend face-to-face interviews. All interviews were conducted virtually (telephone or video meeting). Despite the small sample, the data was rich and offered valuable insights, with participants representing various districts across Finland. Translating interviews from Finnish to English may inevitably lead to differences in perceptions and meaning. To mitigate this, the team discussed uncertainties with the bilingual primary researcher (JG).

Conclusion

This study explored Finnish diabetes nurses' experiences and perceptions of the impact of CI on older adults with T1D. Although conducted in Finland, our findings may be relevant to other countries with similarly increasing prevalence rates. Our participants highlighted the multiple impacts of CI and T1D on individuals affected, their familes, informal and formal carers, as well as additional professional challenges for diabetes nurses. Several practical solutions were identified and care system changes proposed, involving novel approaches to multidisciplinary working, targeted policy planning, and routine, non-stigmatising screening. Based on these findings, the creation of a standardised CI screening protocol should be prioritised, piloted and feasibility tested. Guided by the Medical Research Council (MRC) framework for developing and evaluating complex interventions,[32] the further efforts should focus on developing self-management support tools to promote autonomy, alongside educational resources such as home-care and nursing home training to improve safety. Ultimately, the establishment of national guidelines is warranted to provide a framework and ensure consistent implementation of screening, referral and review practices. Such guidelines would also support quality assurance and audit processes across care settings.

Conflict of interest and funding

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References

1. Harjutsalo V. Tyypin 1 diabeteksen ennuste on parantunut. Lääketieteellinen aikakausikirja Duodecim. 2018; 134(16): 1541–42. Available from: https://www.duodecimlehti.fi/duo14465 [cited 20 November 2025].
2. Bispham JA, Hughes AS, Driscoll KA, McAuliffe-Fogarty AH. Novel challenges in aging with type 1 diabetes. Curr Diabetes Rep. 2020; 20(5): 1–9. doi: 10.1007/s11892-020-01298-9
3. International Diabetes Federation. Type 1 diabetes estimates in children and adults: T1D Index report. International Diabetes Federation; 2022. Available from: https://diabetesatlas.org/resources/idf-diabetes-atlas-reports/type-1-diabetes-estimates-in-children-and-adults/ [cited 25 July 2025].
4. Shalimova A, Graff B, Gąsecki D, Wolf J, Sabisz A, Szurowska E, et al. Cognitive dysfunction in type 1 diabetes mellitus. J Clin Endocrinol Metab. 2019; 104(6): 2239–49. doi: 10.1210/jc.2018-01315
5. Topo P, Sormunen S, Saarikalle K, Räikkönen O, Eloniemi-Sulkava U. Kohtaamisia dementiahoidon arjessa: havainnointitutkimus hoidon laadusta asiakkaan näkökulmasta. Helsinki: Sosiaali- ja terveysalan tutkimus- ja kehittämiskeskus STAKES; 2007. Available from: https://urn.fi/URN:NBN:fi-fe201901232767 [cited 04 December 2025].
6. Pekkala S. Dementiaan liittyvät puheen, kielen ja kommunikaation muutokset. In: Korpilahti P, Aaltonen O, Laine M, eds. Kieli ja aivot: kommunikaation perusteet, häiriöt ja kuntoutus (pp. 293–9). Turku: Kognitiivisen neurotieteen tutkimuskeskus, Turun yliopisto; 2010.
7. Chaytor NS, Barbosa-Leiker C, Ryan CM, Germine LT, Hirsch IB, Weinstock RS. Clinically significant cognitive impairment in older adults with type 1 diabetes. J Diabetes Complic. 2019; 33(1): 91–7. doi: 10.1016/j.jdiacomp.2018.04.003
8. Brands AM, Biessels GJ, De Haan EH, Kappelle LJ, Kessels RP. The effects of type 1 diabetes on cognitive performance: a meta-analysis. Diabetes Care. 2005; 28(3): 726–35. doi: 10.2337/diacare.28.3.726
9. Kodl CT, Seaquist ER. Cognitive dysfunction and diabetes mellitus. Endocr Rev. 2008; 29(4): 494–511. doi: 10.1210/er.2007-0034

10. Dhaliwal R, Weinstock RS. Management of type 1 diabetes in older adults. Diabetes Spectr. 2014; 27(1): 9–20. doi: 10.2337/diaspect.27.1.9
11. Kilvert A, Fox C. The challenges of type 1 diabetes in older people. Pract Diabetes. 2015; 32(5): 175–9. doi: 10.1002/pdi.1952
12. Bettany-Saltikov J. How to do a systematic literature review in nursing: a step-by-step guide. London: McGraw-Hill Education; 2012.
13. Porritt K, Gomersall J, Lockwood C. JBI's systematic reviews: study selection and critical appraisal. Am J Nurs. 2014; 114(6): 47–52. doi: 10.1097/01.NAJ.0000450430.97383.64
14. Malterud K, Siersma VD, Guassora AD. Sample size in qualitative interview studies: guided by information power. Qual Health Res. 2016; 26(13): 1753–60. doi: 10.1177/1049732315617444
15. World Health Organization. Adaptation and translation guide: translation process for WHO instruments (Version 1.0). Geneva: World Health Organization; 2023. Available from: https://iris.who.int/bitstream/10665/366278/WHO-MSD-GSEDpackage-v1.0-2023.9-eng.pdf [cited 12 April 2025].
16. Saunders B, Sim J, Kingstone T, Baker S, Waterfield J, Bartlam B, et al. Saturation in qualitative research: exploring its conceptualization and operationalization. Qual Quan. 2018; 52(4): 1893–907. doi: 10.1007/s11135-017-0574-8
17. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006; 3(2): 77–101. doi: 10.1191/1478088706qp063oa
18. Braun V, Clarke V. What can 'thematic analysis' offer health and wellbeing researchers? Int J Qual Stud Health Well-Being. 2014; 9(1): 26152. doi: 10.3402/qhw.v9.26152
19. Maguire M, Delahunt B. Doing a thematic analysis: A practical, step-by-step guide for learning and teaching scholars. AISHE-J: The All Ireland Journal of Teaching and Learning in Higher Education, 2017; 9(3): 3351. Available from: http://ojs.aishe.org/index.php/aishe-j/article/view/335/553 [cited 20 November 2025].
20. Ayres L. Thematic coding and analysis. In Given LM, ed. The SAGE encyclopedia of qualitative research methods (pp. 868–9). Thousand Oaks, CA: Sage Publications Ltd; 2008.
21. QSR International Pty Ltd. NVivo (Version 12). 2018. Available from: https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home [cited 06 January 2023].
22. World Medical Association. World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. JAMA. 2013; 310(20): 2191–4. doi: 10.1001/jama.2013.281053
23. Folstein MF, Folstein SE, Fanjiang G. Mini-mental state examination: MMSE-2. Lutz, FL: Psychological Assessment Resources; 2010.
24. Worldometer. Finland demographics 2025 (population, age, sex, trends). 2025. Available from: https://www.worldometers.info/demographics/finland-demographics/ [cited 25 July 2025].
25. Munshi MN. Cognitive dysfunction in older adults with diabetes: what a clinician needs to know. Diabetes Care. 2017; 40(4): 461–7. doi: 10.2337/dc16-1229
26. Ngandu T, Lehtisalo J, Solomon A, Levälahti E, Ahtiluoto S, Antikainen R, et al. A 2 year multidomain intervention of diet, exercise, cognitive training, and vascular risk monitoring versus control to prevent cognitive decline in at-risk elderly people (FINGER): a randomised controlled trial. Lancet. 2015; 385(9984): 2255–63. doi: 10.1016/S0140-6736(15)60461-5
27. Biessels GJ, Whitmer RA. Cognitive dysfunction in diabetes: how to implement emerging guidelines. Diabetologia. 2020; 63(1): 3–9. doi: 10.1007/s00125-019-04977-9
28. Sinclair AJ, Dunning T, Colagiuri S. Managing older people with type 1 diabetes: global guidance. Diabet Med. 2015; 32(2): 161–75. doi: 10.1111/dme.12683
29. Litchman ML, Wawrzynski SE, Allen NA, Tracy EL, Kelly CS, Helgeson VS, et al. Yours, mine, and ours: a qualitative analysis of the impact of type 1 diabetes management in older adult married couples. Diabetes Spectr. 2019; 32(3): 239–48. doi: 10.2337/ds18-0057
30. Sinclair AJ, Dunning T, Dhatariya K, an International Group of Experts, Sheu WH. H., Lin SY, et al. Clinical guidelines for type 1 diabetes mellitus with an emphasis on older adults: an executive summary. Diabet Med. 2020; 37(1): 53–70. doi: 10.1111/dme.14135
31. Taboada Gjorup AL, Snoek FJ, van Duinkerken E. Diabetes self-care in older adults with type 1 diabetes mellitus: how does cognition influence self-management. Front Clin Diabetes Healthc. 2021; 2: 727029. doi: 10.3389/fcdhc.2021.727029
32. Skivington K, Matthews L, Simpson SA, Craig P, Baird J, Blazeby JM, et al. A new framework for developing and evaluating complex interventions: update of Medical Research Council guidance. BMJ. 2021; 374: n2061. doi: 10.1136/bmj.n2061

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