

Diabetes specialist nurses' insights on an in-reach service project for people with diabetes on dialysis: Evaluating impact and outcomes

Diabetes is the leading cause of chronic kidney disease (CKD) and end-stage renal disease (ESRD) in many developed nations (Esposito et al, 2023). The National Diabetes Audit reported 1.21 million cases of diabetic nephropathy (stage 3A to 5) in England, with 13785 cases in North West London alone (NHS Digital, 2019). According to Diabetes UK (2024), about one fifth of the diabetes population will require some treatment for diabetic nephropathy in their life and one third will proceed to haemodialysis (HD) or renal transplant.

For people being treated on HD, managing diabetes is particularly challenging. Glycaemic fluctuations, inaccurate measurements of glycaemia, such as HbA_{1c} or fructosamine, and treatment complexity mean that access to specialist diabetes services are necessary (JBDS, 2023). People often need to attend multiple clinic appointments for ongoing care.

A recent study examining the impact of dialysis on people's well-being found that thrice-weekly, in-centre HD can lead to exhaustion, interference with daily plans and reduced quality of life (Antoun et al, 2023). Additional hospital appointments can compound this emotional and physical burden, potentially resulting in missed clinic attendance and subsequent suboptimal care (Reed, 2024). This group is also at risk of being discharged from specialist services, back to their primary care providers.

Upon examining the three dialysis centres of London North West University Healthcare NHS Trust, only 80 out of the 225 people with diabetes on HD were under specialist diabetes services. As a result, a joint quality improvement project was initiated with the Imperial College Renal and Transplant Team based at Northwick Park Hospital (NPH).

The project aimed to demonstrate the potential for enhancing glycaemia in this population through

an in-reach diabetes specialist service, and to obtain funding for a dedicated in-centre renal diabetes specialist position. The broader objective was ultimately to improve glycaemic control in individuals with diabetes awaiting a transplant, so that they were prepared for transplant surgery optimally.

The project

As an initial step, all people with diabetes attending the NPH dialysis unit, who were not already receiving secondary care from diabetes services, were referred to the NPH diabetes services by the renal team. From this group, a cohort of ten people awaiting a renal transplant was selected for the 16-week pilot study, Education to Protect Tomorrow.

A diabetes specialist nurse (DSN) visited these participants during their in-centre HD sessions. She explained the purpose of the visit, introduced them to the diabetes service, gathered diabetes histories, initiated intermittently scanned continuous glucose monitoring (isCGM) and provided NPH DSN contact details. Freestyle Libre 2 sensors were chosen for their proven reliability in glucose monitoring among the dialysis population (Avari et al, 2023).

Additionally, a baseline assessment of participants' knowledge of diabetes management was conducted using a validated Diabetes Knowledge Questionnaire (DKQ) adopted from an Australian study (Eigenmann et al, 2011). The areas assessed included each participant's understanding of the nature of their condition, associated complications, blood glucose levels, glycaemic targets, diet, physical activity, hypoglycaemia management, sick-day rules and the importance of self-monitoring of blood glucose, follow-up reviews and diabetes medications. The DKQ results were later used to tailor participants' education, focusing deeply on areas that required refresher education, but not limited to it.

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HbA_{1c} and fructosamine levels were also assessed at the beginning of the project, as part of the baseline data and for comparison with the isCGM data. However, the former were not extensively analysed in this study owing to their limitations in accurately depicting the prevailing glycaemia (JBDS, 2023).

During the second DSN visit, the initial two-week isCGM data were analysed with the participants to identify the underlying factors contributing to glucose variability, instances of hyperglycaemia and hypoglycaemia, and any gaps in the glucose data. The participants were educated on diet and lifestyle modification, and necessary adjustments were made to their diabetes treatment regimens.

Subsequent visits involved discussion of their glycaemic targets and reflection on their isCGM data, wherein each participant was shown their daily glucose graphs on the isCGM data platform. This helped to provide better insight into their glucose patterns, encouraged the setting of realistic lifestyle modification goals and enhanced treatment adherence. Some participants stated that viewing their daily glycaemic patterns was eye-opening. A few found that the regular evaluation of those patterns by the DSN and the consequent close monitoring were the motivating factors for better diabetes self-management, while another considered in-centre diabetes reviews as preparation for the pre-transplant monitoring and evaluation. However, frequent prompts for regular scanning of isCGM to capture the complete daily glycaemic pattern, and continued personalised motivation for diet and lifestyle modification, were paramount in most participants.

The frequency of reviews varied based on participants' glycaemia, and ranged from bi-weekly to monthly. Remote reviews were conducted between face-to-face visits, particularly when there were time constraints (e.g. when participants were attending twilight dialysis sessions or when the DSN was on leave).

Following the in-centre DSN reviews, participants increasingly recognised the significance of expert diabetes care, leading to increased attendance at routine DSN clinic appointments. One participant preferred in-clinic DSN reviews over in-centre reviews, owing to privacy concerns during HD. All participants had at least one face-to-face clinic review with their diabetologist during

the study. Furthermore, the DSN discussed the participants' isCGM data and diabetes medications with their respective diabetologists before switching to new insulin or adding a new medication.

During regular reviews, the DSN reassessed participants' insulin injection sites, techniques and hypoglycaemia management, and provided education addressing any problems and incorrect practices identified, along with reference leaflets. The DSN also ensured that all participants were aware of sick-day protocols and that they had a back-up glucometer to use if the isCGM failed or a confirmatory finger-prick glucose test was required.

Recommended treatments for hypoglycaemia were glucose tablets or gel, and jelly babies. These were preferred to fruit juices or regular soft drinks because of the high phosphate and potassium levels in the latter (Naber and Purohit, 2021; The British Dietetic Association, 2018), which can worsen existing conditions in people undergoing HD, and increase cardiovascular events and mortality in ESRD (Fukuoka et al, 2017).

The in-centre renal dietitian offered personalised dietary guidance as needed, including meal-planning assistance for those requiring nutritional build-up, living alone, learning to cook or following a cultural diet.

At the end of 16 weeks, participants' diabetes knowledge was reassessed using the same DKQ, and end-point isCGM data were collected for a quantitative evaluation. The results have been published previously in *Diabetic Medicine* (Joseph et al, 2024). The evidence of significant improvement in participants' understanding of diabetes and in their isCGM glycaemic profiles has provided substantial support for the business case to secure funding for a permanent position. Consequently, an in-centre renal diabetes practitioner was successfully recruited.

The feedback obtained at the end of the study showed that the participants found the service “very helpful”, they felt “well-cared for” and were “encouraged to manage the condition better”. They also found it highly beneficial and felt adequately supported, with someone “always available on the phone”.

Post-project event

A joint renal–diabetes learning event was held at the NPH dialysis centre to discuss the project's results,

to which all people living with diabetes and CKD were invited. The session encompassed the project's outcomes and key aspects of diabetes and renal issues.

A participant who had a successful renal transplant also shared his experience. The session was highly interactive, and attendees found it exceptionally beneficial and informative.

Conclusion

Despite the need for continuous, individualised motivation to enhance glycaemia in people with diabetes on HD, the integrated person-centred strategy improved overall glycaemia and diabetes knowledge in this group. This service model is sustainable, as these people, according to current guidelines, would otherwise be under the hospital diabetes team owing to the complexities of concurrent CKD and diabetes (JBDS, 2023). The key distinction is the shift in the point of service delivery from clinic review to dialysis unit.

Expanding to a larger cohort is feasible with adequate funding. However, providing personalised support is resource-intensive and would require one dedicated DSN for every 10–15 individuals. Once these people have been integrated into the secondary care diabetes service, the monitoring frequency can be reduced, optimising the nurse-to-patient ratios.

An alternative approach to consider is to upskill the senior dialysis staff as a diabetes link nurse or resource person through additional training on interpreting isCGM data, as much of the participants' motivation was driven by the discussions on glycaemic patterns and the impact of diet and lifestyle on these patterns. ■

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Challenges encountered during the Education to Protect Tomorrow pilot project.

Participants

- One participant lacked a smartphone and was provided with a reader, which prevented remote monitoring.
- A vision-impaired participant needed assistance with each isCGM application.
- All participants needed help completing the baseline Diabetes Knowledge Questionnaire, although some required minimal assistance for the endpoint questionnaire.
- There was a lack of privacy during dialysis unit reviews, compared to in-clinic DSN reviews.

Service delivery

- The project was not funded.
- The cohort size was kept small, owing to the intensive continual motivation required for each participant.
- Remote monitoring was sometimes impractical.
- The DSN worked beyond regular hours to manage the additional workload, as the project was not funded.

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