The effectiveness of a hospital diabetes outreach service in supporting care for acutely admitted patients with diabetes

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Summary

Background: Patients with diabetes have increased frequency of hospital admissions and longer lengths of stay compared to patients without diabetes. Our specialist diabetes inpatient service was reconfigured to deliver a proactive diabetes outreach service to improve the overall care of this population.

Aims: To ascertain the effect of a structured diabetes outreach service to acutely admitted patients with diabetes on avoidable admissions, delayed discharges and appropriate diabetes related follow-up plans.

Methods: Audits were carried out before and 4 months after the introduction of a diabetes outreach service. The proportion of patients under care of the diabetes team, avoidable admissions, delayed discharges and existence of effective follow-up plans were compared pre- and post-implementation of this outreach service.

Results: The number of inpatients with diabetes fell by 35% (83 on a typical day pre-outreach vs. 53 post-outreach) despite a similar number of total medical admissions in that month (1449 vs. 1459). This was due to a reduction in those admitted with diabetes related (13 vs. 5) and general medical (29 vs. 10) problems whilst numbers requiring other specialist care (41 vs. 39) remained unchanged. The proportion of patients under the care of diabetes team rose (23% vs. 73%) while those with avoidable admissions (18% vs. 7%), delayed discharges (17% vs. 2%) and inappropriate discharge plans (65% vs. 11%) all fell.

Conclusions: This reformatted service was associated with a marked improvement in a number of parameters relevant to inpatient care.

Introduction

Diabetes is a chronic illness affecting at least 3% of the UK population. This population has been found to occupy more than 10% of hospital beds and their length of hospital stay is longer compared to the population without diabetes.

We undertook a local baseline audit to assess various aspects of inpatient diabetes care on all patients with diabetes on all medical wards in September 2005. It revealed inappropriate or inadequate diabetes-related discharge planning in the majority that may have led to potentially avoidable admissions and delayed discharges in some. Thus, our own experience and experience elsewhere suggest that some of the increased bed occupancy by people with diabetes is due to sub-optimal diabetes care. To deliver structured diabetes care to our inpatient population with diabetes in line with National Service Framework recommendation, we fully reviewed and reconfigured our service which historically was delivered in a dedicated diabetes ward and provided support to patients elsewhere following referrals. This involved reduction of beds by 50% on our specialist ward, negotiation of bed management for those with inpatient diabetes, and development of a proactive outreach service to support inpatient care.

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diabetes and the establishment of a completely new team to deliver a proactive diabetes outreach service (DOS). DOS was launched in June 2006. We then undertook a re-audit, to assess the effectiveness of delivery of care, 4 months after the launch of structured DOS. This article describes the effect of introduction of DOS on avoidable admissions, delayed discharges and diabetes-related discharge planning of our inpatients with diabetes.

Methods

Objectives of DOS

The objectives of this service were: (i) to prevent admissions by developing rapid and open access services; (ii) to effectively manage diabetes of those admitted by addressing glycaemic control, complication screening and risk factor management; (iii) to manage their other medical problems, if in our competency so to do, or support other teams providing specialist care; (iv) to reduce delayed discharge by early formulation of an effective discharge plan and (v) to organize appropriate follow-up to ensure continuity of diabetes care.

For the purpose of this study, we defined avoidable admissions as those where early input from the diabetes team with appropriate facility for follow up, could have allowed effective out patient management. Discharges were defined to be delayed when it was perceived that the length of patient stay was prolonged because of late involvement by the diabetes team. Diabetes-related discharge planning was defined as one that clearly addressed the factors not only relevant to the admission but also to the wider diabetes-related care needs and to their subsequent follow up.

Structure of DOS

We deployed an enhanced and reconfigured team as shown in Table 1 to provide this service. The team was broadly divided into three sub-teams based on the areas to be supported. Outreach team 1 was mainly responsible for acute admission areas. Outreach team 2 provided support to patients after they were transferred to different medical wards, specialist wards and surgical wards. Outreach team 3 was dedicated to running an outreach clinic for patients requiring short term review and support following discharge. There were three consultant-led ward round each week in areas covered by outreach teams 1 and 2.

Operational pathway of DOS

Outreach team 1 focussed on initial triage of all patients with diabetes in the acute admission areas into one of the three groups as shown in (Figure 1). A proportion of patients thus triaged by the diabetes team were directly discharged from the admission areas itself (avoidable admissions). For such rapidly discharged patients, appropriate follow up was arranged either in the outreach clinic for short-term review and early support post-discharge or in the community with various services including community-based diabetes specialist nursing team as deemed necessary.

Before the initiation of the DOS, it was agreed internally within the trust and with the rest of our colleagues that we would take over the care of all patients presenting with diabetes-related problems and patients with diabetes presenting with general medical problems if we felt it was within our competency to do so. Such patients with diabetes triaged for takeover of care by our team were moved to beds allocated to the diabetes team either in a medical short stay area if their admission was predicted to be of short duration (≤ 3 days) or to a limited number of specialist diabetes ward-based beds if their anticipated length of stay was > 3 days. By an effective gate-keeping, we ensured that the specialist diabetes ward beds accommodated only patients with diabetes with complex needs needing prolonged stay. However, due to the sheer number

<table>
<thead>
<tr>
<th>Team</th>
<th>Areas covered (weekdays 9 a.m. to 5 p.m.)</th>
<th>Team members</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outreach 1</td>
<td>Acute admission wards: assessment, triage and allocation into appropriate care</td>
<td>1 DSN, 1 MG, 1 Cons</td>
</tr>
<tr>
<td>Outreach 2</td>
<td>All medical and surgical wards especially the ‘high risk’ areas: renal, cardiac, vascular, maternity</td>
<td>2 DSN, 1 MG, 1 Cons</td>
</tr>
<tr>
<td>Outreach 3</td>
<td>Early post-discharge outpatient support</td>
<td>1 DSN</td>
</tr>
</tbody>
</table>

DSN: diabetes specialist nurse; MG: middle-grade doctor; Cons: consultant Endocrinologist.
of patients with diabetes and complex needs, it was not always possible to transfer this group of patients to allocated beds and it was our aim to continue looking after this subgroup of patients regardless of their areas of transfer.

Patients with diabetes whose admission demanded attention from other specialists were directly transferred to specialist beds, where they were supported by outreach team 2.

**Audit methods**

The audit was conducted in New Cross Hospital which has around 700-bed capacity and provides a number of tertiary specialist services including renal, cardiac and oncology services besides those services provided by a district general hospital. The hospital serves a population of 380,000, 30% of which are comprised of ethnic minorities. Initial audit was carried out on two separate weekdays in September 2005. Patients with diabetes were identified through the hospital patient administration system (PAS) which has link with the district-wide diabetes registers enabling identification of all known individuals with diabetes. In addition, the nursing teams in the admission areas were relied on to identify any other patients including those with newly diagnosed diabetes. Case records were reviewed by a middle-grade doctor. Diabetes details, primary reason for admission, speciality bed occupied, referral to hospital diabetes team (nursing or medical), proportion of patients under the care of diabetes team, diabetes related discharge planning, avoidable admissions and delayed discharges were recorded. Data was collected in a standardized manner using a proforma.

Appropriateness of diabetes care and discharge planning was agreed by the whole audit team and recorded. The mean of the two daily values was calculated for each outcome to give the picture of a ‘typical day’.

The DOS was functional from June 2006. Four months after the launch of DOS, a re-audit was carried out on three separate weekdays in October 2006. This was done in a blinded fashion so that the outreach team was kept unaware of the fact that the audit was being carried out. The mean of the three daily values was calculated for each outcome to give the picture of a ‘typical day’.

**Results**

Overall, the number of acute medical admissions in the month before and after the launch of DOS was similar (1449 in September 2005 vs. 1459 in October 2006). Despite this, the average number of inpatients with diabetes on a typical day showed a substantial fall from 83 to 54 after the initiation of DOS as shown in Figure 2a. Within that, the numbers with a primary diabetes-related admissions fell (13 vs. 5), as did those with general medical problems as the key cause of admission (29 vs. 10). However, the number of patients with diabetes needing other specialist care remained unchanged (41 vs. 39). Figure 2b summarizes these data.

![Figure 1](image1.png)

**Figure 1.** Diagrammatic representation of DOS delivery (DM, diabetes; DM + GIM, patients with diabetes with general medical problems).

![Figure 2](image2.png)

**Figure 2.** The number (a) and percentage (b) of inpatients with diabetes according to indication of admission (DM: diabetes; DM + GIM: diabetes patients with general medical problems).
in percentage. The proportion of those with a primary diabetes-related admissions fell (16% vs. 9%, $\chi^2 = 857, P < 0.001$, pre- and post-outreach), as did those with general medical problems as the key cause of admission (35% vs. 18%, $\chi^2 = 294, P < 0.001$). As might be predicted, the number of patients with diabetes needing other specialist care increased (49% vs. 73%, $\chi^2 = 48.8, P < 0.001$).

Patients hospitalized with diabetes related and general medical problems as the key cause for admission were further evaluated (Figure 3). A marked rise was observed in the proportion of such patients under the care of diabetes team (23% vs. 73%) while that of avoidable admissions decreased (18% to 7%). When all patients with diabetes in each of the three admission groups were taken into account, it was observed that delayed discharges (17% to 2%) and inadequate or inappropriate discharge planning showed a sharp reduction after DOS (65% to 11%).

**Discussion**

It is well known that individuals with diabetes have increased frequency of hospital admission and longer lengths of stay compared to their non-diabetic counterparts and our preliminary audit confirmed this finding. Despite the awareness of the diagnosis of diabetes at admission, studies have found little change in care plans or structured follow-up for such hospitalized patients. Post-discharge retrospective analyses have also identified substantial numbers re-entering acute care. These outcomes highlight the need for a structured and improved care that inpatients with diabetes receive over and above that directly relating to glycaemic control, and the Diabetes National Service Framework standard 8 recommends this.

Our relatively simple cross-sectional audit of a restructured and a proactive specialist hospital diabetes service, focused on those patients with diabetes admitted acutely, shows a reduction in bed occupancy, a decrease in avoidable admissions, a decrease in ineffective discharge planning and delayed discharge and an improved allocation of patients to appropriate care after structured triage of patients. The reduction in the number of avoidable admissions was achieved mainly by discharging patients directly from the admission areas. Interestingly, there was a sharp rise seen in the proportion of patients achieving care from our other specialist colleagues and this proportional rise was seen alongside a decreased percentage of admissions due to diabetes related and general medical related indication for admission—essentially reflecting a more effective allocation of care as a consequence of triage. Whilst this result emphasizes that admissions into specialist areas of patients with highly complex needs are generally unavoidable, the newly structured team still contributed to effective discharge planning and a reduction in delayed discharge amongst this cohort.

A number of other studies have shown similar positive outcomes following the implementation of structured interventions for inpatients with diabetes. In 2001, Cavan et al.9 showed a reduction in the median length of stay of patients with diabetes on a medical ward with the introduction of ward-based diabetes nurse advisor. Around the same time, Davies et al.10 showed that with the intervention of diabetes specialist nurse (DSN) support, the mean cost per admission was lower. Levetan et al.4 demonstrated that contact with a diabetes specialist team reduced the length of stay. Koproski et al.5 observed improvement of glycaemic control, reduction in readmissions in addition to decreased length of stay with intervention by a diabetes team. Cultural changes brought on by increasing diabetes awareness hospital-wide and implementing effective identification and management system have helped to provide high quality diabetes care.11

It is unlikely that our audit was subject to a significant variation in case mix given that it was conducted at the same time of year over several days and from a matched base of total acute admissions. Identical audit standards, definitions and proforma’s were used between the two audits. The audits had a number of limitations—namely we did not look at length of stay, readmission rates, clinical outcomes or patient satisfaction.
Nevertheless we feel the gains were fairly manifest. This was due to the proactive nature of the new service which involved: very early formal triaging of patients in acute admission areas; taking over the care of patients with diabetes wherever appropriate; not only looking after diabetes but the patients’ medical problems as whole; focusing our attention on ‘high-risk’ areas with provision of continued support. At the same time because of involvement of the whole diabetes team with its various skill mixes, we were able to educate, modify treatment and formulate appropriate diabetes related discharge plans taking into account the patient’s current diagnosis, previous co-morbidities and their social circumstances at an early stage. Finally, effective communication with the community diabetes services, closer link between the ‘hospital-based’ and ‘community-based’ DSN and existence of an outreach diabetes clinic facilitated discharges.

The service reconfiguration required to achieve the new structure was somewhat painful for the whole local specialist diabetes team. It meant difficult but fruitful negotiations with the Trust, reduction of beds on a designated diabetes ward, a decreased diabetes team inpatient bed capacity, a loss of jobs for some staff though majority were redeployed, new ways of working, and new lines of hand over and communication at all levels within the multi disciplinary team. All consultant job plans were re-written, consultants agreed co-working and cross cover patterns and junior doctors’ commitments were reconfigured—also meaning that they and their training committees were asked to accept that this change in service, and their service contribution, was also a training opportunity. The role of diabetes specialist nursing significantly shifted and, of particular importance, was the vital need to ensure that the acute and community specialist nursing teams worked in an integrated way around discharge planning and transitional care back into the community. This in turn involved a number of work pattern changes amongst the community component of our DSN team. Ultimately, financial savings from our ward closure were fed, in part, into an expanded number of middle-grade doctors and specialist nurses.

In conclusion, we report the positive outcomes of a restructured hospital diabetes service which essentially reduced bed occupancy, inappropriate admissions, delayed discharges and ineffective discharge planning.

Conflict of interest: None declared.

References