

Do diabetic patients have appropriate prescribing and endorsing of their medication while under hospital inpatient care?

Abstract

Objective: To evaluate whether inpatient orders of oral hypoglycaemics (OH) and insulin within a teaching hospital are prescribed and endorsed according to the hospital guidelines.

Design: Audit through data collection form.

Participants: All patients on all wards except wards where the patients receiving insulin were expected to be on an insulin sliding scale. 118 patients were identified on all wards and those who were eligible for inclusion was 102.

Main outcome measures: Prescribing of insulin and OH in relation to food, endorsement of some instructions on administration of OH in relation to food, correct endorsement, endorsement of insulin device, prescribing or endorsement of insulin species and strength.

Results: Only 65.6% of OH orders and 66.7% of insulin orders were prescribed at the right time in relation to food on inpatient drug charts. Only 29.5% of inpatient drug charts were endorsed with some instructions on administration of OH in relation to food. 100% of the instructions were correctly endorsed. Only 41.2% of inpatient insulin prescriptions had the device endorsed by ward pharmacists. For insulins that are available from different species 91.4% had the species neither prescribed by doctors nor endorsed by pharmacists. For biphasic insulins, 13.9% had the strength neither prescribed by doctors nor endorsed by pharmacists.

Conclusions: Most standards audited fell short of those made at the outset. Doctors and pharmacists were not consistently following the Trust's guidelines for prescribing and endorsing of diabetic medication on inpatient drug charts. Reviewing the guidelines to make it less ambiguous was recommended. Re-auditing in one year was advised.

Introduction

Incorrectly timed administration of insulin and oral hypoglycaemics (OH) in relation to food can result in reduced efficacy and an increased side-effect profile. For example, the risk of experiencing the gastrointestinal (GI) side-effects associated with metformin administration is increased if it is not given with food. Increased side-effects may decrease patient compliance. Poor compliance may have a deleterious effect on glycaemic control, which in turn may increase the risk of diabetic complications.¹ Similarly, if insulin is incorrectly administered in relation to meals there would be an increased risk of hypoglycaemia or hyperglycaemia and consequently poor glycaemic control. Therefore, when considering ways to achieve tight glycaemic control for hospital inpatients, appropriate prescribing and pharmacist endorsement of diabetic medication may be seen as a

priority especially in the context of an increasing incidence of diabetes in the UK.

The aim of this audit, which was conducted as part of the clinical pharmacy MSc requirements, was to determine whether inpatient orders of OH and insulin within a busy teaching hospital were prescribed and endorsed according to the hospital guidelines, which are detailed in Table I.

Method

A data collection form was designed by reviewing the standards of the audit shown in Table 2. All ward pharmacists within the hospital were given an overview of the audit. Ward pharmacists identified diabetic patients during the course of their regular ward rounds and referred these to the study coordinator. Cumulative data collection forms were used by the ward pharmacists for the whole period of data collection to avoid duplication of subjects. The handover sheet provided by the nurse in charge on every ward was also checked to ensure that no diabetic patient was missed.

The initial data collection form was piloted on all wards on two consecutive days. Because the number of patients on the second day of piloting was small — only eight patients — the decision was made to collect data on alternate days. The data collection period was run for three weeks on alternate days. Because diabetic patients can be found on any ward the data collection included all wards except wards where patients receiving insulin were expected to be on an insulin sliding scale (such as intensive care unit, neonatal unit, surgical and obstetrics). The wards included were 13 medical, 1 elderly and 2 acute admissions.

Table 1. Trust guidelines

The following is an excerpt of the relevant section of Trust guidelines for the prescribing and endorsing of inpatient prescription charts:

1. The prescriber must write the prescriptions legibly using the approved medicine name. The only exception is modified release (m/r) preparations when it is necessary to use the 'brand name' e.g. theophylline, diltiazem, nifedipine.
2. The prescriber must specify the frequency and the time of medicine administration.
3. All drugs are prescribed or endorsed with the approved name.
4. Prescriptions are endorsed with guidelines on administration according to the *BNF*.

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Some of the diabetic patients who were identified by nurses had not yet had their drug charts checked by the pharmacist and were excluded from the study.

When calculating the percentage of correct prescribing and endorsement of OH and insulin in relation to meals the glargine orders (11) and rosiglitazone orders (2) prescribed to patients were excluded because glargine and rosiglitazone can be given with no restriction to meal time.

Results

The total number of patients included in the study was 102. The data for these were collected and analysed using the database, SPSS (Statistical Package for the Social Sciences) and Microsoft Excel.

Of the 102 patients, 46 were prescribed at least one OH, 50 were prescribed insulin and 6 were prescribed insulin and OH.

Prescribing of OH

Of the 52 patients' who were prescribed OHs there were 61 OH drugs prescribed (excluding rosiglitazone).

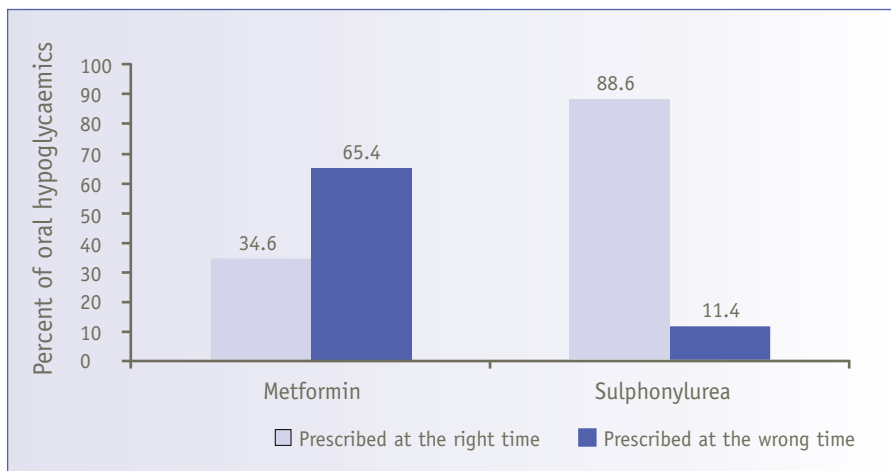


Figure 1. Appropriateness of timing of oral hypoglycaemics administration in relation to meals

Figure 1 shows the data for timings of oral hypoglycaemics in relation to meals. Of the 61 OH orders, only 40 (65.6%) were prescribed at the ideal time in relation to meals. These were 9 out of 26 orders for metformin (34.6%) and 31 out of 35 orders for sulphonylureas (88.6%).

Endorsement of OH

Figure 2 shows the detailed endorsement data for the OHs. Of the 61 OH drugs prescribed, only 18 (29.5%) were endorsed with instructions on administration in relation to meals (12 out of 26 for metformin (46.2%) and 6 out of 35 for sulphonylurea (17.1%)). All OH drugs that were endorsed with instructions on administration with regard to meals were correctly endorsed by ward pharmacists.

Prescribing of insulin

Excluding glargine there were a total of 57 insulin drugs prescribed for the 56 patients in this group. Of the 57 insulin drugs only 38 (66.7%) were prescribed at the right time in relation to meals.

Prescribing and endorsement of insulin species, device and strength

There were 23 prescriptions for those insulins available from different species. Of these 21 (91.4%) had the species neither prescribed by doctors nor endorsed by pharmacists.

Of the 68 insulin drugs, 28 (41.2%) had the administration device endorsed by ward pharmacists. Thirty-six insulin prescriptions were for biphasic insulins. Of these 36 biphasic insulin drugs 5 (13.9%) had the strength neither prescribed by doctors nor endorsed by pharmacists.

Discussion

Prescribing and endorsement of diabetic medication

This study showed that only 65.6% of OH and 66.7% of insulin orders were prescribed at the correct time in relation to meals. In addition, only 29.5% of OH orders were endorsed with the appropriate instructions. Therefore, the audit showed that the set standards were not being met. These findings may be explained by the lack of knowledge of some junior doctors and

Table 2. Audit standards

1. 100% of OH on inpatient drug charts should be prescribed at the right time in relation to meals.
2. 100% of inpatient drug charts should be endorsed with instructions on administration of OH in relation to meals e.g. "taken with meals".
3. 100% of the instructions on administration of OH in relation to meals should be correctly endorsed according to the type of oral hypoglycaemic that is given to the patient.
4. 100% of insulins on inpatient drug charts should be prescribed at the right time in relation to meals.
5. 100% of insulin prescriptions on inpatient drug charts should have the insulin device endorsed by the ward pharmacist.
6. 100% of insulin prescriptions on inpatient drug charts should have the species, if insulin drug is available from different species, prescribed or endorsed.
7. 100% of biphasic insulin prescriptions on inpatient drug charts should have the strength prescribed or endorsed.

pharmacists of the appropriate prescribing of insulin and OH in relation to meals and the appropriate endorsement of OH in relation to meals, and lack of appreciation of its importance in achieving a tight glycaemic control. The *BNF* recommends that when glipizide is prescribed the pharmacist should recommend it to be taken 'shortly before meal'.² According to the pharmacokinetic characteristics of glipizide its absorption is delayed by about 40 minutes if given with meals. Thus, it would be more effective when administered shortly before, rather than with, the meal. Another possible reason for our findings could be that ward pharmacists were not fully aware of their responsibilities in confirming the safety of prescriptions in terms of the additional instructions required. We found that 100% of the endorsements made, however, were correct and so the audit standard against which practice was measured was met.

Prescribing or endorsement of insulin species, strength and device

The study also showed that 91.4% of the insulins available from different species had the species neither prescribed by doctors nor endorsed by pharmacists and 13.9% of the biphasic insulin orders had the strength neither prescribed by the doctors nor endorsed by the pharmacists. In addition, only 41.2% of insulin orders had the device endorsed by ward pharmacists. Therefore, the audit standards were not met.

Possible explanation of these results could be unawareness of the importance

of specifying these vital details on the drug chart. Indeed, some patients have reported lack of hypoglycaemia warning after they transferred from animal to human insulin.² In addition, endorsing the device on the drug chart ensures that at the point of discharge individuals are supplied with the appropriate devices that would meet their needs (for example, in cases of visual impairment) and that this is communicated into the primary care setting. Alternatively, our findings could be explained by the possibility that doctors and pharmacists lack the knowledge that these products are available in more than one species and strength.

Specifying the species, the strength and the device the patient is using on the drug chart helps the pharmacy staff in establishing vital details they need to dispense insulin and could, therefore, reduce the delay in the discharge of insulin-dependent patients.³

Comparison to similar work

In reference to the study conducted by Browne and colleagues¹ to assess the knowledge of health care professionals about the appropriate administration of OH in relation to meals, 59% of doctors knew the appropriate administration of sulphonylureas in relation to meals whereas 41% knew the appropriate administration of metformin in relation to meals.¹ By comparison, our data showed that 88.6% of sulphonylurea orders and 34.6% of metformin orders were prescribed at the

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right time in relation to meals. If the reason for the poor prescribing was the lack of knowledge then our findings are consistent with the results of this study.

There is no published literature in which inpatient prescribing habits and pharmacist endorsement of insulin and OH have been studied. However, a similar audit to our audit was carried out at another hospital within the Trust, in 2004. The earlier audit found a higher number of OH and insulin orders were prescribed correctly in relation to meals than found in our audit. In addition, the number of biphasic insulin prescriptions that had the strength prescribed or endorsed was larger; other findings were similar to our audit.⁴ A possible factor accounting for the differences in findings between the two audits might be that the lead educator during the 2004 audit specialised in general medicine with a special interest in diabetes.

Recommendations and future work

This study suggests that prescribing and endorsing of diabetic medication on inpatient drug charts can be improved. Pharmacists and doctors need to be educated about the appropriate administration and endorsements of insulin and OH in relation to meals and its impact on decreasing the risk of diabetic complications. In addition, pharmacists should be made more aware of their responsibility in confirming the safety of prescriptions in terms of the additional instructions required. The Trust guidelines need to be updated and made less ambiguous. This should be followed by education and training sessions for junior pharmacists and doctors about the guidelines. Re-audit in one year is recommended.

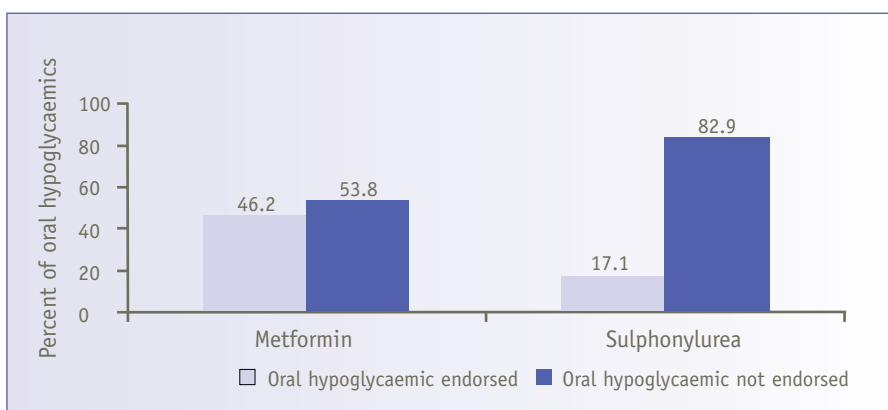


Figure 2. Percentage of endorsements for oral hypoglycaemics

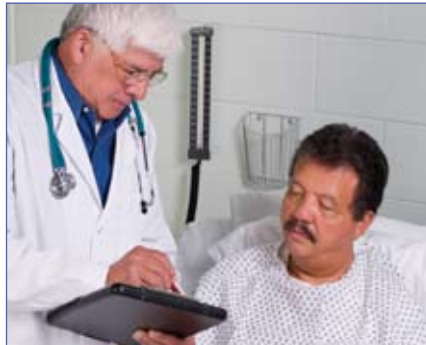
Original research

Limitations

The Trust guidelines, which were used to set the audit standards, are insufficiently detailed. This made setting the standards difficult and the conclusions less definitive. Reasons why the audit standards were not met are uncertain and this area needs to be explored with prescribers and pharmacists in a future study.

Conclusion

In our study we found that prescribing and endorsing of insulin and OH in relation to meals did not always conform to the Trust guidelines. Also, most of the audit standards were not met, suggesting we need to improve practice to achieve tight glycaemic control for diabetic hospital inpatients. ❖



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Declarations of interest

The authors have no interests to declare.

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