Self-administration of medications in inpatient postnatal women: an opportunity to empower self-care, improved medicines knowledge and adherence utilising clinical pharmacists and midwifery workforce and use of a midwife formulary

Sherry Ann Wright,[1] Claire Higgins,[2] Jenny Carson,[1] Moira Kinnear,[3] Pauline Smith,[4] Nirmala Mary,[5] Emma Westall,[6] Sadaf Arshad[1]

ABSTRACT

Objectives To assess the impact of self-administration of medicines (facilitated by a midwife formulary) on postnatal women's knowledge of certain post-delivery medications, awareness of the Green Bag Scheme, factors contributing to constipation, pain satisfaction, adherence, and time released to midwives plus feedback from these women and their midwives.

Methods The study was conducted in consented postnatal women, who self-administered medications from their bedside lockers. The mode of delivery and parity were recorded. Data were compared in women who self-administered to those who did not. Midwives used our established midwife formulary to write their essential unprescribed medications. Direct interview questionnaires were used to obtain their knowledge on chosen post-delivery medicines, pain satisfaction, the Green Bag Scheme and factors contributing to constipation. Regular medicines counts were used to check adherence. Midwives' time not administering these self-administered medications was estimated. Self-reported questionnaires were used to obtain feedback from participants and midwives. Responses were analysed proportionately and where appropriate by simple statistics.

Results Women (n=203) who self-administered were compared with those (n=401) who did not. Greater medicines' knowledge and better (96% vs 79%) pain satisfaction were found in self-administering women. Knowledge of each contributing factor to constipation varied. Mode of delivery and parity had no impact on these outcomes. Adherence seemed high 96% (195/203). Awareness of the Green Bag Scheme was poor (66/604). Most women, 94% (191/203) found the service helpful and 89% (178/200) would take part again. At least 224 hours were released to midwives by these self-administering women. 164/203 (81%) midwives felt the scheme was beneficial.

Conclusions Self-administering women had better pain satisfaction, medication knowledge and adherence. The need to improve engagement in the Green Bag Scheme was flagged. This service, supported by use of a midwife formulary, can release time to midwives to do other tasks including care for women with more complex issues. A business case for this service is under review.

INTRODUCTION

Self-administration of medicines (SAM) has been promoted as an important inpatient hospital service as it can improve compliance and empower self-care.[1 2] Most SAM services have been offered in the care of the elderly[3 4] and to a limited extent in maternity services.[5–7] Medication usage during and after pregnancy and while breastfeeding is widespread.[8] Information on safety and efficacy of medications may reduce misperceptions and poor adherence.[9] Common postnatal care issues are pain[10] and constipation.[11] Constipation can contribute to pain so active management and awareness of causative factors could be beneficial. SAM service presents a face-to-face opportunity to educate these women about their medications and management of these common care issues. Better understanding about medicines may improve adherence and reduce medication errors.[12–15] In mental health services non-adherence resulted in wastage of about £150 million (€175 million) per annum and 55–60% hospital readmission.[16] Non-adherence of medication is common in pregnant women, but its implications are unknown.

Midwives (MWs) can legally write midwife exemptions and other medicines within their sphere of practice and competency.[17] Single doses can be written and administered only by the same midwife. A key role of clinical pharmacists (CPs) is to provide pharmaceutical care to ensure safe and effective use of medicines within the multidisciplinary workforce. With a small CP team, we needed to explore options to support MWs to embrace these activities. CPs collaborated with senior MWs and obstetricians and developed the Lothian Midwife Formulary (LMF) (online supplemental information A-1/2) and education and assessment packages to enable MWs to initially write single doses of agreed medicines. MWs were aware of women who would be suitable for SAM, especially those who were likely to need longer inpatient stays related to babies or other care issues. Legally MWs can write medications for inpatient women under their care, who are suitable and consented to SAM and at discharge. SAM can speed up the discharge process.[5–7] To optimise benefits of LMF, it was agreed to introduce a maternity SAM service. Locally approved support packages were developed to educate, assess, and

Table 1 Women's knowledge of the Green Bag scheme and those who brought in their own medicines

Medicines issues	Non-SAM (n=401)	SAM (n=203)	P value
Women who knew about the Green Bag Scheme	8%	18%	p<0.005
Women who brought in their own medicines	52%	64%	p<0.005

SAM, self-administration of medicines.

engage MWs in the SAM service. If certain medications had not been prescribed by doctors, MWs could write required medications using the LMF for SAM women and speed up the process, avoiding the need to contact a doctor to do this task.

One Stop Dispensing Service (OSDS)[18] is essential to implement a SAM service as patients' bedside lockers containing all labelled medications, not the drug trolley, are used for medicine administration. Our maternity unit has an OSDS. At antenatal clinics, women should be encouraged to bring in their own medications at admissions, part of the Green Bag Scheme,[19] as it improves access to medications, patient care and flow and reduces medicine wastage with potential financial benefits. OSDS can facilitate prompt set up of SAM as it avoids the need to order chronic medications from the pharmacy with potential for delays.

CPs and senior MWs collaborated to support and evaluate benefits of the SAM service, also supported by the introduction of the use of LMF by MWs in postnatal women. The outcomes assessed were women's pain satisfaction and knowledge of chosen post-delivery medications, factors contributing to constipation, awareness of the Green Bag Scheme, the need to bring in their own medications at admissions, and medicines adherence. Potential time released to MWs by SAM women and feedback from SAM women and their MWs were obtained. The vision was that SAM can potentially deliver a more patient-centred care[20] and make better use of the workforce.

METHODS
Evaluation of the benefits of implementing a SAM scheme was undertaken in postnatal women on two postnatal wards at the Royal Infirmary of Edinburgh, a regional maternity service offered to a population of over 800 000 which manages about 9600 deliveries per annum. Data were collected from May 2016 to January 2017.

Exclusion criteria for participation in SAM were history of alcohol or drug misuse, <18 years old, unwell, confused, not fluent in English, and non-consenters. Direct interview questionnaires were completed for consented SAM and non-SAM women. SAM was initiated in those capable of level 3 SAM,[1] that is, they could independently self-administer medications and record the word 'self' and their initials for each dose taken on their medicine chart. Only labelled medicinal products with

directions were stored in bedside lockers. They had to agree to keep the locker key safe and return it to their MWs at discharge. MWs were available for support if required. Women were informed that regular counts of their medications and a record of intakes on a medicine chart would be done. The option to stop SAM anytime if felt appropriate was shared.

Quantitative and qualitative methodologies[1 2 21] were used to develop a local structured direct interview questionnaire using mainly closed-ended yes/no questions. The direct interview questionnaire technique was chosen as it provided the opportunity for direct patient interaction to clarify questions and reduce misunderstanding. Before its use, questionnaires were piloted among the CP team and amended accordingly.

Unique keys for lockers were issued to consented SAM women. Master keys, that could open all lockers, were used by MWs. A paper log was created to record all keys provided to SAM women. SAM information packages were created and shared. These contained a consent form, criteria for level 3 SAM assessment, medicines adherence log, and SAM women's and MWs' feedback forms. Laminated sheets were provided to SAM women at initial set-up. It contained essential information on the SAM process and how to record each dose taken on medicine charts.

A simplified booklet was created to support and engage MWs in the SAM service. Education sessions on the SAM scheme were delivered by CPs to MWs before this evaluation and support was provided on how to write required medications using the LMF, where appropriate. During the initial stage of implementation, SAM set up, monitoring and data collection were done by the CP team. SAM set ups were done by MWs using the LMF in the latter stages. Before consent for SAM, a pharmaceutical care review was done by CPs on all women's medical, clinical results, medicine reconciliation[22] and allergy histories. Prompt management of pain was encouraged. Information about onset and duration of action of prescribed analgesics were shared with women to enable a better understanding of pain management.

Recorded patients' demographics were mode of delivery and parity, as after complex deliveries such as caesarean section and/or after first birth (primiparous) women may be more unwell or cautious and less likely to take part in SAM. The impact of these factors was considered useful to direct implementation of the SAM service. As women were usually knowledgeable about their chronic medications, the evaluation assessed knowledge on chosen post-delivery medicines, namely paracetamol, ibuprofen, dihydrocodeine and ferrous sulfate/fumarate. Medication knowledge (name, dosage, a common adverse drug effect), pain satisfaction, factors contributing to constipation, medicine adherence, awareness of the Green Bag Scheme, and the requirement to bring their own medications at admission were assessed.

All medications were checked before SAM set up by the CP team or MWs to ensure these were appropriately labelled and suitable for re-use before a tablet count was done and logged.

Table 2 Women's knowledge on post-delivery medicines (SAM (n=203) and non-SAM (n=401))

Name	Know name of medicine SAM vs non-SAM, p value	Know dose SAM vs non-SAM, p value	Know a common ADR SAM vs non-SAM, p value
Paracetamol	100% to 95%, p<0.005	89% to 47%, p<0.005	61% to 19%, p<0.005
Ibuprofen	98% to 92%, p<0.005	84% to 37%, p<0.005	63% to 22%, p<0.005
Dihydrocodeine	91% to 60%, p<0.005	66% to 17%, p<0.005	63% to 19%, p<0.005
Ferrous sulfate/fumarate	97% to 78%, p<0.005	70% to 32%, p<0.005	65% to 29%, p<0.005

ADR, adverse drug reaction; SAM, self-administration of medicines.

MWs were advised to contact the CP team for any unmet medicines-related issues. All prescribed medicines (name, form, strength), date and initial quantity were recorded. Subsequent tablet counts by the CP team or MWs every 1–2 days and at discharge were also recorded on the medicine adherence log and stored in the bedside locker. Adherence was based on the tablet counts that matched signed dosages by SAM women on their medicine chart. Non-adherence/compliance (including overuse of opiates or opioids) was discussed with doctors or their MWs.

For non-SAM women, those who opted not to self-administer but consented to questionnaires, direct questionnaires were done immediately after consent. It was not pragmatic to specify a fixed time for SAM women to do direct interview questionnaires for various reasons such as being asleep, have family/friends visiting or out-of-ward visiting baby on the neonatal unit, so it was done at one of the tablets counts 1–2 days later. The question 'Did you find SAM useful?' for SAM women and their MWs was on the direct questionnaire completed by the CP team. All quantitative responses were logged on a Microsoft Excel document. Data were analysed quantitatively based on counts of responses of open and closed-ended questions.[23] Open and closed-ended questions with free text feedback questionnaires were left in SAM women's bedside lockers with agreement that these were to be self-reported by them and their MWs at a suitable time during their inpatient stay. Responses were recorded manually on a Microsoft Excel document. Compliance with data protection was adhered to by anonymising all patients' specific data before analysis. Quality of pain control was based on local maternity practice; codes 1–5 were used, where very unsatisfied=1 and very satisfied=5. Baseline knowledge data (n=203) were obtained on factors contributing to constipation[11] (fibre, fluid, mobility, and medications). As constipation can contribute to pain, all constipated women were prescribed laxatives.

The average time taken to complete the SAM setup by the CP team across a small sample (n=20) was used to estimate MWs' SAM set up time. Only time directly related to SAM set up and evaluation was recorded. MWs (n=20) were shadowed while using bedside lockers to administer oral dosages to determine the average time taken to administer each oral medicine. The total number of doses taken by SAM women was multiplied by time taken by MWs to administer and record each dose to estimate time released to MWs.

Statistical analysis

The Z test was used to estimate p values to confirm statistical difference where appropriate.[24] Categorical/binary data were analysed using a mean value and standard deviation (if distribution was normal). A value of $p<0.05$ was considered to be statistically significant.

RESULTS

SAM and non-SAM women's awareness of the Green Bag Scheme, knowledge of chosen post-delivery medicines, pain satisfaction, factors contributing to constipation, and medication adherence

Of 604 postnatal women reviewed, 203 took part in SAM and 401 did not self-administer (non-SAM). Mode of delivery was 37% by caesarean section and 63% by uncomplicated deliveries; 57% were primiparous and 43% parous in SAM women. Awareness of the Green Bag Scheme was poor (68/604) for all women; however, more SAM women brought in chronic medications

Table 3 Women's pain satisfaction for SAM versus non-SAM

Pain satisfaction level	SAM (n=203)	Non-SAM (n=401)	P value
Very satisfied/satisfied	96%	79%	p<0.005

SAM, self-administration of medicines.

(table 1). About 35% (140/401) of non-SAM women compared with 45% (92/203) of SAM women were on chronic medicines for pre-pregnancy conditions.

Most (183/203, 90%) of the initial SAM set ups were done by the CP team, and the remaining 10% (n=20) were done by MWs. MWs used the LMF to write appropriate medications before SAM set up in 15 women. Better medication knowledge (table 2) and pain satisfaction (table 3) were reported by SAM women. Awareness of factors contributing to constipation was mixed (table 4). Self-reported feedbacks from SAM women and MWs were generally positive. Some questionnaires were incomplete. The main reason was that they forgot to complete them. These issues could not be addressed as data were analysed at the end of the evaluation. Most (72/92) SAM women on chronic medications said they would bring these at future admissions (table 5 and online supplemental information B). The mode of delivery or parity had no impact on women's knowledge of the Green Bag Scheme, chosen post-delivery medications or factors contributing to constipation and pain satisfaction. Medicines adherence was high (96%- 195/203) in SAM women.

Estimate time released by SAM postnatal women to MWs

SAM women (n=203) took an average of 22 doses using a mean of four medicines (range 3–8) over a mean duration of stay of 51.5 hours (range 18–263 hours). Each oral dose given by MWs using the women's bedside locker took 3 min. If the bedside locker was not used or MWs were distracted or had to administer subcutaneous dalteparin, then the time taken was longer. The minimum time released to MWs by 203 SAM women, who took 4474 doses, was 224 hours. Many women who had their babies on the neonatal unit, or those who desired more private time, found SAM gave them flexibility. Questionnaires confirmed that some found SAM very educational and helpful. The time taken by the CP team to obtain consent, log medicines, explain the process and provide necessary medicines-related information was about 20 min, but was longer depending on complexity and communication issues. No pharmacy input was required for SAM women (n=20) set up by MWs and hence time was released to the CP team to do other tasks.

DISCUSSION/CONCLUSION

This evaluation found that postnatal SAM women had better pain satisfaction and medication knowledge in line with previous studies.[5–7] SAM enabled these young and healthy childbearing-age women to be more informed about medicines and be responsive to their needs within a supported inpatient environment with

Table 4 SAM women's knowledge on causative constipation factors (n=203)

Factors contributing to constipation	
Fibre	72%
Fluid intake	65%
Mobility	30%
Medications	64%

SAM, self-administration of medicines.

Table 5 Postnatal SAM women's and their MWs' feedback

Questions	Yes
Feedback 1—SAM women (n=203)	
Did you find SAM helpful? (n=203)	94%
More knowledgeable about medicines? (n=150)	91%
More in control of symptoms? (n=145)	95%
More flexible? (n=143)	93%
Do not have to buzz midwife and wait for medicines? (n=142)	90%
Pain control very satisfied/satisfied? (n=201)	96%
Will you bring in own medicines in future? (n=92)	78%
Would you participate in SAM again? (n=200)	89%
Feedback 2—MWs who cared for SAM women (n=203)	
Did your patient find SAM beneficial? (n=203)	81%
Released MW's time to care for more complex patients? (n=149)	92%
Patient more knowledgeable about medicines? (n=148)	89%
Did MW encounter problem with SAM? (n=180)	11%
What will make SAM sustainable?	
Continued support from pharmacy to assess patients (n=128)	100%
Continued support from pharmacy to monitor patients (n=128)	94%
MWs, midwives; SAM, self-administration of medicines.	

regular checks of adherence. Improved knowledge about medications has been shown to improve adherence, patient satisfaction and outcomes.[12 25] Previous studies have shown benefits are greater and more sustainable with input from a multidisciplinary team including CPs.[25 26] This study also confirms that SAM should be offered at every postnatal unit[5–7] as it enables women to engage in their care issues.

In this evaluation, more women on chronic medications took part in SAM.[6] Despite poor awareness of the Green Bag Scheme, more SAM than non-SAM women (64% vs 52%) brought in chronic medicines at admission, and 78% of SAM women agreed that they would do so at future admissions. Adherence was about 96% in SAM women. Further study is required to confirm whether this adherence continues after discharge. Effective communication is essential to share information and build trust. It is important to modify information to the patient's needs. When non-adherence (4%) was found, this approach was useful to detect the possible cause and address issues without blame. Motivational interviewing technique training would be appropriate before adoption of the SAM scheme.[27]

Introduction of the SAM scheme is a change of practice for MWs as it shifts the emphasis from scheduled medicines administration to the education of patients about medications, which may be more time consuming. About 92% of MWs agreed that SAM has the advantage of releasing time to them to care for women with more complex issues. MWs have engaged in the SAM set-up and used the LMF to write unprescribed medications for SAM women, thereby releasing time to doctors to manage more complex women. MW-led SAM service may also release time to CPs to deal with other tasks, including women with more complex pharmaceutical care issues. This project has confirmed many benefits of SAM in postnatal women, such as improving the quality of care and potentially making better use of the workforce with multidisciplinary collaboration.

Study strengths and limitations

The strength of this study was that evaluation of this service redesign required engagement of key stakeholders, production of educational packages and training that met service governance and quality standards. Direct interview questionnaires helped to clarify ambiguities and offered a more patient-focused response, but was time consuming, especially for women who had several enquiries. Questionnaires were designed locally so generalisability is unknown. A limitation was that the women were self-selective and may therefore not be representative of those who opted out, or the women were from other regions so future collaboration would be helpful. Factors such as age, ethnicity, cultural and socioeconomic differences, and level of education were not assessed so such comparisons were not possible. Tablet counts were used to measure adherence; however, as each dose intake was not overseen, it was unclear if the medicines were taken.

What this paper adds

What is already known on this subject
⇒ Self-administration of medicines (SAM) postnatal women reported better satisfaction and pain relief using fewer analgesics. SAM can speed up the discharge process and should be offered at every postnatal unit.
⇒ Younger women and those with better general health are more likely to participate in SAM.

What this study adds
⇒ SAM contributed to high adherence of medicines.
⇒ SAM presents an opportunity to improve knowledge on factors contributing to constipation in postnatal women.
⇒ SAM can release time for midwives (MWs) to do other tasks.
⇒ MWs used the midwife formulary to write certain unprescribed medicines for SAM women and thereby speeded up the SAM process and did not require input from doctors.

Author affiliations
[1]Lead Pharmacist, Women's Services, Royal Infirmary of Edinburgh, NHS Lothian University Hospitals Division, Edinburgh, UK
[2]Pharmacy Technician, Women's Services, Royal Infirmary of Edinburgh, NHS Lothian University Hospitals Division, Edinburgh, UK
[3]Pharmacy, Education and Research and Development, NHS Lothian University Hospitals Division, Edinburgh, UK
[4]Clinical Midwifery Manager, Women's Services, NHS Lothian University Hospitals Division, Edinburgh, UK
[5]Consultant Obstetrician, Women's Services, Royal Infirmary of Edinburgh, NHS Lothian University Hospitals Division, Edinburgh, UK
[6]Charge Nurse, ward 119, Midwifery, Women's Services, NHS Lothian University Hospitals Division, Edinburgh, UK

Twitter Moira Kinnear @MoiraKinnear

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