A prescribing quality improvement programme: reducing antipsychotic high dose and combination therapy across acute adult inpatient wards

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Evidence of efficacy for high-dose antipsychotic therapy (HDAT) and antipsychotic combinations (AC) is lacking while evidence of harm is compelling. Significantly higher proportions of Norfolk and Suffolk NHS Foundation Trust (NSFT) patients were being prescribed and AC compared with the national average. Here, the authors describe a quality improvement program at NSFT to rationalise and reduce HDAT and AC prescribing in NSFT to bring it in line with or below the national average. The initiative demonstrates that prescribing culture can be improved through a sustained multiprofessional team approach involving education and training, targeted campaign, proactive clinical pharmacy team and pharmacists' support.

High-dose antipsychotic therapy (HDAT) is defined as:[1,2]

- A single antipsychotic prescribed at a dose more than the maximum British National Formulary (BNF) / Summary of Product Characteristics (SmPC) recommended dose,

  or

- The combined use of two or more antipsychotics (regular or when required, PRN) where the total of the individual doses, expressed as a percentage of the BNF / SmPC maximum recommended dose exceeds 100%.

Antipsychotic combination (AC) is defined as the prescription of two or more antipsychotic drugs (either regular or ‘as required’ [PRN]).[3]

HDAT and AC lack evidence of benefit but evidence of harm is compelling.[2] Clozapine augmentation with another antipsychotic is perhaps the only therapeutic area where AC is supportable. Thus HDAT and AC should be prescribed as an exception and only after other evidence-based treatment strategies have failed.[1]

HDAT and AC are associated with significant adverse effect burden including QTc prolongation, arrhythmias, sudden cardiac death, seizures, increased incidence and severity of adverse effects, longer hospital stay[3–6] and possibly increased mortality.[7] When managing a patient's mental health, they should not be exposed to higher risk of physical health without proper risk management process in place.

Prescribing of HDAT and AC were significantly higher in Norfolk and Suffolk NHS Foundation Trust (NSFT) compared with the national average as indicated by baseline audit in May 2015 and the National Audit of Schizophrenia 2014 (NAS 2).[8] In May 2015, pharmacists collected baseline data for 153 patients in NSFT acute adult inpatients wards, which showed HDAT in 35% of patients and AC in 51% compared with national averages of 25% and 36% respectively.

We focused on a quality improvement program to reduce HDAT and AC by around 10% in 12–18 months to bring prescribing in line with or below the national average. This quality improvement program was initiated across the Trust but prioritised on the inpatients area. This report focuses on the improvements demonstrated in our acute adult (18–65 years old) inpatients.

Methods

We adopted and adapted the nationally recognised Prescribing Observatory for Mental Health UK (POMH-UK) audit tool for monitoring HDAT. All acute adult inpatients prescribed antipsychotics were included in the baseline measurement.

Clinical pharmacists collected data from prescription charts in 10 acute adult inpatient wards during a two-week audit period using an audit tool (see Table 2) adapted from the national POMH-UK audit tool. No patient identifiable data was collected including age or sex as our primary objective was to measure the overall HDAT and AC prescribing pattern in the acute adult service line.

Our objective was to reduce HDAT and AC prescribing by around 10% from baseline in 12–18 months to bring it in line with national average. To achieve this goal our strategy, based on previous studies[10,3] and various mental health Trust's guidelines in the UK, included:

1. *Guideline Development:* Pharmacy department drafted HDAT guidelines and sent out for broad consultation to pharmacists, nurses and doctors in March 2015. Feedback from doctors, nurses and pharmacists were considered at the drug and therapeutic committee and the guideline was approved by the Trust's drug and therapeutics committee in June 2015. The guideline required that:

- Doctors to prescribe HDAT and AC only in exceptional circumstances and rationale for HDAT and AC fully documented.
- Pharmacists to monitor HDAT and AC and discuss with the responsible clinician.
- Nurses to monitor patients on HDAT and AC as required by the guideline

2. Implementation of the guideline: It was agreed to start implementation from the beginning of July 2015. The guideline was fully endorsed and supported by the medical director, director of nursing and senior clinicians.

- Communication: A summary of the guidelines and actions required by nurses, doctors and pharmacists were communicated through emails and discussed at various meetings and forums. Broader communication was sent through the Trust's communication bulletin.
- Awareness raising program: Evidence-based poster from the Royal College of Psychiatrists / POMH-UK was sent to all units for display in a prominent area. The guideline was presented at various meetings including the lead clinician's meeting, medical staffing committee, physical health strategy group, pharmacists' clinical sessions and non-medical prescribers' (NMP) forum. The guideline also raised the virtual debate, *ie* via email discussion and at face-to-face training, which raised its profile and kept clinicians talking.
- Education and training: A summary of the guidelines, including baseline data comparing national average, was introduced into the junior doctors' induction training, consultants' and senior doctors' training, and a rapid tranquillisation e-learning module. The rapid tranquilisation e-learning module is mandatory for all doctors, nurses and pharmacists working in an inpatient area or anyone who may be involved with prescribing or administering rapid tranquillisation.

3. Pharmacists' support included proactive monitoring of HDAT and AC at the time of pharmacists' ward visit (about 2–3 times a week), the weekly review of PRN, discussion with prescribers and providing necessary clinical support, putting HDAT red stickers on prescription charts to highlight HDAT / AC and collecting data twice a year. We also added a text box in the discharge prescription to include 'rationale for high dose or antipsychotic combination'.

4. Monitor progress: Reduction in prescribing of HDAT and AC was monitored twice a year

Results

Our primary outcome was to reduce HDAT and AC prescribing. We presented categorical variables (HDAT and AC) as percentages, and chi-square tests were used to assess the difference in HDAT and AC prescribed in NSFT in October 2016 (second follow-up) with baseline data as well as with national sample. *P*-values less than 0.05 were considered significant. Results are detailed (also see Table 1, Figures 1 and 2) in chronological order:

Baseline measurement in May 2015: Baseline data were collected for 153 patients from 10 acute adult inpatient wards in May 2015 before the launch of interventions. HDAT was prescribed in a total of 54 (35%) patients and AC in 78 (51%) of patients. These figures were significantly higher than the national average as mentioned earlier.

First follow-up (March 2016): Following the launch and implementation of the guideline and interventions, data for 146 patients were collected at first follow-up in March 2016, ten months after baseline audit in May 2015. The result was very positive and encouraging. It shows 21% reduction in HDAT and 26% reduction in AC from baseline as shown in Table 1, and Figures 1 and 2.

Second follow-up (October 2016): Similarly, data from 163 patients were collected during the second follow-up in October 2016, 17 months after baseline. The result shows HDAT reduction of 24% from baseline, a further improvement from the first follow-up, and AC reduction of 26% from baseline. The result was statistically significant: Chi-square ($\chi 2$) = 26.3821, *p*-value is 0 for HDAT; $\chi 2$= 23.5808. *p*=0.000001 for AC. The result was well below national average: 11% of HDAT in NSFT versus 25% national average and 25% AC versus 36% respectively. The result was statistically significant: $\chi 2$=16.5678, *p*=0.000047 for HDAT and $\chi 2$=9.0309, *p*=0.002655 for AC.

Discussion

The Royal College of Psychiatrists published a consensus paper in 2006 and again in 2014[2] stating: 'While there is little convincing evidence that off-label prescription of doses of antipsychotic medication above the licensed dosage range has any therapeutic advantage in any clinical setting, there is clear evidence for a greater side-effect burden and the need for appropriate safety monitoring'. The National Institute of Health and Care Excellence (NICE) in the UK produced a clinical guideline for psychosis and schizophrenia[9] in 2014, which recommended that antipsychotic doses be prescribed within the BNF dose range and that any antipsychotic combination for regular use should be avoided. Despite decades of effort, HDAT and AC remained a challenge in mental health. Some of the programmes aimed at reducing HDAT and AC in the past has produced only very little change.[10–4] Paton and colleagues[10] reported the extent of the problem of HDAT and AC in National Health Service (NHS) in the UK based on 3942 patients' data collected in 2006 (baseline) and 3271 patients' data collected in 2007 (re-audit) as a part of the POMH-UK

quality improvement program. Intervention to improve prescribing of HDAT and AC included education and awareness, workshop, engagement, and practical tools such as sticker reminder in the prescription chart, ready dosage reckoner, etc.[10] There was little change in the prevalence of HDAT (baseline 36%; re-audit 34%) or AC (baseline 43%; re-audit 39%) in the POMH-UK re-audit in 2007. However, the POMH-UK audit in 2012[15] showed some improvement: HDAT prescribed in 25% and AC prescribed in 36% of patients based on 4596 patients. Mace *et al*.[3] presented the result of their six-year quality improvement programme to reduce HDAT and AC in the South London and Maudsley NHS Foundation Trust in the UK. The interventions included restriction of PRN, review of PRN at least weekly, re-audit and report dissemination, setting the target to reduce HDAT and AC below 20% by 2009, and reviews of antipsychotics by pharmacists. Data from the final survey of 222 patients in 2012 in the Maudsley NHS Foundation Trust demonstrated a significant reduction in HDAT (10%) and AC (16%) based. Compared with this, NSFT still has significant room for improvement. However, it is to be noted that the NSFT report is for about 18 months' work compared with six year's quality improvement program of Maudsley NHS.

As required (PRN) prescriptions were the principal cause of both HDAT and AC prescribing.[10] It is noteworthy that NICE published a guideline on violence and aggression in mental health in 2015 that further emphasised the need for good practice when prescribing PRN.[16] It specifically recommends that when using PRN medication:

- not to prescribe PRN medication routinely or automatically on admission
- tailor PRN medication to individual need
- ensure the rationale and circumstances in which PRN medication may be used
- ensure that the maximum daily dose does not inadvertently exceed the BNF maximum dose
- ensure that the interval between PRN doses is specified.

This quality improvement project shows that pharmacists, nurses and doctors working together as one team with focused interventions can improve prescribing practice to reduce risk and optimise pharmacological treatment.

The strength of this project was its multiprofessional approach led by the clinical pharmacy team. The need for extensive support from senior clinicians was recognised and received early on. The framework to support frontline clinical pharmacists was provided by the development of the guideline. Robust communication, debates, broad consultation and engagement, education and training and proactive clinical support from ward pharmacists were critical to the success of the project.

While this project has brought cost-effective, evidence-based prescribing practice to the forefront, we did not look at the specific impact on cost improvement. Future projects would benefit from quantifying cost-effectiveness. HDAT and AC may be justified in

some exceptional cases but their prescribing should be thoroughly thought through, clinically robust, regularly reviewed, their rationale fully documented and patients monitored more frequently regarding their physical health.

NSFT has electronic prescribing in very small number of wards and the Trust is looking at expanding it. Electronic prescribing will have very beneficial advantages in safe, cost effective and evidence-based prescribing practices including HDAT and AC.

Conclusion

Current evidence suggests HDAT and AC are no more effective than standard dose or monotherapy alone but evidence of harm is compelling. Despite many years of efforts HDAT and AC remain prevalent and pose a risk to patient's physical health. With concerted multi-professional teamwork, focused and targeted interventions and campaign, education and training, raising awareness and pharmacists' support, prescribing culture in healthcare organization can be improved for patient's benefit and to support the maxim of 'doing no harm'.

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Ethical approval

Ethics approval was not required because it was a prescribing improvement study and not a study on human subjects and no patient identifiable data were collected or stored.

Declaration of interests

No conflicts of interest were declared related to this work.

Mr Prajapati is Clinical Pharmacy Manager, Ms Johnston is the Chief Pharmacist, Dr Ugochukwu is Consultant Psychiatrist and lead clinician, and Dr Solomka is Medical Director, all at Norfolk and Suffolk NHS Foundation Trust, UK.

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Table 1. High-dose antipsychotic therapy (HDAT) and antipsychotic combination (AC) prescribing pattern in acute adult inpatient ward

Description	**No. of patients**	**AC**	**HDAT**
National average (POMH-UK 2012)	4596	36%	25%
NSFT baseline (May 2015)	153	78 (51%)	54 (35%)
NSFT 1st follow-up (Mar 2016)	146	36 (25%)	21 (14%)
Change from baseline in Mar 2015		**–26%**	**–21%**
NSFT 2nd follow-up (Nov 2016)	163	40 (25%)	18 (11%)
Change from baseline in Mar 2015		**–26%**	**–24%**
Chi-square ($\chi 2$) = 16.5678, p=0.000047 for HDAT (national average vs. NSFT Oct 2016)			

Chi-square (χ2) = 9.0309, *p*=0.002655 for AC (national average vs NSFT Oct 2016)

Chi-square (χ2) = 26.3821. *p*-value is. For HDAT (baseline vs Oct 2016)

Chi-square (χ2) = 23.5808. *p*=0.000001 for AC (baseline vs Oct 2016)

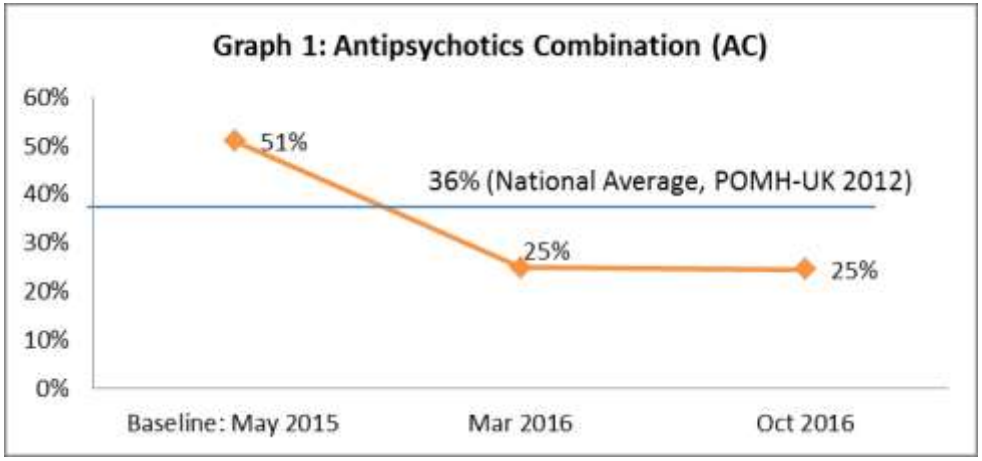

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Figure 1. Antipsychotics combination (AC)

%

60

50

40

30

20

10

0

Baseline:

May 2015

Mar 2016

Oct 2016

51%

25%

25%

(National average, POM-H UK 2012)

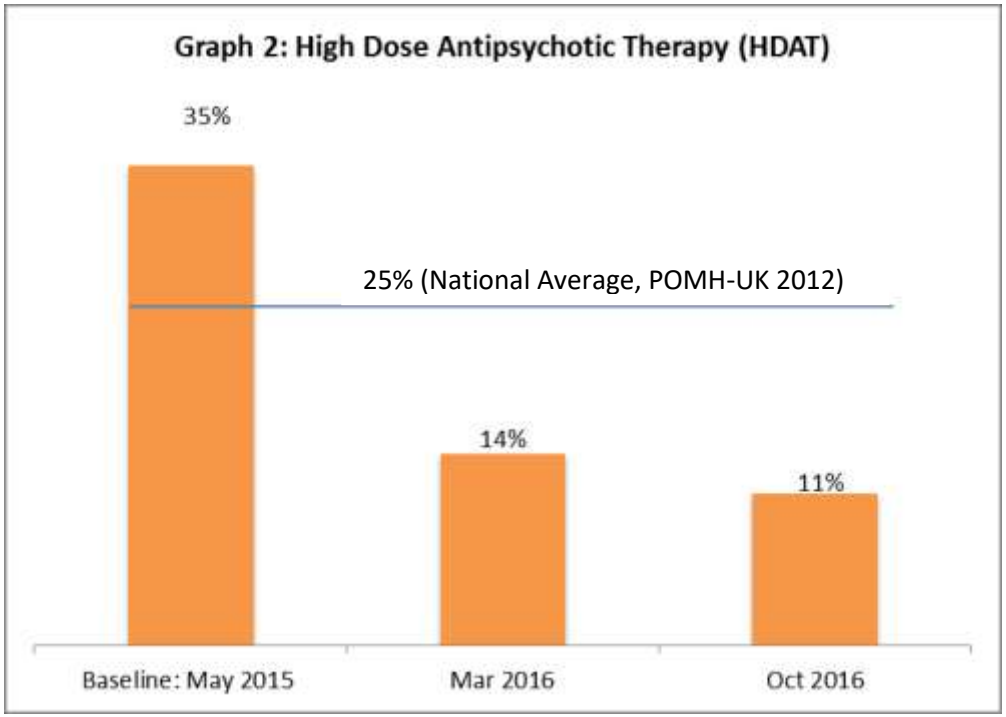

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Figure 2. High dose antipsychotic therapy (HDAT)

35%

14%

11%

Baseline:

May 2015

Mar 2016

Oct 2016