DEVELOPING TRAINING IN INTRAMUSCULAR INJECTIONS

Trish Reynolds and Louise Saxton describe a programme to improve technique among pre- and post-registration nurses

Abstract

There is a wealth of international publications regarding evidence-based practice in relation to administering safe and effective intramuscular (IM) injections. This article describes and examines the processes that North East London NHS Foundation Trust, an integrated mental health and community health provider and one of the biggest NHS trusts in the country, initiated to improve the IM injection technique of its qualified mental health nursing staff. It also aims to deliver up-to-date evidence-based practice relating to this area of clinical practice.

Keywords

Developing practice, evidence-based practice, injection mentors, intramuscular injections, mental health nurses, nursing students

ADMINISTERING INTRAMUSCULAR (IM) injections is an important part of mental health nursing practice (Walsh and Brophy 2010). There is a range of knowledge, skills, confidence and attitudes that nursing students require for the safe administration of IM injections, who then pass these on to subsequent cohorts of students (Department of Health (DH) 2005). Educating nursing students on injection techniques leads to improved and safer practice (Bandolier 2003). Though in reality the procedure is usually taught once during pre-registration education and may not be formally revisited (Malkin 2008), with limited evidence qualified nurses have had additional updates. Around 12-15 years ago, ‘Z tracking’ became a recommended technique for deep IM injection administration to ensure that all of the medication is received into the muscle, eliminating leakage and minimising pain (Feetam and White 2014). Few nurses received any formal training for this and as a result some nurses, nationally and locally, have been using this technique incorrectly (Cocoman and Murray 2008, Malkin 2008).

Different techniques

While working with NHS trusts in London and Essex to deliver training relating to IM injection administration, one of the authors has encountered a number of injection techniques such as, slapping the buttock or pinching the site area, singing or reading a book to reduce the pain of the injection, one size needle serves all and drawing an imaginary Z on the buttock as a technique for Z-tracking. There is no real evidence that these techniques either work or have an evidence base. However, nursing students have told the authors that qualified mentors tell them about similar examples. Not only is this confusing for students, but it must be equally confusing and concerning for patients who would appear to be exposed to a variety of non-evidence based techniques.

Most mental health nurses only have experience of using one injection site: the dorsogluteal (upper outer quadrant of the buttock) (Ross-Kerr and Wood 2001, Cocoman and Murray 2008). Apart from this being the most dangerous site of all, due to potential risk of nerve injury (Mishra and Stringer 2010), medication may not reach the gluteal musculature and becomes deposited into fatty tissue where painful nodules may develop. Pharmacokinetics (Burbridge 2007), plasma concentration and further administration are subsequently negatively affected. Patient choice has also been either limited or absent and suggests a lack of considered thought regarding potentially compromised injection sites.
The synthesis of art and science is lived by the nurse in the nursing act

JOSEPHINE G. PATERSON
IM medications in mental health have changed and licensing requires administration into alternative sites. Through the process of providing updated training regarding injection techniques, the authors have found that limited training has been received by registered nurses to develop confidence and competence with other IM injection sites, that is, deltoid (upper arm), ventrogluteal (commonly known as the hip-site) and vastus lateralis (outer thigh). The authors have also found that registered nurses and nursing students have demonstrated limited knowledge regarding:

- Increased prescribing of non-psychotropic medications such as flu vaccines and contraceptive injections
- Condition of the preferred injection site
- Patient choice
- Preserving the patient's dignity
- Choice of needle size, based on the patient's body mass index

Other issues that registered nurses and nursing students neglected were injections sites and absorption rates. For example, the least effective site for absorption is the dorsogluteal due to the potential for increased subcutaneous fat-to-muscle ratio and fibrous muscle. In contrast, the most effective site for rapid absorption is the vastus lateralis, which is where adrenaline or glucagon would be administered in an emergency situation (Box 1).

Students informed the authors that injection technique is expected to be taught by mentors in the clinical environment, yet many of them state they have not been exposed to the depth of information they received through the training provided by the authors.

Other evidence-based changes relating to injection technique include the prevention and control of infection and avoidance of needlestick injury. There are a variety of safety device needles in use and by the end of 2015 it is anticipated that retractable syringes will be used in most mental health settings. The wearing of gloves to administer injections is now written into policies as a standard requirement.

The Nursing and Midwifery Council’s (NMC) code of conduct (2015) requires nurses and midwives to continuously update their knowledge and apply this to their practice. The authors and colleagues involved in this training initiative have attempted to develop a programme of learning for a specific population of the workforce, that is, both pre- and post-registered nursing staff, to update their knowledge, but also to change their practices that relate directly to the administration of IM injections.

**The initiative**

The authors worked with colleagues to deliver updated and evidence-based injection technique training to registered nursing staff on the aforementioned four injection sites for a year before the initiative commenced. However, it has been found that not all staff who undertook the initial training have transferred their learning into daily practice. A number of issues have contributed to this:

- Not all patients want to change the site of their injection.
- Limited types of medication allow different use of sites (due to licensing).
- Confidence levels of staff to offer different sites.
- Lack of practice using other sites, particularly the ventro-gluteal site.

Nursing students informed the authors that when attempting to put their learning into practice, it was not being recognised by mentors who were subsequently underscoring students on their technique.

The authors, who are primarily involved in practice development and practice education, decided that a strategy was required to develop all registered nurses in the North East London NHS Foundations Trust (NELFT) who are regularly administering IM injections. There were discussions about making this training mandatory for registered nurses, but it was thought that it would not necessarily equate to a change in practice. It was agreed that this would be offered to all commissioned mental health and learning disability nursing students, and to appropriate registered nursing staff.
The proposal for the initiative was to continue to develop registered nurses and nursing students through training sessions. It was acknowledged that there was a need for team sustainability to help reinforce the training received and to promote changes to practice. It was, therefore, agreed that existing nurse mentors in relevant clinical teams would be developed into experts in injection technique and knowledge, relating to medication issues, who would then deliver training to their team members and allocated students on placement. They would also be a source of contact for injection-related concerns and issues in their teams. The experts would become known as injection mentors. The programme could also be used as evidence towards meeting the eight competency domains of the NMC’s standards to support learning and assessment in practice (2008).

Pilot programme
The first programme was designed to be a pilot to test the different elements of the proposed development programme. Nurse mentors were approached to take part; the 13 mentors who did had previously engaged in extending their mentoring role and had a proven interest in education. The authors and colleagues acted as supervisors for the mentors and carried out their assessments (Box 2).

The pilot group was advised that, as with any programme of development, there is the potential for learning and practice deficits and that if any such gaps were identified, depending on the enormity of the deficit, the individual may be referred to the trust’s practice improvement practitioners as part of the trust’s medication competency processes. The pilot group was also advised that there would be an expectation that as injection mentors they would engage in developing future injection mentors.

Ethical considerations
A proposal report was presented to NELFT executive management team, which approved the go-ahead of the pilot.

Evaluation and outcome
The mentors agreed to take part in a pre- and post-pilot evaluation and this included quantitative, see Tables 1 and 2, and qualitative data. The pilot programme ran from October 2012 to March 2013 and the expected target of six months was achieved. A total of nine (69%) mentors who engaged in the pilot successfully completed the entire programme. Out of the 13 who initially engaged, three withdrew early on in the process due to personal issues and one did not complete the assessment process due to clinical demands.

Authors and mentors thought that the content covered on the training day was ambitious and the facilitators were unable to address all intended elements. As part of their feedback, mentors felt the content required two days. The project team advised this would be considered for subsequent programmes.

Completing and marking the clinical workbooks was a labour-intensive process for mentors and supervisors. However, mentors reported that this part of the process helped them to fully embed their learning from the training day and mentors stated this was a valuable part of the development programme. Although protected time to complete these were approved by the NELFT executive management team, mentors found it difficult to find protected time and tended to complete the workbooks in their own time.

The practice assessments were highly evaluated by mentors who thought that the required preparation informed their technique and they gained confidence to impart their new learning and assess others. The assessment checklists developed for the injection sites were valued and assisted the mentor to structure their teaching and the assessment process of students’ performance. All mentors commented on the usefulness of supervisors identifying gaps in their knowledge and technique and helping them to focus on these.

Mentors thought that the competency assessments could have been structured in a way that did not interfere with clinical duties. The authors acknowledged that this was a time-management

Box 2  Assessments carried out by supervisors

- **A full day of training and development** This included the purpose process of the programme, the assessment process, dealing with difficult situations, for example, those avoiding change, a four-hour training session on the latest evidence base for intramuscular injection technique (also included issues related to administration accountability, licensing requirements, maximum doses of medications, land marking, Z-tracking and relaxing the muscles of the four sites) and simulated practice.
- **Clinical workbook (Stocks and White 2009)** This was to be undertaken in conjunction with the standard operating procedure guidance for intramuscular injections (Feetam and White 2014).
- **Assessment of practice** Supervisors arranged a practice assessment of the mentors’ learning and development, nursing students were actively involved and assessed by mentors, simulated practice using scenarios and developed checklists.
- **Competency assessment of practice** Supervisors arranged a competency practice assessment of the mentors’ continued learning and development, once again, students were actively involved in this process and assessed by the mentors.
- **Access to supervisors** Open dialogue remained throughout the programme between mentors and supervisors, support group sessions were also offered.
issue that would be considered for subsequent programmes. Some mentors believed that patients should have taken an active role in the competency assessment. This will be explored as an option for subsequent programmes.

Three support groups were offered to the mentors taking part in the pilot during the six-month period, but only a small percentage attended the first session and the other two did not take place due to pressure of clinical work. However, mentors did maintain dialogue with the supervisors for support and advice.

### Conclusion

A report was presented to NELFT’s executive management team to inform them of the outcome of the pilot and to seek approval to introduce the programme across mental health and learning disability settings at the trust. The authors also requested an additional training day and protected time to complete the workbooks. The executive management team approved the programme in July 2013 and agreed to the requests put forward, including the proposed two-day training event as opposed to one day. A second programme commenced in September 2013. Nursing students continue to receive yearly injection-technique

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### Table 1  Pre- and post-pilot evaluation by mentors (n=9)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Disagree (pre-pilot) %</th>
<th>Disagree (post-pilot) %</th>
<th>Agree (pre-pilot) %</th>
<th>Agree (post-pilot) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every nurse should be using the same technique</td>
<td>40</td>
<td>–</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>It is not always necessary to wear gloves when administering injections</td>
<td>30</td>
<td>100</td>
<td>70</td>
<td>–</td>
</tr>
<tr>
<td>Using the Z-track technique offers no real benefits</td>
<td>60</td>
<td>100</td>
<td>40</td>
<td>–</td>
</tr>
<tr>
<td>The main cause of pain is needle length</td>
<td>45</td>
<td>100</td>
<td>55</td>
<td>–</td>
</tr>
<tr>
<td>It is not possible to administer a pain-free injection</td>
<td>85</td>
<td>33</td>
<td>15</td>
<td>67</td>
</tr>
<tr>
<td>Little has changed in injection technique over the past ten years</td>
<td>30</td>
<td>100</td>
<td>70</td>
<td>–</td>
</tr>
<tr>
<td>Body mass index has little significance on administering intramuscular (IM) injections</td>
<td>28</td>
<td>100</td>
<td>72</td>
<td>–</td>
</tr>
<tr>
<td>Any IM medication can be administered into the deltoid site</td>
<td>30</td>
<td>100</td>
<td>70</td>
<td>–</td>
</tr>
<tr>
<td>No other sites apart from the dorsogluteal has any benefit</td>
<td>48</td>
<td>100</td>
<td>52</td>
<td>–</td>
</tr>
<tr>
<td>I have a good understanding of the different IM medications I administer in mental health</td>
<td>75</td>
<td>–</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>I have a good understanding of general best practice</td>
<td>55</td>
<td>–</td>
<td>45</td>
<td>100</td>
</tr>
<tr>
<td>I have a good understanding of Z-tracking and why it is used</td>
<td>45</td>
<td>–</td>
<td>55</td>
<td>100</td>
</tr>
<tr>
<td>I have a good understanding of risks to service user</td>
<td>60</td>
<td>–</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>I know of the four IM injection sites</td>
<td>35</td>
<td>–</td>
<td>65</td>
<td>100</td>
</tr>
<tr>
<td>I am familiar with administering into the four injection sites</td>
<td>95</td>
<td>85</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>I am familiar with trust policy on IM administration</td>
<td>60</td>
<td>–</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>I have good knowledge of maximum volumes that can be administered into the four sites</td>
<td>75</td>
<td>–</td>
<td>25</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table 2  Pre- and post-pilot evaluation by mentors (n=9)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Pre-pilot (average)</th>
<th>Post-pilot (average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am confident I can administer into all four intramuscular (IM) sites</td>
<td>0-2</td>
<td>8-9</td>
</tr>
<tr>
<td>I am confident I am using up-to-date evidence-based practice</td>
<td>2-4</td>
<td>9-10</td>
</tr>
<tr>
<td>I am confident I can minimise pain with IM injections</td>
<td>1-4</td>
<td>6-9</td>
</tr>
<tr>
<td>I am confident I can safely and correctly advise colleagues</td>
<td>3-4</td>
<td>7-9</td>
</tr>
<tr>
<td>I am confident I can safely and correctly advise service users</td>
<td>3-5</td>
<td>8-10</td>
</tr>
</tbody>
</table>
training from the authors during their nurse training in addition to the injection mentor programme.

NELFT’s commissioned mental health and learning disability nursing students, receive minimal training from their education provider in relation to injection technique. There is an expectation that students will learn this technique through practice during their placements. The challenges that students face to practise this technique are well known, for example, students avoiding opportunities due to phobias, reluctance from the patient for students to practise on them and a high number of students on placement against the number of opportunities to administer injections.

An additional strategy to facilitate students’ injection technique practice during their clinical placements has also been developed. NHS Trusts and universities across London are identifying a specific number of injections that a student must achieve prior to registration. Students at NELFT now receive a portfolio to record all their injection practice activity over the three-year course period. The authors have identified a number of simulations to help develop the student’s confidence and competence required each year, as well as a number of actual administrations to patients.

To test the achievability of the number of activities identified, students from three cohorts, representing each year of training, have taken part in a small pilot. Students were asked to take a copy of the portfolio on placement and record every simulated injection practice and those administered to a patient. This helped to determine a realistic number of practice activities to be achieved by students over the three-year period. As a result of this small pilot, it is anticipated that students will achieve 50 simulations and 35 patient-administered injections by the time they are due to register as newly qualified nurses.

This is supported and encouraged by NELFT’s local education provider for pre- and post-registration education, specifically the mental health field of nursing.

In view of the feedback collected and outcomes of the injection mentor pilot, this has been a successful pilot and a robust process designed for developing a specific part of the workforce and their practice, as well as ensuring changes to practice are made and sustained.

Through the process of training many staff and students, the authors believe that the observed gaps in knowledge, skills and practice surrounding the administration of injections are merely the start of the problem. The authors firmly believe the problem is a much wider one and that these gaps extend to many other issues relating to medication management. They are working towards developing a comprehensive training package related to much broader issues regarding medication, including students administering an injection when a patient requires rapid tranquillisation in restraint conditions. This training package will be available to nursing students and registered nurses.

### Implications for practice

- Nursing staff need to know the four intramuscular (IM) injection sites and the maximum volume of medication that can be administered into each site.
- Staff need to be familiar with trust policy on IM injection administration.
- Nursing staff need to practise administering IM injections into each of the four sites to develop their confidence.
- Existing nurse mentors are expected to promote up-to-date injection technique to colleagues and students.

### References