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Administering intramuscular injections: How does research translate into practice over time in the mental health setting?

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SUMMARY

Background: Increasingly, mental health nurses are expected to base their clinical practice on evidence based knowledge and many of the practice traditions that have passed between generations of nurses must now be examined within this scientific context. Since 2000, there has been an increasing debate on what is best practice for the administration of intramuscular injections particularly in relation to site selection, needle size and technique. Weight gain associated with second generation long acting antipsychotics influences the site and needle size for effective medication delivery.
Aim: To determine intramuscular injecting practice choices made by nurses working in the mental health setting in 2006 compared to those made by a similar group of nurses in 2012.
Methods: A descriptive cross sectional study conducted across two time points: 2006 (93 participants) and 2012 (245 participants) utilising the same questionnaire designed to measure nurses' intramuscular injecting practice choices.
Results: Data were analysed using SPSS version 20 package. Six statistically significant practice changes were recorded related to needle size, site selection and the use of the Z-tracking technique. A continued higher usage of the dorsogluteal site was also reported in 2012 contrary to the recommendations in the current research for the ventrogluteal site.
Conclusion: Whilst some practice changes occurred, translation of research into evidenced based practice is challenging and definitive best practice in the administration of intramuscular injections remains unclear. Education and randomised controlled trials are needed to provide the evidence to ensure the delivery of safe and effective intramuscular injecting practice.

Introduction

Traditionally, the IMI technique and site choice have been based on nurse preference (Zimmermann, 2010), educational preparation and experiential knowledge gained in clinical practice (Gerrish and Clayton, 2004). However, nursing practice must now be based on evidence obtained from primary research where rigorous methodological and ethical standards are applied (Cocoman and Murray, 2010; Farchaus Stein, 2013; Hunter, 2008). The use of intramuscular injections (IMIs) in the general health care setting has decreased substantially over the last decade with the emergence of newer medication administration methods, for example, for pain management (Mitragotri, 2005). With the advent of alternative methods for administering medication in health care, generally nurses are giving fewer IMIs (Carter-Templeton and McCoy, 2008; Cornwall, 2011) which has decreased the importance of the subject area in undergraduate programmes (McGarvey, 2001). It may also have impacted on nurses' confidence levels to use different injection sites (Greenway, 2004), and this curriculum change has failed to acknowledge the importance of quality and safe IMI practice to mental health consumer outcomes. Limited graduate in-service education in this area has also led to technique and practice differences across services (Wynaden et al., 2005). However, a high skill level in nurses to administer medications via IMI in the mental health setting is an expected quality and safety outcome (Cocoman and Murray, 2008; Wynaden et al., 2005).

More than 83,000 first generation and 140,255 second generation (SGA) depot injections were prescribed in Australia in 2010 (Mabbott

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et al., 2011) and antipsychotic drugs are now the top-selling class of pharmaceuticals in America, generating an annual revenue of about $14.6 billion (Wilson, 2010). LAI antipsychotics are recommended for people with early episodes of psychosis as well as those who have a long term illness trajectory (Kane and Garcia-Ribera, 2009). They are prescribed for the perceived ability to achieve consistency of medication dose (Kane and Garcia-Ribera, 2009; Leucht et al., 2012). Depot or LAI antipsychotic medication was originally prescribed for consumers who had poor adherence to oral medications (Bond et al., 2007). Non-adherence continues to be problematic and a costly issue with as many as 75% of consumers not adhering to prescribed oral medications (Fleischhacker, 2009; Schooler, 2003). Whilst the use of LAI antipsychotic medications may facilitate adherence (Cañas and Möller, 2010; Davis, 2010), if the medication given using IMI does not reach the correct site and absorption of medication is incomplete, the resulting suboptimal serum level of antipsychotic may impact negatively on the consumer's mental health outcomes. Depot or long acting injectable (LAI) medications when administered in the optimal manner are reported to provide consumers with an adequate supply of medication for several weeks, with less serum level fluctuation than oral medication (Bond et al., 2007).

A class effect of antipsychotics is the potential to cause weight gain (Leucht et al., 2009; Reynolds and Kirk, 2010; Royal Australian and New Zealand College of Psychiatrists, 2005) and in a population that has been identified as increasingly overweight this could become a greater problem for consumers (Nisbet, 2006). If the depth of adipose tissue prevents the needle to reach the muscle layer, the average absorption of the drug will be lower (Nisbet, 2006) and delayed absorption may result in a dose increase if the anticipated treatment response is not obtained. In a study with 119 people, researchers found that IMIs administered at the dorsogluteal site in 98% of women and 37% of men, and at the ventrogluteal site in 97% of women and 57% of men, did not reach the muscle layer (Zaybak et al., 2007). The standard 21 G (38 mm) needle was found ineffective in carrying medication to the muscle tissue at the dorsogluteal site and at the ventrogluteal site in women with a body mass index (BMI) of greater than 25 kg/m^2 (Zaybak et al., 2007).

Intramuscular Injection Sites

Properly administered, IMIs deposit medication under the muscle fascia below the fatty subcutaneous layer of the skin (Boyd et al., 2013). Site selection should be based on the manufacturer's recommendations, medication to be administered, muscle density at selected site and ideally, consumer choice (Gray et al., 2009). The literature identifies four sites: dorsogluteal, ventrogluteal, vastus lateralis and deltoid (Cocoman and Murray, 2008; Gilsenan, 2000; Rodger and King, 2000) and each site has advantages and disadvantages that should be incorporated into site selection (Feetam and White, 2011). The ventrogluteal is most frequently recommended (Cocoman and Murray, 2008; Malkin, 2008; Walsh and Brophy, 2011; Zimmermann, 2010) but there remains a dissonance between research and practice translation in relation to site selection and needle size (Greenway, 2004). Since 2000, increased scrutiny has been placed on the IMI technique used to administer long acting injectable (LAI) antipsychotic medications (Cocoman and Murray, 2008; Wynaden et al., 2006) but there remains a lack of evidence to inform best practice (Tarnow and King, 2004; Hough et al., 2009). Reviewing current practice and identifying areas for improvement is an important part of ensuring ongoing efficacy of care. Therefore, the authors were interested to evaluate what practice changes had occurred in the mental health area between 2006 and 2012. In 2006, nurses at two services were surveyed on their intramuscular injecting practices (Wynaden et al., 2006) and the decision by Wynaden et al. to recommend the dorsogluteal as best practice in 2006 was based on available literature, nurse and consumer preference and perceived safety issues from staff using the ventrogluteal site in the mental health setting (Wynaden et al., 2006) but the recommendation is now questioned by the authors. The original survey was therefore repeated across seven services in 2012 to assess practice changes related to the current evidenced based practice.

Aim

To determine IMI practice choices made by nurses working in the mental health setting in 2006 compared to those made by a similar group of nurses in 2012.

Methods

A descriptive cross sectional study across two points of time (2006 and 2012) was completed utilising the same questionnaire. Prior to its use in 2006, the questionnaire was piloted and face validity was established. The questionnaire contained items to assess nurses' knowledge and practice in relation to the administration of IMIs (Wynaden et al., 2006). All nurses at the participating mental health services were invited to take part in the research in 2006 and 2012 and were provided with an information sheet detailing the purpose of the study. Consent was implied if the questionnaire was completed and returned. Demographic information was collected at both points of time and confidentiality was maintained. Ethics approval to conduct both studies was obtained from each health service. Data from both time periods were entered into the SPSS version 20 package and reported as descriptive statistics and chi square analysis. Data was stored on password protected computers and only accessed by the research team.

Results

Ninety three registered nurses (41.5%) in 2006 and 245 registered nurses (40.6%) in 2012 returned completed questionnaires. Cohort demographic differences that were significant are presented in Table 1.

Six statistically significant practice changes were noted ($p < 0.05$) between the two time points. Two changes involved needle size: increased use of 21 G (38 mm) in 2012: χ^2 (2, 338) = 23.613, $p < 0.001$ and the decreased use of 23 G (32 mm) needles since 2006: χ^2 (2, 338) = 30.228, $p < 0.001$. The third practice change considered the choice of injection site based on the medication given and in 2006, 86 (92.5%) participants considered the site whilst only 151 (61.6%) considered the site in 2012: χ^2 (2, 338) = 30.648, $p < 0.001$. This could be related to the increased use of LAIs with the manufacturer's recommendations given for the injecting site. The fourth practice change was the application of gentle pressure to the site post-injecting with participants in 2012 increasingly using the practice: χ^2 (2, 338) = 80.036, $p < 0.001$. Always using the Z-track method of administration increased from 18 (19.4%) in 2006 to 125 (51%) in 2012 and was the fifth significant

Table 1
Demographic differences between participants in 2006 and 2012.

	2006 (n = 93)	2012 (n = 245)	χ^2	df	p value
Age			41.915	4	<0.001*
20–30	24 (28.5%)	23 (9.4%)			
31–40	40 (43%)	54 (22%)			
41–50	20 (21.5%)	86 (35.1%)			
51+	9 (9.7%)	82 (33.5%)			
Gender			10.336	2	0.006
Male	18 (19.4%)	85 (34.4%)			
Female	75 (80.6%)	160 (65.6%)			
Length of employment			102.883	6	<0.001*
<1 year	23 (24.8%)	10 (4.3%)			
1–5 years	29 (31.2%)	35 (14.1%)			
6–10 years	13 (13.9%)	38 (15.6%)			
11–15 years	28 (30.1%)	33 (13.8%)			
16–20 years		37 (14.9%)			
21+		92 (37.3%)			

* denotes significance if p = < 0.05.