Nurse Education Today 35 (2015) e18–e22

Contents lists available at ScienceDirect

Nurse Education Today

journal homepage: www.elsevier.com/nedt

Knowledge level assessment and change among nursing students regarding administering intra-muscular injection at Al-Balqa'a Applied University: An interventional study

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ARTICLE INFO

Article history:
Accepted 16 February 2015

Keywords:
Intra-muscular injection
Educational session
Knowledge level
Nursing student

SUMMARY

Background: Intra-muscular injection is a widely used technique for administering parenteral medication, so education about correct techniques of administering intra-muscular injections is important to prevent complications associated with intra-muscular injection.
Objectives: To assess the knowledge level of nursing students regarding administering intra-muscular injection and to determine if knowledge level change after joining an educational session about administering intra-muscular injection.
Designs: This study used pretest and posttest control group designs.
Settings: Regular class in which a pretest and an educational session was conducted followed by a posttest after 2 weeks.
Participants: Nursing students of Al-Balqa'a Applied University/Zarqa University College participated in this study.
Methods: Data were collected through self-administered questionnaire.
Results: Experimental group did not do better in the posttest than the control group after they joined an educational session about administering intra-muscular injection. The level of students (first year vs. second year) has been identified as a covariate that may have distorted the results.
Conclusion: One educational session is insufficient to change level of knowledge regarding administering intra-muscular injection, in addition to considering the level of nursing students when conducting the educational session, as well as the follow up and feedback during administering intra-muscular injection at clinical sites.

Introduction

The administration of injections is one of the skills that nurses use regularly in clinical practice (Greenway, 2004). In developing countries, it has been observed that patients prefer injections as a mode of administration of medication (Valliani et al., 2011). As muscle tissue has relatively few sensory nerves, intra-muscular (IM) injections allow less painful administration of concentrated or irritating drugs (Greenway, 2004), so the administration of IM injections has become a common nursing intervention in clinical practice and an activity perceived as fundamental to patient care (Cocoman and Murray, 2008).

The identification of the most appropriate muscle site for each injection is vital in order to ensure that the medication reaches its target area and to avoid injury/trauma to the client. In addition, the medication effect can be enhanced or diminished depending on the site of injection chosen (Cocoman and Murray, 2008), so IM injections are less painful when administered correctly and can be used to inject concentrated and irritant drugs that could damage subcutaneous tissue (Hunter, 2008). Inappropriate selection of site and poor technique of injection administration can increase the risk of patient injury and lead to pain, nerve injury, bleeding, accidental intravenous administration and sterile abscesses caused through repeated injections at one site with poor blood flow (Hunter, 2008).

Knowledge and attitudes of nurses and nursing students may vary regarding IM injection techniques, the most common issues are selection of injection site, cleansing skin before injection, needle size used and pinching or spreading the skin before injection. Despite the evidence favoring the ventrogluteal site over the dorsogluteal site, nurses in clinical practice are slow to embrace it, relying on the traditionally taught and much-used dorsogluteal injection site (Cocoman and Murray, 2010), this may be because many nursing practices are

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http://dx.doi.org/10.1016/j.nedt.2015.02.012
0260-6917/

deeply rooted by tradition, despite the push for evidence-based practice (Cocoman and Murray, 2008). No one injection site or technique can be recommended for all children a careful assessment of the child for possible injection sites, drug regime and situation of administering the injection is required to provide safe and suitable choices for each individual (Hemsworth, 2000).

Background

Šakić, Milutinović and Simin (2012) concluded that the traditional approach of IM administration (i.e., preferring dorsogluteal site, using disinfectants to cleanse the skin, withdrawing the needle immediately after injecting drug, and rarely using Z track technique) is rooted, and it will be difficult to change, which may be because nurses apply IM injection procedure in practice in the way they learned from their older colleagues. Cocoman and Murray (2010) reported that changing the working habits and routines of experienced professionals can be a difficult task.

A study conducted by Davidson and Rourke (2013) has shown that needle length for IM injection should be selected based on the client's body weight, and the use of bunching or flattening technique significantly affects the deltoid fat pad and skin-to-muscle distance and, therefore, the required needle length. However, Z rack technique implies pulling (flattening) the skin 2–3 cm sideways or downwards from the injection site (Hunter, 2008).

Since nurses are trained well and are doing better than the new medical graduates (Valliani et al., 2011), those who practice nursing are hesitant to forgo old practices even after their utility or efficacy has been disproved by the most current evidence remains a challenge (Cocoman and Murray, 2010). Furthermore, no studies specific to administering IM injection were conducted in Jordan and no previously proven method to increase knowledge level regarding administering IM injection, the study purposed to assess knowledge level of associate degree nursing students—in Al- Balqa'a Applied University/Zarqa University College—regarding administering IM injection and to determine whether their knowledge level differ after they join an educational session of administering IM injection.

Methods

Design

This study used pretest and posttest control group designs (Polit and Beck, 2012), in which one group was an experimental and another group was a control one.

Sample

The entire population (i.e., associate degree nursing students in Zarqa University College during the academic year 2013/2014) equals to 70 students; all of them were selected to participate in the study, and they were acknowledged to participate freely (autonomously) or to withdraw at any time during the study. The inclusion criteria were as follows: being registered as an associate degree nursing student in Al- Balqa'a Applied University (i.e., having a valid university ID number), and participant has joined at least one clinical course applied in the hospital. Exclusion criterion was students from other specialties other than nursing.

Settings and procedure

Participants were randomly allocated (using the table of random numbers) into both groups. Both groups were in the settings of the session in the foundation of nursing/clinical course in the associate nursing laboratory in Zarqa University College. The participants in the experimental group had a pretest (paper and pencil test) about administering IM injection, then they joined an educational 50-min session on May 14, 2014, about administering IM injection (see Appendix A). After 2 weeks (on May 28, 2014), they were asked to complete the same version of the paper and pencil test they had in the pretest. The same approach (pretest, joining an educational session and posttest) was applied to the control group but with nothing new as what was given to experimental group (i.e., they received a regular educational session about a topic other than administering IM injection).

Data collection

The instrument used in this study to assess the knowledge for administering IM injection was a self-administered questionnaire designed for the purpose of this study (i.e., has no name yet) and developed from the protocols and guidelines provided by Hunter (2008), Davidson and Rourke (2013), Hemsworth (2000) and Cocoman and Murray (2010), which was validated by three clinical and academic personnel (face validity provided by each) (see acknowledgment section). The questionnaire (test) contained 20 yes/no questions written in Arabic reflecting the knowledge of participant for administering IM injection (see Appendix B). Each item in the test has a dichotomous answer (yes or no), with yes receiving a score of one and no receiving a score of zero (except for some items that have reverse score; zero for yes and one for no). The maximum score for the test was 20, with higher scores indicating more knowledge about administering IM injection. On the posttest, an increase in the scores of participants will indicate an effectiveness of the teaching session of increasing knowledge about administering IM injection.

The reliability of the questionnaire was provided using the KR20 test, which is a special case of alpha when test scores on items are not continuous are dichotomously scored (Waltz et al., 2010). The KR20 test values obtained from both results of pretest and posttest were .80 and .83, respectively.

Data analysis

First, data were screened for missing data and unexpected responses and treated with appropriate techniques. Means, standard deviations, and ranges for overall score for each participant were calculated. For comparison between the experimental and the control groups, independent-samples *t*-test and paired samples *t*-test were used. Analysis of covariance (ANCOVA) test was conducted to control for confounding variables. All statistical analyses will be calculated using SPSS program version 21 (George and Mallery, 2003). α level of statistical significance was determined at 0.05.

Results

Participants were randomly allocated (using the table of random numbers) into both groups and were distributed as the following: 33 participants in the control group versus 33 participants in the experimental group (4 students decided not to participate in the study).

The response rate in pretest was 94% (66 out of 70 participants completed the pretest), while the response rate in posttest was 88% (59 out of 66 participants completed the posttest), which made unequal number of participants in both control and experimental groups even though they were distributed equally in both groups prior to data collection. A total of 38 participants (64.4%) were first year nursing students, whereas 21 (35.6%) participants were second year nursing students.

Only slight changes were observed in the scores of posttest compared to the scores of pretest for the experimental group (*M*: 13.65, *SD*: 1.70 in posttest compared to *M*: 13.39 *SD*: 1.39 in pretest). The same applies on the control group (Table 1).