The effect of in-service education on nurses' preference for the ventrogluteal site in intramuscular injection implementation

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The effect of in-service education on nurses' preference for the ventrogluteal site in intramuscular injection implementation

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Abstract

Purpose: This study conducted to determine the effect of in-service education on nurses' preference for the ventrogluteal site in intramuscular injection implementation.

Method and materials: In this intervention study, the sample comprised 45 clinic nurses, where intramuscular injection practice is frequently applied. In-service education was conducted with regards to applying intramuscular injection to the ventrogluteal site. In the content of the planned education, the transmission of theoretical information on the subject, the demonstration on the manikin and video were included. Then, the nurses carried out the intramuscular injection implementation on the manikin under the supervision of the researchers. The data were collected at 2014 through the use of the "Nurses' VG Site Injection Preference Status Form". The data collection form was applied before the in-service education and two months after the in-service education.

Results: The results showed that 71.11% of the nurses did not receive education on intramuscular injection implementation in the ventrogluteal site in basic nursing education. In basic nursing education, 84.44% of the nurses used the dorsogluteal site and 22.22% the ventrogluteal site for intramuscular injection. The number of intramuscular injection implementations of the nurses in the ventrogluteal site was increased from 2.18 to 9.04 after the in-service education ($p = 0.001$). The nurses stated that, they felt more comfortable during ventrogluteal injection implementation, after the in-service education,

Conclusion: After the in-service education of the nurses, it was determined that the number of IMI implementations in the ventrogluteal site increased.

Key words: in-service education; injection; intramuscular; nursing; ventrogluteal site

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1. Introduction

An average of 12 billion parenteral drug implementations are performed worldwide per year (Gittens and Bunnell, 2009). One of the most common parenteral drug implementations is intramuscular injection (IMI) (Nicoll and Hesby, 2002). IMI can be applied to different sites of the

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body where muscle tissue is involved. However, the site that nurses use frequently is the dorsogluteal (DG) site (Engstrom et al., 2000; Farley et al., 1986; Güneş et al., 2009). In fact, in the DG site, the sciatic nerve passes close to the injection site, and it is known that the anatomical location of the sciatic nerve differs from person to person. For this reason, IMI is reported to be safer in the ventrogluteal (VG) site than in the DG site to prevent possible complications (Ogston-Tuck, 2014).

The VG site comprises gluteus medius and gluteus minimus muscles. The VG site is safe for use during injections because its muscle tissue is thick, and it is remote from large blood vessels and nerves. For these reasons, serious injuries are unlikely to occur as a result of injections into the VG site. Because less subcutaneous fat tissue is in the VG site, the possibility of injecting into subcutaneous tissue is low (Kozier et al., 2000: 748-808). In addition, complications, such as fibrosis, nerve damage, abscess, tissue necrosis, muscle contraction, gangrene and pain, are less likely to develop in the VG site. For this reason, it is stated that this site can easily be used in infants, children or adults for the injection of irritating and oily solutions (Nicoll and Hesby, 2002).

Although the use of the VG site for IMI has been proposed for many years (Cocoman and Murray, 2010; Gülnar and Çalışkan, 2014; Walsh and Brophy, 2011), the frequency of use among nurses is low (Small, 2004). In the research with 219 nurses that Engstrom et al. (2000) conducted, it was found that most of the nurses (81.5%) preferred the DG site during IMI implementations and preferred the VG site at a low level (4.5%). Similarly, in the research with 264 nurses that Walsh and Brophy (2011) conducted, it was reported that although nurses were aware of the possible complications of injecting into the DG site, they preferred the DG site primarily. In the same research, nurses stated that they feel comfortable when they identify the injection site and that they prioritise knowledge from the existing literature later. Cocoman and Murray (2010) stated that nurses know the importance of the VG site but do not prefer the site due to difficulties in identifying the site anatomically. They also emphasised that nurses should be informed about the current literature to increase their usage rate of this site. In the survey with 283 nurses that Gülnar and Çalışkan (2014) conducted, it was reported that 85.9% of the nurses used the DG site most frequently, whereas 34% of the nurses did not have knowledge about the VG site injection, and this issue was not emphasised very well in their basic education.

Engstrom et al. (2000) stated the most important reasons why nurses do not prefer the VG site for IMI: Education programs do not comprise sufficient injecting implementations in the VG site, and nurses cannot identify the VG site. In another study that Tuğrul and Denat (2014) conducted with 85 nurses, 48.2% of the nurses stated they always use the DG site during their IMI implementations, and 38.8% stated they never use the VG site. In the same study, it was determined that 72.9% of the nurses do not have sufficient knowledge related to the VG site, and 44.7% are worried, as they have not used this site at all. Gülnar and Çalışkan (2014) stated that the majority of the nurses prefer the DG site and do not use the VG site because they are not accustomed to it. As can be understood from the concerned literature, reasons such as the relatively difficult detection of the VG site and the VG site's low usage rate may cause nurses to be reluctant to use this site (Engstrom et al., 2000; Wynaden et al., 2006). In this context, it can be argued that in IMI implementations, it is difficult for nurses to adapt to injecting into an area to which they are not accustomed (Alannah and Floyd, 2007).

The above mentioned studies demonstrate that nurses need in-service education, which will contribute to their preference for the VG site, a safer and recommended site for IMI implementation. Although the advantages of using the VG site during IMI implementation are explained in the existing literature, a limited number of studies will enable nurses to prefer the VG site and increase their knowledge on this subject. It is thought that in-service education that will enable nurses to prefer the VG site in IMI will contribute to this field.

2. Purpose

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The research was conducted to determine the effect of in-service education on nurses' preference for the VG site in IMI implementation.

3. Method and material

3.1. Population and sample selection

The research was conducted with nurses working in emergency department, general surgery, urology, cardiovascular surgery, plastic surgery, orthopedics and anesthesia reanimation clinics, where IMI implementation is frequently applied at a 1037-bed university hospital in a metropolis in Turkey. The total number of nurses working in these clinics was 95, and the implementation was performed with 45 nurses volunteering to participate in the research. In this research, the participation rate of the nurses was 47%.

3.2. Type of study

An intervention design was used in this study.

3.3. Data collection tools

The data were obtained using the "Nurses' VG Site Injection Preference Status Form" that the researchers developed based on the literature. The form is composed of two parts. In the first part are six questions addressing the nurses' age, education status, clinical experience, clinic in which they work, the site they use for IMI. In the second part of the form are seventeen questions regarding the IMI implementation of nurses in the VG site.

3.4. Procedures

The "Nurses' VG Site Injection Preference Status Form" was applied to nurses who volunteered to participate in the research after they were informed about the research. Then, trainings were conducted for nurses to apply IMI to the VG site. The in-service education content consisted of three parts. The first part of the education covered theoretical information about the anatomy of the VG site, the injection site of the VG site, the size of the needle to be used, the amount of the drug to be administered and so on. Then, the nurses viewed a video showing IMI implementation in the VG site as performed on a real patient, and IMI implementation was demonstrated on a manikin. Following practical training with theoretical knowledge, the nurses engaged in IMI implementation in the VG site on the manikin. The nurses performed their implementations under the supervision of the researchers. In addition, all of the questions were answered during the implementation, and it was ensured that the site was personally determined and that the injections were made. The in-service education program featured two sessions lasting three hours in total on the same day, with both theoretical knowledge and implementation covered.

During the two months following the completion of the in-service education, the nurses were supported in performing IMIs into the VG site in their clinics. The researchers made weekly visits to the clinics and answered questions about the nurses' IMI implementations. In addition, counseling was provided to the nurses who needed it and demanded it by phone. Two months after the completion of the in-service education, the 'Nurses' VG Site Injection Preference Status Form' was applied for the second time.

3.5. Limitations of study

The limitedness of the research is constituted by the fact that it was conducted in a university hospital and with a limited number of nurses.

3.6. Research ethics

Ethical committee permission from the Gazi University Clinical Research Ethics Committee (Application 25901600-1734) and written permission from the Chief Physician of the Health

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Research and Application Centre at Gazi University were obtained for the research. Verbal permission to participate in the research was also obtained from the nurses.

3.7. Evaluation of data

Data were evaluated using SPSS (17.0) software (SPSS, Inc., 2007). The Shapiro-Wilk test was used because of the unit numbers during the investigation of the normal distribution of variables. A chi-square analysis was applied when the relations between groups of nominal variables were examined. Fisher's exact test was used when the expected values in the cells on the 2x2 tables did not have sufficient volumes, and the Pearson chi-square analysis was applied on RxC tables with the help of a Monte Carlo simulation. While examining the variance between the two dependent variables, the Wilcoxon test was used because the variables do not come from the normal distribution. While interpreting the results, 0.05 was used as the significance level; when it was $p < 0.05$, it was stated that a significant relation existed, and when it was $p > 0.05$, it was stated that no significant relation existed.

4. Results

A total of 71.11% of the nurses who participated in the research each have a bachelor's degree. The average age of the nurses is $\overline{X} = 31.66 \pm 7.93$, and 57.78% of them each have more than six years of clinical training. A total of 71.11% of the nurses stated that they did not receive education on IMI into the VG site in their basic nursing education. A total of 84.44% of the nurses stated that they used the DG site for IMI and 22.22% the VG site in their basic nursing education. The most significant reasons why nurses do not prefer IMI implementation in the VG site are that, in nursing education, injection into the VG site was not taught (60%), and detection of the DG site is easy (48.89%) (Table 1).

Table 1. Descriptive characteristics of nurses

Characteristics	Categories	n	%
Last completed education program	Undergraduate formal education	32	71.11
	Undergraduate remote	5	11.11
	Medical vocational high school	3	6.67
	Associate degree	2	4.44
	Post graduate	3	6.67
Total clinical training in nursing	0–5 years	19	42.22
	6 years or more	26	57.78
Education on IMI implementation in the VG site in nursing education	Did not receive	32	71.11
	Receive	13	28.89
Site used for IMI in basic nursing education	DG	38	84.44
	Deltoid	18	40
	Vastus lateralis	14	31.11
	Rectus femoris	14	31.11
	VG	10	22.22
Site frequently preferred for IMI implementation	DG	35	77.78
	VG	8	17.78
	Rectus femoris	6	13.33
	Deltoid	5	11.11
	Vastus lateralis	3	6.67
Reasons for not preferring the VG site	It was not taught how to inject into the VG site in nursing education.	27	60
	Detection of the DG site is easy.	22	48.89
	Patients do not prefer injection implementation in the VG site.	6	13.33
Age average	$\overline{X} = 31.66 \pm 7.93$		

DG, dorsogluteal; IMI, intramuscular; VG, ventrogluteal

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A total of 52.63% of the nurses have worked for 0-5 years, and 11.54% of those who have worked for more than six years each stated that in their basic vocational education, they received education about IMI implementation in the VG site (p = 0.008). A total of 42.11% of the nurses working for 0-5 years stated that they prefer the VG site for IMI implementation, and this ratio is 7.69% among those working for more than six years each (p = 0.010) (Table 2).

Table 2. Statuses of IMI implementation in the VG site regards to clinical training year

Statements of nurses	0–5 years		6 years or more		Total		
	n	%	n	%	n	%	*p*
I received education for IMI implementation in the VG site in my vocational education.	10	52.63	3	11.54	13	28.89	0.008
I applied IMI to the VG site	8	42.11	2	7.69	10	22.22	0.010*

*Fisher's exact test
IMI, intramuscular; VG, ventrogluteal

Whereas the number of IMI implementations of nurses in the VG site was $\overline{X} = 2.18 \pm 5.14$ before education, it was $\overline{X} = 9.04 \pm 16.19$ after education. The number of IMI implementations of nurses in the VG site showed a statistically significant increase after education (p = 0.001) (Table 3).

Table 3. Statuses of IMI implementation in the VG site for nurses before and after education

Number of injection implementation	Mean	SS	*p*
Before education	2.18	5.14	0.001**
After education	9.04	16.19	

** Wilcoxon test
IMI, intramuscular; VG, ventrogluteal

Before education, 40% of the nurses stated they would be excited to apply IMI, but this rate decreased to 22.22% after education. In addition, 31.11% of the nurses stated they could easily apply IMI to the VG site before education, and this ratio increased to 53.33% after education. A total of 22.22% of the nurses before education and 55.56% after education stated they applied IMI implementation in the VG site (Table 4).

Table 4. Opinions of nurses about IMI implementation in the VG site

Statements of nurses	Before education		After education	
	n	%	n	%
I get excited when I apply IMI to the VG site	18	40	10	22.22*
I comfortably apply IMI to the VG site	14	31.11	24	53.33
I applied IMI to the VG site	10	22.22	25	55.56*

*Fisher's exact test
IMI, intramuscular; VG, ventrogluteal

5. Discussion

This research was conducted to determine the effect of in-service education on nurses' preference for the VG site in IMI implementation. Forty-five nurses participated in this study, which was conducted as intervention research.

It was determined that most of the nurses who participated in the study had been working in nursing for at least six years (57.78%) and that most of them (71.11%) did not receive education on IMI implementation in the VG site during their nursing education (Table 1). In Turkey, IMI skill is generally taught in the first year of undergraduate programs and within the scope of the Fundamentals of Nursing course. Until recently, textbooks indicated that the sites used in IMI

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implementations are generally the DG site, VG site, deltoid muscle and vastus lateralis muscle, and their implementation patterns were detailed (Kozier et al., 2000: 748-808; Ramont and Niedringhaus, 2004: 517-518). However, in the current literature, information about how the sciatic nerve is close to the injection site in the DG site and how its position changes from person to person is strongly indicated. For this reason, it has been emphasised since the beginning of the 2000s that the DG site should not be used in IMI implementation (Nicoll and Hesby, 2002; Potter and Perry, 2001: 945). However, the fact that nurses already perform IMI implementations in particular sites affects nurses' preference for the VG site in their IMI implementations. The majority of the nurses participating in the research each have a bachelor's degree, and when their age average is considered, they make up a relatively young group. The knowledge of the preference for the VG site in IMI implementations in Turkey has entered the main course books for the past decade. For this reason, nurses often prefer the DG site for IMI in their practices. In the research, it was found that only 11.54% of the nurses working for at least six years received education for IMI implementation in the VG site in their basic vocational education (Table 2). This situation reveals that the subject knowledge of nurses with more professional experience is incompatible with the current literature. Similarly, Walsh and Brophy (2011) stated that (n = 264) the site preferences of nurses during IMI implementation varied depending on the age. As a result of the study, younger nurses were more likely to administer IMI in the VG site compared with older nurses. In the same study, it was found that the preference rate for the VG site decreased as the years of vocational service of nurses increased.

Nurses participating in the research indicated that they preferred the DG site in a large proportion (77.78%) and the VG site in a low proportion (17.78%) (Table 1). Our findings run parallel with the literature. Floyd and Meyer (2007) stated that 99% of nurses use the DG muscle, whereas only nine percent of nurses use the VG site for the purpose of IMI. In the study that Güneş et al. (2009) (n = 110) conducted, 60% of the nurses stated that they have always applied IMI to the DG site, and 78.2% have never used the VG site. Similarly, Tuğrul and Denat (2014) reported in their study (n = 85) that 48.2% of the nurses use the DG site at all times, and 38.8% never use the VG site. In another study the Gülnar and Çalışkan (2014) conducted, 85.9% of the nurses use the DG site, and 63.3% of the nurses do not use the VG site at all. The results of this study reveal that nurses do not prefer the VG site primarily for IMI that in-service education is needed on this issue. It is necessary to prefer IMI implementation in the VG site not alternatively but primarily.

In our research, although the mean number of IMI implementations of the nurses was 2.18 ± 5.14 before the education, it was calculated as 9.04 ± 16.19 after the training (p = 0.001) (Table 3). Gülnar and Özveren (2016) determined in their study (n = 81) that the nurses were given a planned training program on IMI and that the ratio of the nurses' usage of the VG site increased after the training. For this reason, nurses' knowledge and skills about IMI should be updated with planned in-service education. Evidence-based implementations cannot be conducted unless the nurses' knowledge and skills are updated (Greenway, 2004; Small, 2004). The fact that an increase in the IMI implementation averages of the nurses in the VG site was detected in our study suggests that the nurses are interested in updating their knowledge and skills. For this reason, it is important that the nurses are informed about the current literature, the benefits of the training are given attention and the nurses' awareness of the subject is increased by organising continuous in-service education.

The excitement ratio of the nurses participating in the study when applying IMI to the VG site after in-service education decreased from 40% to 22.22%. In addition, the ratio of nurses who said they could easily apply IMI to the VG site increased from 31.11% to 53.33% (Table 4). Greenway (2004) stated that the nurses' knowledge and skills in the use of VG sites are not

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adequate and that they lack the confidence to carry out the skills unaided. Therefore, they are reluctant to use this site. Alannah and Floyd (2007) stated that nurses have difficulty adapting to a different method they are not used to. The reason given for this was that the VG site is difficult to identify and that the use of the DG site in the nursing literature was recommended for a period of time starting in the 1960s. Walsh and Brophy (2011) reported that when the nurses (n = 264) select the site of IMI implementation, 85.2% of them select the site with which they are comfortable, whereas 15.2% of them act in parallel with the literature. Although the current literature recommends using the VG site in IMI implementation, nurses prefer injection implementation in this site at a lower level. Any kind of change can cause some resistance and anxiety in people. Especially in invasive interventions, it is important that nurses feel safe and comfortable when they perform implementations and that they do not have any anxiety. However, it is necessary that nurses keep pace with the new and current literature and that they learn new information/implementations (Walsh and Brophy, 2011). Knowledge, skills and experience need to be increased for a skill to be implemented safely.

6. Conclusion and recommendations

According to this study, most of the nurses did not gain proficiency in preferring the VG site for IMI and performing implementations in this site during their basic education. For this reason, they do not prefer the VG site in their professional implementations. Following the conducted in-service education, it was determined that the number of injections that the nurses administered in the VG site increased and that the nurses felt more comfortable when administering injections in this site. There was also a decrease in their excitement statuses. In line with the research results, it was suggested that the in-service education for the nurses should be done in larger groups and that the education should be repeated periodically.

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