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THE EFFECT OF THE INTERACTIVE WORKSHOP, E-LEARNING AND PRACTICE TRAINING GIVEN TO NURSES ON INJECTION TO THE VENTROGLUTEAL REGION ON THE KNOWLEDGE AND PRACTICES OF NURSES

VENTROGLUTEAL BÖLGEYE İNTAMÜSKÜLER ENJEKSİYON KONUSUNDA HEMŞİRELERE VERİLEN İNTERAKTİF WORKSHOP, E-ÖĞRENME VE UYGULAMA EĞİTİMİNİN HEMŞİRELERİN BİLGİ VE UYGULAMALARINA ETKİSİ

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ABSTRACT

Objective: This study aims to determine the effect of different training techniques on VG (ventrogluteal) IM (intamuscular) injection provided to nurses during in-service training on their knowledge and practice.

Method: Data were collected employing "Information Form" and "VG IM Injection Knowledge and Practice Steps". The study sample was included hospital in Turkey with individuals who worked nurses. Assigning the VG injection training and control groups, kurra method was used. SPSS package program was used for data analysis.

Results: The mean of pre-training knowledge were 12.11±3.89 in the VG injection interventions group and 12.00±3.72 in the control group. After 3 months of training, it was found that these were 18.17±1.29 in the VG injection training interventions group and 17.02±1.94 in control group, and that there was a significant difference in the VG injection training groups ($p<0.001$). It was determined that the mean of sum the practice scores of individuals was 6.35±1.04 in the VG injection training interventions group and 3.97±1.46 in the control group, and that there was a significant difference between the groups ($p<0.001$).

Conclusion: It was concluded that the use of e-learning and interactive workshops in adult education are effective methods in nursing education.

Key Words: Parenteral, Nurse, Psychomotor Performance

ÖZ

Amaç: Bu çalışmanın amacı hemşirelere hizmet içi eğitimleri sırasında verilen VG (ventrogluteal) IM (intramüsküler) enjeksiyonu konusunda farklı eğitim tekniklerinin bilgi ve uygulamalarına etkisini belirlemektir.

Yöntem: Veriler Bilgi Formu ve VG IM Enjeksiyon Bilgi ve Uygulama Adımları Formu ile toplandı. Çalışma örneklemini Türkiye'de bir hastanede çalışan hemşireler oluşturdu. Deney ve kontrol gruplarının belirlenmesinde ve atanmasında kura yöntemi kullanıldı. Verilerin analizinde SPSS paket program kullanıldı.

Bulgular: Eğitim öncesi bilgi ortalaması VG enjeksiyonu eğitimi deney grubunda 12.11±3.89 ve kontrol grubunda 12.00±3.72 idi. Üç aylık eğitim sonunda VG enjeksiyonu eğitimi deney grubunda 18.17±1.29, kontrol grubunda 17.02±1.94 ve VG enjeksiyonu eğitimi grubunda anlamlı farklılık olduğu görüldü ($p<0.001$). Bireylerin uygulama puanlarının VG enjeksiyonu eğitimi deney grubunda 6.35±1.04 ve kontrol grubunda 3.97±1.46 olduğu ve gruplar arasında anlamlı bir fark olduğu tespit edildi ($p<0.001$).

Sonuç: Yetişkin eğitiminde e-öğrenme ve interaktif workshop kullanımının hemşirelik eğitiminde etkili yöntemler olduğu sonucuna varıldı.

Anahtar Kelimeler: Paranteral, Hemşire, Psikomotor Performans

INTRODUCTION

In literature, it is emphasized that complications are highly seen when it comes so intramuscular drug administration in dorsogluteal site. The most common complications are administering drugs to subcutaneous tissue by mistake, insufficient drug absorption, tissue irritations such as necrosis, hematom, ecchymosis, vessel or nerve damage and pain and all these complications can be prevented simply by choosing the ventrogluteal (VG) site as the injection site, which is a very safe option [1-4]. However, it is also emphasized that even though the VG site is known to be safer and recommended, nurses hesitate injecting drugs on the VG site and they usually prefer the dorsagluteal (DG) site [3,5-7]. When nurses were asked about their reasoning regarding their injection site choice, they stated that they did not have sufficient information on the VG site, they were not familiar with it and the VG site was small anatomically. Thus, they think that they may harm the patient and they do not feel confident enough to do it, since they don't injected drugs on the VG site [5,7-9]. It was revealed that nurses did not observed this technique when it was being applied and they could not practice it, although the practice of VG IM injection was included in the nursing undergraduate education for many years [8-11].

Nursing requires an education system which covers cognitive, affective and psychomotor learning. Thus, it is emphasized that the health personnel should be provided with practical training for psychomotor skill in parallel with the theoretical training [3,4,12].

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It is thought that the VG IM injection practice training should include theoretical training followed by e-learning which provides attentiveness and awareness and then practical training which enhances the psychomotor skills of nurses, helps them get familiar with the practice and diminishes their fears.

METHOD

Purpose of the Study

This study aims to determine the effect of different training techniques on VG IM injection provided to nurses during in-service training on their knowledge and practice.

Hypotheses

"Hypothesis 1 (H1)"; The knowledge scores of nurses who were provided with interactive workshop, e-learning and practical training is higher than those who do not practice the application.

"Hypothesis 2 (H2)"; The practice scores (psychomotor skills) of nurses who were provided with interactive workshop, e-learning and practical training is higher than those who do not practice the application.

Research Design

The study was planned as a randomized VG injection training interventions study with pretest-posttest design in an attempt to determine the effect of planned interactive workshop training on VG IM injection, e-learning technique and practice on knowledge and practice.

Study Participants

Between April- July 2019 in a hospital in Turkey with individuals who worked nurses. The ventrogluteal region is not used in the institution and the region where the institution is located, and it was observed among the nurses that the region was heard but not used before. The randomization method, which was designed employing drawing lots method, was used to determine whether the individuals meeting the sampling selection criteria should be included in the VG injection training VG injection training or in the control group (Figure 1). In the accordance with literature information (Ellis 2010; Gökbel 2017) used that averages were obtained in this study and using the G*Power (α=0.05, 1-β=0.80) the sample size was calculated both for VG injection interventional and control groups as 32, in total 64 nurses. Assigning the VG injection interventions and control groups, kurra method was used. In the lots, each service was separated in separate boxes and one person from each service was selected to avoid interaction. The selection was made in the order of VG injection interventional and control group.

Sample selection criteria;

- Being volunteer to participate in the study
- Taking to job in clinical training
- Being work on specified dates

Sampling exclusion criteria;

- Not suitable for including criteria

Data Collection and Procedure

The data were collected employing Information Form and VG IM Injection Knowledge and Practice Steps.

Information Form; It was prepared by the researcher and consists of eight questions (age, education, gender et.). "VG Site IM Injection Knowledge Test"; was prepared in the light of the literature and consists of 20 questions [4,6,13,14]. They are required to answer these questions either "yes" or "no". They got 1 point for each answer they got right and 0 point for the ones they did not. The score ranged between 0 and 20. It was assumed that higher scores signified better knowledge on VG IM injection. The form was assessed by two experts who did not participate in the study.

VG Site IM Interactive Workshop Training Program; was a training which lasted for 75 minutes and carried out in an interactive environment. During the training, adverse results of the current practice technique was demonstrated and the importance of the VG site as an evidence-based practice was explained in with questions and answers.

E-Learning; Some reminders on the use of VG site were sent to the participants via Hospital Information Management System (HBYS). This message appeared on their patient management page for 3 months after the workshop, when participants logged in to the system.

Practical Training: Nurses on the e VG injection training group practiced VG site IM injections instead of DG site on the patients who needed IM injections therapy with researchers for 3 months.

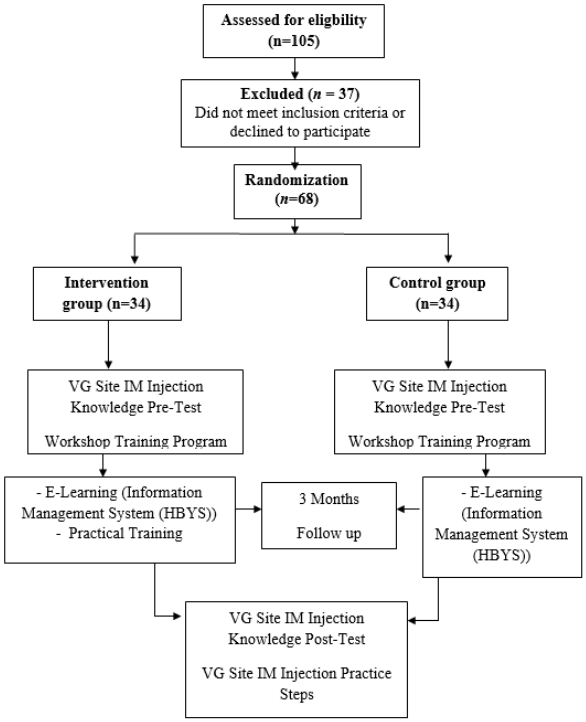

Figure 1. Flow chart of patient selection

Intervention

Nurses were not informed about the study subject when they were invited to the interactive workshop training. Before the training, the study subject was explained to them and volunteers were categorized into VG injection training and control groups as the researcher drew lots. Participants did not know which group they were in and they were asked to fill up the forms (sociodemographic information, VG Knowledge and Practice Steps) before the training. The interactive workshop training was conducted as questions and answers in which the participants directed the training. After the training, an electronic reminder was sent to both VG injection training and control group participants for 3 months via HBYS (e-learning) (Figure 2).

The participant in the VG injection training group carried out VG site IM injections on patients who required IM injection with the researcher for Three months. Control group members did not carry out any practice. Three month later, participant in both VG injection training and control groups were asked to fill up the VG Information form again and to practice the VG IM injection in laboratory. During the practice, the researcher filled out the table which covers practice steps.

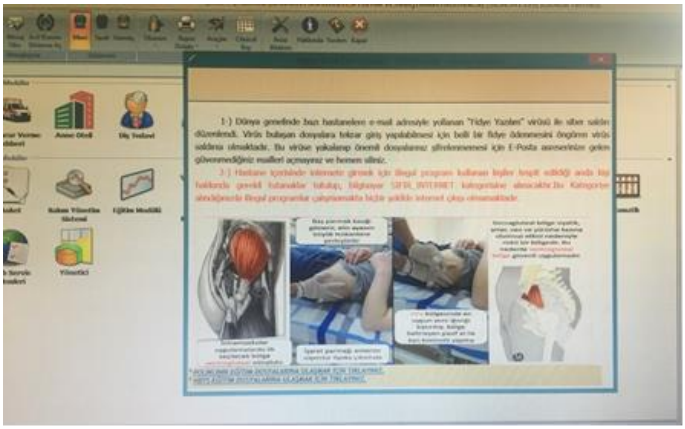

Figure 2. Ventrogluteal site e-learning screen image

Ethical Considerations

This study was approved by the independent ethics committee by Ethics Committee of the Sakarya University (27.03.2019/157). Verbal consent was obtained from all of the nurses who agreed to participate after they were informed about aim and time of study just.

Statistical Analysis

The data collected from the study was evaluated by transferring to the IBM SPSS Statistics 22 program. For the analysis of the data, their normal distribution was examined by using Kolmogorov-smirow test and it was seen that it shows a normal distribution (demographic score of groups) (p=0.200).

The analysis by using independent sample t test, paired sample t test, Cronbach's alpha and Chi square tests was evaluated. The effect sizes were calculated using the Cohen's d formula with computer program and significance was considered as p<0.05.

RESULTS

It was observed that the average age of the participant nurses was 32, their professional experience was over 10 years, they worked more than 45 hours per week, most of them had undergraduate degree (55.9%; 58.8%) and worked as a clinical nurse (50.0%; 41.2%). No statistical significant difference is found assessing the demographic features of participants in VG injection training and control groups (p>0.05) (Table 1). This finding proved that there was a homogeneous distribution in VG injection training and control groups (Table 1).

Majority of the nurses (%42.6) stated that they had heard of VG site, however they did not practice VG injection (%29.4; %22.1). 19.1% of the nurses claimed that that was because they were not habit with the practice and said that they preferred "dorsa gluteal site" (%44.1; %45.6).

No statistically significant difference was determined between the nurses in VG injection training and control groups regarding their IM injection VG injection training group, on the contrary a homogeneous distribution was observed (p>0.05) (Table 2).

No significant difference was detected between the mean scores of nurses in VG injection training and control groups before the interactive training. The mean scores were 12.11±3.89 in VG injection interventional group and 12.00±3.72 in control group [t = 0.127, p>.05]. However, there was a significant difference between the mean scores of the nurses in VG injection training and control groups after 3 months. The mean scores were 18.17±1.29 in VG injection training group and 17.02±1.94 in control group [t=2.865, p<.05]. Moreover, it was concluded that the knowledge score of the VG injection training group increased more than that of control group (Table 3). The Cohen's d value which signifies the effect size of the difference was calculated in the study (Cohen d=0.69). This finding showed that the difference between two means is significant (medium effect size) (20- small; .50- medium; .80- large effect size)14.

Table 1. Distribution of socio-demographic characteristics of nurse (n=68)

Characteristics		VG injection training (n=34)		Control (n=34)		Statistics
		n	%	n	%	t\x2; p
Age		32.35±8.48		32.24±7.32		t=0.061 p=0.951*
Weekly working hours		47.53±5.97		49.41±8.80		t=-1.032 p=0.306*
Total work year		11.50±8.96		10.08±7.68		t=0.697 p=0.488*
Gender	Male	3	4.4	2	2.9	x²= 1.000 p=0.642*
	Female	31	45.6	32	47.1	
Educational	High school/Pre-license	15	44.1	14	41.2	x²= 1.000 p=0.500*
	Licence/ Graduate	19	55.9	20	58.8	
Working	Day	11	16.2	11	16.2	x²= 1.000 p=0.602*
	Day-Night	23	33.8	23	33.8	
	Night	0	0.0	0	0.0	
Income status	Little	31	45.6	31	45.6	x²= 1.200 p=0.549*
	Equivelant	0	0.0	1	1.5	
	Much	3	4.4	2	2.9	
Unit working	Clinic	17	50.0	14	41.2	x²= 2.776 p=0.250*
	Intensive Care	12	35.3	18	52.9	
	Emergency	5	14.7	2	5.9	

**p>0.05, t=Independent Sample T test, x²=Chi-square*

Table 2. Distribution of VG injection training and control group of staff nurses administering IM injections- before training

Variables		Training n=34		Control n=34		Statistics
		n	%	n	%	x²; p
Have you heard of the VG site?	Yes	29	42.6	29	42.6	x²=1.000 p=0.633*
	No	5	7.4	5	7.4	
Have you practiced in the VG site?	Yes	14	20.6	19	27.9	x²= 1.472 p=0.166*
	No	20	29.4	15	22.1	
If you've heard of the VG but you have not used it, why not?	Not having information	11	16.2	15	22.1	x²=7.701 p=0.173*
	Cannot find the correct site	4	5.9	1	1.5	
	It's complicated, worrying	3	4.4	0	0.0	
	Habit	13	19.1	13	19.1	
	Do not think the zone is unsafe	1	1.5	0	0.0	
	Anatomically small site and difficult to identify	2	2.9	5	7.4	
Which site do you usually prefer for adult IM injection?	Dorsagluteal	30	44.1	31	45.6	x²=3.816 p=0.148*
	Vastus Lateralis	4	5.9	1	1.5	
	Deltoid	0	0.0	0	0.0	
	Ventrogluteal	0	0.0	2	2.9	

**p>0.05, x²= Chi-square*

Table 3. Pre-test and post-test knowledge scores of staff nurses

Groups	VG injection training Groups (n=34) (min:0, max:20)	Control Groups (n=34) (min:0, max:20)	t**	p
Interventions	x±SD	x±SD		
Pre-education	12.11±3.89	12.00±3.72	0.127	0.899
Post-education (After 3. months)	18.17±1.29	17.02±1.94	2.865	0.006 ****
Test (t*/ p)	-8.201/ 0.000***	-7.297/ 0.000***		

** t=Paired Sample t test, **Independent Sample t-test, ***Cohen d: VG injection training tal Group 2.09, Control Group 1.69; ****Cohen d Post-test: 0.69*

Analyzing the before and after in-group differences, it was found out that there was an increase in both groups and this increase formed a significant difference (Table 3) [t =-8.201, p<.001], [t=-7.297, p<.00]. The effect size of the pretest and posttest was 2.09 in VG injection training group and 1.69 in control group. That is to say the difference was significant, and the effect size was large. Collecting the final data, nurses were asked to perform VG site IM injection on a model.

During the practice, researchers made observations and filled out the table which includes practice steps prepared in the light of the literature. Realization of the practice steps is presented in Table 4.

Table 4. Distribution of the steps maden by nurses on practices IM injection to the VG site (n=68)

VG Sites IM Practice Steps		Training		Control		Statistics
		n	%	n	n	
Positioning the patient according to the case to be injected (supine, lateral, prone)	+	0	0.0	1	2.9	t=1.000 p=0.321*
	-	34	100	33	97.1	
Using the left hand on the right hip and the right handon the left hip	+	5	14.7	27	79.4	t=6.915 p=0.000*
	-	29	85.3	7	20.6	
The palm of the hand, large trochanteric placement	+	3	8.8	20	58.8	t=5.057 p=0.000*
	-	31	91.2	14	41.2	
The thumb points to the patient's groin while the other four fingers point to the patient's head	+	7	20.6	23	67.6	t=4.372 p=0.000*
	-	27	79.4	11	32.4	
Place the index finger on the anterior superior crista	+	3	8.8	11	32.4	t=2.471 p=0.000*
	-	31	91.2	23	67.6	
Open the middle finger as far as possible to the posterior crista iliac (backward) and create a V-shaped triangle	+	2	5.9	13	38.2	t=3.442 p=0.000*
	-	32	94.1	21	61.8	
Control of sensitivity, swelling, nodule color change in the injection site and selection of the most suitable area in the VG region	+	2	5.9	8	23.5	t=2.090 p=0.000*
	-	32	94.1	26	76.5	
Total Score (Min:0 Max:7)		6.35±1.04		3.97±1.46		t=7.724 p=0.000**

Independent Sample t-Test,Cohen d:1.87*

It was observed that 100% of the participant in the VG injection training group and 97.1% in control group positioned the patient correctly during the practice, however the active and passive hand positions of 79.4% of the participant in the control group were wrong.

Practice scores were 6.35±1.04 (high) for the VG injection training group and 3.97±1.46 (low) for the control group. A significant difference was determined between the groups and it was concluded that the difference was at large effect size level (Table 4, Figure 3) [t =-7.724, p<.001, d=1.87].

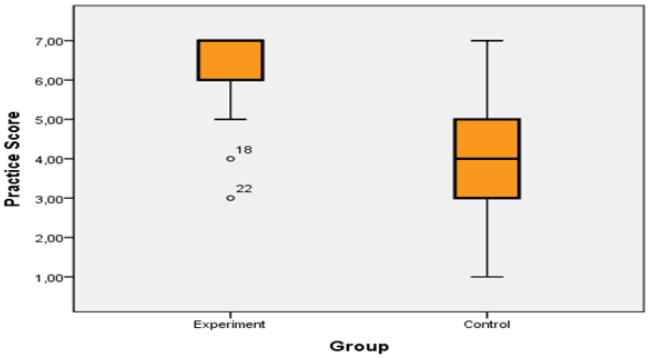

Figure 3. Graph showing the mean pre-test and post-test practice scores obtained by staff nurses

DISCUSSION

It was found out that most of the nurses had heard of VG site IM injection and the mean knowledge scores of VG injection training and control groups had increased after the training. After the training, participants in the VG injection training group have gained experience on VG site IM injection for three months and their practice skills have advanced. All in all, there are only a limited number of studies which focuses on the effect of the interactive workshops, e-learning and practical training on knowledge and practice.

The mean knowledge scores of both VG injection training and control groups were low. This finding gave rise to the thought that nurses might be missing on information since VG site IM injection is not common in the clinic. Three months after the training, the mean knowledge scores of both groups commenced to increase (p<.001) (Table 3). It was estimated that the e-learning provided to groups for three months after the interactive workshop raised awareness and the information is kept fresh. Examining the literature, it can be seen that a study conducted on the effects of e-learning on knowledge is yet to be done. Thus, it constitutes the authenticity of the study.

Gülnar and Çalışkan (2014), Sarı et al. (2017), Sakic et al. (2012) and Tuğrul and Denat (2014) stated that the nurses had low knowledge scores on the use of VG site and that they needed training [9,11,16,17]. Accordingly, Singh and Sood (2016), Gülnar and Özveren (2016) stressed out that there was a significant difference between the knowledge scores of both VG injection training and control groups before and after the training [18,1].

Since the mean score of the VG injection training group increased more than that of control group creating a significant difference three months after the training (p<.05), it was thought that the reason behind that was the fact that the VG injection training group carried out practices unlike control group and that the practical training contributed to the knowledge scores. The fact that these findings accept the H1 hypothesis reveals the effect of training once more.

Nurses in the VG injection training group practiced VG site IM injections on patients with the researcher. Three months after the training, they were asked to practice VG site IM injection on a model. During the practice, the researcher assessed the practice steps and graded the nurses. The scores amount to 6.35±1.04 (high) for the VG injection training group and 3.97±1.46 (low) for the control group. A

significant difference was determined between the groups (p>.05) (Table 4, Figure 2). This finding, which corresponds to the literature, asserts once again the importance of the inclusion of practical training, which helps nurses to develop psychomotor skills, in nursing training [4,16,20,21]. The fact that these findings accept the H2 hypothesis reveals the effect of training once more.

In parallel with this study the importance of practical training in nursing for the development of psychomotor skills is also touched upon by various studies. Young Park et al. (2016) and Oermann et al. (2011) also provided therotical and practical training on cardiac resuscitation (CPR) and defibrillation to clinic nurses and assessed them in pre-training and post-training period [22,23]. In conclusion, it was emphasized that the practical training improved psychomotor skills. Our study showed that the theoretical and practical training is very instructive for nurses, allow them to internalize the information at their own speed and helps them grow accustomed to this practice.

It is very important to employ sufficiently trained nurses who are equipped with updated information for performing IM injections in order to prevent any serious complications originating from IM injections. It is also thought that nurses with practical experience should learn about ever changing practices and spread the new information in their clinic.

Limitations and Strengths of the Study

One of the strengths of this study was the randomized and the multicenter hospital. One of the other strengths of the study, ventrogluteal discussed the implementation of the ıntamusculer is one of the first few studies conducted in Turkey. The data were collected by equally trained researchers for each structure, but there was one limitation to this study. The study was carried out with nurses at only one hospital. Thus, the results of this study cannot be generalized to all nurses.

Contribution to Practice

- Nursing requires an educational system that develops cognitive, sensory and psychomotor skills.
- E-learning and interactive workshops are the most effective methods of adult training,
- The teaching health professionals about IM injection in the VG region both in theory and practice will have an effect in increasing self-efficacy which will in turn have an impact on behavior.
- The teaching health professionals about IM injection in the VG region both in theory and practice will have an effect in increasing self-efficacy which will in turn have an impact on behavior.

CONCLUSION

Constant training is very essential for institutions to access changing information. Interactive workshop that is based on active participation of the group and e-learning which allows continuous communication are some of the most effective training methods especially in adult training. In our study, it was seen that interactive and applied education is important in nursing education. After the theoretical training, the information received should be reinforced with practice. Therefore, VG site IM injection, which is an evidence-based practice, should be included in in-service trainings intended for active nurses both theoretically and practically. Accordingly, it is important to include practical training regarding VG site IM injection in in-service training provided to clinic personnel.

Ethical Approval: *2019/157 Non-Interventional Clinical Research Ethics Committee of Sakarya University*

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