Original Article

Whats App Supported Training on the Administration of Injection into the Ventrogluteal Site

Sule Biyik Bayram, PhD
Assistant Professor, Karadeniz Technical University, Faculty of Health Sciences, Department of Nursing, Trabzon, Turkey

Nurcan Caliskan, PhD
Associate Professor, Gazi University, Faculty of Health Sciences, Department of Nursing, Ankara, Turkey

Emel Gulnar, PhD
Assistant Professor, Kırıkkale University, Faculty of Health Sciences, Department of Nursing, Kırıkkale, Turkey

Yeter Kurt, PhD
Research Assistant, Karadeniz Technical University, Faculty of Health Sciences, Department of Nursing, Trabzon, Turkey

Corrospondence: Sule Biyik Bayram, Karadeniz Technical University, Faculty of Health Sciences, Department of Nursing, Trabzon, Turkey, e-mail: sulebiyik@gmail.com

Abstract

Background: Ventrogluteal site is the proposed area nowadays to apply intramuscular injection. However, the studies having been varied out so far have revealed that nursing students have difficulty in identifying the site and tend to avoid applying intramuscular injection due to their deficiency in necessary knowledge and skill. The present students spend a great time using social media and communication means triggered the idea to apply WhatsApp Messenger in the training of intramuscular site injection.
Aims: The present study aimed at identifying the effect of WhatsApp supported training on the knowledge of nursing students about the safe administration of intramuscular injection into the ventrogluteal site.
Methodology: The study was randomized controlled trial conducted from April – May 2016. It was carried out in the Department of Nursing at the Faculty of Health Sciences of a university in a metropolis in Turkey. After the students were instructed about the safe administration of intramuscular injection into the ventrogluteal site, the pre-knowledge and pre-skill test scores were identified. According to these scores, the participants were classified into the experimental (n=46) and control (n=54) groups. Intentional shares were communicated to the students in the experimental group via WhatsApp. The control group did not receive any intervention. After seven days, their post-knowledge and post-skill test scores were determined. Necessary permissions were received from the institution and participants so that the study could be carried.
Results: A statistically significant difference (p = 0.001) was observed in the average post-knowledge and post-skills test scores of the experimental and control groups. When considering the administration of injection in the correct area, a statistically significant difference (p = 0.001) was observed between the experimental and control groups.
Conclusions: At the end of the study, a statistically significant difference was observed in the average scores of both groups, and the average post-knowledge and post-skill test scores of the experimental group increased.

Keywords: Nursing education, Secure intramuscular injection, Ventrogluteal site, WhatsApp messenger

Background

Intramuscular (IM) injection, a drug administration method, is an invasive procedure that must be performed safely and appropriately in the correct site (Berman, Snyder, Kozier & Erb, 2016; Potter & Perry, 2017). Nurses generally prefer the dorsogluteal (DG) site for IM injections (Sari Sahin, Yasar, Taskiran, & Telli, 2017; Ozturk, Baykara, Karadag, & Eyikara, 2017). However, studies have suggested that the ventrogluteal (VG) site should be used instead of the DG site because injection on this site causes sciatic nerve and superior gluteal artery injuries (Berman et al., 2016). However, students have difficulty in learning how to safely administer intramuscular injection into the VG site due to problems in locating the site, and nurses do not use this site in clinical settings (Sagkal, Edeer, Ozdemir, Ozen, & Uyanik, 2014). Thus, nursing students must properly locate the VG site and learn how to safely and accurately administer injections.

The teaching staff has been working with students, defined as generation z, who often use technology as well as those who were born in 2000 and have enrolled in universities. For this reason, the teaching staff should use appropriate teaching techniques to catch the attention of students during their courses. Furthermore, new teaching techniques must be used as every individual has a different learning style (Boctor, 2013). With the change in traditional in-class training, some changes were also observed in the role of an educator (Antonio & Tuffley, 2014). Therefore, it is necessary for educators to adapt to this change. Social media applications, such as WhatsApp Messenger (WM), have been used as a teaching tool in several higher education institutions, and these applications help students learn and increase their motivation (Bozalek et al., 2015). Accordingly, WM is the most popular social media and communication tool that is used today, and it can support traditional in-class training. This application can be used as an educational tool in an environment that enables teaching staff and students to interact outside the classroom, thus enhancing the knowledge or skills of the students, which is a type of continuing formal education, and allowing students to freely ask questions.

Based on medical literature, nurses refrain themselves from performing intramuscular injection into the VG site because it is not safe, and they thought of hurting the patient owing to the difficulty in locating the VG site. Moreover, they believe that they lack the necessary knowledge and skills (Wynaden et al., 2015). In Turkey, the students are not competent in laboratories due to the ratio of students and teaching staff and the laboratory conditions, which are not ideal. Thus, it is important to teach students how to safely administer intramuscular injection into the VG site during nursing education. For this purpose, social media and communication tools, such as WM, which can help the teaching staff to continuously communicate with students and provide audio and visual learning resources, can be used as a supportive tool for formal training in health education (Jeong, 2017; Willemse, 2015; Willemse & Bozalek, 2015).

The frequent use of social media tools, such as WM, has affected the educational needs and learning styles of students in the current generation. WM is a messaging and calling application developed for smart phones that can operate between platforms (Willemse, Jooste & Bozalek, 2019; Raiman, Antbring & Mahmood, 2017).

It also allows users to chat and interact via multimedia group chat and unlimited messaging (George, DeCristofaro, Murphy, & Sims, 2017). Sharing on this platform contributes to the knowledge and skill development of nurses via learning (Moorley & Chinn, 2015).

In the literature, social media tools, such as Twitter and Facebook, can be used in student education (Tower, Latimer & Hewitt, 2014). However, no studies that examined the immediate effect of WM on the development of psychomotor skills have been conducted. Students will learn how to safely perform intramuscular injection into the VG site permanently, and it will be easier for them to continuously learn by sharing videos, pictures, and information related to the subject via the use of WM whenever and wherever they want.

Methodology

This study aimed at evaluating the effect of WM-supported training on the knowledge of nursing students about the safe administration of intramuscular injection into the VG site. This is a randomized controlled trial with control and experimental groups that were classified via random sampling.

Participants: The study population comprised 200 first-year students enrolled in the Fundamentals of Nursing II course in the spring semester of 2015–2016 academic year. The study was conducted from April 2016 to May 2016 in the Department of Nursing at the Faculty of Health Sciences of a university in a metropolis in Turkey.

The inclusion criteria for this study:

- To be enrolled in Fundamentals of Nursing II for the first time,
- To be have an Android system on the mobile phones,
- To be have internet access
- To be have no previous experience in ventrogluteal intramuscular injection.

The exclusion criteria for this study:

- To be not having attended at post-knowledge test and skill scores.

The students, who are in conformity with such criteria, agree to participate in the study and have similar scores in pre-knowledge test and skill scores, are divided into two groups by random sampling (block randomization) method. The scores of the groups were taken into consideration to show a homogeneous distribution. Statistics on knowledge and skill scores of the groups are displayed on Table 1. Totally 110 students were included in the study as 55 to experimental group and 55 to control group. However, the study was completed with 46 students in experimental group and 54 students in control group on grounds that nine students in experimental group and one student in control group did not take part in post-knowledge and skill test (Figure 1). The power analysis was carried out using G*Power 3.1. According to the results of the study conducted by Tower et al. (2014), it was determined that the number of individuals required to reject the null hypothesis, with 80% power and a significant level of 0.05, was at least 100 students (46 experimental group and 54 control group) with an effect size 0.56.

Data collection and Instruments: Data were collected using the knowledge proposition into the VG site, skill control list of the VG injection, and post-clinical application evaluation forms, which were prepared based on the results of the literature review carried out by the researchers (Berman et al., 2016; Potter & Perry, 2017; Sari et al., 2017; Taylor, Lillis, LeMone, & Lynn, 2011). All the forms were used after the researchers have made some important revisions based on the opinions of five expert reviewers who are in the field of fundamentals of nursing.

The forms included 24 proposals for the administration of intramuscular injection into the VG site (information proposals towards the VG site). Among these proposals, 12 were accurate, whereas 12 were not. Subsequently, the students were asked to answer the proposals as correct and wrong. One point was provided for correct answers and 0 for wrong answers. Therefore, the students can receive a minimum score of 0 and a maximum score of 24.

The skill control list of VG injection form consists of 39 steps, and it was evaluated as correct or incorrect. The students can receive 1 point for each correct step and 0 for each wrong step. Therefore, the students can receive a minimum score of 0 and a maximum score of 39.

In the post-clinical application evaluation form, the students were asked about the status of intramuscular injection, the number of injections made into the VG site, their feeling of self-sufficiency, and the techniques used in administering intramuscular injection. In addition, only the experimental group was asked with open-ended questions on the contribution of WM on the knowledge of nursing students about the safe administration of intramuscular injection into the VG site.

The Intramuscular Injection Training Buttocks Model (BT-CSIM I) is used for the administration of injection into the VG site. This simulator was used because it has a software that shows the proper location where the injection should be administered and the penetration depth of the syringe.

Intervention: The researchers explained the theory of safe IM injection into the VG area to all students via a PowerPoint presentation, question and answer session, and discussions, and they also demonstrated how it should be administered on the simulator. Later, the students were classified into small working groups, and they practiced injecting using the simulator with individual researchers in the laboratory. The advisory forms for the VG site were used to determine the preliminary knowledge scores of the students. The pre-skill test scores of the

students were determined after the application scores were obtained and recorded with the help of the checklist for the VG injection skills. The students were classified into the experimental and control groups via random sampling according to their preliminary knowledge and pre-skill test scores.

In addition to formal education, the researchers shared some intentional contents to the students in the experimental group via WM. First, the WM group was established, and two of the researchers were assigned as the group admins. Two videos and pictures that show the bone spurs, such as the trochanter major and cristae iliac anterior, which are important in determining the VG site, were prepared by the researchers (Figure 2). Moreover, these materials, which were prepared over seven days, describe the methods that can be used in the safe administration of intramuscular injection into the VG site. Then, questions were shared with the students.

The control group did not use any additional applications. At the end of the seven days, the final knowledge scores of the students were determined through the advisory forms for the VG site. The final skill scores of the students were determined after the application scores were obtained and recorded with the help of the checklist for the VG injection skills. Two researchers observed each student at the same time. The first researcher filled in the checklist for the VG injection skills, and the second researcher saved the checklist on the tablet connected to the simulator via Bluetooth. In addition, the site where the student performed the injection was saved on the tablet. The average score of the students provided by both observers is the final score. Finally, all the students were asked to complete the post-clinic application evaluation form after clinical application.

Written approvals for this study were obtained from the University Department of Nursing where the study was performed. The students who were recruited were informed about the aims and methods of the study, and a written consent was obtained from all students.

Data analysis; Data were analyzed using SPSS Version 22.0 (IBM SPSS Statistics, IBM Corporation, NY, USA). The information and skill scores of the students were analyzed using the Mann–Whitney U test and Wilcoxon test. The tests were utilized according to the normal distribution of the data. Parametric tests were used in normally distributed data, whereas non-parametric tests were utilized in non-normally distributed data. $p < 0.05$ was considered statistically significant with a 95% reliability.

Results

In total, 100 nursing students, who were in their first year, were included in the study; among which, 46 were included in the experimental group and 54 in the control group.

No statistically significant difference was observed between the two groups in terms of the average pre-knowledge test scores ($p = 0.209$). This result shows that the two groups were similar in terms of the average pre-knowledge test scores. A statistically significant difference was observed between the two groups in terms of the average post-knowledge test scores ($p = 0.017$) and the change (difference) ($p = 0.012$).

No statistically significant difference was observed between the experimental and control groups in terms of the average pre-skill test scores ($p = 0.119$). This result shows that the two groups were similar in terms of the average pre-skill scores. A statistically significant difference was found between the two groups in terms of the average post-skill test scores ($p = 0.000$) and changes (difference) ($p = 0.000$) (Table 1).

A statistically significant difference was observed between the control and experimental groups in terms of the number of times that the injection was properly administered ($p = 0.009$). During the pre-skill test, 22.2% of the students in the control group and 43.5% of the students in the experimental group administered the injection in the correct area. In addition, during the post-skill tests, 31.5% of the students in the control group and 89.1% of those in the experimental group administered the injection in the correct area (Table 2).

Approximately 63.3% of the students in the control group stated that they conducted intramuscular injection in clinical settings, of which around 20.4% used the VG site. Meanwhile, 92.7% of the students in the experimental group stated that they conducted intramuscular injection in clinical settings, of which around 26.8% used the VG site. Moreover, approximately 95.1% of the students in the experimental group preferred the VG site for intramuscular injection after the training. Nearly 97.6% of the students in the experimental

stated that WM-supported training helped enhance the knowledge of nursing students on the proper administration of intramuscular injection into the VG site (Table 3).

Table 1 Comparison of the average pre-knowledge and post-knowledge test scores between the control and experimental groups.

VG* injection	Knowledge Score			Skill Score		
	Control Group (n=54) Mean (SD)	Experimental Group (n=46) Mean (SD)	*p***	Control Group (n=54) Mean (SD)	Experimental Group (n=46) Mean (SD)	*p***
Pre	13.85 (3.16)	13.08 (2.74)	0.209	21.73 (3.40)	22.90 (3.70)	0.119
Post	17.79 (2.50)	18.82 (2.39)	0.017	21.89 (3.82)	26.50 (2.42)	0.000
Change	3.94 (3.66)	5.73 (3.68)	0.012	0.16 (5.01)	3.59 (3.55)	0.000
p***	0.000	0.000		0.863	0.000	

***** Ventrogluteal ** Mann–Whitney U test *** Wilcoxon sign test

Table 2 Number and percentage distribution of the injections correctly administered during the pre-skill and post-skill tests of the students in the control and experimental groups.

VG* injection	Control Group (n=54) n (%)	Experimental Group (n=46) n (%)	*p*
Pre-skill performance	12 (22.2%)	20 (43.5%)	0.009*
Post-skill performance	17 (31.5%)	41 (89.1%)	
Change	5 (09.3%)	21 (45.6%)	

* Ventrogluteal **Chi Square test

Table 3 Administration of intramuscular injections of the students in the control and experimental groups in clinical settings.

Statements	Control Group (n=49)		Experimental Group (n=41)	
	n	%	n	%
The ones applying IM injection	31	63.3	38	92.7
The ones applying IM injection on VG	10	20.4	11	26.8
The ones stating to prefer VG site afterwards	40	81.6	39	95.1
The ones considering that there is contribution of WM support to learning of secure IM application on VG site	-	-	40	97.6

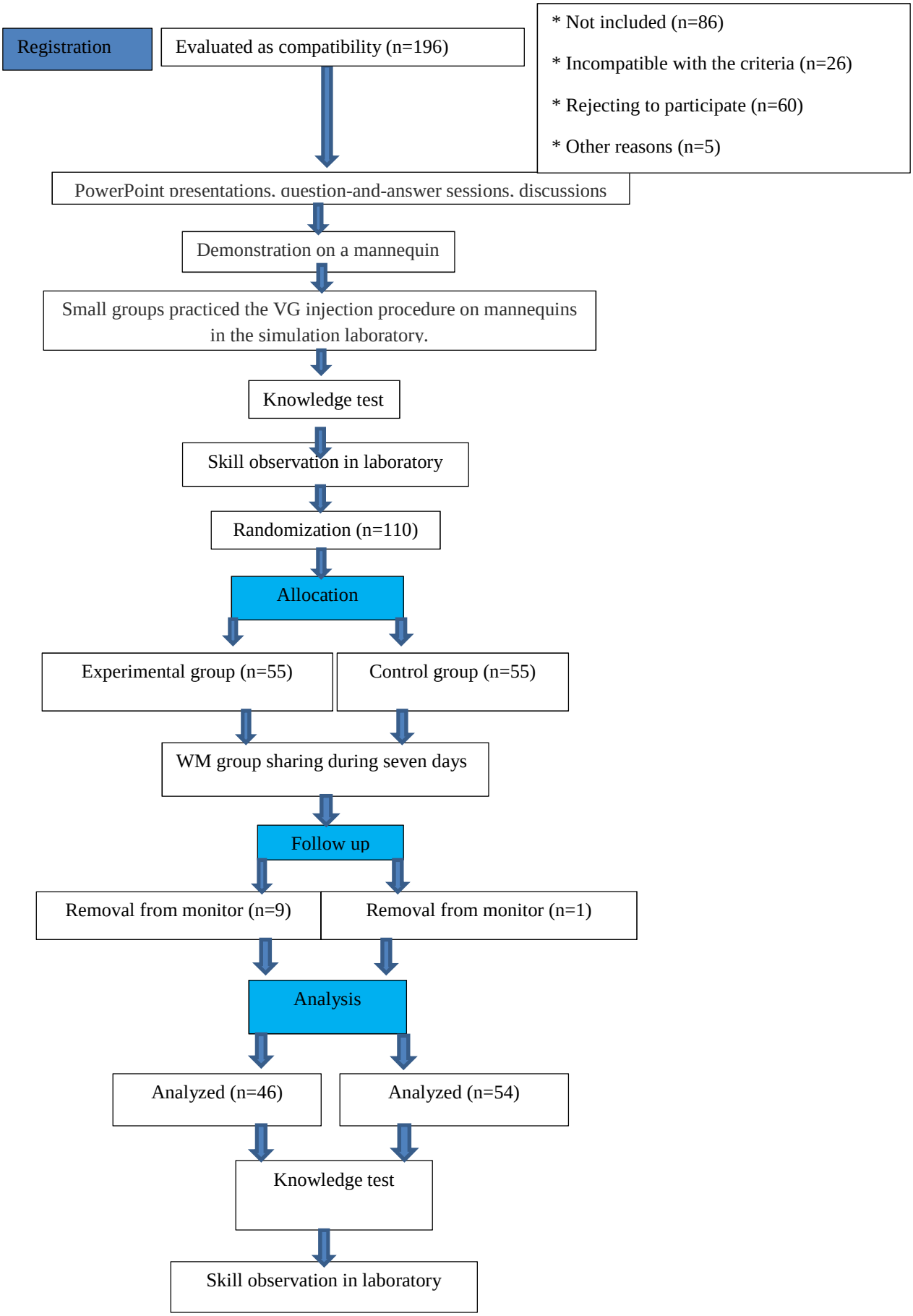

Figure 1 CONSORT diagram of this study

Figure 2 Video share

Discussion

The present study evaluated the effect of WM-assisted training on the knowledge of students on the safe administration of intramuscular injection into the VG site. Studies that examined the immediate effect of WM when used as a supportive tool for helping students develop their psychomotor skills have not been conducted. However, few studies have shown that WM can be used for educational purposes (Willemse et al., 2019; Raiman et al., 2017). Therefore, the findings of this study are based on the limited number of previous studies.

Instructors are responsible for ensuring that nursing students accurately determine the VG site and safely perform intramuscular injection. For this reason, different teaching methods must be used to achieve the goals of the in-class theoretical courses, obtain the desired benefits in clinical practice, and facilitate the learning of students in the new generation. WM is one of the interactive, social media communication tools that can be used to communicate with students anytime and help them review the courses and stimulate their interest (Willemse et al., 2019; Raiman et al., 2017). In our study, the students who received training on the safe administration of intramuscular injection into the VG site via the use of WM, in addition to formal training, were compared with those who did not receive the training. The students in the experimental and control groups had a significant increase in their average pre-knowledge and post-knowledge as well as pre-skill and post-skill test scores. Furthermore, a statistically significant difference was observed between the experimental and control groups in terms of post-knowledge and skill point average ($p < 0.05$). It is expected that the planned instruction will positively influence the knowledge and skills of the students. However, the videos, pictures, questions, and information that were shared via WM had a more significant influence in the experimental group than in the control group. A study conducted by Tower et al. (2014) have shown that 89.8% of the students who shared questions based on critical thinking and interpretation in the Facebook group before the exam had an increased knowledge and 83.2% of these students guided the skill development. These results were similar to those of the present study. In a study by Raman (2015), results have shown that mobile technology enhances the learning and clinical skills of students. Meanwhile, Wu (2014), reported that education provided via tablet and PC with the use of Google Plus improved the knowledge and skills of students. In the studies conducted by Fattah (2015) and Sahan, Coban, & Razi, (2016), findings have shown that group sharing on WM improved the knowledge of students about foreign language.

In our study, the skill point averages of the experimental group that used WM as a supportive tool for formal training significantly increased ($p < 0.05$). Mobile phones, which are always portable, provide students the opportunity to watch videos whenever they want (Gon & Rawecar, 2017). In addition, the training staff can communicate with students through WM at any time. Students can instantly ask about the parts they did not understand via WM, and all the group members can read the shared information. In the study carried out by Ekici and Kiyici (2012), it was determined that the use of an application based on social network was more effective than the courses thought with the traditional teaching method. It was revealed that WM has a positive effect on student-to-student interaction, motivation to mobile learning and collaborative learning (George et al., 2017). In a study where Duban et al. (2015) received the views of teachers on the use of social networks in science classes, it was noted that videos and pictures that were transferred through WM facilitated the concretization of abstract concepts and supported the permanent learning.

After comparing the average number of correct intramuscular injections into the VG site of the students in the experimental and control groups in our study, the results revealed that the difference was statistically significant ($p < 0.05$). Sagkal et al. (2014) have shown that 69.7% of the students did not accurately locate the VG site. In addition, Wynaden et al. (2006) have shown that nurses had difficulty in anatomically locating the VG site during intramuscular injection. The anatomical structure of the VG site is small, which caused the students to have a difficult time locating the site. (Wynaden et al., 2006).

Although it is not presented in the tables, the students in our study stated that the information shared via WM after the application enabled them to learn about the subject at the same time as the other students. In a study conducted by Willemse (2015) the students have stated that the responses provided by the faculty members for

the questions shared in the WM group had been effective during lectures, and this result is similar to that of the present study. Moreover, in our study, the students stated that they could look at and learn the information related to the subject from their mobile phones via WM. Moreover, it enables them to learn it by heart. In the studies conducted by Mistry (2011), the information that students shared on Twitter increased motivation. In addition, it had a positive influence on their knowledge and skills. In the study conducted by Tower et al. (2014), the data shared on social media helped the students prepare for clinical application and the students were also able to exchange important information and ideas through these shared data.

More than half of the students in the control group and almost all students in the experimental group performed the intramuscular injection during clinical practice, and only one-fourth of the students in the experimental and control groups stated that they preferred the VG site. In the study conducted by Gulnar and Ozveren (2016), only 7.4% of the nurses used the VG site, and 34.6% of the nurses injected into the VG site after 4 months of planned training. The VG site is easily located because patients are placed in a comfortable position, and the bone spurs can be easily felt by hand. However, nurses refrain themselves from using the site because they are worried about harming patients, and they also believe that they lack the necessary knowledge and skills (Greenway, Merriman, & Statham, 2006). This result is important because it shows that among the students using WM in the experimental group, stress can be the reason for not using the VG site during clinical practice as they want to apply the injection with the same flawless skills they have watched in the video.

Nearly all the students in the experimental group think that WM is part of the training on the administration of injection into the VG site. Similarly, in a study by Willemse (2015) students have stated that the training provided via WM enabled theory to be integrated to clinical practice. Meanwhile, in a study conducted by Raiman et al. (2017) WM is considered a useful tool because it improves the communication between students and creates an opportunity for learning by offering a platform for discussion.

Conclusion: The number of nursing students in Turkey is high and that of the teaching staff is low. This is considered an important problem. Thus, to address this problem, the use of social media application was considered in nursing education, practices, and research (George et al., 2017). Considering the fact that the current generation is socializing with the use of mobile phones, the integration of social media application to the teaching methods becomes more important.

The students could view the pictures and videos on the safe administration of intramuscular injection into the VG site with guidance from instructors with the use of WM, which is one of the mobile social communication tools used as a supporting tool for formal education. Thus, training was also conducted outside the classroom, and the students inevitably checked the notifications on their cell phones.

Acknowledgements: The authors thank nursing students who participated in the study.

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