

Determination of Nurses' Site Preference and Reasons For Intramuscular Injection in Gluteal Region: A Descriptive, Cross-Sectional Study

Gülbanu ZENCİR¹, Fadime GÖK^{2*}, Züleyha ÖZTÜRK³

¹ Pamukkale University, Faculty of Health Sciences, Fundamentals of Nursing Department, Denizli

² Pamukkale University, Faculty of Health Sciences, Surgical Nursing Department, Denizli

³ Pamukkale University, Faculty of Medicine, Department of Training Nurse (retired), Denizli

*Corresponding author: fadimgok@gmail.com

Received: 22.08.2024

Accepted: 08.10.2024

Abstract

Studies show that the ventrogluteal site is safer for intramuscular injection in the gluteal region, but nurses prefer this site less. The aim of this study was to determine the preferred site in the gluteal region for intramuscular injection and the reasons for preference. This descriptive and cross-sectional study was conducted in a University hospital. The study's sample consisted of 130 nurses. The data were collected with a questionnaire form and evaluated using number, percentage, mean, and standard deviation calculations. It was determined that 62.3% of the nurses preferred to use the dorsogluteal site, 5.4% to use the ventrogluteal site, and 32.3% to use both sites for intramuscular injection. The reasons for the nurses' preference for the dorsogluteal site were determined as a habit, mandatory position, obesity, patient's desire, cachexia, being a safe site, ease of application, and receiving training only on this site. The reasons for choosing the ventrogluteal site were determined as patient desire, obesity, forced position, more reliability, habit, cachexia, less risky, and less painful, respectively.

Keywords: Nursing, intramuscular injection, dorsogluteal site, ventrogluteal site

1. Introduction

Giving medicine to the patient, which is one of the therapeutic principles, is one of the fundamental parts of the nursing profession (Yılmaz Yarıcı, 2022). Intramuscular injection (IM) is a widely used method among parenteral drug administrations (Taylor et al., 2011). The correct and reliable application of IM injection is very important for the prevention of complications (Polania Gutierrez and Munakomi, 2023). According to studies, the dorsogluteal site is most commonly used in IM medication administration (Yılmaz and Yarıcı, 2022). Since the dorsogluteal site is close to the site where the sciatic nerve and superior gluteal artery pass, giving drugs to the nerves and vessels brings risks such as the drug not reaching the muscle (remaining in the subcutaneous tissue) due to the thick subcutaneous tissue (Çalışkan et al., 2023, Malhotra et al., 2023, Hopkins and Arias, 2013). Therefore, it is reported that complications such as sciatic nerve injury, skin infections, abscess, hematoma, cyst, tissue damage, periostitis, skeletal muscle fibrosis, muscle contracture, gangrene, and abscess often develop as a result of incorrect applications to this site (Hopkins and Arias, 2013, Kalaycı, 2022, Fidancı et al., 2020). In addition to these complications, if the IM injection is made to the antigravity muscle groups that provide standing-sitting functions, it causes the patient to feel more pain (Hopkins and Arias, 2013; Kaya and Palloş, 2012).

The ventrogluteal site is further away from major blood vessels and nerves (Treas and Wilkinson, 2014). The muscles in this site are wider and better defined. Therefore, it is easier to find the breakpoints during injection. Another advantage is that the subcutaneous tissue thickness in this site is thinner than the dorsogluteal site, and the muscle tissue is thicker than the dorsogluteal site (Güllü, 2021). Therefore, the possibility of inadvertent administration of IM injection to the subcutaneous tissue is less (Treas and Wilkinson, 2014). In the

study of Chan et al., it was reported that more than half of the drug (68%) remained in the subcutaneous tissue in the intramuscular injection applied to the dorsogluteal site and did not reach the muscle tissue (Chan et al., 2006).

In studies conducted to date, no evidence of vascular injury or other complications after injection into the ventrogluteal site has been reported yet (Apaydın and Öztürk, 2021, Hopkins and Arias, 2013). Although several evidence-based studies suggest that the ventrogluteal site is a safer site for IM injection for both patient and nurse, most nurses are still unwilling to use this site (Apaydın and Öztürk, 2021; Güven, 2023; Yılmaz and Yarıcı, 2022).

2. Materials and Methods

2.1. Aim and design

The aim of this study was to determine the preferred site in the gluteal region for intramuscular injection and the reasons for preference. This descriptive and cross-sectional study was conducted in the clinical and intensive care units of a University hospital in the Aegean region of Turkey between April and May 2019.

2.2. Participant setting and recruitment

The study's population consisted of nurses ($n=506$) who worked clinic and intensive care units. All nurses ($n=130$) who volunteered to participate in the study were included in the sample.

2.3. Data collection

The data were collected with a questionnaire form prepared by the researchers in accordance with the literature (Apaydın and Öztürk, 2021, Güven, 2023, Yılmaz and Yarıcı, 2022). The data collection form consists of three parts. In the first part, there are 6 questions related to the descriptive characteristics of the nurses and in the second part, there are 3 questions related to the reasons for the nurses' preference for the gluteal region, totaling 9 questions. The third part of the questionnaire form consisted of 33 items including nurses' opinions on the reason for preference of the site for IM injection.

2.4. Statistical analysis

The data analysis was carried out with the IBM SPSS Statistics (Version 21.0) software. The data was analyzed using number, percentage, mean, and standard deviation calculations.

2.5. Ethical considerations

The study was approved by the Ethics Committee of the Faculty of Medicine of Pamukkale University (06/03/2019-

E.17315). Written permission was obtained from the hospital management as well.

3. Results

It was established that the average age of nurses is 30.04 ± 6.76 , 38.5% of them were between the ages of 20 and 25, 93.8% were women, 64.6% had a bachelor's degree, and they had worked for at least 1 and up to 25 years, with a median of 7, *IR*: 5 years. 49.2% of the nurses worked in the intensive care units (Table 1).

Table 1. Descriptive characteristics of the nurses (n=130)

Variable	M ± SD or n	%
Age (years)	30.04 ± 6.76	
20-25	50	38.5
26-31	29	22.3
32-37	29	22.3
Age older than 38 years,	22	16.9
Sex		
Female	122	93.8
Male	8	6.2
Marital status		
Married	87	66.9
Single	43	33.1
Educational background		
Vocational school of health	35	26.9
Associate degree	11	8.5
Bachelor degree	84	64.6
Work experience (year)		
1-5	50	38.5
6-11	45	34.6
12-17	22	16.9
18 year and more	13	10.0
Department of working		
Intensive Care Units	64	49.2
Internal Units	28	21.5
Surgical units	38	29.2
Total	130	100.0

Table 2 shows the distribution of the nurses' answers regarding their gluteal region usage preferences and reasons. It was found that 62.3% ($n=81$) of the nurses preferred to use the dorsogluteal site, 5.4% ($n=7$) the ventrogluteal site, and 32.3% ($n=42$) both sites for intramuscular injection. It was determined that 5.7% of the nurses did not give a reason for their preference for the dorsogluteal site (DGS).

The reasons for preferring DGS were habit (29.4%, $n=35$), mandatory position (14.6%, $n=18$), obesity (9.8%, $n=12$), patient's desire (8.1%, $n=10$), cachexia (8.1%, $n=10$), reliability (8.1%, $n=10$), ease of application (8.1%, $n=10$), and I received training just on this site (8.1%, $n=10$).

It was determined that 14.3% ($n=7$) of the nurses who prefer the ventrogluteal site (VGS) for intramuscular injection did not

explain why. Patients' desire (16.3%, $n=8$), obesity (16.3%, $n=8$), mandatory position (14.3%, $n=7$), more reliable (12.2%, $n=6$), habit (10.2%, $n=5$), cachexia (8.2%, $n=4$), a

lower risk (4.1%, $n=2$), and less painful (4.1%, $n=2$) are reasons for preferring VGS (Table 2).

Table 2. Gluteal region preference and reasons for nurses for intramuscular injection

Gluteal region preference and reasons for nurses	n	%
Status of site preference in the gluteal region		
Dorsogluteal site	81	62.3
Ventrogluteal site	7	5.4
Both sites	42	32.3
Reasons to prefer the dorsogluteal site ($n=123$)		
Those who did not provide reasons for their preference	7	5.7
Habit	35	29.4
Mandatory position	18	14.6
Obesite	12	9.8
Patients' desire	10	8.1
Cachexia	10	8.1
Reliable	10	8.1
Application ease	10	8.1
I got only training about this site	10	8.1
Reasons to prefer the ventrogluteal site ($n=49$)		
Those who did not give a reason for their preference	7	14.3
Patients' desire	8	16.3
Obesite	8	16.3
Mandatory position	7	14.3
More reliable	6	12.2
Habit	5	10.2
Cachexia	4	8.2
Lower risk	2	4.1
Less painful	2	4.1

When the thoughts of the nurses about applying injection in the dorsogluteal site were examined, it was found that 85.3% of them stated "I feel more ready", 83.0% stated "I think it is a safe and comfortable application site", 82.3% stated "I prefer it because of habit", 81.5% stated "I think the patients are more ready and compatible", 78.4% stated "I think I have to touch the patients less". When the distribution of their

thoughts about the ventrogluteal site was examined, it was determined that 76.9% of them thought "I think that it should be preferred only in obligatory situations", 74.6% thought "I think it is far from the sciatic nerve and vessels", 73.8% thought "I think it is not suitable for underweight patients", 73.8% thought "I think patients are not used to it" (Table 3).

Table 3. Opinions of nurses on the reasons for preferring a site for intramuscular injection in the gluteal region (n=130)

Nurses' opinions	Yes n (%)	No n (%)
Nurses' opinions on why they prefer the dorsogluteal site		
I feel more ready	111 (85.3)	19 (14.7)
I think it is a safe and comfortable application site	108 (83.0)	22 (17.0)
I prefer it because of habit	107 (82.3)	23 (17.7)
I think it is easier to determine the boundaries of this site	107 (82.3)	23 (17.7)
I think the patients are more ready and compatible	106 (81.5)	24 (18.5)
I realize that I have been using this site without questioning it	103 (79.2)	27 (20.8)
I think I have to touch the patients less	102 (78.4)	28 (21.6)
I think that I do not need to choose a site because the patient immediately takes the position and prepares himself/herself	100 (76.9)	30 (23.1)
Nurses' opinions on why they prefer the ventrogluteal site		
I think that it should be preferred only in obligatory situations	100 (76.9)	30 (23.1)
I think it is far from the sciatic nerve and vessels	97 (74.6)	33 (25.4)
I think this position is not suitable for underweight patients.	96 (73.8)	34 (26.2)
I think patients are not used to it	96 (73.8)	34 (26.2)
I think this site is too close to the bone	94 (72.3)	36 (27.7)
I think there is insufficient muscle thickness in this site	92 (70.7)	38 (29.3)
I think I will have to touch the patient more	90 (69.2)	40 (30.8)
I think that only drugs with a minimal amount can be administered in this site	90 (69.2)	40 (30.8)
I think it will be uncomfortable because I contact the patient more during the detection	89 (68.4)	41 (31.6)
I think patients will respond negatively if I inject in this site	89 (68.4)	41 (31.6)
I received theoretical training in this field, but I think that I do not have enough skills	87 (66.9)	43 (33.1)
Although I have theoretical knowledge, I do not trust myself because I do not use this site much	87 (66.9)	43 (33.1)
I think there is not enough subcutaneous tissue thickness in this site	86 (66.1)	44 (33.9)
I am worried that the tip of the needle will touch the bone when injecting this site	85 (65.3)	45 (34.7)
I think the patients would not allow it	84 (64.6)	46 (35.4)
I do not think the detection method is easy and applicable	83 (63.8)	47 (36.2)
I think that drugs with irritating properties will damage this site	80 (61.5)	50 (38.5)
I think it is difficult to position the patient	80 (61.5)	50 (38.5)
I think patients will have less pain	78 (60.0)	52 (40.0)
I think I'm going to harm the patient	75 (57.6)	55 (42.4)
I think I will cause harm to the patient	74 (56.9)	56 (43.1)
Anatomically, I'm having trouble identifying this site	73 (56.1)	57 (43.9)
I find it dangerous to inject into this site	73 (56.1)	57 (43.9)
I find this site more reliable	71 (54.6)	59 (45.4)
I think it is not appropriate to use this site in obese patients	69 (53.0)	61 (47.0)

4. Discussion

The safe administration of drugs to patients is one of the basic elements of the nursing profession, and the knowledge, skills and awareness of nurses on this issue are very important (Yılmaz and Yarıcı, 2022). Among drug therapies, intramuscular (IM) injection is commonly used (Dincer and Yildirim 2021). For

intramuscular drug administration, the dorsogluteal and ventrogluteal sites, which contain large muscle groups, are often used (Kaynar Şimşek, 2020).

When the literature is examined, it is seen that the dorsogluteal site is preferred more than the ventrogluteal site in IM drug administration (Su and Bekmezci, 2020, Yılmaz and Yarıcı, 2022). However, the

dorsogluteal site is a more risky site in terms of its anatomical location (Manchikanti et al., 2021, Treas and Wilkinson, 2014, Hopkins and Arias, 2013). Improper application to this site causes multiple complications (sciatic nerve injury, skin infections, abscess, hematoma, cyst, tissue injury, periostitis, skeletal muscle fibrosis, muscle contracture, gangrene, abscess, etc. (Alves et al., 2018, Treas and Wilkinson, 2014, Fidancı et al., 2020). Some studies have even reported that patients experience more pain after IM injection in this site (Roldán-Chicano, 2023, Hopkins and Arias, 2013, Kaya and Palloş, 2012).

Recent evidence-based studies show that the VGS is a safer site for intramuscular injection (Arslan and Özden, 2018, Gülnar and Özveren, 2016, Sarı et al., 2017), and the risk of complications seen in the DGS in terms of anatomical structure is less in this site (Apaydın and Öztürk, 2021, Nakajima, et al., 2020, Hopkins and Arias, 2013). However, in some special cases (children under 7 years of age, cachexia) it is recommended not to be preferred unless absolutely necessary (Güneş Yapucu et al., 2008, Yılmaz and Yarıcı, 2022).

Despite the results of multiple evidence-based studies showing that the VGS is a safer site for both the patient and the nurse in the administration of IM injections, most nurses are still unwilling to use this site (Apaydın and Öztürk, 2021, Çırlak et al., 2020, Güven, 2023, Yılmaz and Yarıcı, 2022). In this study, which was conducted to determine the site preference and reasons of nurses in the gluteal region for intramuscular injection, it was determined that nurses mostly preferred the dorsogluteal site for IM injection, similar to the literature information (Table 2). The results of this study and the studies in the literature show that most of the nurses are still unable to choose a safe site for IM injection (Apaydın and Öztürk, 2021, Güven, 2023, Yılmaz and Yarıcı, 2022).

In this study, when the reasons why nurses preferred the DGS were analysed, habit took the first place. Similarly, it was

reported in the literature that nurses stated that injecting in the DGS was a habit and it was difficult to give it up (Gülnar and Çalışkan, 2014, Kilic et al., 2014, Wynaden et al., 2006). In different studies, it is seen that nurses prefer DGS "firstly" (Gülnar and Özveren, 2016, Fekonja et al., 2020), "mostly" (Güven, 2023, Su and Bekmezci, 2020), and "as a tradition" (Cerit, 2020, Coskun et al, 2016) for IM injection. The other reasons for the preference of DGS in this study were determined as mandatory position of the patient, obesity, patient request, reliability and ease of application, respectively (Table 2). Similar to the findings of this study, nurses expressed the reasons for preferring the DGS as "I believe that patients will prefer this site" and "easily accessible" (Cerit, 2020, Korkmaz et al., 2018) "safer" (Güllü and Akgün, 2021, Sarı et al., 2017), and "more practical" (Korkmaz et al., 2018). In another study, it was found that nurses absolutely preferred DGS especially in obese patients (Strohfus et al., 2017).

Although the risks are known, the main reason why nurses prefer DGS more in IM injection is their negative thoughts and perceptions about the ventrogluteal site. According to the results of the study, it was observed that the nurses did not have sufficient knowledge about VGS, they did not find their own knowledge sufficient, they were not used to using the site, they had difficulty in making behavioural changes, they were concerned about harming the patient because they thought that the anatomical structure of the ventrogluteal site was small and therefore they did not trust themselves in this regard (Doğu, 2016, Güven, 2023, Kilic et al., 2014). In another study, on the contrary, it was determined that student nurses stated that they received theoretical information about the use of VGS during the education process, but they could not transform this knowledge into skills because there were no nurses who applied IM injection in this site as role models (Kilic et al., 2014, Meteris and Biçer, 2021). It is thought that this

situation is also valid for newly employed nurses.

When the literature is examined, it is seen that IM injection into the VGS has been included in the educational curriculum for many years. As with intramuscular injection, psychomotor skills can only become permanent with repeated practice in the presence of experienced colleagues (Öztürk et al., 2017). Studies show that there are no nurses who are adequate role models in the application of IM injection to the VGS in practice. This situation creates an barrier for students or new nurses to acquire relevant skills (Šakić et al., 2012, Sarı et al., 2017). The fact that the theoretical knowledge is not completely transformed into skills creates anxiety in the process of performing the relevant practice (Doğu, 2016, Güven, 2023, Kilic et al., 2014). In this study, it was determined that the majority of the nurses were young and in the first years of their professional life. This situation suggests that the nurses did not find enough practical application opportunities to perform injections in the VGS.

The VGS has several advantages over the DGS for IM injection (Nakajima et al., 2020). However, it is known that nurses are reluctant to use this field due to the reasons stated above (Güven, 2023, Kilic et al., 2014). In this study, similar to the literature, it was determined that very few nurses used VGS in IM injection administration. Approximately one seventh of the nurses using this field did not give a reason for preference (Table 2). This situation creates a dilemma as to whether nurses actually use VGS or not.

Approximately one-third of the nurses included in the study reported that they preferred the VGS because of habit and less than one tenth because it was safe and less risky (Table 2). However, it is thought-provoking that this rate is quite low. The reason for this is thought to be that although the nurses are undergraduate graduates, they have not yet transformed their

theoretical knowledge into skills because they are new in the profession.

Similarly, there are studies in the literature showing that nurses do not have sufficient knowledge or skills to administer IM injection to the VGS (Güven, 2023, Sarı et al., 2017, Su and Bekmezci, 2020). It was reported that 57.3% of the nurses in Güven's study and 40% of the nurses in Su and Bekmezci's study did not use the VG site because they were not used to it (Güven, 2023, Su and Bekmezci, 2020). In another study, it was found that nurses were extremely resistant to change and did not use VGS because they could not give up their habits (Wynaden et al., 2006). To a large extent, change requires the giving up of habits. In this study, it is thought that nurses resist change and use VGS less because they are not used to it. This situation also poses a risk in terms of patient/employee safety (Cerit, 2020, Nakajima et al., 2020, Yılmaz and Yarıcı, 2022).

In this study, it was determined that nurses preferred the ventrogluteal site because it was less painful (4.1%) (Table 2). In previous studies, it was found that patients reported that the intensity of pain experienced in IM injections applied to the VGS was less than in the DGS (Apaydın and Öztürk, 2021, Dere Isseven and Sagkal Midilli, 2020). In the study conducted by Yılmaz and Yarıcı, on the contrary, it was found that more than half of the nurses (54.2%) thought that the patient would experience more pain in the injection made in the VGS (Yılmaz and Yarıcı, 2022). The reason for this is thought to be that nurses' anxiety overrides their knowledge because they administer fewer injections in the VGS.

When Table 3 is examined, similar to the literature information given above, it is seen that the thoughts of the nurses affect the site preferences for intramuscular injection in the gluteal region.

4.1. Implications for nursing practice

In this study, it was determined that nurses used the ventrogluteal site less

frequently for IM injection. Knowing the site preferences of nurses in IM injection will be effective in reducing the barriers to less use of the ventrogluteal site. Therefore, it is thought that the results of this study will contribute to the literature.

4.2. Limitations

The results are specific to the nurses of only one University hospital, and therefore, can only be generalized to them.

5. Conclusions

It was determined that although the majority of nurses knew that the ventrogluteal site was safer, they used this site less. It is important for nurses to be aware of the barriers to preferring the ventrogluteal site for IM injection. Therefore, it is recommended to conduct more evidence-based research in this field and to plan and conduct regular in-service trainings to increase the awareness of nurses to use ventrogluteal site.

Declaration of Author Contributions

Study conception and design: GZ, FG. Data collection: ZÖ. Data analysis and interpretation: GZ, FG. Drafting of the article: All authors. Critical revision of the article: GZ, FG.

Declaration of Conflicts of Interest

All authors declare that there is no conflict of interest related to this article.

Ethical Committee Approval

The study was approved by the Ethics Committee of the Faculty of Medicine of Pamukkale University (06/03/2019-E.17315). Written permission was obtained from the hospital management as well.

Acknowledgment

The authors would like to thank all the nurses who participated in the study and the university hospital where the study was conducted.

References

Alves, K., Godwin, C.L., Chen, A., Akellot, D., Katz, J.N., Sabatini, C.S., 2018. Gluteal fibrosis, post-injection paralysis, and related injection practices in

Uganda: a qualitative analysis. *BMC Health Services Research*, 18(1): 892.

Apaydın, E., Öztürk, H., 2021. Comparison of intramuscular injections applied on ventrogluteal and dorsogluteal areas in the way of bleeding, pain and hematoma. *Gümüşhane University Journal of Health Sciences*, 10(1): 105–113.

Arslan, G.G., Özden, D., 2018. Creating a change in the use of ventrogluteal site for intramuscular injection. *Patient Preference and Adherence*, 12: 1749–1756.

Cerit, B., 2020. Determining emergency department nurses' competence and preference levels for using ventrogluteal site in administering intramuscular injections. *The Anatolian Journal of Family Medicine*, 3(2): 107–115.

Chan, V.O., Colville, J., Persaud, T., Buckley, O., Hamilton, S., Torreggiani, W.C., 2006. Intramuscular injections into the buttocks: are they truly intramuscular? *European Journal of Radiology*, 58(3): 480–484.

Çalışkan, N., Gülnar, E., İnal, M., Kömürcü Erkmen, S. H., Özveren, H., 2023. Comparison of Four Dorsogluteal and ventrogluteal sites for safe intramuscular injection: a cross-sectional study. *International Journal of Caring Sciences*, 16(3): 1503–1513.

Çırlak, A., Temiz, N., Başol, M., 2020. The effect of the ventrogluteal injection training on the knowledge levels and preferences of health professionals. *Forbes Journal of Medicine*, 1(2): 30–35.

Coskun, H., Kilic, C., Senture, C., 2016. The evaluation of dorsogluteal and ventrogluteal injection sites: a cadaver study. *Journal of Clinical Nursing*, 25(7–8): 1112–1119.

Dere Isseven, S., Sagkal, Midilli, T., 2020. Comparison of the dorsogluteal and ventrogluteal sites regarding patients' levels of pain intensity and satisfaction following intramuscular injection. *International Journal of Caring Sciences*, 13(3): 2168–2179.

- Dincer, B., Yildirim D., 2021. The effect of vibration stimulation on intramuscular injection pain and patient satisfaction: Single-blind, randomised controlled study. *Journal of Clinical Nursing*, 30(11-12): 1615-1622.
- Doğu, Ö., 2016. The Invisible Tip of the Iceberg; How Often is the Ventrogluteal Site Used? *Journal of Education and Research in Nursing*, 13(1): 7–10.
- Fekonja, U., Fekonja, Z., Vrbnjak, D., 2020. The assessment of knowledge and practical skills of intramuscular injection administration among nursing staff: a cross-sectional study. *Aust. Journal of Advanced Nursing*, 38(3): 33-42.
- Fidancı, H., Öztürk, İ., Arlıer, Z., 2020., Inferior gluteal nerve injury due to intramuscular injection. *Duzce Medical Journal*, 22(3): 161-165.
- Güllü, A., Akgün, S., 2021. The effect of training on the “V” and “G” techniques used in the ventrogluteal site and injection application to this site on the knowledge level of nurses. *International Archives of Integrated Medicine*, 8(8): 15–33.
- Gülнар, E., Çalışkan, N., 2014. Determination of knowledge level of nurses regarding intramuscular injection administration to ventrogluteal site. *Dokuz Eylül Üniversitesi Hemşirelik Yüksekokulu Elektronik Dergisi*, 7(2): 70–77.
- Gülнар, E., Özveren, H., 2016. An evaluation of the effectiveness of a planned training program for nurses on administering intramuscular injections into the ventrogluteal site. *Nurse Education Today*, 36: 360-363.
- Güneş Yapucu, Ü., Zaybak, A., Tamsel, S., 2008. Investigation of the reliability of the method used to determine the ventrogluteal region. *Cumhuriyet University School of Nursing Journal*, 12(2): 1–8.
- Güven, Ş.D., 2023. Nurses’ usage and knowledge of ventrogluteal field in intramuscular injection application. *Health Academy Kastamonu*, 8(1): 128–139.
- Hopkins, U., Arias, C., 2013. Large-volume IM injections: a review of best practices. *Oncology Nurse Advisor*, 4(1): 32–37.
- Kalaycı, T., 2022. Gluteal abscess after intramuscular injection. *Van Sağlık Bilimleri Dergisi*, 15(2): 156-159.
- Kaya, N., Palloş, A., 2012. Parenteral drug applications. *Nursing Fundamentals Nursing Science and Art* (A. Atabek and A. Kardağ, Eds). İstanbul: Akademi Basın ve Yayıncılık.
- Kaynar Şimşek, A., 2020. Using the ventrogluteal site for intramuscular injection. *The Anatolian Journal of Family Medicine*, 3(3): 195–199.
- Kilic, E., Kalay, R., Kilic, C., 2014. Comparing applications of intramuscular injections to dorsogluteal or ventrogluteal regions. *Journal of Experimental and Integrative Medicine*, 4(3): 171-174.
- Kılıç, M., Meteris, Ç., Biçer, B.N.K., 2021. Expanding the use of the ventrogluteal region, an evidence-based practice example, in senior nursing students: a methodological study. *Research Square*, (1): 1-16.
- Korkmaz, E., Karagözoğlu, Ş., Çerik, B.K., Yıldırım, G., 2018. Knowledge about intramuscular injection sites and administration preferences of nurses. *Journal of Research and Development in Nursing*, 20(1): 1–10.
- Malhotra, P., Kartam, S., Gupta, S. 2023. Administration of Medicine, Nursing Practices And Skills, p:116 published by: AGPH Books (Academic Guru Publishing House) Bhopal, M.P. India ISBN-978-81-19152-13-1.
- Manchikanti, V., Prasad, N., Sindhu, K., Botchu, R., 2021. Post Injection Sciatic Neuritis: A Case Report. *International Journal Of Anatomy Radio Klogy and Surgery*, 10(4): 4-5.

- Nakajima, Y., Fujii, T., Mukai, K., Ishida, A., Kato, M., Takahashi, M., Nakatani, T., 2020. Anatomically safe sites for intramuscular injections: a cross-sectional study on young adults and cadavers with a focus on the thigh. *Human Vaccines and Immunotherapeutics*, 16(1):189–196.
- Öztürk, D., Baykara, Z.G., Karadağ, A., Eyikara, E., 2017. The effect of in-service education on nurses' preference for the ventrogluteal site in intramuscular injection implementation. *Journal of Human Sciences*, 14(4): 4199–4205.
- Polania, Gutierrez., J.J. Munakomi, S. 2023. Intramuscular Injection. Continuing Education Activity. PMID: 32310581 Bookshelf. Stat Pearls Publishing ID: NBK556121 <https://www.ncbi.nlm.nih.gov/books/NBK556121/>
- Roldán-Chicano, M.T., Rodríguez-Tello, J., Cebrián-López, R., Moore, J. R., del Mar García-López, M., 2023. Adverse effects of dorsogluteal intramuscular injection versus ventrogluteal intramuscular injection: A systematic review and meta-analysis. *Nursing Open*, 10(9): 5975–5988.
- Šakić, B., Milutinović, D., Simin, D., 2012. An assessment of intramuscular injection practices among nursing students and nurses in hospital settings: is it evidence-based? *South Eastern Europe Health Sciences Journal*, 2(2): 114–121.
- Sarı, D., Şahin, M., Yaşar, E., Taşkıran, N., Telli, S., 2017. Investigation of Turkish nurses frequency and knowledge of administration of intramuscular injections to the ventrogluteal site: Results from questionnaires. *Nurse Education Today*, 56: 47–51.
- Strohfus, P. K., Paugh, O., Tindell, C., Molina-Shaver, P., 2017. Evidence calls for practice change in intramuscular injection techniques. *Journal of Nursing Education and Practice*, 8(2): 83-92.
- Su, S., Bekmezci, E., 2020. The Reasons for the nurses not to use ventrogluteal region in intramuscular injection administration. *Journal of Education and Research in Nursing*, 17(1): 46–50.
- Taylor, C., Lillis, C., LeMone, P., Lynn, P., 2011. Fundamentals of Nursing: The art and science of nursing care (7th ed.). Philadelphia: Woters Kluwer Health\Lippincott Williams and Wilkins.
- Treas LS, Wilkinson JM., 2014. Basic nursing: concepts, skills and reasoning. Philadelphia (PA): F. A. Davis Company; p. 792–836. ISBN-13: 978-0-8036-2778-9
- Wynaden, D., Landsborough, I., McGowan, S., Baigmohamad, Z., Finn, M., Pennebaker, D., 2006. Best practice guidelines for the administration of intramuscular injections in the mental health setting. *International Journal of Mental Health Nursing*, 15(3):195–200.
- Yılmaz, B., Yarıcı, F., 2022. Determination of opinions of nurses working in a university hospital about intramuscular injection into the ventrogluteal site. *Karya Journal of Health Science*, 3(2): 120–125.

To Cite: Zencir, G., Gök, F., Öztürk, Z., 2024. Determination of Nurses' Site Preference and Reasons For Intramuscular Injection in Gluteal Region: A Descriptive, Cross-Sectional Study. *MAS Journal of Applied Sciences*, 9(4): 1205-1214.

DOI: <http://dx.doi.org/10.5281/zenodo.14551166>
