Adherence to adult intramuscular injection protocol at Civil Hospital Karachi

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Abstract

Objective: To assess the level of adherence to Adult Intramuscular Injections Protocol by health care providers of Civil Hospital Karachi.

Methods: This analytical cross sectional study was conducted in July and August of 2009, at Civil Hospital Karachi after institutional permission. Data was collected with a pre tested data collection tool. Two hundred and seventeen house officers and nurses were interviewed. SPSSv16.0 was used for descriptive and scoring analysis.

Results: With a 94% response rate, 156(76%) interns and 49(24%) nurses were interviewed. Majority scored well regarding preparation of intramuscular injections with 40(19.5%) participants scoring 12 out of 15 marks. Highest score about administration of intramuscular injects questions was 7 in 43(21%) of the participants. Twenty three (11%) failed to reply about contraindications and 14 (20%) mentioned that there are no contraindications.

Conclusion: Health care providers at Civil Hospital Karachi are partially adhering to Adult Intramuscular Injections protocol, which calls for intensive training.

Keywords: Injections, Intramuscular, Health Care Providers, Civil Hospital, Karachi (JPMA 61:1254; 2011).

Introduction

Annually, numerous injections are administered worldwide. Ensuring injection safety is critical to prevent iatrogenic injury and spread of blood-borne pathogens such as human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV).[1] In developing countries, it has been observed that patients prefer injections as a mode of administration of medication. In 2006 the World Health Organization (WHO) estimated that 16 billion injections are given per year worldwide.[2] It was estimated that on an average each person in the developing world receives 1.5 injections per year.[3]

All clinical procedures should follow standard protocols. The current standard protocol being followed globally is well explained by Rodger MA et al.[4] Stepwise approach to administering intramuscular (IM) injections includes preparing injections, confirming the identity of the patient and the medication to be given. It is also important to select an appropriate site according to the volume to be given. Positioning of the patient followed by disinfecting the injection site are also important features.[4] Each step has to be precise and several methods have been proposed for administrating IM injections. One commonly approved method is the Z-track technique which uses the non-dominant hand to pull the skin and subcutaneous tissue 1±1.5 inches away from the site of injection.[5,6] Z-Technique locks the medication in the muscle it is delivered in.[7] The recommended angle of needle insertion in the muscle through the skin is between 70 and 90 degrees. Distraction techniques are also recommended for anxiety prone individuals.[5]

Civil Hospital Karachi (CHK) is one of the tertiary care centers offering medical training in Pakistan for undergraduates and postgraduates nurses and physicians. Delivering medications through IM injections is a daily duty of these house officers/interns and nurses. They are required to make decisions regarding factors such as patients' weight, needle size, amount, length, and site of medication. Complications result due to errors in techniques. It has been advised by World Bank to conduct studies involving the Health Care Providers (HCP) and feedback from patients to assess these practices closely and help avoid these errors.[8] Despite its frequent use, IM injection has been identified as most injury prone.[9-11] Due to limited resources, gaps have been observed in the IM injection delivery practices seen at CHK in comparison to those followed internationally. This would improve care of patients. The areas of error will be analyzed and rectified in future. Hence, the relevance of conducting this study is manifold in solving the shortcomings in our healthcare system. We conducted this study to assess the level of adherence to adult IM injections administration protocol by HCP of CHK, Pakistan.

Methodology

After ethical approval from the institute, this analytical cross sectional study was conducted at a tertiary care hospital,

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CHK. It is one of the largest public serving hospitals with a catchment area involving Karachi city and villages outside the main city. With 1670 beds, it imparts training to both undergraduate and postgraduate physicians and nurses.

We collected data from July to August of 2009, with a pre tested data collection tool. It comprised of a written consent form and three sections. Ward information was noted in the first section. Closed ended questions about preparing and administering of IM injections were inquired in the remaining two sections.

HCPs including house officers/Interns and nurses of this hospital were interviewed by the study team. The colleagues of the participants on leave were excluded. Particular information involving IM injections was judged excluding all other commonly-used types of injections.

Sample size was calculated to be 217 with 95% confidence interval. An approximate prevalence of IM usage at 50% was used for calculations as no previous study was identified during literature review. Stratified random sampling was done from all wards of the hospital, with wards as the strata and participants being randomly selected from the monthly rotation sheets of each ward. SPSSv16.0 was used for descriptive analysis. Scoring regarding adherence to protocol preparation of IM injections was performed using total of 15 nominal variables. Similarly, scoring regarding administration of IM injections was performed using total of 13 nominal and ordinal variables. Scores are reported in maximum, minimum and percentiles of 25th, 50th and 75th for comparison amongst the participants. Later, these scores were divided in accordance with their percentile values as Unsatisfactory for those below 25th percentile, Satisfactory below 50th percentile and good for those having 75th percentile of above. Pearson Chi-square test was used to assess significant difference between practices of interns and nurses. Weighted analysis was used for this calculation to nullify the effect of increased number of interns in comparison to the nurses. Level of significance included 95% CI and alpha of 0.05.

Results

With a response rate of 94%, we interviewed 156(76%) house officers/interns and 49(24%) nurses participating in our study. Figure-1 shows comparison of scoring on preparation and administration of IM injections. Weighted analysis of scores achieved by interns and nurses are shown in Table. Interns do an unsatisfactory job while preparing these injections however when administering they do a satisfactory to good job, 42% vs 40% and 30% (X^2 = 42.07, P= 0.0001) Similarly, nurses do a satisfactory job in preparing them but can improve in administrating them. 63% vs 39% and 49% (X^2 =13.59, P= 0.001)

The participants were assessed to adhere to protocol regarding preparation of IM injections, as the minimum of 3

Table: Comparison of scores achieved by interns and nurses.+

Scoring	Interns	Nurses	Person Chi-square	P-value
Preparation of IM injections				
Unsatisfactory	65(42%)	6(6%)	42.07	0.0001*
Satisfactory	48(31%)	62(63%)		
Good	43(28%)	30(31%)		
Administration of IM injections				
Unsatisfactory	46(30%)	12(12%)	13.59	0.001*
Satisfactory	63(40%)	38(39%)		
Good	47(30%)	48(49%)		

+This is weighted analysis therefore the frequencies and percentages will not sum up by simple addition. *Significant.

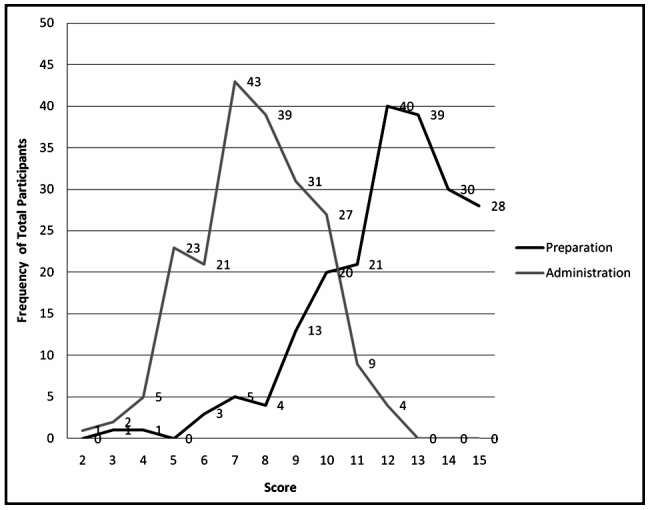

Figure-1: Comparison between IM preparation and administration knowledge of study participants.

was scored by only 1(0.5%) participants. Maximum score of 15 was scored by 28(14%) with 12 being the most common score among 40(20%) participants. Hence, mean score was 12±3, with 11,12 and 14 as 25th, 50th and 75th percentiles, respectively.

Data further revealed that 128(62%) participants washed or used disinfectant before preparing injections. Majority, 196(96%) used sterile syringe/needle but 9(4%) said otherwise. Only 20(10%) did not routinely check the packaging for any signs of manipulation. Forty one (20%) were not concerned with the clearance of the area or contamination by body fluids. Most, 194 (95%), routinely checked the plungers' functioning. While, 31 (15%) did not check the expiry date on the medication being given. Few, 7(3%) did not check for dosage information on the injections. Out of 200, replying about presence of hazardous particles in the injection, only 164(82%) checked and discarded such injections. Only 112(55%) were concerned about glass cut injury from the ampoules, while 135(67%) had already had incidences of broken ampoules while opening them in vertical position.

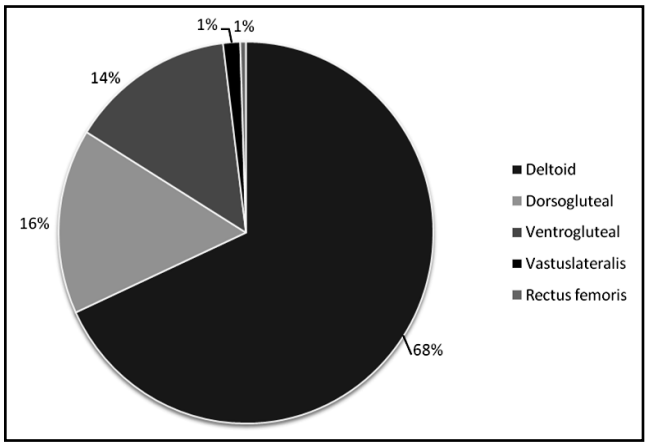

Figure-2: Preferred area of administrating intramuscular injection.

The participants scored a minimum of 2, by only 1(0.5%) participant when inquired of IM injection administration techniques. Maximum score was noted to be 12, scored by 4(2%). Majority, 43(21%) scored 7 out of 13. Mean score was 8±2, with 6, 8 and 9 as 25th, 50th and 75th percentiles, respectively.

Majority, 128(62%) took measures to prevent sudden movement of the patient during and after administering the injection. Only, 95(46%) preferred the patients' skin to be washed, however 199(98%) only used alcohol swabs to clean the area. Few, 5(2%) still continued to administer the injection if spirit was unavailable. Proper exposure of the injection area was not important for 6(3%) participants, nor was confirming the patient's identity by 8(4%). Administration practice inquiries further showed that 187 understood the skin stretching maneuvers, out of which 127(68%) preferred spreading the skin between the fingers of the administrator's non dominant hand and 58(31%) used Z-track technique. Perception of needle depth varied with 97(48%) inserting the whole needle of any quantity syringe being used, 78(38%) inserted two-thirds while rest inserted one-third. Majority, 146(72%) were not concerned about the patient's weight and assessment of depth of needle accordingly.

Preferred area of administrating the IM is illustrated in figure 2. Mostly, 148(74%) chose the site in accordance to the volume of medication being given. Out of a total of 202 participants who replied to the question on the position of the patient, this was preferred according to the area as lying prone by 38(19%), lying lateral by 86(43%) and remaining 78(39%) preferred the sitting position.

Majority, 137(67%) preferred holding the syringe like a pen to insert it in the skin. Some, 16(8%) did not check the needle tip to be in the blood vessels instead of the muscle. Only, 84(42%) checked for specific routes of administration for various medications. Sudden jerky withdrawal of needle was reported by 7(3%) participants.

Most, 176(86%) recapped the syringe after usage, while 107(52%) did not discard them in safety boxes. Only 129(63%) participants washed their hands after the procedure. The importance of contraindication to IM injections was acknowledged by 144(70%) participants.

Discussion

This study reveals that majority of the nurses and more than half of interns at CHK do a satisfactory to good job in following IM injection protocols. Nursing staff makes fewer mistakes while preparing the injections. However, when administering it to the patient there is room for improvement. Interns need to improve in preparing them. To the best of our knowledge and available resources, literature for comparison of our findings is lacking.

Nurses are trained well and are doing better than the fresh medical graduates as shown as comparison in Table. The nurses have been following some of the WHO guidelines where they are assessed to ensure accuracy, injection safety, using appropriate types of syringes and needles and safe disposal.[12] However, some points are not followed due to insufficient funds and resources. The numbers of patients in the public sector greatly outnumber the available HCP. At CHK measures are taken to adhere to the proposed WHO protocol.[12,13] However, the procedure needs further refinement. Some of the WHO guidelines need to be reinforced for better results.

In developing nations an orderly and careful sterilization system of the syringes would be very helpful.[8] In our study we noted that the majority of these HCP were recapping used syringes and only half utilized safety boxes. Disposable syringes should be properly disposed after cutting the needles. Appropriate collection boxes for syringes are already available in our set up and their use should be encouraged. Lately a well equipped skills laboratory has been formed to formally train the personnel. However, to train and evaluate each HCP in CHK is an expensive and time consuming task. Experienced staff has been educating young graduates. New techniques need to be taught to both old and new HCPs. Both these tools have been established to play a key role as identified by Hagiabadi et al.[14]

When we compare the scoring achieved by our study participants, most 110 (54%) including both the interns and nurses, were more proficient in the IM injection administration and adhered to preparation, 137 (67%), as shown in Figure-1. The remaining interns and nurses need to be trained to weigh the risks and benefits and rationalize before choosing a technique over another. Similarly, Cocoma A et al concluded in their study that health care professionals' approach to IM medications had not been evidence based and was found to be disorganized in various steps on the technique.[6] In their study the HCW chose the site of injection according to their convenience.[6] On the contrary, in our study

74% of our participants chose the injection site according to the volume of the medication to be given. The same study reinforced that limited training led to flaws in their techniques.[6] In CHK, the experienced HCWs have trained the new HCW as the new formal training did not have many HCW before data collection of this study. Others have also found formal teaching effective. The nurses and students need to be trained by an experienced trainer in a favourable and encouraging clinical educational set up.[15]

Our study limitations are that this was a single centre study. Also, it has been conducted in a public hospital and findings at the private health care setup may vary in those large private sector facilities where standard techniques are followed. However, majority of the staff in the city's small private hospitals have no formal training for procedures in general.

Conclusion

HCPs at CHK are partially adhering to Adult IM Injections protocol. The need to train them for administrating such injections as their daily practice is immense. No HCP should be allowed to prepare and administer these injections until properly trained and certified through the available skills training courses.

References

1. Mantel C, Khamassi S, Baradei K, Nasri H, Mohsni E, Duclos P. Improved injection safety after targeted interventions in the Syrian Arab Republic. Trop Med Int Health 2007; 12: 422-30.
2. Templeton HC, McCoy T. Are we on the same page? A comparison of intramuscular injection explanations in nursing fundamental texts. Med Surg Nurs 2008; 17: 237-40.
3. Simonsen L, Kane A, Lloyd J, Zaffran M, Kane M. Unsafe injections in the developing world and transmission of bloodborne pathogens: a review. Bull World Health Organ 1999; 77: 789-800.
4. Rodger MA, King L. Drawing up and administering intramuscular injections: a review of the Literature. J Adv Nurs 2000; 31: 574-82.
5. Wynaden D, Landsborough I, McGowan S, Baigmohamad Z, Finn M, Pennebaker D. Best practice guidelines for the administration of intramuscular injections in the mental health setting. Int J Ment Health Nurs 2006; 15: 195-200.
6. Small SP. Preventing sciatic nerve injury from intramuscular injections: literature review. J Adv Nurs 2004; 47: 287-96.
7. Jane D. Z-Track Method. (Online) 2010 (Cited 2011 Mar 29). Available from URL: http://nursingcrib.com/nursing-notes-reviewer/fundamentals-of-nursing/z-track-method/.
8. World Bank Injection Safety. (Online) 2010 (Cited 2011 Mar 29). Available from URL: http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTHEALTHNUTRITIONANDPOPULATION/EXTPHAAG/0,,contentMDK:20758063~menuPK:64229809~pagePK:64229817~piPK:64229743~theSitePK:672263,00.html#DoDont.
9. Small SP. Preventing sciatic nerve injury from intramuscular injections: literature review. J Adv Nurs 2004; 47: 287-96.
10. Mansoor F, Hamid S, Mir T, Abdul Hafiz R, Mounts A. Incidence of traumatic injection neuropathy among children in Pakistan. East Mediterr Health J 2005; 11: 798-804.
11. Mishra P, Stringer MD. Sciatic nerve injury from intramuscular injection: a persistent and global problem. Int J Clin Pract 2010; 64: 1573-9.
12. World Health Organization. Injection Safety. (Online) (Cited 2011 Mar 29). Available from URL: http://whqlibdoc.who.int/aide-memoire/a71914.pdf.
13. World Health Organization. First, do no harm. (Online) 2002 (Cited 2011 Mar 29). Available from URL: http://www.who.int/vaccines-documents/DocsPDF02/www704.pdf.
14. Hajiabadi MR, Kazemi T. What are the Sources of Learning Medical Skills for Medical Students and Interns of Birjand University of Medical Sciences and Health Services? J Med Educ 2008; 12: 43-7.
15. Cheraghi MA, Salasli M, Ahmadi F. Factors influencing the clinical preparation of BS nursing student interns in Iran. Int J Nurs Pract 2008; 14: 26-33.