Injection Safety Practices among Nurses in Kenyan Public Hospitals.

Rogers K. Chemoiwa[1*] Wanja Mwaura-Tenambergen[2]

[1]Deparment of Health Systems Management & Medical Education, Kenya Methodist University, P.O. Box 45240-00100, Nairobi, Kenya
[2]Deparment of Health Systems Management & Medical Education, Kenya Methodist University, P.O. Box 45240-00100, Nairobi, Kenya
**Corresponding Author Email: rchemoiwa@gmail.com*
Email: wanja.tenambergen@gmail.com

Abstract

One of the priority areas identified by the World Health Organization in the service delivery building block is patient safety and quality of care. This is achieved by having systems and procedures that improve safety. Being a major area of intervention in the delivery of health services, the safety of injections has been identified and prioritized and as a result, a lot of resources have been invested in support of this priority. The study aimed at investigating the safety practices of nursing staff during preparation and administration of medications via injections. The study employed a cross sectional study design. The process of injection preparation and administration was observed using checklists for 355 patients proportionately sampled from 12 sites within the Rift Valley Provincial Hospital. The results showed that Nurses in medical wards were less likely to wash their hands 125 (35.2%) during injection procedures as compared to those in the surgical units 82 (23.1%). Approximately, 159(44.8%) of nurses involved reuse of injection devices during preparation of medication. Of drugs preparation, observations showed that 142 (40%) were prepared at the patient bedside. Among the patients, more than half, 218 (62.2%) received their medication after the prescribed time. The number of patients admitted on the study sites had a significant effect on nurses' hand washing behavior (p=0.000), preparation of injections in a clean environment (p=0.000) and the reuse of injection devices during administration of medication (p =0.000). The hospital should ensure adequate supply of injection devices and place emphasis on infection prevention to minimize reuse. Public sensitization and surveillance system for registering and reporting of unsafe injection practices to patients in hospitals should be established.

Keywords: *Injection safety, Nurse staffing, Safety practices.*

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Introduction

Health systems consist of all organizations, people and actions whose primary intent is to promote, restore or maintain health (World Health Organization [WHO], 2007). The health system functions have been broken down into six essential building blocks, including service delivery, health workforce, health information, medical products, vaccines and technologies, health financing, and leadership and governance. At the core of the service delivery building block are hospitals which are mainly concerned with the organization of various health interventions and treatment to the population in a way that ensures that they are effective and safe at all times across different locations (WHO, 2008). The organization, configuration and delivery of services has an impact on the performance of the overall health system and therefore, emphasis has to be put on the development of systems monitoring and performance regulation of health care providers, especially hospital performance, and as such, health systems are still poorly developed throughout many countries.

In this context therefore, hospitals deserve special attention because they are an important part of any health system. Hospitals provide complex curative care that, depending on their capacity, acts as a first referral, secondary or last referral level curative care facility, they also provide emergency care for the severely injured or the critically ill, they are centers for the transfer of knowledge and skills; they constitute an essential source of information and power; and they generally spend the major part of national health resources (WHO, 2000). The major part of these resources in hospitals are spent on treating health care associated infections which affects hundreds of millions of people worldwide, complicating the delivery of patient care and has led to patient disability and deaths (Pittet, 2005). In developing countries, hospital acquired infections from unsafe care account for 15% - 31% of all hospital admissions (Government of Kenya [GOK] 2010). Unsafe injection practices has been identified as one of the major contributors to hospital acquired infections and therefore strategies have been put in place to understand the underlying causes of unsafe injection practices in developing nations (ICPS, 2009). In Kenya it is estimated that 6 million people received injections at least once a year, this being a major predisposing factor to hospital acquired infections within the population (Kenya AIDS Indicator Survey, 2007).

Due to minimum resources, developing nations cannot afford to treat these diseases, and therefore strategies to understand and eliminate unsafe injections and enhance patient safety must be put in place to decrease these unnecessary health expenditures resulting from hospital acquired infections. Savings from these unnecessary health expenditures could be used by government in strengthening other building blocks within the health system.

Focusing on the service delivery building block, this paper outlines the findings of a study that was conducted between 13th of June 2011 and 18th of July 2011 with additional data collection in 2012. It analyzes the injection safety practices of nurses and nurse staffing factors that affect their injection safety practices. The evidence gathered from the study shows that there is a relationship between nurse staffing factors and injection safety practices in public hospitals.

Materials and Methods

The study was conducted at the Rift Valley Provincial General Hospital, situated in

Nakuru County and has a bed capacity of 656 for inpatients. It also runs other specialized consultation clinics. Due to the nature of this study 12 study sites within the hospital were chosen due to predictability of the schedule for administration of medications to patients. This study was a cross sectional analytic study where data on injection safety practices of nurses was collected from the Out-Patient injection room, and selected wards of the Rift Valley Provincial General Hospital, Nakuru.

The study population were patients who were in the process of receiving prescribed injectable medications at various study sites within the hospital. A total of 355 patients were sampled from 12 study sites within the hospital using stratified random sampling procedure where the strata were patients who were taking medications in form of injections. Additionally, systematic random sampling was used to select the study subjects in each stratum where every fifth injection procedure was observed at different times of the working day of nurses. **N**on-participant observation by different research assistants was used to collect quantitative data on the injection safety practices of nurses in preparing and administering injectable medication to patients.

Results

A total of 355 observations across the sections of the hospital were sampled. Table 1 summarizes the study sample distribution.

Table 1: Summary distribution of observations across the sections sampled

STUDY SITE	**NUMBER OF OBSERVATIONS**				
	9-10 Am	3-4 Pm	9-10 Pm	3-4 Am	**TOTAL**
Injection Room	13	28	10	24	**75**
Ward 2 (Pediatrics Surgical)	5	4	4	4	**17**
Ward 4 (Gynecology)	6	6	6	6	**24**
Ward 6 (Pediatric Medical)	12	10	10	10	**42**
Ward 7 (Surgical Male)	6	5	5	5	**21**
Ward 8 (Psychiatric ward)	8	8	8	7	**31**
Ward 10 (Surgical Male)	6	6	6	5	**23**
Ward 11 (Medical Male)	9	9	9	9	**36**
Ward 12 (Medical Female)	11	11	10	13	**45**
Ward 13 (Surgical Female)	4	4	4	3	**15**
Ward 14 (Burns Unit)	5	5	5	7	**22**
Ward 15 (ENT)	1	1	1	1	**4**
TOTAL OBSERVATIONS	**86**	**97**	**78**	**94**	**355**

Injection Safety Practices

Hand Washing During Medication Preparation

Of the 355 injection procedures observed, hand washing was practiced by only 86 (24.2%) of the respondents while 269 (75.7%) did not wash their hands during medication. The different study sites were grouped into three broad categories; medical units which comprised of Ward 8, Ward 11,Ward 12, Ward 15, Ward 4, Ward 6; surgical units which comprised of Ward 10,Ward 13,Ward 14,Ward 7,Ward 2, and the Outpatient Department. Results indicate that nurses in Medical wards were less likely to wash their hands 125 (35.2%) during injection procedures as compared to those in the surgical units 82 (23.1%). Table 2 shows results on the adherence to hand washing in specialized wards.

Table 2: Adherence to hand washing in specialized wards

HAND WASHING	MEDICAL UNITS N (%)	SURGICAL UNITS N (%)	O.P.D N (%)	TOTAL N (%)
Washed	32 (9.0)	38 (10.4)	15 (4.2)	85 (23.6)
Did not wash	125 (35.0)	82 (23.1)	60 (18.0)	267 (76.1)
Did not observe	3 (0.3)	0 (0.0)	0 (0.0)	3(0.3)
TOTAL	**158 (44.3)**	**120 (33.5)**	**75 (22.2)**	**355 (100.0)**

Use of Sterile Injection Devices

Out of 355 medication preparation procedures observed, 159(44.8%) involved reuse of injection devices during preparation of medication .Of these, 13(3.59%) reused syringe alone, 26(7.49%) reused needle alone, and 120(33.83%) reused both needle and syringe. Observations on devices reused during administration of medication revealed that 311(87.6%) of nurses did not reuse injection devices during administration of medication. However, 18(5.07%) involved reuse of the syringe alone, 11(3.09%) reused the needle alone, and 10(2.81%) reused both the needle and the syringe.

Cleaning of Access Diaphragm

The cleaning of the access diaphragm of the medication vial before withdrawing the drug was observed. Results indicate that out of the 355 injection procedures observed, the cleaning of access diaphragm was observed in only 52 (14.6%) of those that needed cleaning before access while in 188 (53%) of those that needed cleaning, this procedure was not performed. The remaining 115 (32.4%) did not require any form of cleaning because the medication was packaged in ampoules.

Multi Dose Vial Usage

Additionally, the study shows that 12 (3.4%) of injection procedures observed had a multi dose reserved for one patient

compared to 225 (63.4%) where multi dose medication vials were used by more than one patient.

Medication Preparation on Site

The study indicates that out of 349 injection procedures observed, 142 (40%) were prepared at the patient bedside while 149 (42%) were prepared in the nursing station before administration. 58 (16%) of the cases were not observed.

Time of Medication Administration

Of the 355 injection procedures observed, 137(37.7%) patients received their medication on time while the rest 218 (62.2%) received their medication after the prescribed time. Figure 1shows the time taken by nurses to administer medication after reconstitution summary of results.

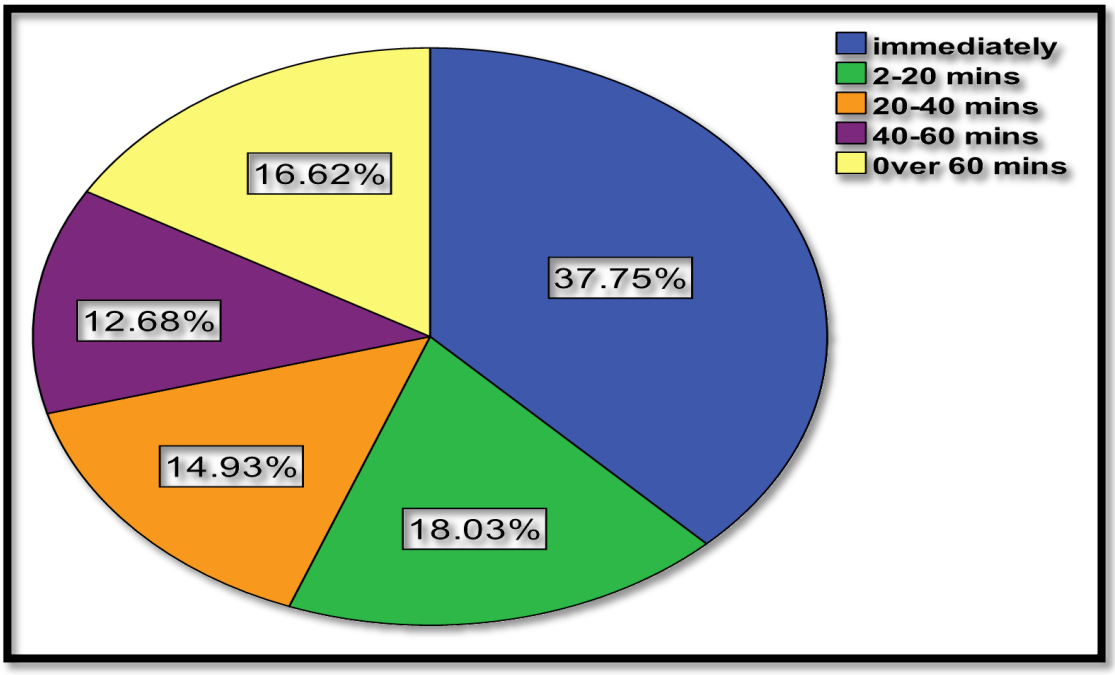

Figure 1: Time taken to administer medication after reconstitution

Type of Injection Device

The Study assessed the adoption of engineered technology in the provincial hospital and analysed the proportion of injections administered using the recommended injection devices. The results showed that 304 (85.6%) of injections observed used the standard disposable injection devices while 51 (14.4%) of injections administered used the recommended auto disable injection devices.

Prescribed Drugs Administered

Another objective of this study, was to estimate the number of patients who missed their medication even after having been prescribed. The results show that out of 352 injections observed, 325 (92.3%) were actually administered while only 22 (6.2%) did not receive the medication. Another 5(1.4%) patients had their prescriptions substituted. Further analysis on reasons why the patients did not receive the prescribed drug showed that, 9 (2.5%) had no intravenous port in situ while 9 (2.6%) of patients had refused their medication. In

addition 1 (0.3%) patient missed their medication because it was not in stock, while 3 (0.8%) had a blocked intravenous port.

Discussion

Hand hygiene is important in reducing and preventing health care associated infections, which are acquired by patients while receiving care (WHO, 2011). Adherence to hand washing by health workers is estimated to be low with the global average being 38.7% (WHO, 2009). Another study in a similar setting in Nigeria showed that 12.3% (N=531), of health workers washed their hand before handling injections (Omorogbe, Omuemu, Isara, 2012)

Injections must always be reconstituted and administered using sterile devices. In African countries the proportion of needle and syringe reuse is estimated to be between 17-19% (Hutin, Hauri, & Armstrong, 2003). A study by Okwen et al. (2011) in Cameroon showed that 44% of health care workers reported practicing some form of injection device reuse while in Nigeria it is estimated that 5.6% of injections administered involved the reuse of and injection device (USAID, 2009). Reuse of injection devices occurs when health care workers mistakenly believe that it is safe to reuse a syringe after changing a needle or that it is safe to reuse a needle or syringe on the same patient or even that it is safe to reenter a multi-dose vial with a used needle or syringe (WHO, 2010). This observation is also made by Okwen et al. (2011), who indicate that health workers believe that contamination is limited to the needle portion when a syringe and needle are used together as a unit. There is also an incorrect belief that the syringe does not become contaminated if the plunger is only ‘‘pushed’’ to inject medications and not ‘‘pulled’’ to aspirate or withdraw.

This study indicate that a significant proportion of patients would receive unsafe injections due to the fact that nurses, who prepare medication elsewhere other than at bedside, were prone to making errors. This argument is brought to perspective by Garreth and Craig (2007) who say that since medication administration is an increasingly complex process, it is influenced by a number of factors. An important factor in this regard is interruptions which occur during this critical process in medication rooms which were highly visible and in high traffic locations (Potter et al, 2005 as cited in Garreth & Craig, 2007).

Time for medication administration forms part of the five patient rights of medication administration and it is an important consideration in patient care (WHO, 1997). In this study a significant proportion of patients 62.2% (N=355) did not receive their medications on time. Because of drug pharmacokinetics, medication is given in measured doses and at calculated intervals, which requires that medication must always be administered at the right time for it to be therapeutic.

The World Health Organization’s best practices for injections states that “whenever possible, use devices with safety features that are activated either automatically or manually which are designed to prevent reuse and needle stick injuries and which have been shown to be effective in protecting patients and providers”. The findings of this study showed that 86.5% (N=386) of injections were administered using ordinary syringes. A study in Nigeria by the USAID in 2009, found that 1,033(44.6%) used auto-disable injection devices. The low rate of usage of AD syringes in the provincial hospital, could be attributed to two main reasons; first is that most of donor support for injection safety in developing countries is geared towards immunization programs and secondly the low adoption of AD

devices could be due to the high cost of devices compared to the standard diposable types. Study findings in Madagascar by Drain, Ralaivao, Rakotonandrasana, & Carnell (2003), showed that on average AD syringes were approximately five times (ranging from 3.7 to 6.2) more expensive per injection than the standard disposable syringes.

Conclusion

The findings of this study indicate that injection safety in Rift Valley Provincial Hospital is relatively low where 28.3% of all injections are administered without following the recommended procedures. The use of sterile devices to prepare and administer medication is not adhered to by nurses as evidenced by data collected. At least 16 (4.5%) of injections observed at the hospital were administered using reused syringe or a needle. The adoption of recommended injection devices like the use of reuse prevention syringes and the reservation of a vial to one patient is still low with only 50 (14.1%) of all injections sampled using the recommended auto disable syringes while 225 (63.4%) of patients shared their medication vials. It is recommended that all injections administered must always adhere to recommended injection safety practices. Findings from the study revealed a positive relationship between the number of patients admitted and the injection safety practices of nurses at the hospital. High number of patients admitted at the hospital resulted in nurses not being keen on preparing medication in clean trays ($p = 0.000$), washing their hands ($p = 0.000$), or using sterile devices to reconstitute medication ($p = 0.000$). Furthermore data collected has shown that patients at the hospital are not getting their medication at the right time. This study has also shown that longer working hours has an influence on injection safety practice of nurses at the hospital ($p = 0.000$).

Finally, one positive finding of this study indicates that a majority of patients in the hospital receive their prescribed medication.

Recommendations

Based on the findings of this study, the following are recommendations to improve injection safety practices of nurses in Kenyan public hospitals.

The hospital should ensure adequate supply of recommended injection devices within the hospital in order to minimize reuse.

The hospital should deal with the high number of patients admitted by rotating nurses to cover extra load of patients in different wards on a shift-to-shift basis, and regularly train nurses on injection safety.

The establishment of a surveillance system for registering and reporting of unsafe injection practices to patients in hospitals should be done because this system is currently missing in Kenya.

Public sensitization should be done in order to ensure that they too play a role in ensuring that health interventions are always effective and safe at all times across different locations.

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