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Peripheral IV Devices, IV Fluids Administration and Urinary Catheters Management, in IM Department, at University Teaching Hospital of Butare (CHUB), Rwanda

Benimana Oswald*, **Nyampundu Yvonne, Mukabaranga Angelique**

Department of Internal Medicine, University of Rwanda, Butare, Rwanda

ABSTRACT

Creditable and timely clinical documentation is an essential component in patient care quality improvement. Good infection prevention and control is essential to ensure that people who use healthcare facilities receive safe and effective care. Lack of IV line labelling, poor technics, lack of IV fluids labelling, poor nursing documentation were reported during accreditation program surveys that took place at CHUB, and also from the nursing students reports after their internship, they have reported such cases.

Keywords: Prevention; Clinical documentation; Patient care; Infection

INTRODUCTION

Effective prevention and control of infection must be part of everyday practice and be applied consistently by every health care professional. Good management and organizational processes are crucial to make sure that high standards of infection prevention and control are set up and maintained. The IPC modules in the health care facilities is among the risk management modules, and the risk management is a process consisting of well-defined steps which, when taken in sequence, support better decision making by contributing to a greater insight into risks and their impacts. Risk management is about identifying opportunity and avoiding losses. The health care facility should provide appropriate care in suitable facilities consistent with good practice to protect patients, staff and others from the risks of acquiring healthcare associated infection. Intravascular catheters (central lines, arterial lines, and peripheral IV lines) are often necessary for administering fluids, medications, and nutritional products to patients. They are also used for monitoring hemodynamics (*i.e.*, monitoring blood pressure and blood flow in the veins, arteries, and heart) in intensive care settings and for providing hemodialysis (*i.e.,* the process of cleansing the blood using a dialyzer machine). While intravascular catheters can be essential for patient care, they put patients at risk for infection by interrupting the protective barrier that intact skin provides. In addition, they provide a direct route of entry for microorganisms into the bloodstream and can easily become contaminated during use. Evidence based practices can reduce the incidence of infections related to intravascular catheters (both central lines and peripheral IV lines). A large multi-center study in India found up to a 53% reduction in infection rates after hospitals implemented evidence based Infection Prevention and Control (IPC) practices, measured the rates, and instituted a performance improvement and feedback program.

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Corresponding author: Benimana Oswald, Department of Internal Medicine, University of Rwanda, Butare, Rwanda; E-mail: benoswaldino05@gmail.com

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Studies have found that up to 90% of health care associated bloodstream infections are caused by some form of vascular access. Bloodstream infections are one of the most common causes of HAIs in Low and Middle Income Countries (LMIC), representing 19% of all reported HAIs. In low income settings, health care associated bloodstream infections result in a 24% mortality rate.

According to Vera Lucia, et al., Catheter Associated Urinary Tract Infection (CAUTI) is the most common health care associated infection accounting for 80% of all hospital acquired infection and is mostly related to the use of urinary catheter frequently found in severely ill patients. Although, many preventive measures and guidelines to prevent CAUTI exist in different healthcare settings, the prevalence of CAUTI and Urinary Catheter (UC) use is still a major issue as 25% of hospitalized patients receive urinary catheters, sometimes unnecessarily. Healthcare Associated Infections (HCAI) or nosocomial infections constituting a major health problem worldwide; and the most frequent HCAI is Catheter Associated Urinary Tract Infections (CAUTI) accounting for 34% followed by surgical site infections, central line associated blood stream infections and ventilator associated infections. Most of CAUTI cases are associated with the presence of urinary catheter even though many catheters are used unnecessarily and for prolonged periods of time.

The best way of CAUTIs prevention would be to avoid the use of a urinary catheter at all. Unfortunately, and at times impossible, attention should be focused on different issues to reduce catheter related urinary tract infections. Simple nursing procedures such as maintaining a closed catheter system, implementing evidenced based urinary catheter care, maintain unobstructed urine flow, and minimizing the duration of catheterization are concerned. Simple initiatives as hand hygiene, use of a reliable technique, maintenance and the way the catheter is removed can contribute to prevent the associated infection. Nurses are the key providers whose role allows for insertion and maintenance of IV lines and urinary catheters, administration of IV fluids and monitoring the patients for possible HAIs, therefore they must have the strong knowledge, evidence based practices regarding the implementation of IPC measures so that they can ensure their roles in preventing the HAIs [1-6].

Problem Statement

Lack of IV line labelling, poor technics, lack of IV fluids labelling, poor nursing documentation were reported during Accreditation program surveys that took place at CHUB, and also from the nursing students reports after their internship, they have reported such cases. It was even evidenced by clinical documentation audits reports that took place at CHUB, where there are many gaps regarding nursing documentation. Even though there is under reporting of HAIs at CHUB, few data that were being reported were also the catheter (IV and urinary catheters) and wounds associated infections. This audit was selected to be done as QI project because the IPC domain is among the risk management modules/issues that are considered into the accreditation requirements. These IPC audited matters also reflect the real situation of daily nursing practices. Therefore the reason of doing is to ensure that we get baseline data that will help in prompting the plan for improvements with regard to the IPC standards compliance and also to improve on nursing care services delivery, leading to avoid complications to patients.

MATERIALS AND METHODS

Methods and Data Collection Tool

The audit was done in September 2021 at the university teaching hospital of Butare (CHUB), in IM department that has the capacity of 77 beds for inpatients wards. The project was led by matron of IM department together with two IPC link persons from the department. We selected 20 admitted patients who were having the peripheral IV line and 14 admitted patients who were having the urinary catheterization. The audit used the observation at the bedside of how nurses work, review of clinical documentation from patients files and also interviewing the care givers/patients' relatives, and these were done by trained IPC link persons in IM department. Two nurses have been trained about the use of the tool and started the audit after clear understanding. The tool was piloted using the patients who were in the wards during October 2022 and it was reviewed to adjust it. The elements that made the questionnaire were from infection prevention and control manual, Johns Hopkins university, and were focusing on peripheral IV lines insertion maintenance and removal protocols; IV fluids administration monitoring and urinary catheters insertion, maintenance and management. Data were entered into excel and analysed also using excel that provided proportions and percentages used in audit findings presentation [7-10].

RESULTS

The scoring was dichotomous; answers were "Yes" or "No". The final score was obtained by adding the total number of "Yes" answers and divide by the total number of questions answered (including all "Yes" and "No" answers) excluding the "N/A" and then multiply by 100 to get the percentage. The criteria to be assesses were the following (**Table 1**):

Peripheral intravenous cannulation and management:

- Site clean and dry and there is no sign of inflammation.
- Closed system is maintained.
- Injection ports remain clean and dry. Insertion site clean and dry and there is no sign of inflammation.
- Point of administration set connection with intravascular catheter remains clean and dry.
- There is free flowing of fluid (vein not obstructed)/patency of IV line in place.
- The infusion is hanged onto drip stand properly.
- Proper documentation and labelling of IV catheter in place.

IV fluids administration and management:

- Intact fluid bag and well labelled.
- Connection with administration set.
- Closed system is maintained.
- Injection ports remain clean and dry.
- The infusion is hanged onto drip stand properly.
- Inputs are well monitored and documented.

Urinary catheter management:

- Catheter is secured.
- Closed urinary drainage system is maintained.
- The urinary drainage bag is off the floor/hanged.
- The urinary drainage bag is below the level of the pelvis.
- The tap of urinary drainage bag is clean and dry.
- Monitoring of outputs is done and documented.

Table 1: Findings from the audit.

No	1. Peripheral Intravenous Devices (PIVD) A. Assessment of PIVC insertion site	Yes	No	Yes (%)	No (%)
1	Location of catheter/ insertion site.	Right arm: 11	Left arm: 9	55	45
2	Catheter size/gauge observed during the time of data collection.	G20:16	Other size: 4	80 (G20)	20 (other sizes)
3	Is the catheter type/ gauge documented?	3	17	15	85
4	What is the date of its insertion (documented)?	19	1	95	5
5	Is the date of insertion documented in patient file?	15	5	75	25
6	Catheter is labelled with date and hour of insertion.	13	7	65	35
7	Patency/occlusion is regularly checked and documented.	0	20	0	100
8	Presence of adverse event during visual inspection like limb asymmetry and any signs of phlebitis (erythema, tenderness, swelling, pain etc.) are assessed and documented.	0	20	0	100
9	No infiltration/ extravasation or leakage observed during data collection.	18	2	90	10
10	The dressing is secure, intact, clean and dry.	16	4	80	20
11	It is oozing as there is visible ooze	16	4	80	20

	underneath the dressing.				
12	The tapes are not too tight or restrictive.	13	7	65	35
	B. Management of PIVD	**Yes**	**No**	**Yes (%)**	**No (%)**
13	Indication of PIVD is documented.	10	10	50	50
14	The patient or family member knows the indication of PIVD.	16	4	80	20
15	Type of fluid and/or drugs the patient is taking during the time of data collection.	IV drugs : 8	IV fluids: 12	40 (IV drugs only)	60 (IV fluids and IV drugs)
16	Rate of infusion/flow rate documented at the bottle.	2	13 (NA: 5)	13	87
17	Fluid bag is labelled with date, time of beginning and ending.	0	15 (NA: 5)	0	100
18	Documentation at the fluid/inputs and outputs chart.	0	20	0	100
19	Infusion set is not connected to patient catheter.	Connected: 9	Not connected: 11	45	55
20	The site of insertion and generally the patient hygiene is very good.	18	2	90	10
	2. Urinary catheterization	**Yes**	**No**	**Yes (%)**	**No (%)**
1	Was the patient or family members informed about the indication and procedure?	14	0	100	0
2	Was the privacy respected during the time of insertion as per patient/family members reports?	12	2	86	15
3	Catheter type and size documented in patient file.	1	13	7	93
4	Amount of water instilled into the balloon documented.	1	13	7	93

5	Outputs being monitored and recorded into patient file.	2	12	14	86
6	Urinary bag hanged on the bed and not on the floor.	13	1	93	7
7	The nurses empty the bags and document or care givers empty the bags and give the reports to nurse who document.	1	13	7	93
8	Emptying the bags is respected when urine arrives at least at when 2/3 of urinary bag level full.	2	12	14	86
9	There is urine passing and flowing around the catheter in place.	4	10	29	71
10	Signs and symptoms of UTI like urethral discharge/ abdominal pain and other signs and symptoms are being assessed on daily basis and documented?	0	14	0	100

The **Table 1** above represents the findings from audit done regarding the compliance levels and nurse practices towards peripheral IV lines insertion, maintenance and documentation, the IV fluids management and documentation; and the urinary catheter management.

Figure 1 shows that the IC catheter size used by taking the IV line is not documented into patients files at 85%, the date of its insertion is not documented at 25%, 35% of catheters in place are not labeled, the check of potency of IV line before drugs or fluids administration are not done at 100%. The nurses don't even assess at all the IV line in place and the parts where it is for possible adverse events. 20% of IV lines were wet due to oozing from IV fluids or drugs being administered or from blood back flow after IV injections.

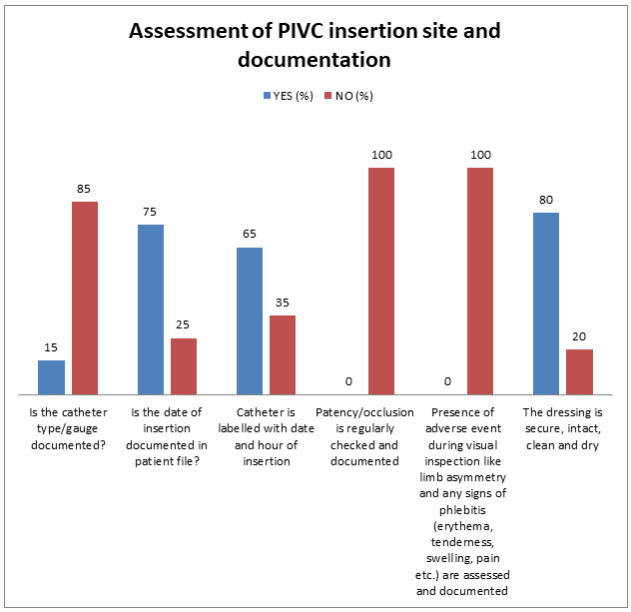

Figure 1: Assessment of PIVC insertion site and documentation.

Figure 2 shows that the indications of IV line insertion was not documented at 50%. 80% of patients and family members were aware of the reason of having peripheral IV line in place,

the Infusion rate for those who were having IV fluids in place was not documented at 87% and the IV fluids bottles were not labelled at 100%. For the patients who were receiving the IV fluids, the inputs and outputs was not being monitored and documented at all. The nurses just wrote the type of fluids they administered but not summing up at the end of the shift so that they can calculate the balance from inputs and outputs.

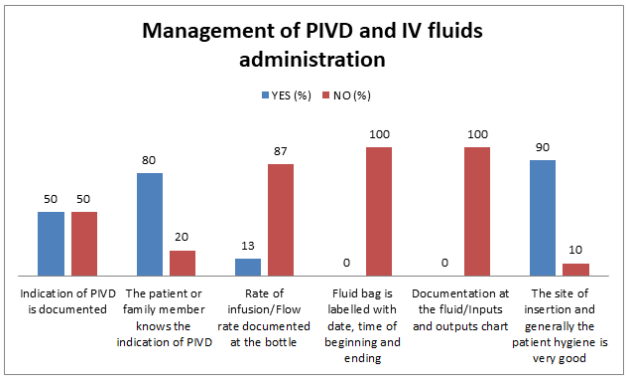

Figure 2: Management of PIVD and IV fluids administration.

Figure 3 shows that 100% of patients and care givers knew the indications of urinary catheterization. The catheter size used was not documented at 93% in the patient file, the amount of water used in inflating the balloon was not documented at 93% too. 93% of all the cases, the bags were being emptied but no documentation of the quantity. 100% of all patients who had urinary catheters, there were no evidence of documentation about signs and symptoms of possible UTI development.

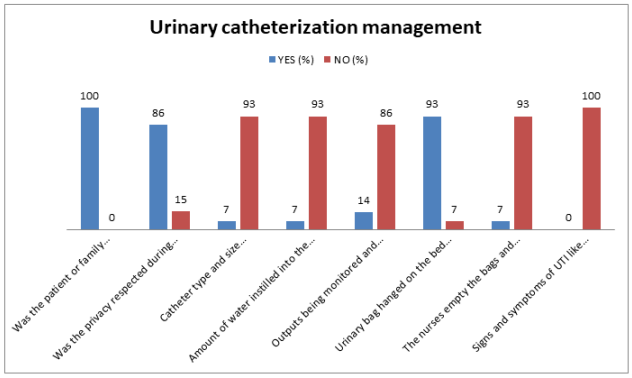

Figure 3: Urinary catheterization management.

DISCUSSION

Discussion of the Audit Findings

The audit found that the IC catheter size used by taking the IV line is not documented into patients files at 85%, the date of its insertion is not documented at 25%, 35% of catheters in place are not labelled, the check of potency of IV line before drugs or fluids administration are not done at 100%. The nurses don't even assess at all the IV line in place and the parts where it is for possible adverse events. 20% of IV lines were wet due to oozing from IV fluids or drugs being administered or from blood back flow after IV injections. It also shows that the indications of IV line insertion were not documented at 50%. 80% of patients and family members were aware of the reason of having peripheral IV line in place, the Infusion rate for those who were having IV fluids in place was not documented at 87% and the IV fluids bottles were not labelled at 100%. For the patients who were receiving the IV fluids, the inputs and outputs was not being monitored and documented at all. The nurses just wrote the type of fluids they administered but not summing up at the end of the shift so that they can calculate the balance from inputs and outputs [11,12].

The findings were similar to the ones from a study by Rickard, et al. The study states that the Intravenous Therapy (IVT) is a treatment modality based on infusing various compatible fluids (e.g.: Solutions, medications, blood, or blood products) directly into a vein. Peripheral IV catheterization is an invasive procedure indicated for short term use across a broad range of clinical scenarios, including administration of IV fluids, drugs, blood/blood products, dyes, and contrast media. Due to its inherently invasive nature, Intravenous (IV) therapy is associated with a number of potential complications, many of which are directly relevant to patient safety. PIV related morbidity may be due to mechanical or non-mechanical factors. The most frequent non-mechanical peripheral venous catheterization adverse events include insertion site pain, phlebitis, hematoma formation, and infuscate extravasation. The most common mechanical factor is catheter obstruction/ occlusion and dislodgement. Significant complications can also occur with the administration of incorrect type or wrong amount of IV fluids. Moreover, simultaneous infusion of incompatible medications can result in infusate precipitation. Finally, less frequent but significant complications have been reported, including bloodstream and local infections, air embolization, nerve damage, arterial puncture, skin necrosis associated with vasopressor infusions, and limb threatening forgotten tourniquet events. Taken together, the above complications can lead to substantial patient discomfort, unnecessary or prolonged hospitalization, increased costs, and additional downstream morbidity. Efforts to prevent these complications and improve patient outcomes should involve thorough health care provider education, clinical vigilance by all involved healthcare providers, health service level strategies to improve as audits as well.

The current audit found that the most sites of IV catheter insertion are at the arms. Rickard, et al., found that there are several factors which must be considered when selecting a site for peripheral IV catheterization. It is imperative to consider the clinical status of the patient carefully before selecting the site. Such assessment should consider the general condition of the veins, tortuosity, locations of valves, bifurcations, the size of cannula, and type of drug to be administered, infusion rate, and duration of the intended IV therapy. Intravenous cannula gauge and site of placement are critical factors in defining the success and longevity of peripheral IV cannula of note, larger gauge (P=0.0002, RR=1.17, 95% CI 1.08–1.27) and forearm placement (P=0.005,

RR=0.7, 95% CI 0.55–0.9) were among the strongest predictors of longer functional cannula life. Rickard, et al., during a prospective observational study, the CATHEVAL project, suggested that the incidence of Peripheral IV Catheters Adverse Events (PIVCAE) was significantly underestimated. The incidence rate of at least one PIVCAE was 52.3%. The most frequent clinical PVCAE were phlebitis (20.1/100 PIVs), followed by hematoma (17.7/100 PIVs) and fluid/blood leakage (13.1/100 PIVs). In terms of mechanical complications, obstruction/occlusion of PIV was the most frequent event (12.4/100 PIVs). Of interest, the authors also reported on post-removal PVCAEs (21.7/100 PIVs) as well as infections (0.4/100 PIVs). He continued by reporting that the significant complications can occur if the incorrect quantity (volume) of IV fluids or incorrect medication infusion/dosage is administered.

In a multicenter prospective study of 1498 patients, the authors cited that anatomical site selection and a lack of adherence to *in situ* PIVC placement recommended guidelines resulted in increased rates of phlebitis. They concluded that additional staff education was needed. They also reported a 19% reduction in PIVC associated bloodstream infections after implementing a fundamental PIVC insertion and education bundle for bedside nurses that increased staff awareness of proper skin preparation, aseptic technique, and the importance of the care and maintenance of dressings. Nursing education leaders in another tertiary healthcare setting developed an educational intervention to improve the recognition and reporting of infiltration and phlebitis on medical surgical units, which was identified by the risk management database as a concern. Although the differences between pre and post-knowledge scores were not significant (P=0.21), the unexpected results of the research served as a catalyst to develop annual PIVC procedural education to validate competency related to PIVC related complications. A standardized approach to education and competency assessment across the healthcare system was recommended. A simulation based multimodal educational method have been considered, including self study and deliberate practice, with objective outcome monitoring and feedback using well-designed, validated, and reliable checklists (**Table 2**).

Table 2: Local and systemic complications of peripheral venous catheter.

Peripheral Venous Catheter Adverse Events (PVCAEs)	
Local complications	**Systemic complications**
Tissue infiltration and extravasation Infusate solution leaks out into the surrounding tissue. **Diagnosis:** Detecting local tissue edema, cool skin, decreased flow rate, and comparison with contralateral limb. **Prevention:** Avoiding PIV too close to the joint, securing the catheter, and monitoring site frequently.	**Air embolism** Rare unintended venous administration of air through IV site. **Diagnosis:** Nonspecific sudden onset of dyspnea, cough, wheezing, tachypnea, and/or neurological signs of CVAs. **Prevention:** Avoidance of air traps in IV circuit; patient is in Trendelenburg position followed by supine position during catheter removal.
Hemorrhage/hematoma Bleeding from puncture site/localized collection of extravagated blood. **Diagnosis:** Swelling, tenderness, and reddish discoloration. **Prevention:** Application of pressure after removal of cannula, usage of sterile transparent dressing.	**Pulmonary edema** Fluid overload caused by excess fluid accumulation in the lungs. **Diagnosis:** Breathlessness, tachycardia, dyspnea, cyanosis, pink frothy sputum, chest radiography, decreased oxygen saturation. **Prevention:** Avoidance of miscalculation IV rate and prolonged infusion, early recognition of symptoms.
Nerve injury Due to tissue infiltration, IV needle laceration, hematoma irritation. **Diagnosis:** Localized numbness or tingling, loss of sensation to pin prick. **Prevention:** Good knowledge of anatomy, shallow insertion at 5 degrees–15 degrees relative to the skin.	**Catheter fragment embolism** Small part of the cannula breaks off and flows into the vascular system. **Diagnosis:** Symptomatology depends on the location, incidental finding on imaging, chest x-ray. **Prevention:** Careful inspection of cannula; catheters should not be removed against unexpected resistance; repairs should only be done by manufacturer.
Occlusion Slowing or cessation of fluid infusion. **Diagnosis:** Presence of discomfort, blood within the PV line, PIV not running. **Prevention:** Check the kinks; remove the nonfunctioning cannula.	**Infection** Purulent discharge from the site after 2 days–3 days. **Diagnosis:** Presence of purulent discharge, and/or temperature, blood count, D-dimer. **Prevention:** Hand hygiene, aseptic technique.
Dislodgement Due to more forces applied upon the catheter than the securement method was intended to endure. **Diagnosis:** Checking the flow of IV fluids or IV flushes. **Prevention:** Effective securement; use of catheters with wings, extension tubing for movement.	**Hypersensitivity** A severe hypersensitivity can be life threatening. **Diagnosis:** Sudden fever, joint swelling, rash, urticarial, bronchospasm, wheezing. **Prevention:** Ask about any previous history of allergies, stay with the patient for five to ten minutes to detect early signs.

Venous spasm
Due to cold IV fluid infusion, drug related irritation, or trauma to the vein.
Diagnosis: Pain, blanching at the site, difficulty in palpating vein.
Prevention: Apply warm compress; slow infusion rate.

Intra-arterial placement
Misplacement of PIV due to lack of vigilance.
Diagnosis: Detection of pulsatile blood, changes in capillary refill, appearance of ischemia, blood gas analysis, ultrasound.
Prevention: Recollecting that veins are more superficial than arteries, immediate removal of PIV after detecting pulsatile bleeding.

Rickard, et al., local and systemic complications of peripheral IV catheterization. Caston-Gaa, et al., stated that while intravascular catheters can be essential for patient care, they put patients at risk for infection by interrupting the skin barrier and providing a direct route of entry for microorganisms into the bloodstream. Health Care Workers (HCWs) should be aware that intravascular catheters (both central lines and IV lines) can become contaminated by handling of the catheter with contaminated hands, contamination of the insertion site, contamination of the catheter hub (including touching the patient's skin), contamination of end caps, contamination of tubing ends, contamination of injection ports, contamination of IV fluids or medications (either introduced by the manufacturer or during medication mixing and preparation), excessive or substandard manipulation of the catheter or tubing. IVs lines are thought to rarely cause systemic bloodstream infections. However, in most settings these infections are often under evaluated and may have a higher incidence of infection than what is reported. If not properly inserted and maintained, these devices can cause bloodstream infections and local reactions (e.g., phlebitis, exit site infection and extravasation which is the discharge or escape of blood into tissues) that potentially increase the risk for development of subsequent systemic bloodstream infections.

The use of evidence-based IPC practices can decrease the risk of intravascular catheter infections from both central and peripheral IV lines. Barriers to implementation of evidence based practices to prevent HAIs include the type of hospital facilities available, overcrowded in patient wards, insufficient rooms for isolation, poor hand hygiene compliance, lack of IPC supplies and other medical supplies (e.g., personal protective equipment, antiseptics, and needleless connectors), non-compliance with recommended IPC practices (e.g., keeping intravascular catheters in place longer than indicated, poor dressing techniques, using unsafe injection practices). In order to minimize the occurrence of HAIs, Carton-Gaa, et al., recommended that in order to maintaining IV lines safe, all health care professionals must follow recommended IPC practices at all times, check at least every 8 hours for phlebitis or evidence of infection, rotate the IV catheter site at 72 hours-96 hours (3-4 days), when practical, to reduce the risk of phlebitis and local infection. The infusion (administration) sets should be changed whenever they are damaged, the tubing becomes disconnected or routinely change continuous infusion sets at 96 hours (4 days), change intermittent infusion sets every 24 hours, and provide instructions to the patient/family members on maintaining the IV line.

Due to under-reporting, the HAIs rate might be at low levels at CHUB. This might be supported by Blanco-Mavillard, et al., during the study done at Manacor hospital, Spain, where they collected all the tips from Peripheral Intravenous Catheters (PIVCs) during December 2017 and January 2018 in hospital wards for cultures semi quantitatively. The findings were that seven hundred and eleven tips were cultured, with 41.8% (297/711) reported as PIVC failure. The PIVC failure rate density-adjusted incidence for Hospital Length of Stay (HLOS) was 226.2 PIVC failure/1000 HLOS. 5.8% (41/711) tips yielded positive isolates, with most frequent microorganisms *Staphylococcus* spp (*S. epidermidis* 29/41, 70.7%, *S. aureus* 2/41, 4.9%, *S. hominis* 2/41, 4.9%), and *Acinetobacter baumannii* (1/41, 2.4%). One *S. aureus* isolate was methicillin-resistant. 53.6% (22/41) positive cultures were obtained from patients with local signs and symptoms compatible with Catheter Related Infection (CRI), 2.4% (1/41) were compatible with CRBSI and that clinical signs improve within 48 h of catheter removal (density adjusted incidence for hospital stays of 16.7 PIVCCRI/1000 hospital-stays and 0.76 PVC-BSI/1000 hospital stays respectively). Most cases responded favourable to catheter removal and management. A high number of positive tip cultures without clinical signs and symptoms were observed, reason of underpin the importance to remove unnecessary PIVCs for the prevention of CRBSI.

The audit also shows that 100% of patients and care givers knew the indications of urinary catheterization. The catheter size used was not documented at 93% in the patient file, the amount of water used in inflating the balloon was not documented at 93% too. 93% of all the cases, the bags were being emptied but no documentation of the quantity. 100% of all patients who had urinary catheters, there were no evidence of documentation about signs and symptoms of possible UTI development. These data suggest poor practices especially during urinary catheters management. Chantelle, et al., stated that providing evidence-based care on catheter use is important to improving patients' outcomes and preventing urinary catheter related complications and during their study, the following recommendations were provided: Suprapubic catheters should be considered over long-term indwelling urethral catheters for women with urinary incontinence; short duration bladder catheterization (*i.e.*, seven to 10 days) is favored over a longer duration of catheterization (*i.e.*, more than 10 days) for post-operative patients who had repair of a simple obstetric urinary fistula; health care providers should consider removing or, if not possible, changing the catheter for patients who have a catheter associated urinary tract infection if the catheter has been in place for more than seven days; do not routinely offer antibiotic prophylaxis for the prevention of catheter-associated urinary tract infections or when changing catheters for patients with long-term indwelling catheters. Moreover, the study suggests considering antibiotic prophylaxis for patients who have a

history of symptomatic UTI after catheter change or experience trauma during catheterization.

The findings from the above audit were quite similar to the ones from Schwinger, et al., in a non-randomized multi-centre intervention study in seven hospitals in Switzerland aiming at a decrease of urinary catheterization and, consequently, Catheter Associated Urinary Tract Infections (CAUTIs) and non-infectious complications, in which the intervention bundle consisting of:

- A concise list of indications for urinary catheterization.
- Daily evaluation of the need for ongoing catheterization.
- Education on proper insertion and maintenance of urinary catheters.

They found that the most common reasons for placing the first urinary catheter were surgery (61% at baseline and 57% post intervention), urine monitoring (16% at baseline and post intervention) and urinary retention (13% at baseline and 17% post intervention). Re-insertions were mainly due to urinary retention (60% *vs* 66%), surgery (21% *vs* 18%) and urine monitoring (14% *vs* 10%). The patients experienced many more non-infectious complications than CAUTIs at baseline. A straightforward three fold intervention consisting of distributing an indication list for placing a catheter, promoting daily evaluation for ongoing need of a urinary catheter, and ensuring adequate education in catheter handling managed to decrease catheter utilization and non-infectious complications, and increase the proportion of documented justified catheterization and the frequency of documented daily catheter evaluations.

This poor documentation regarding peripheral IV lines and urinary catheters management were supported by the study done by Kamanzi, et al., where they said that creditable and timely clinical documentation is an essential component in patient care quality improvement. They designed and implemented a practical clinical documentation audit process as a way of measuring and improving quality of clinical care in Rwanda; as well as to enhance the compliance score according to the hospital accreditation standards. A pre and post-intervention study was used to examine the impact of creating a standardized auditing system on the department clinical auditing completion rate and the accreditation standards compliance rate. The completion rate of monthly audit reports increased from 57% (pre-intervention) to 96% (post-intervention), P<0.000. The hospital-wide average accreditation standards compliance rate for clinical documentation also significantly improved from 27% to 60%, P=0.000. as this still is below the standard (below 80%), the quality office provided to the departments a simple and user friendly clinical documentation auditing tool that can enhance the completion rate of audit reporting at no additional cost to the hospital, and also there was a need to review and change the way patients files were made so that the improvement in data recording can be made. These data can be used for evidence-based decision making to improve completeness and accuracy of clinical documentation and thus comply with accreditation standards as regarding quality health care services improvement, clinical records completeness and patients health care provider's interactions matter.

In a study done by Hakizimana, remarkable improvement was observed in 7 wards during follow-up done one week after the initial risk assessment visit, whereby urinary catheter care improved from 64% to 85% (21% improvement) and peripheral IV line care improved from 81% to 86% (5% improvement). Working together IPC team and Unit/Ward managers might be very fruitful to improve infection prevention and control and healthcare service delivery. All patients with peripheral IV lines and or urinary catheter should be monitored closely. IPC in service training should be encouraged in all clinical wards.

CONCLUSION

Despite their best intentions, health care professionals sometimes act as vectors of disease, disseminating new infections among their unsuspecting clients. Attention to simple preventive strategies may significantly reduce disease transmission rates. Frequent hand washing remains the single most important intervention in infection control. However, identifying mechanisms to ensure compliance by health professionals remains a perplexing problem. There is greater consensus about sterile insertion techniques for intravascular and urinary catheters a common source of infections and their care. Nosocomial infections are worth preventing in terms of benefits in morbidity, mortality, duration of hospital stay, and cost. Educational interventions promoting good hygiene and aseptic techniques have generally proved to be successful, but these practices are often not sustainable. Greater efforts are being made in some countries to ensure the application of the infection control evidence base into practice. Conducting regular IPC assessment in clinical areas in collaboration with clinical staff (unit managers and in-charges and IPC link persons) is essential to improve the quality and safety of healthcare service delivery and plan for improvement from identified gaps.

Outcome of the Study/Future Perspectives

Findings about our practices as nurses regarding the respect of principles of peripheral IV lines management, IV fluids administration principles and urinary catheters management will disseminated to the nurses staffs and also to the IPC to raise the awareness and enhance change in practices, set the action plans and plan for improvement that will lead to prevention of HAIs and other related complications to patients. This will contribute in improvement about HAIs assessment and reporting at the hospital level, and then will hopefully improve a lot of things in IPC standards compliance and improving the quality nursing services. An education program will be developed based on these findings. We will use the CDC's evidence based guiding principles for CAUTI prevention using the ANA CAUTI tool kit. After the training, we expect to conduct another audit covering all aspects from IPC tool used at CHUB to measure the improvement and sustainability regarding IPC measures compliance. The findings will also help the hospital to develop the guidelines

about peripheral IV lines management, IV fluids administration and urinary catheters management. It can be the basis for further studies in the entire Hospital regarding the implementation and compliance of IPC standards, and also improve on HAIs detection and reporting (e.g.: Future study about "peripheral intravenous catheter and urinary catheter HAIs: Variability between microbiological data and clinical signs and symptoms, at university teaching hospital of Butare, Rwanda".

LIMITATIONS

The study data were obtained from the nurses' daily working practices working in IM department of a single audit. It is difficult to generalize the results of the study to the working practices of the whole hospital. Further studies with bigger sample size are recommended.

REFERENCES

1. Hakizimana B (2017) Infection prevention and control risk assessment: Approach for early identification of harmful practices and improving quality and safety of healthcare service delivery in acute healthcare settings. J Infect Dis. 2(3):1-4.
2. WHO (2004). Practical guidelines for infection control in health care facilities. World health organization. Manila, regional office for South-East Asia, New Delhi, India. 1-110.
3. Saloojee H, Steenhoff A (2020) The health professional's role in preventing nosocomial infections. Postgrad Med J. 77(903):16-19
4. Andrade VLF, Fernandes FAV (2016) Prevention of catheter-associated urinary tract infection: Implementation strategies of international guidelines. Rev Lat Am Enfermagem. 24:2678.
5. Mukakamanzi J (2017) Knowledge, attitude and practice of nurses towards the prevention of catheter associated urinary tract infection in selected referral hospitals in Rwanda. Crit Care. 1-90.
6. Kaur P, Rickard C, Gregory SD, Kevin RG (2019) Dangers of peripheral intravenous catheterization: The forgotten tourniquet and other patient safety considerations. Postgrad Med J. 4:1-2.
7. Kamanzi J, Megentta A, Nsabiyumva W, Sendegeya A, Rex W (2015) Improving clinical documentation through monthly audits in Butare teaching hospital, Rwanda. Postgrad Med J. 8(6):1-8.
8. Mavillard BI, Calero MAR, Gomez GDP, Garcia GP, Fernandez FI, et al. (2019) Incidence of peripheral intravenous catheter failure among inpatients: Variability between microbiological data and clinical signs and symptoms. Antimicrob Resist Infect Control. 8:124.
9. Lachance CC, Grobelna A (2019) Management of patients with long term indwelling urinary catheters: A review of guidelines. Can healt J. 19:1-25.
10. Schweiger SP, Kuster JM, Bertschy SE, Bortolin G, John H, et al. (2020) Impact of an evidence based intervention on urinary catheter utilization, associated process indicators, and infectious and non-infectious outcomes. J Hosp Infect. 106(2):364-371.
11. Sleire L (2013) Diabetes: A neglected disease in Sub-Saharan Africa: A comparative study between Rwanda and Norway. Postgrad Med J. 1-65.
12. Nyirantibibaza M (2017) Knowledge and practice on preventive measures of nosocomial infections among nurses working in intensive care unit of referral hospitals. Intensive Care Med. 17:1-92.