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# Nursing Errors during Intravenous Infusion

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### ABSTRACT

**Introduction and Objective:** Intravenous solutions are considered one of the most widely used medical materials in emergency departments in all hospitals around the world and the nurse must follow the correct medical scientific steps for that, choosing the right place and the right vein and good sterilization of the skin before the formation of cannula. Our study aimed to determine the weakness points during intravenous infusion and detect the high errors that lead to complications to patient. **Material and Methods:** Descriptive study design was carried out in order to achieve the objectives of the present study. Constructed checklist was dependent for this study includes (14) items. The data were collected from the 30th of June 2021 to 1st of September 2021. The study subjects consist of (140) nurses who were working in emergency departments in seven general hospitals at Mosul city, (20) nurses from every hospital. **Results:** The results show (98.6) from the sample don't wash your hands before nursing procedures, (51.4) not wear gloves, (65.7) don't sterilized of patient's skin before insert the cannula, (90%) from them don't give the (I.V) fluid according to drop formula, (58.6%) not follow the signs and symptoms of (I.V) fluid complications, and (67.1) from the nurses puncture the intravenous fluid bags by needle during (I.V) infusion. **Conclusion:** the study demonstrates some defects during intravenous infusion process, this defects related to hand washing, wear gloves, good sterilization for skin before insertion the cannula, give the fluid according to drops formula, Monitor the Patient for (I.V) fluids complications, the puncture of intravenous fluid bags by needle. And when comparing the results between the seven hospitals, the results of the Al-Khansa, Al-Salam, and Ibn Al-Atheer hospitals were the worst. **Recommendation:** training courses and alerting nurses to follow the correct application of nursing procedures and the universal standard protocols to protect patient's health and their safety.

## 1. Introduction

Intravenous solutions are considered one of the most widely used medical materials in emergency departments in all hospitals around the world, whether they are surgical or medical, since most patients entering these departments are those who suffer from severe vomiting or severe diarrhea or those with car accidents, work

injuries, explosions or serious household accidents, and all of these need fluid compensation and rebalancing blood circulation due to fluid loss and hemorrhage. (Ong G., et al. 2017).

Giving an intravenous solution or giving blood to the patient preceded by the process of cannula

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formation, and here the nurse must follow the correct medical scientific steps for that, choosing the right place and the right vein and good sterilization of the skin before the formation of cannula. (Wirtz V. et al. 2018).

There are many mistakes that occur as a result of not following the medical instructions related to the process of forming cannula or the protocol for giving intravenous solutions and following the patient while taking the intravenous solution and monitoring for any complications that may occur and worsening the patient's condition and generate additional health problems for him that could have been avoided and not occurred. (Bride H. et al. 2016).

Errors may be occurring can cause clinical physical harmful outcomes to the patient, which may lead to mortality and morbidity. (Pavlína S. et al. 2019)

Intravenous (I.V) direct medication administration into a patient's vein, and rapid systemic response occurs. It is usually a complex process requiring the preparation in the clinical areas before administration to the patients. Therefore, the errors may be occurring during preparation and administration at any stage can cause serious adverse drug reactions or events such as thrombus formation, infection and severe hypersensitivity reactions, which may lead to increase mortality rate. (Fahimi F. et al. 2018)

Internationally up to eighty percent (80%) of hospitalized patients receive (I.V) therapy during their stay or admission. almost half errors occurred in the drug preparations and administrations, reasons for these errors include communication, equipment, or personal problems; lack of training, weakness in the experience and knowledge; and faults in the system lead to life threatening medication errors (Abbasinazari M. et al. 2017)

Prescribed intravenous ((I.V)) fluids an important treatment inside hospitals for many inpatients. (Adapa R. et al. 2016). The use of intravenous drugs can be very beneficial if the correct criteria for giving treatment are applied. And any errors can occur in any phase of drug management: prescription, preparation, dispensing or administration of the drug. Adverse effects associated with the use of intravenous drugs can have serious human consequences. The errors that occur in healthcare facilities have been reported as the seventh most common cause of death (Dowell S. et al. 2017). Our study aimed to determine the weakness points during intravenous infusion and to compare the results between hospitals to identify the high errors that lead to complications to patient.

## 2. Methodology

Descriptive study design was conducted on (140) Nurses were selected from the emergency departments from seven general hospitals at Mosul city (AL-Jumhory , Al-Salam, , Ibn-Sena, Al-kanssa, Ibn Alather, Al-batool, and Al-mosul, Hospitals), twenty nurses from every hospital. Constructed checklist was dependent for this study, consist from fourteen item, every item applicable (yes) put one degree (1) and if not applicable (no) put zero degree (0), the total degree for checklist is 14, and validated by many experts, where as their opinions, suggestions and recommendations were depended to adopt and direct the checklist. Data were collected throughout two months, this study was conducted on both gender, male and female nurses who working in emergency departments. The checklists do by researchers. The data were collected from the 30<sup>th</sup> of June 2021 to 1<sup>st</sup> of September 2021. SPSS program version (23) was used to analyze the data: Percentage, Frequency as descriptive statistic.

### 3. Results

Table (1) frequency and percentage for every checklist item

No.	Item		No.	%
1	Hand washing	Yes	2	1.4
		No	138	<b>98.6</b>
2	Wear gloves	Yes	68	48.6
		No	72	<b>51.4</b>
3	Select appropriate site for insertion the cannula away from joints	Yes	110	78.6
		No	30	21.4
4	Good sterilization for skin before insertion the cannula (site)	Yes	48	34.3
		No	92	<b>65.7</b>
5	Select appropriate cannula size and congruent with patient's age and his Condition	Yes	114	81.4
		No	26	18.6
6	Check the fluid name and expire date and according to patient's chart	Yes	84	60
		No	56	40
7	Ensure from empty of infusion set from air bubbles	Yes	88	62.9
		No	52	37.1
8	Give or open the fluid according to (drops formula)	Yes	14	10
		No	126	<b>90</b>
9	Monitor the Pt. for any allergy may be happened	Yes	64	45.7
		No	76	<b>54.3</b>
10	Continuous checking for appear circulation overload or shock	Yes	58	41.4
		No	82	<b>58.6</b>
11	Do not puncture of intravenous fluid bags by needle for any reason	Yes	46	32.9
		No	94	<b>67.1</b>
12	Monitor the Pt. for appear signs or symptoms of air embolism	Yes	46	32.9
		No	94	<b>67.1</b>
13	Continuous checking for vein rupture, redness, swelling, pain (out cannula)	Yes	58	41.4
		No	82	<b>58.6</b>
14	Documentation	Yes	96	68.6
		No	44	31.4

This table show (98.6) from the sample don't wash your hands before nursing procedures, (51.4) not wear gloves, (65.7) don't sterilized of patient's skin before insert the cannula, (90%) from them don't give the (I.V) fluid according to

drop formula, (58.6%) not follow the signs and symptoms of (I.V) fluid complications, and (67.1) from the nurses puncture the fluid pint by needle during (I.V) infusion.

Table (2) the checklist items (Practices applied true) according to hospitals

Hospital Items	AL- Jumhory	Ibn-Sena	Al-Salam	Al-kanssa	Ibn Alather	Al-batool	Al-mosul	Total degree for every practice
1	0	0	0	0	0	0	2	2
2	16	6	12	4	10	8	12	68
3	14	16	18	16	16	16	14	110
4	6	2	4	6	4	18	8	48
5	20	20	18	18	18	16	16	126
6	18	16	8	6	12	20	16	96
7	18	20	10	6	14	14	14	96
8	0	0	0	2	4	0	8	14
9	10	12	4	4	2	12	8	52
10	8	4	6	6	4	12	10	50
11	14	0	8	2	6	8	8	46
12	10	14	0	4	2	10	6	46
13	6	14	6	6	4	12	10	58
14	18	18	4	8	12	18	18	96
<b>Total degree for every hospital</b>	<b>158</b>	<b>142</b>	<b>98</b>	<b>88</b>	<b>108</b>	<b>164</b>	<b>148</b>	

This table show a higher defect in four practices (hand washing, good sterilization, give the fluid according to drop formula, puncture of body's

intravenous fluid bags by needle, and monitor the (I.V) fluids complications).

Table (3) the difference level among hospitals according to the total practice degree

The degree	AL-Jumhory	Ibn-Sena	Al-Salam	Al-kanssa	Ibn Alather	Al- batool	Al-mosul
Total from (280)	<b>158</b>	<b>142</b>	<b>98</b>	<b>88</b>	<b>108</b>	<b>164</b>	<b>148</b>

This table demonstrates the higher degree was in *al-Batool* hospital while the lower degree was in *Al-kanssa* hospital.

#### 4. Discussion

(Westbrook J. et al. 2020) said in his study that majority of the nosocomial infections spread because the lack or bad hand hygiene and washing, also (Valentin A. et al. 2019) showed in your study : “washing our hands is the big problem” Gloved hand disinfection for a single patient encounter has been shown to increase compliance with hand hygiene and where glove

use is appropriate, careful removal and disposal of gloves is important as environmental contamination is known to occur with doffing of personal protective equipment (PPE) and gloves. In our study there are high defect in the hand washing and wearing gloves, this condition reflects the fact of spread nosocomial infections and the complications in our hospitals.

Infection prevention actions which involves aseptic technique, designed to protect patients from infection when performing invasive clinical procedures, is universally prescribed by guideline makers as a critical efficacy in the prevention of

infections. aseptic technique involves many actions of infection prevention actions designed to protect patients from infection when under invasive clinical procedures, including combination of decontamination processes, sterilized equipment and handling technique is used to minimize potential transmission of pathogenic microorganisms (Nicholas PK, and Agius C. 2015). In our study 65.7% from our subject have weakness for good sterilization technique.

Intravenous (I.V) fluids are routinely used in the treatment of all patients. (I.V) fluids are required for fluids are crystalloids (normal saline, ringer lactate, 5% dextrose) and colloids (Haemaccel, dextran 40, 5% Albumin). Crystalloid (I.V) fluids are isotonic, hypotonic or hypertonic Often (I.V) fluid orders are not written in drop rate per minute but instead it is left for the doctor or nurses on duty to calculate the rate of infusion. In our study 90% from the sample don't give the

fluid according to (fluid drop formula), this result may be lead to may complications to the patients such as circulatory overload or shock. (Seki Y, and Yamazaki Y. 2016)

As a nurse should be do not puncture of intravenous fluid bags by needle for any reason, (A.Ali et al. 2019) concluded in your study the contamination in the I.V. fluids in Baghdad hospitals was mostly because external factors, during clinical use, most possible attributed to induction of needle puncture in the body of bags of I.V. fluid by staff of nursing, and 79,45% from the punctured bottles were contaminated by several bacteria such as ((Candida albicans, Stapylococcus epidermidis and Escherichia coli)) in our study (67.1%) from the nurses were puncture the intravenous fluid bags, as shown in Fig (1).



Figure 1. Punctured intravenous fluid bags.

## 5. Conclusion

This study demonstrates some defects during intravenous infusion process, this defects related to hand washing, wear gloves, good sterilization

for skin before insertion the cannula, give the fluid according to drops formula, Monitor the Patient for (I.V) fluids complications, the puncture of intravenous fluid bags by needle. And when comparing the results between the seven

hospitals, the results of the Al-Khansa, Al-Salam, and Ibn Al-Atheer hospitals were the worst.

## 6. Recommendations

1. Do training courses to develop nursing skills and procedures.
2. Continue perform hand hygiene and put on non-sterile gloves.
3. Continue Checking of intravenous infusion complication and reaction.
4. Choose the right cannula for each patient, depending on the age, vein size, and condition of the patient.
5. Avoid puncturing the intravenous solution bags.
6. Document all intravenous infusion steps.

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