



Administration Of Inotropic Drugs In Critical Care Unit Of Nepal: A Cross-Sectional Study

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Abstract: Despite successful therapeutic use of inotropes, the high potent can lead to devastating-harmful effects to critically ill patients. The study aimed to assess knowledge, attitude and practice of administration of inotropic drugs among critical care nurses Nepal. A descriptive cross-sectional study was adopted for the study. Enumerative technique was used to obtain 90 critical care nurses using self-administered structured knowledge questionnaire, three-point Likert scale for attitude and observational checklist for practices. Data were analyzed using descriptive statistic for level of knowledge, attitude and practice; Chi-square for association between knowledge, attitude and practice with selected variables and Pearson correlation to determine relationship among knowledge, attitude and practice regarding administration of inotropic drugs. Out of 90 respondents, 37.8% of respondents had 4-5 years of working experience in CCU with mean age 24.77 ± 3.54 . Approximately, 30% of respondents had unsatisfactory level of knowledge (mean knowledge score 38.66 ± 5.56), whereas 81% had positive level attitude (mean attitude score 41.611 ± 8.335) and only 26.7% had unsatisfactory level of practice with mean practice score 17.800 ± 3.392 . statistically significant relationships among knowledge, attitude and practice scores of respondents regarding administration of inotropic medication. Though major of respondents had satisfied knowledge, need furthermore in-service education and training to enhance the positive attitude and satisfactory level of practice.

Index Terms - Knowledge, Attitude, Practice, Inotropic medication, Critical care Nurse

I. INTRODUCTION

Though the improvement in advance therapeutic measures including surgical treatment and myocardial protection, pharmacological support for low cardiac output is often required during and after weaning from cardiopulmonary bypass. The drug of choice in this field is inotropes.^[1] Inotropes are among the most widely used medications in Critical Care Unit, since they help patients to correct hemodynamic instability. Both positive (digoxin, dopamine, dobutamine, adrenaline) and negative (beta-blocker, calcium channel blockers and antiarrhythmic drugs) type of inotropic drugs is utilized in the administration of different cardiovascular conditions. Negative inotropic action decreases the force of contraction, positive inotropic action increases it. Common inotropes used in ICU are dopamine, dobutamine, noradrenaline, vasopressin, adrenaline, digoxin, levosimendan.^[2]

In Nepal, Cardiovascular disease incidence and mortality rates have increased from 1990 to 2017, with the burden greater among males and among older groups. Ischemic heart disease was the predominate CVDs, contributing 16.4% to total deaths and 7.5% to total disability adjusted life years (DALYs).^[3] Inside the Kathmandu valley it self 64.7% of hospital is providing ICU services, among them 40% hospital is having 1:2 nurse patient ratio.^[4] A survey conducted in Kaski district of Nepal stated that 15.4 % of death occurs as ICU morality and the median length of stay was 4 days for critical patient.^[5] Medication non-compliance possess a major threat to the health and well-being of the patient. It is estimated that non-adherence to prescribed medications causes nearly 1,25,000 deaths/year in USA, and 10% of hospital admission and 23 % of nursing home admission are linked to medication error. Over half of that are filled associated with in correct administration of drugs.^[6] In Nepal, the incidence of different aspects of iatrogenic problems due to drugs is Adverse Drug Events 2.4-6.5%, Adverse Drugs Reaction is 6.7%. Negligence in serious ADEs and death is 34% and 51% respectively, preventable ADEs is 28-50%. Medication errors occurs most often in prescribing (29-56%). The common cause of medicine error is lack of knowledge about drugs (29%) and the patient about 18%.^[7] Nurses with insufficient pharmacological knowledge is accounted as one of the major critical factors aiding towards medication errors. The recurrence of these mistakes done by staff nurses & its effects influence the wellbeing of the patient as well as the general expanse of health care. Ultimately these harm to the nurses' personal and professional status, confidence, and practice.^[8] Nursing staff, the care provider of the patients must have sufficient knowledge regarding its administration. Many patients are admitted to ICU/CCU who are undergoing inotropes support. CCU nurse is responsible for providing patient safety. Patient safety is increasingly recognized as essential in the practice of intensive care medicine. ^[9] Nurses should have great enthusiasm towards updating their knowledge and reporting their medical errors, preventing medical errors and apply principles of medication safety. Hence, providing educational training programs, upgrading evidence-based practices and positive perspective are very essential for nursing personnel. Therefore, the study aimed to assess knowledge, attitude and practice regarding administration of inotropic drugs among nurses working in critical care unit.

II. METHODOLOGY

A Descriptive cross sectional study design was adopted for the study for exploration of phenomenon of real-life situation. Ethical clearance was obtained from the Institutional Review Committee of Yeti Health Science Academy on 16th August 2021. The study was conducted in Critical Care Unit of three selected private hospitals i.e., Chirayu National Hospital & Medical Institute Pvt. Ltd, Green City Hospital Pvt. Ltd and BP (Bishweshwar Prasad) Smriti Hospital Pvt. Ltd, Kathmandu. After taking written formal permission from the concerned authority of each selected hospital the total 90 of critical care nurses were selected using enumerative sampling technique. As per the study critical care nurses are registered nurses working in critical care unit, intensive care unit and high-dependency unit of selected private hospitals, Kathmandu. The participants selected from Critical Care Unit, Intensive care unit and High-dependency Unit were 43, 20 and 27 respectively. The condition was kept for inclusion that the nurses must have at least one month of working experience in CCU.

The semi structured self-administered questionnaire, observational check list tool and 3-point Likert scale was developed by the researcher on the basis of extensive literature review, discussion with research experts, consultation with the research advisor and the constructive feedbacks from the members of research committee. The research tool consists of four parts: Part I: Questions related to socio-demographic characteristics, professional characteristics and service training, Part II: Questions related to knowledge regarding administration of inotropic medication, Part III: Likert attitude scale regarding administration of inotropic medication and Part IV: Observation checklist regarding administration of inotropic medication. The validity of the instrument was maintained by extensive literature review, consulting with research advisor, research experts and the members of research committee and the reliability of instruments was obtained using internal consistency method with Cronbach's alpha formula (Lee Cronbach, 1951). Pre- testing of study was done in critical care nurses working in the hospital of the similar setting in Sumeru City Hospital, Lalitpur. Pre-testing of the study tool was done in 10% of total sample size i.e., 10% of 90 that is 9 nurses of selected hospital. Pretesting was done to check its clarity, sequencing, feasibility and practicability and this purpose will help to increase the reliability of the instrument.

The collected data was checked, reviewed and organized daily for its accuracy, completeness and consistency. The data was coded and entered in Statistical Package for Social Science (SPSS) version 26.0 for analysis. Data was analyzed by using simple descriptive statistics and inferential statistics. Frequency, percentage distribution was used to describe the socio demographic variables. Mean and standard deviation was used to describe the knowledge, attitude and practice among critical care nurses. Chi-square test was used to find out the associations between level of knowledge, attitude, practice and selected socio-demographic variables of nurses. Karl Pearson's Coefficient of Correlation was used to detect the correlation between knowledge, attitude and practices. The analyzed data was presented on academic tables.

III. RESULT

Among total participants, more than half (68.9%) were under 25 years old with mean age 24.77 ± 3.57 . All the nurses were female, 47.8% were married, 58.9% were from brahman/chhetri ethnic group community. More than half of participants had completed their PCL/proficiency level of nursing education and 68.9% participants had more than 3 years of working experience and the rest of relevant demographic characteristics has presented in Table 1. Similarly table 2 reveals that majority of respondents (90.0%) gave correct answer regarding definition of inotropic drugs. Majority of respondents i.e. 82.2% and 91.1% answered correctly in mechanism of inotropic drugs, indication of inotropic drugs more than half of respondents i.e., 83.3% answered correctly. Drug calculation of noradrenaline and dopamine were known by 82.2%, 85.6% of respondents. The maintenance dose of tab digoxin was correctly answered by 90.0% respondents. Regarding side effects of inotropes, 82.2% respondents answered correctly on drugs that cause tissue necrosis. Majority of respondents i.e. 88.9% answered correctly on drug used for low cardiac output. Approx 60% agreed that inotropic drugs considered as safe life medication however maximum of respondents (68.9%) disagreed

that heart rate is not important. Again more than half respondents (82.2%) disagreed that extravasation can be ignore. Similarly majority of respondents had positive attitude, 13.3% respondents had neutral attitude whereas 5.6% respondents had negative attitude. Again majority of respondents (73.3%) had satisfactory level of practice whereas 36.7% respondents had unsatisfactory level of practice.

Table 1: Socio-demographic Characteristics of Respondent

Characteristics		Frequency (n=90)	Percentage (%)
Age	< 25years	62	68.9
	≥ 25 years	28	31.1
	Mean ± SD = 24.77± 3.57		
Marital Status	Single	47	52.2
	Married	43	47.8
Ethnicity	Brahman/ Chhetri	53	58.9
	Others*	37	41.1
Religion	Hinduism	67	74.4
	Non-Hinduism**	23	25.5
Residence area	Inside ring road	51	56.0
	Outside ring road	39	44.0
Education	Proficiency Level of Nursing	52	57.8
	Bachelor in Nursing	24	26.7
	BSC Nursing	14	15.6
Area of work	High Dependency Unit	35	38.5
	Intensive Care Unit	45	49.5
	Others [#]	10	11.0
Professional designation	Nursing Officer	14	15.4
	Senior Staff Nurse	33	36.3
	Staff Nurse	43	47.3
Total professional experience	Below 1 year	2	2.2
	2-3 years	25	27.8
	4-5 years	62	68.9
	Above 5 years	1	1.1
Working experience in CCU	Below 1 year	14	15.6
	2-3 years	25	27.8
	4-5 years	34	37.8
	Above 5 years	17	18.9
Any training	Yes	29	32.2
	No	61	67.8
Name of Training		n=29	
	Critical Care Training	10	11.1
	Basic Life Support Training	19	21.1
Any ICU protocol	Yes	70	77.8
	No	20	22.2

* Dalit, Janjaati, Madhesi ** Buddhism, Christianity [#]Postoperative ward

Table 2: Respondents' knowledge regarding administration of inotropic medication n=90

Characteristics	Right Answer Frequency(%)	Wrong Answer Frequency(%)
Definition	Mean ± SD	6.85±0.71
- Meaning of inotropic drugs: Drugs that affect the strength of contraction of heart	81(90.0)	9(10)
- Commonly used inotropes in critical care unit except: Nitroglycerin	75(83.3)	15(16.6)
Mechanism of action	Mean ± SD	8.23±0.97
- Mechanism by which epinephrine increase blood pressure: Vasoconstriction	74(82.2)	16(17.8%)
- Mechanism by which norepinephrine increase blood pressure: Vasoconstriction at precapillary muscles and veins	82(91.1)	8(8.9%)
- Uses of positive inotropic drugs: For contraction of blood vessels	74(82.2)	16(17.8%)
Indications	Mean ± SD	15.4±1.49
- The indication of inotropes, expect: Muscle relaxation	75(83.3)	15(16.6%)
Route and dose calculation	Mean ± SD	4.75±0.78
- Safest route for continuous infusion of inotrope: Central line	75(83.3)	15(16.7%)
- Mcg/kg/min of noradrenaline running at 10ml/hrs. for 60 kg Patient: 0.2mcg	74(82.2)	16(17.8%)
- The maximum infusion rate for vasopressin: 0.04 units	79(87.8)	11(12.2%)
- Available form of drug of dobutamine: 250mg/5ml	81(90.0)	9(10.0%)
- Daily maintenance dose of Tab digoxin for an adult patient: 0.125 to 0.5mg	81(90.0)	9(10.0%)
- Mcg/kg/min of dopamine running at 5ml/hr. for 50kg patient: 5mcg	77(85.6)	13(14.4%)
- Available form of drug of noradrenaline: 2mg	81(90.0)	9(10.0%)
Side effects	Mean ± SD	5.01±0.52
- Important side effect of inotrope: Ventricular arrhythmias	71(78.9)	19(21.1%)
- Drug cause tissue necrosis, when given through a peripheral line: Dopamine	74(82.2)	16(17.8%)
Nursing considerations	Mean ± SD	3.66±0.79
- Drug is used for low cardiac output: Dopamine	80(88.9)	10(11.1%)
- Early signs and symptoms that indicate toxicity of this drug: Dysrhythmias	65(72.2)	25(27.7%)
- Antidote of nor epinephrine: Phentolamine	83(92.2)	7(7.8%)

Table 3: Respondents' attitude regarding administration of inotropic medication n=90

Statements	A No (%)	N No (%)	D No (%)	Mean±SD
Definition				5.11±0.19
- Inotropic drugs considered safe life medications	54(60.0)	28(31.1)	8(8.9)	2.51±0.658
- Heart rate is not important*	8(8.9)	20(22.2)	62(68.9)	2.60±0.650
Indications				5.10±0.19
- Inotropes maintain organ perfusion	44(48.9)	37(41.1)	9(10.0)	2.39±0.665
- Inotropes regulate heart rate, blood pressure and the force of contraction of heart	74(82.2)	6(6.7)	10(11.1)	2.71±0.658
Dose and route				4.94±1.15
- Inotropic drugs can be administered peripherally	37(41.1)	36(40.0)	17(18.9)	2.22±0.746
- Maintaining accurate dose rate is not necessary*	10(11.1)	5(5.6)	75(83.3)	2.72±0.654
Side effects				5.28±1.20
- Extravasations can be ignored and start the infusion as usual*	9(10.0)	7(7.8)	74(82.2)	2.72±0.636
- Mild side effects can be ignored and need not be reported*	9(10.0)	21(23.3)	60(66.7)	2.57±0.671
Nursing Considerations				21.8±4.74

- Vital signs, fluid status, laboratory markers should be monitored	71(78.9)	6(6.7)	13(14.4)	2.64±0.724
- Starting with a high dose and decreasing it until the effect is maintained	74(82.2)	7(7.8)	9(10.0)	2.72±0.636
- Training on safe management of IV drugs could reduce the risk of error	70(77.8)	12(13.3)	8(8.9)	2.69±0.630
- The medication prepared by others also can be administered*	14(15.6)	65(72.2)	11(12.2)	1.97±0.529
- Most inotropes given via central line because of their vasoactive properties	42(46.7)	39(43.3)	9(10.0)	2.37±0.661
- Medication errors should be reported	71(78.9)	10(11.1)	9(10.0)	2.69±0.647
- Did you think positive inotropes can be given in the ward?	30(33.3)	21(23.3)	39(33.3)	1.90±0.875
- Authoritative guidelines are necessary for scientific evidence	40(44.4)	41(45.6)	9(10.0)	2.34±0.567
- Inotropic drugs can be infused without dissolving with normal saline*	8(8.9)	23(25.6)	59(65.6)	2.57±0.654

A=Agree, N=Neutral, D=Disagree *Negative Statement

Table 5 depicts that attitude of trained participants were directly related to level of attitude at $p=0.048$. there was no statistically significant association between respondents' level of knowledge regarding administration of inotropic medication and socio-demographic variables at $p<0.05$. Table 6 represent that Pearson's correlation, calculated to find out bivariate relationship among respondents' knowledge, attitude and practice score regarding administration of inotropic medication.

Table 4: Respondents' practice regarding administration of inotropic medication n=90

Performances	Complete done frequency (%)
Epinephrine infusion	Mean ± SD 5.98±0.15
- Validate adrenaline concentration and prescribed infusion rate	66(73.3)
- Obtain baseline vital signs	60(66.7)
- Monitor BP frequently through arterial line BP& monitoring machine	80(88.9)
- Stay beside the patient during the initial titration of infusion	59(65.6)
- Monitor patient's blood pressure every 5 minutes initially	73(81.1)
- Monitor for chest pain, dysrhythmias and hypertension	68(75.6)
- Never administer any other infusion in the same line	64(71.1)
Norepinephrine infusion:	Mean ± SD 9.13±0.06
- Obtain baseline vital signs	80(88.9)
- Assess peripheral circulation prior to starting infusion	81(91.0)
- Monitor and document vital signs and medication dose with each adjustment	84(93.3)
- Monitor IV site closely	76(84.4)
- Monitor BP every 5 minutes initially, every 30 minutes and every hour	57(63.3)
Dopamine infusion:	Mean ± SD 10.0±0.82
- Obtain base line vital signs	76(84.4)
- Monitor carefully blood pressure and urine output	53(58.9)
- Monitor central venous pressure during dopamine infusion	25(27.8)
- Observe infusion site hourly for signs of extravasation	74(82.2)
- Monitor peripheral circulation and temperature of extremities for any changes	19(21.1)
- Report tachycardia, hypertension and arrhythmia's immediately	83(92.2)
- Check BP and urine output prior to each adjustment in infusion rate	70(77.8)
Dobutamine infusion:	Mean ± SD 4.78±0.59

- Document vital signs hourly	80(88.9)
- Monitor fluid balance (intake and output)	80(88.9)
- Observe IV site closely and avoid extravasation	74(82.2)
- Report tachycardia, hypertension and arrhythmia's immediately	73(81.1)

Table 5: Association of knowledge, attitude and practice regarding administration of inotropic drugs and sociodemographic characteristics
n=90

Characteristics		Level of Knowledge			Level of Attitude				Level of Practice		
		Satisfactory Frequency (%)	Un-satisfactory Frequency (%)	χ ² (p-value)	Positive No (%)	Neutral No (%)	Negative No (%)	χ ² (p-value)	Satisfactory Frequency (%)	Un-satisfactory Frequency (%)	χ ² (p-value)
Age (Years)	<20	5(71.4)	2(28.60)	1.19 (0.55#)	5(62.5)	2(25.0)	1(22.5)	2.73 (0.61#)	34(42.8)	4(57.1)	4.12 (0.042)
	20-30	63(75.9)	20(16.80)		68(82.9)	10(12.1)	4(4.8)		63(75.9)	20(24.0)	
Ethnicity	Brahmin/ Chettri	41(77.3)	12(22.60)	4.11 (0.25#)	41(77.3)	8(15.0)	4(7.5)	2.45 (0.87#)	38(71.6)	15(28.3)	1.36 (0.18#)
	Others*	27(72.9)	10(27.02)		32(86.4)	4(10.8)	1(2.7)		28(75.6)	9(24.3)	
Religion	Hinduism	52(77.6)	15(22.38)	1.33 (0.52#)	53(79.1)	10(14.9)	4(5.9)	1.05 (0.90#)	52(77.6)	15(22.3)	1.33 (0.52#)
	Non-Hinduism**	16(69.5)	7(30.4)		20(86.9)	2(8.6)	1(2.3)		16(69.5)	7(30.4)	
Area of work	High Dependency Unit	26(74.2)	9(25.7)	1.51 (0.47#)	29(82.8)	5(14.2)	1(2.8)	2.71 (0.61#)	25(71.4)	10(28.5)	1.90 (0.39#)
	Intensive Care Unit	33(73.3)	12(26.6)		35(79.5)	6(13.6)	3(6.8)		32(71.1)	13(28.8)	
	Others	9(90.0)	1(10.0)		9(81.8)	1(9.0)	1(9.0)		9(90.0)	1(10.0)	
Education	PCL Nursing	41(77.3)	12(22.6)	0.37 (0.83#)	43(81.1)	7(13.6)	3(6.8)	1.82 (0.77#)	38(71.6)	15(28.3)	9.52 (0.03)
	Bachelor in Nursing	18(75.0)	6(25.0)		19(82.6)	3(13.0)	1(4.1)		19(79.1)	5(20.8)	
	BSc Nursing	9(69.2)	4(30.7)		11(78.5)	2(85.7)	1(7.1)		9(69.2)	4(30.7)	
Professional designation	Nursing Officer	12(85.7)	2(14.2)	2.49 (0.29#)	10(71.4)	2(14.2)	2(14.2)	5.56 (0.24 #)	12(85.7)	2(14.2)	1.99 (0.37#)
	Senior staff nurse	22(66.6)	11(33.3)		28(82.30)	5(14.7)	1(2.9)		22(66.6)	11(33.3)	
	Staff nurse	34(80.9)	9(21.4)		35(83.3)	5(11.9)	2(4.7)		32(74.4)	11(25.5)	
Professional experience (years)	2-3	21(77.7)	6(22.2)	1.75 (0.63#)	3(11.1)	5(18.5)	19(70.3)	4.88 (0.56)	19(70.3)	8(29.6)	
	4-5	47(74.6)	16(25.3)		2(3.1)	7(11.1)	54(85.7)		47(74.6)	16(25.3)	
Work experience (years)	< 1	5(35.7)	9(64.2)	3.57 (0.312#)	1(7.1)	4(28.5)	9(64.2)	7.38 (0.29)	8(57.1)	6(42.8)	2.67 (0.45#)
	2-3	17(28.0)	8(32.0)		2(8)	3(12)	20(80)		18(72.0)	7(28.0)	
	4-5	29(85.2)	5(14.7)		1(2.8)	3(8.5)	31(88.50)		26(76.4)	8(23.5)	
	> 5	13(76.4)	4(23.5)		1(6.2)	2(1.2)	13(81.2)		14(82.3)	3(17.6)	
Any training	Yes	23(79.3)	6(20.6)	0.33 (0.57)	26(89.6)	1(3.8)	2(7.6)	3.66 (0.16)	19(65.5)	10(34.4)	0.33 (0.57)
	No	45(73.7)	16(26.2)		47(77.0)	11(18.0)	3(4.9)		47(77.0)	14(22.9)	
Name of training	Critical Care Training	6(60)	4(40)	3.66 (0.17#)	54(80.5)	11(16.4)	3(4.4)	9.59 (0.048)	6(60.0)	4(40.0)	1.51 (0.471#)
	Basic Life Support Training	17(89.4)	2(63.1)		19(86.3)	1(4.5)	2(9.0)		13(68.4)	6(31.5)	
Any ICU protocols	Yes	56(72.7)	21(27.2)	1.37 (0.24 ¥)	62 (80.5)	11 (14.2)	4 (5.1)	0.551 (0.78)	55(71.4)	22 (28.5)	0.43 (0.512 ¥)
	No	12(92.3)	1(7.6)		11(84.6)	1(7.6)	1 (7.6)		11(84.6)	2(15.3)	
Significance level at 0.05 #Likelihood Ratio ¥Yates Correction											

Table 6: Level of knowledge, attitude and practice regarding administration of inotropic drugs
n=90

Characteristics	Frequency	Percentage (%)
Level of knowledge		
Unsatisfactory ($\leq 85\%$)	27	30.0
Satisfactory ($\geq 85\%$)	63	70.0
Level of Attitude		
Positive (≥ 35 grade)	73	81.1
Neutral (18 to < 35 grade)	12	13.3
Negative (≤ 18 grade)	5	5.6
Level of practice		
Unsatisfactory ($\leq 85\%$)	24	26.7
Satisfactory ($\geq 85\%$)	66	73.3
Co-relation of Knowledge, attitude and practice		
	Correlation (r)	p-value
Knowledge and Attitude score	0.565	0.00000
Knowledge and Practice score	0.724	0.000
Practice and Attitude Score	0.595	0.0000

It revealed, there was moderate correlation between knowledge and attitude score ($r=0.510$) including high correlation between knowledge and practice score ($r=0.724$) and moderate correlation between practice and attitude score ($r=0.595$). It was found that there were statistically significant relationships among knowledge, attitude and practice scores of respondents regarding administration of inotropic medication.

IV. DISCUSSION

The group of drugs that are responsible to alter the cardiac-contraction and are directly related to the function of mean arterial pressure, systemic vascular resistance and cardiac output are inotropic drugs. These drugs are often prescribed to critically ill patients and the major responsible person for administration are critical care nurses. Hence the purpose of the study is to detect knowledge, attitude and practices of CCU nurses. The study showed that 90.0% belonged to the age of 20-30 years with the mean age 24.77 with Standard Deviation 3.57. The majority of respondents that is 52.2% were unmarried and 58.9% were Brahmin and Chettri. Present study showed that 57% had professional qualification of proficiency level of nursing whereas majority of nurses that is 49.5% worked in intensive care unit. The professional qualification of the study was similar to the another study at Cairo University, where 44.3% nurses had qualification of proficiency level of nursing.^[10]

In this study, level of knowledge is classified into two categories on the basis of obtained score where 30.0% had unsatisfactory level of knowledge and 70.0% had satisfactory level of knowledge. The finding was supported by a descriptive study conducted in Odisha, India among nursing students. The study was aimed to assess knowledge on inotropes in Critically Ill Patients in SUM Nursing College. The finding of the study revealed that 72% had fair knowledge regarding uses of inotropic medication.^[11] Whereas the finding of the study was in contrast with another study conducted in Northeastern Brazil to assess the Nurse's knowledge on vasoactive drugs used in critical patients. The study revealed that 42.5% respondents answered satisfactorily regarding the knowledge about inotropic drugs.^[12]

The study revealed that 81.1% had positive level of attitude, 13.3% had neutral level of attitude and 5.6% had negative level of attitude. This study contrasted with the descriptive study conducted in Ismailia City. The study was aimed to assess 'Nurses' Performance Regarding Administration of Inotropic Medications for Critically Ill Patients'. The findings of study revealed that 96% had positive attitude toward administration of inotropic medication, 3% had indifferent attitude where 1% negative attitude.^[13] Similarly, descriptive cross-sectional hospital-based study was conducted in Omdurman Military Hospital, Africa. The study was aimed to assess nurse's knowledge and attitude regarding positive inotropes in critical care unit. The study revealed that 60% positive attitude and 56% negative attitude of nurses toward inotropic medication.^[14]

The study showed that 26.7% respondents had unsatisfactory level of practice whereas 73.3% had satisfactory level of practice. The finding is similar to the descriptive study conducted in Ismailia City. The study was aimed to assess 'Nurses' Performance Regarding Administration of Inotropic Medications for Critically Ill Patients. The study revealed that 89% had satisfactory total practice had 11% nurses had unsatisfactory total score.^[13] Whereas the finding of the study was in contrast with another quasi-experimental study was conducted in Suez Canal. The study was aimed to assess 'Effect of Implementing Guidelines Regarding Administering Inotropic Medications for Critically Ill Patients on Nurses' Practice. The study revealed that 93.3% had satisfactory level of practice regarding inotropic medication post implementing intervention guidelines.^[15]

The present study showed that there was no significant between respondents' knowledge level and socio-demographic characteristics: age ($p=0.553$), marital status ($p=0.218$), ethnicity ($p=0.250$), religion ($p=0.515$) and residence area ($p=0.468$). Similarly, there was no significant association between knowledge level and professional related characteristics: area of work ($p=0.470$), education ($p=0.833$), professional designation ($p=0.288$), professional experience ($p=0.627$), working experience ($p=0.312$), received any training ($p=0.568$), any protocol related to inotropic medication ($p=0.242$). A descriptive study was conducted in Indore, India. The study was aimed to assess the knowledge regarding administration of inotropic drugs among staff nurses in selected hospital. The study revealed that there was no statistically significant between knowledge and socio-demographic characteristics like age, professional qualification, work experience and nursing education programme.^[16]

The study findings showed that there was no significant association between respondents' attitude level and socio-demographic characteristics: age ($p=0.604$), marital status ($p=0.786$), ethnicity ($p=0.874$), religion ($p=0.903$) and residence area ($p=0.488$). There was statistically significant association between respondents' attitude level and training of respondents ($p=0.048$). While the rest of professional characteristics like area of work ($p=0.607$), education ($p=0.769$) professional designation ($p=0.235$), total professional experience ($p=0.560$) and work experience ($p=0.287$) were not significant with the level of attitude regarding inotropic medication. A descriptive cross-sectional hospital-based study in Africa. The study was aimed to assess nurse's knowledge and attitude regarding positive inotropes in critical care unit

in Omdurman Military Hospital. The study revealed that there is no association between total attitude score and years of experience and qualification of nurses.^[14]

The study findings showed that there was significant association between respondents' level of practice and the age of respondents ($p=0.042$). While the rest of socio-demographic characteristics like marital status ($p=0.239$), ethnicity ($p=0.175$), religion ($p=0.515$) and residence area ($p=0.874$). There was statistically significant association between respondents' practice level significant and level of practice and the education level ($p=0.002$). While the rest of professional characteristics like area of work ($p=0.387$), professional designation ($p=0.370$), total professional experience ($p=0.763$) and work experience ($p=0.445$) were not significant with the level of attitude regarding inotropic medication. A descriptive cross-sectional hospital-based study in Africa. The study was aimed to assess nurse's knowledge and attitude regarding positive inotropes in critical care unit in Omdurman Military Hospital. The study revealed that there is no significant difference in the nurses' practice mean scores regarding inotropic medications in post and follow-up implementing guidelines when compared with pre-intervention mean practice score with P value $< .001$.^[14] After the completion of this study, it is recommended that this kind of study can be done on a larger population scale with large sample to find out the knowledge, attitude and practice regarding administration of inotropic medication among critical care nurses of selected private hospitals of Nepal.

V. CONCLUSION

the findings of the study concluded that though there was satisfactory knowledge, positive attitude and satisfactory practice among most of the critical care nurses as per the importance of inotropic administration they frequently and repeatedly needs further Inservice educations and training for safety of critically ill patients.

VI. COMPETING INTERESTS

The authors declare that there is no competing interest.

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