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A Study to Assess the Knowledge and Practices Regarding Administration of IV Therapy among the Staff Nurses Working in BIMR Hospital at Gwalior, M.P.

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Abstract
Intravenous therapy is the parenteral administration of fluids, medication, nutritional support, blood products and the transfusion of blood. Fluids are delivered through a vascular access device, which is inserted into a peripheral or central vein. The aim of the study to assess the knowledge and practice of staff nurses regarding administration of IV therapy. A non experimental design were used of which total 50 Samples were selected by using purposive non probability sampling technique. The Knowledge assessed through structured Questionnaire and practice by observation checklist. The results were described by using descriptive and inferential statistics. Overall knowledge mean score was (14.16%) with (3.60) standard deviations whereas Practice means score was (38.84%) with (1.40) standard deviations. On the basis of the findings of the study, similar study can be replicated on a large sample to generate the findings.

Keywords: Knowledge, Practice, IV Therapy, Staff Nurse

1. Introduction
Intravenous therapy is the parenteral administration of fluids, medication, nutritional support, blood products and the transfusion of blood. The introduction of a large amount of fluid into body through veins is, termed as intravenous infusions. Intravenous injection if small quantity as 1cc to 5 cc, then given through vein directly, by using syringes. When larger quantity is required to be inject like glucose or normal saline it is called as Intravenous infusion. Large superficial veins are selected for purpose of intravenous route. Usually the site is large vein at ante cubital fossa, the next optional site is the visible superficial vein at dorsum of palm of hand and sometimes vein at inner side of ankle is selected. When needle punctures these veins it becomes difficult for infusion is adopted by peering skin and finding a vein either at dorsum of hand or above medial malleolus at ankle joint. Vein puncture is performed by creating the incision on skin. Intravenous therapy may be used to correct electrolyte imbalances, to deliver medications, for blood transfusion or as fluid replacement to correct, for example, dehydration. Compared with other routes of administration, the intravenous route is the fastest way to deliver fluids and medication throughout the body. Some medications, as well as blood transfusion and lethal injections, can only be given intravenously. Substances that may be infused intravenously include following: Volume expanders, Blood-based products, Blood substitutes, Medication, Others etc. Intra Venous Access Device can all be used to obtain blood (e.g. for testing), also known as phlebotomy as well as for the administration of medication/fluids. Intravenous therapy has become a major component of patient care in hospital and nursing homes. It is indicated for almost every individual who is admitted to the hospital and is used to support patient with acute and chronic problems **(**Creamer, 2000**).** The management of the Intravenous therapy is now an accepted and often very relevant part of a nurse's role. Specialist in Intravenous therapy are also becoming, more common, taking the lead in assessing, inserting, managing and removing a variety of vascular access devices both in hospital and in the community. Zingg and Pittet (2009**)** noted that as many as 80% of hospitalized patients will have a cannula in situ, and Hart (2008**)** suggested that patients who require IV therapy are often seriously ill and immunocompromised, thus are more susceptible to infection. The Department of Health (2007) estimated that 6000 patients acquire a catheter-related bloodstream infection every year in the UK. Robust standards of practice are therefore paramount to ensure safe and competent practice, both in peripheral IV cannulation and IV care. Using the chain of infection as a framework to review practice will enable practitioners to ensure thorough standards of practice, and the Royal College of Nursing (2005) stated that only trained and competent staff using strict aseptic techniques should be involved in IV or cannula care. The Code (Nursing and Midwifery Council (NMC), (2008) stipulates all practitioners must deliver care based on the best available evidence and/or best practice, and that knowledge and skills for safe and effective practice must be kept up-to-date throughout each health professionals working life. Intravenous fluid administration is an integral component of clinical care. Errors in administration can cause detrimental patient outcomes and increased healthcare cost, although little known about medication administration errors associated with continuous infusion. When IV therapy is required, the nurse must know the correct solution, equipment needed, and procedures required to initiate an infusion regulate the fluid infusion rate maintain the system, identify and correct problems and discontinue

the infusion. We know that staffs nurses who are working in hospitals have lot experience but at the time administer of IV therapy they are not follow proper procedure, aseptic technique and scientific principles. Thus by the taking all above factors into consideration the investigation felt the need to find out knowledge and practice of staff nurses regarding administration of IV therapy.

2. Materials and Methods

2.1 Research Approach

In view of the nature of the problem selected for the study and the objectives to be accomplished, quantitative descriptive research approach was considered.

2.2 Research Design

The research design selected for the study was non experimental design.

2.3 Setting of the Study

The study was conducted in the BIMR hospital, Gwalior, M.P.

2.4 Sample and Sample size

Sample refers to a sub set of population, selected to participate in research study. The sample of this study comprised of 50 staff nurses of BIMR Hospital, Gwalior.

2.5 Sampling Technique

Sampling refers to process of selecting a portion of population to represent the entire population. Purposive sampling technique was used to draw the sample.

2.6 Criteria for Selection of Sample

Inclusion Criteria

1. Staff nurses who are working in the BIMR Hospital.
2. Staff nurses who are willing to participate in study.
3. Staff nurses who are available at the time of data collection.
4. Staff nurses who are ANM, GNM, B.Sc., PB.BSC.

Exclusion Criteria

1. Staff nurses who are not available at the time of study.
2. Staff nurses who holding M.Sc. nursing degree.

2.7 Selection and Development of Instrument.

Selection of the Tool

A structured knowledge questionnaire and an observational check list were selected for the study.

Development of Tools

A structured knowledge questionnaire was prepared to assess the knowledge of staff nurses regarding administration of IV therapy. An observation check list was prepared to assess the practice of staff nurses regarding administration of IV therapy.

2.8 Description of the Tool

The tool comprised of three sections.

Section –A: Consists of demographic characteristics of nurses seeking information such as age, gender, professional qualification, total clinical experience, availability of necessary equipment's for IV therapy, any in service educational programme attended, frequency of IV therapy per day.

Section –B: Consists of 30 items pertaining to knowledge regarding administration of IV therapy. It has six part mentioned below.

Part I: Consists of 3 items related to general introduction of IV therapy.

Part II: Consists of 5 items related IV site and IV device.

Part III: Consists of 6 items related to IV fluid and calculation.

Part IV: Consists of 5 items related to insertion of IV device.

Part V: Consists of 4 items related nursing care in IV therapy.

Part VI: Consists of 7 items related to complications of IV therapy and prevention complications.

Score

There were 30 items. Each item has four options with one most appropriate answer. The maximum score for correct response to each item was "one" and incorrect was "zero". Thus for 30 items these were 30 correct responses with 30 maximum obtainable scores.

Section-C. Consists of 24 items pertaining to practice of IV therapy.

Score

There were 24 items. Each item has two options such as yes, no. Statements carry scores as follows, Yes-2 and No -1 mark.

2.9 Content Validity

Content validity of the tool was established by obtaining the suggestions from the experts. The tool was validated from the experts in the field of Medical surgical Nursing. The suggestions were incorporated in modifying the tool.

2.10 Reliability

Reliability of the tool was assessed by collecting data from 5 staff nurses from KM & KDG Hospital, Gwalior. Split half method with Spearman Brown prophecy formula was used to test the reliability of the tool. The reliability of the tool was 0.5281. It was statistically significant and thus reliable.

3. Result and Discussion

Section A

Analysis of Demographic Variables

Analysis of demographic data of the sample is described in terms age, gender, and professional qualification, total clinical experience, equipment available in ward attended any in service education programme and frequency of administration IV therapy per day. The findings are presented in tables 1 to 9 and figures 1 to 9.

Table 1: Distribution of Subjects According to Age. N=5O

Age (years)	Numbers	Percentage (%)
21-30	2()	40.00
31-40	28	56.00
41-50	1	02.00
51-60	1	02.00
Total	50	100.00

Shows that majority of the nurses 28(56%) belongs to the age group of 31 to 40 years. 20(40%) of nurses belong to the age group of 21 to 30 years. 1(2%) of nurses belong to the age group of 41 to 50 years as well as between 51 to 60 years.

Table 2: Distribution of Subjects According to Gender N=50

Gender	Number	Percentage
Male	11	22
Female	39	78
Total	50	100

Shows that the majority of the nurses 39(78%) are female and 11(22%) nurses are male.

Table 3: Distribution of Subjects According to Professional Qualification. N=50

Education	Number	Percentage
ANM	2	4
GNM	20	40
BSc	22	44
PB BSc	6	12
Total	50	100

Shows that 22(44%) nurses are BSc, 20(40%) nurses are GNM, 6(12%) nurses are PB BSc and remaining 2(4%) nurses are ANM.

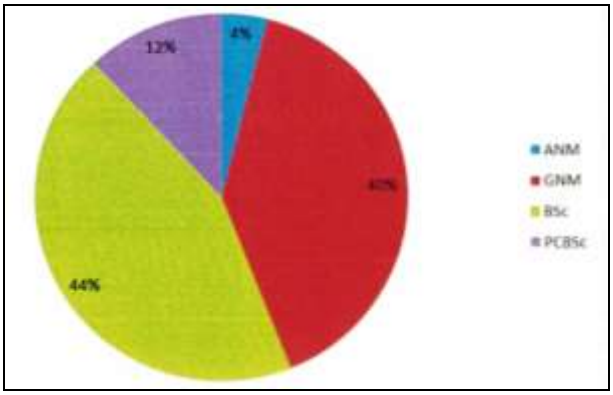

Fig 1: Distribution of Subjects According to Professional Qualification.

Table 4. Distribution of Subjects According to Total Clinical Experience. N=5O

Clinical Experience	Total	Percentage
1-5 years	16	32
6-10 years	25	50
11-2O years	8	16
>20 years	1	2
Total	50	100

Shows that nurses 25(50%) nurses have 6-12 years clinical experience, 16(32%) nurses have 1-5 years clinical experience, 8(16%) nurses have 11-20 years clinical experience and 1(2%) nurses have >20% clinical experience. (Figure 2)

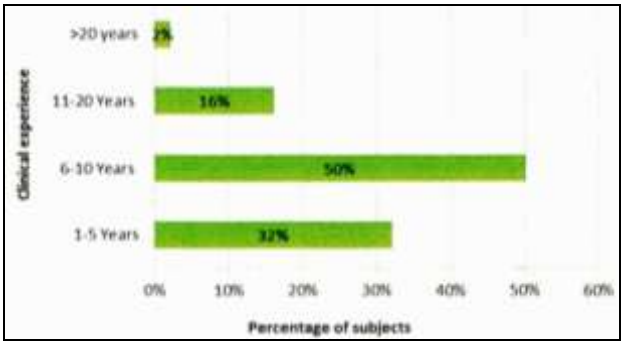

Fig 2: Distribution of Subjects According to Total Clinical Experience.

Table 5: Distribution of Subjects According to Equipment's available in ward. N=50

Equipment's Available	Number	Percentage
Yes	48	96
No	2	4
Total	50	100

Shows that majority of the nurses 48(96%) says that all necessary equipment's for administration of IV therapy are available in the ward and 2(4%) nurses say not available. (Figure 3)

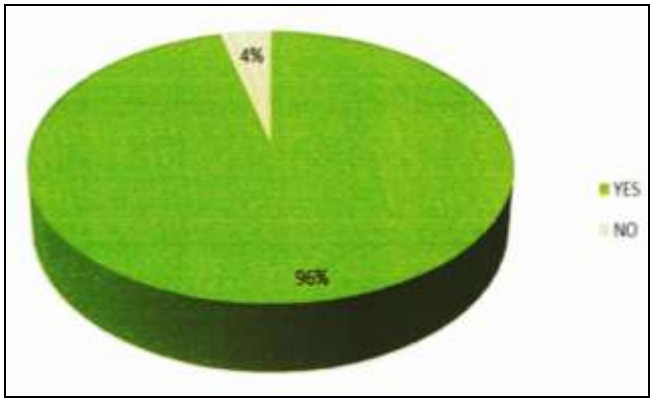

Fig 3: Distribution of Subjects According to Equipment's available in ward.

Table 6: Distribution of Subjects According to attended any in service Education programme. N5O

Attended	Number	Percentage
Yes	28	56
No	22	44
Total	50	100

Shows that majority of nurses 28(56%) attended in service educational programme related IV therapy and 22(44%) nurses not attended any in service educational programme related IV therapy. (Figure 7)

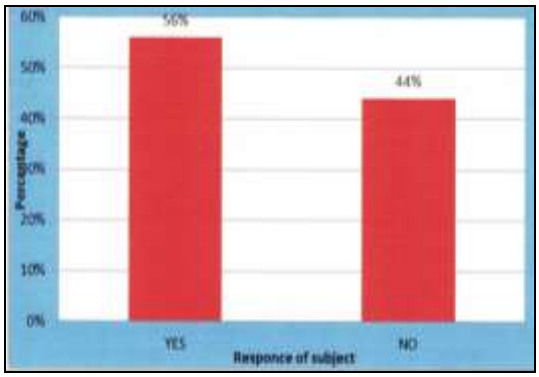

Fig 4: Distribution of Subjects According to Attended any In service Education programme.

Table 7. Distribution of Subjects According to Frequency of N administration. N = 50

Frequency	Total	Percentage
1-4 times	3	6
5-8 times	12	24
9-20 times	16	32
>20 times	19	38
Total	50	100

shows that majority of the nurses 19(38%) are administering >20 times per day, 16(32%) nurses administrating 9-20 times per day, 12(24%) nurses are administering 5-8 times per day and 3(6%) nurses are administering 1-4 times per day.(Figure 5)

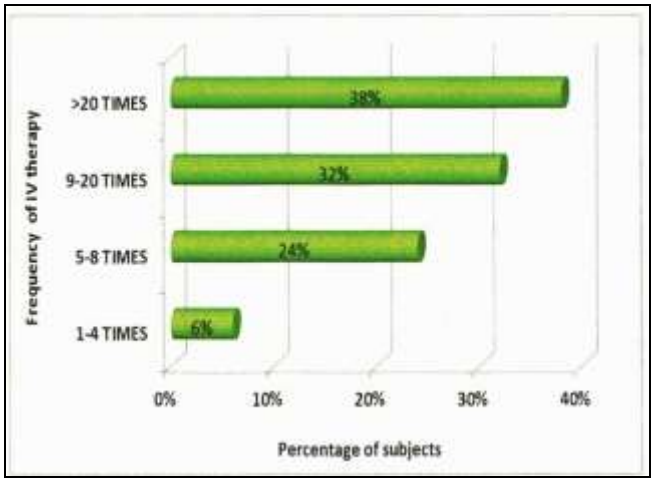

Fig 5: Distribution of Subjects According to Frequency of IV administration

Section B

Analysis of Knowledge Regarding Administration of IV Therapy

Table 8. Frequencies and percentage distribution of knowledge staff nurses regarding administration of IV therapy.

Level of nowledge	Range of score	Frequency (f)	Percentage (%)
Low	1-10	2	2
Average	11-19	42	42
High	19-30	6	6
Total	30	100	100

Shows that staff nurses are categorized into three groups based on their knowledge related to administration of IV therapy. The staff nurses who scored between 1-10 are ategorized into low score knowledge group, staff nurses who scored between 11-19 are categorized into average knowledge group and staff nurses scored above 19 are categorized into high knowledge group.

Table 9. Mean, Median, standard deviation of the overall knowledge of staff nurses regarding administration of IV therapy

Obtained score Range	Mean	Median	Max	SD
8-13	14.56	14	23	3.60

Data Presented in Table-9 Shows that the mean score of knowledge are found to be (14.56) with standard deviation of (3.60) and median of distribution is (14).

Table 10. Area Wise Knowledge Scores of staff nurses regarding administration of N therapy N=50

S. No.	Area wise knowledge	Mean	Median	SD
I	General introduction of IV therapy	44	48	6.92
2	IV site and IV device	27.4	29	11.05
3	IV fluids and fluid calculation	24.16	26.5	8.47
4	Insertion of IV device	26.60	27	3.36
5	Nursing care in IV therapy	16.5	16.5	1.73
6	Complication and prevention of complication.	16.42	15	8.84

The results of statistical data analysis of the area wise knowledge scores have been presented in Table 10.

- Table No.10 shows that in the area of knowledge related general introduction of IV therapy, mean score is (44) with standard deviation (6.92) and median is (48).
- Table No. 10 reveals that in the area of knowledge related IV site and IV device mean score is (27.4) with standard deviation (11.05) and median is (29).
- Table No. 10 shows that in the area of knowledge IV fluids and fluid calculation, mean score is (24.16) with standard deviation (8.47) and median is (26.5).
- Table No. 10 reveals that in the area of knowledge related Insertion of IV device, mean score is (26.60) with standard deviation (3.36) and median is (27).
- Table No. 10 shows that in the area of knowledge related nursing care in IV therapy means score is (16.42) with standard deviation (3.84) and median is 15).

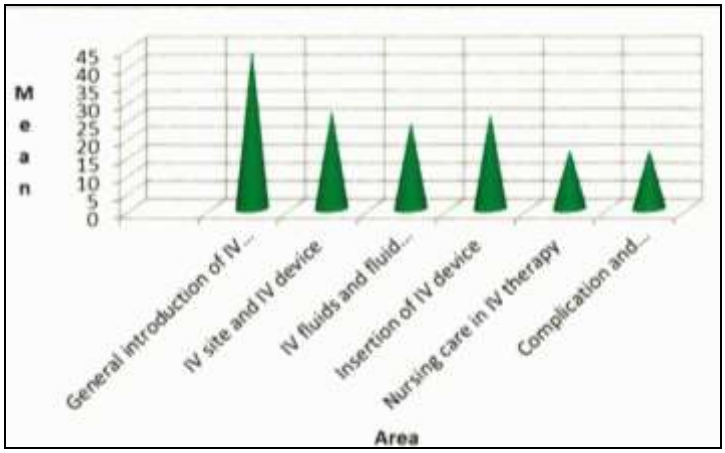

Fig 6: Area Wise Knowledge Scores of staff nurses regarding administration of IV therapy.

Section C

Analysis of Practice Score Regarding Administration of IV Therapy

Table 11: Frequencies and percentage distribution of practices staff nurses regarding administration of IV therapy.

Level of Practice	Range of score	Frequency (f)	Percentage (%)
Low	1-18	0	0
Average	19-38	16	32
Good	39-48	34	68
Total	48	50	100

Shows that practice staff nurses is score 16(32%) in average range while 34(68%) nurses score in good range in administration of IV therapy.

Table 12: Mean, Median, standard deviation of practices of staff nurses regarding administration of IV therapy

Obtained score range	Mean	Median	Max	SD
35-43	39.84	40	43	1.40

Data presented in table 12 shows that the mean score of ractice is (39.84) with standard deviation of (1.40) the median of the distribution is (40) and max is (43).

Section – D

Analysis of correlation between knowledge and practice of staff nurses\

Table 13: Coefficient of correlation between knowledge & practices of staff nurses regarding administration of IV therapy**.** N=50

	Knowledge level	Practice level
Mean	14.56	39.84
SD	3.60	1.48
Coefficient of Correlation (r)	0.1650 ➢ Positive Correlation	

The data in Table 13 shows that there is a positive correlation between knowledge and practice of staff nurses regarding administration of IV therapy. Scores are ($r = 0.165$, $p < 0.05$) hence null hypothesis is rejected. There is positive correlation between knowledge and practice of staff nurses that is knowledge increases there is slightly increases in practices also.

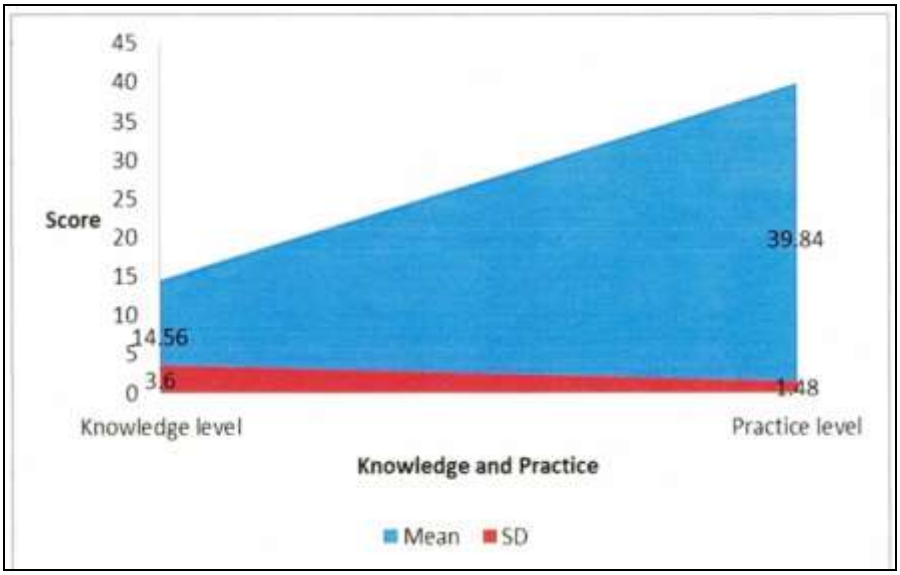

Fig 7: Coefficient of correlation between knowledge & practices of staff nurses regarding administration of IV therapy.

Section - E

Analyis of Association between Knowledge Score with Selected Demographic Variable

Table 14: Association between knowledge score of staff nurses regarding administration of IV therapy with their age N=50

Age in Years	Knowledge score			Total
	Low	Average	Good	
21-30	0	14	3	17
31-40	2	23	3	28
41-50	0	4	0	4
51-60	0	1	0	1
Total	2	42	6	50

$x^2 = 3.87$, df = 6, P value =9.70 Not Significant

Table 14 shows association between age and their knowledge regarding administration of IV therapy. Among 50 samples, 2 staff nurses has low knowledge score (31-40 years), 43 staff nurses has average knowledge score out of them 14 nurses (21-30 years), 23 staff nurses (31-40 years), 4 staff nurses (31-40 years), 1 staff nurse (51-60) and S staff nurses has high knowledge score out of them 3 staff nurses (21-30 year) 3 staff nurses (31-40) year. The data presented in table 14 indicates that the obtained chi square value (x^2) of knowledge of staff nurses with age is (3.87). Hence, there is no significant relationship between age and their knowledge regarding administration of IV therapy.

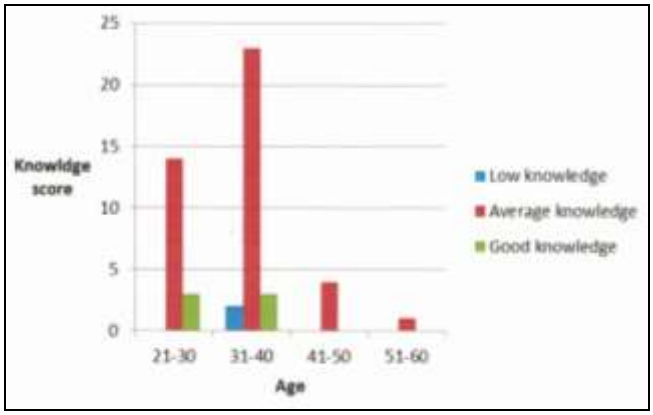

Fig 8: Association between knowledge score of staff nurses regarding administration of IV therapy with their age.

Table 15: Association between knowledge score of staff nurses regarding administration of IV therapy with their gender N=50

Gender	Knowledge score			
	Low	Average	Good	Total
Male	0	8	4	12
Female	2	34	2	38
Total	2	42	6	50

$x^2 = 6.77$, df=2, P value = O.02 Significant

Table 15 shows association between gender and their knowledge regarding administration of IV therapy. Among 50 samples, 2 staff nurses has low knowledge score (male 0, female 2), 42 staff nurses has average knowledge score (male 34, female 8) and 6 staff nurses has high knowledge score (male 4, female 2).The data presented in table 15 indicates that the obtained chi square value (x^2) of knowledge of staff nurses with gender is (6.77). Hence, there is significant relationship between staff nurses gender and their knowledge regarding administration of IV therapy.

Table 16: Association between knowledge score of staff nurses regarding administration of IV therapy with their professional qualification N= 50

Professional qualification	Knowledge score			
	Low	Average	Good	Total
ANM	0	2	0	2
GNM	2	16	2	20
BSc	0	19	3	22
PB BSc	0	6	0	6
Total	2	43	1	50

$x^2 = 5.18$, df=6, P value = 0.50 Not Significant

Table 16 shows association between professional qualification and their knowledge regarding administration of IV therapy. Among 50 samples, 2 staff nurses (2 GNM) has low knowledge score, 43 staff nurses has average knowledge score out of them 2 staff nurses (ANM), 16 staff nurses (GNM), 19 staff nurses (BSc), 6 staff nurse (PB BSc) and 6 staff nurses has high knowledge score out of them 3 staff nurses (2 GNM) 3 staff nurses (BSC). The data presented in table 16 indicates that the obtained chi square value (x^2) of knowledge of staff with professional qualification is (5.18). Hence, there is no significant relationship between professional qualification and their knowledge regarding administration of IV therapy.

Table 17: Association between knowledge score of staff nurses regarding administration of IV therapy with total clinical experience N=50

Total Clinical Experience Years	Knowledge score			
	Low	Average	Good	Total
1-5	0	11	3	14
8-10	2	20	3	25
11-20	0	10	0	10
>20	0	1	0	1
Total	2	42	6	50

$x^2 = 3.87$, df=6, P value = 0.5 Not Significant

Table 17 shows association between age and their knowledge regarding administration of IV therapy. Among 50 samples, 2 staff nurses (6-10 years) has low knowledge score, 43 staff nurses has average knowledge score out of them 11 nurses (1-5 years), 20 staff nurses (6-10 years), 10 staff nurses (11-20 years), I staff nurse (>1 year) and 6 staff nurses has high knowledge score out of them 3 staff nurses (1-5 year) 3 staff nurses (6-10 year). The data presented in table 17 indicates that the obtained chi square value (x^2) of knowledge of staff nurses availability of necessary equipment's for IV therapy in the ward is (3.87). Hence, there is no significant relationship between age and their knowledge regarding administration of IV therapy.

Table 18: Association between knowledge score of staff nurses regarding administration of IV therapy with availability of necessary equipment's for N therapy in the ward. N=50

Availability of equipment's in the ward	Knowledge score necessary			Total
	Low	Average	Good	
Yes	2	41	5	48
No	0	2	0	2
Total	0	43	5	50

x^2 = 1.99, df = 2, P value = 0. 10 Not Significant

Table 18 shows association between availability of necessary equipment's for IV therapy in the ward and their knowledge regarding administration of IV therapy. Among 50 samples, 2 staff nurses has low knowledge score (yes 2, no 0), 43 staff nurses has average knowledge score (yes 41, no 2) and 5 staff nurses has high knowledge score (yes 5, no 0).The data presented in table 18 indicates that the obtained chi square value (x^2) of knowledge of staff nurses with availability of necessary equipment's for IV therapy in the ward is (2.28). Hence, there is no significant relationship between availability of necessary equipment's for IV therapy in the ward and their knowledge regarding administration of IV therapy.

Table 19: Association between knowledge score of staff nurses regarding administration of IV therapy with their attended of any in-service educational programme. N=50

Gender	Knowledge score			Total
	Low	Average	Good	
Yes	2	16	4	22
No	1	25	2	28
Total	3	41	6	50

x^2=2.28, df=2, P value =0.10 Not Significant

Table 19 shows association between attended of any in-service educational programme and their knowledge regarding administration of IV therapy. Among 50 samples, 3 staff nurses have low knowledge score (yes 2, no 1). 41 staff nurses has average knowledge score (yes 16, no 25) and 6 staff nurses has high knowledge (yes 4, no 2).The data presented in table 19 indicates that the obtained chi square value (x^2) of knowledge of staff nurses with attended of any in-service educational programme is (2.28). Hence, there is no significant relationship between staff nurses attended of any in-service educational programme and their knowledge regarding administration of IV therapy.

Table 20: Association between knowledge score of staff nurses regarding administration of IV therapy with frequency of administer IV therapy per day N=50

Frequency of IV therapy per day	Knowledge score			Total
	Low	Average	Good	
1-4 times	0	3	2	5
5-8 times	1	8	3	12
9-12 times	0	13	0	13
>20 times	1	19	0	20
Total	2	43	5	50

x^2=7.29, df = 6, P value =0.10 Not Significant

Table 20 shows association between frequencies of administers IV therapy per day and their knowledge regarding administration of IV therapy. Among 50 samples, 2 staff nurses has low knowledge score (5-8 times,>20 times), 43 staff nurses has average knowledge score out of them 3 staff nurses (1-4 times), 8 staff nurses (5-8 times), 13 staff nurses (9-12 times), 13 staff nurse (> 20 times) and 5 staff nurses has high knowledge score out of them 2 staff nurses (1-4 times), 3 staff nurses (5-8 times). The data presented in table 20 indicates that the obtained chi square values (x^2) of knowledge of staff nurses with frequencies of administer IV therapy per day is (7.29). Hence, there is no significant relationship between frequencies of administer IV therapy per day and their knowledge regarding administration of IV therapy.

3.1 Discussion

The findings of the study are discussed under the following headings:

3.1.2 Demographic Characteristics.

Majority of staff nurses (56%) were in the age group of 31 to 40 years, (79%) of the staff nurses were female and (44%) of them were B.Sc. nursing, (50%) of them had 6–10 years clinical experience. (96%) of staff nurses found that all necessary equipment's available in ward for IV therapy. (56%) of the staff nurses attended in service educational programme related IV therapy and (38%) of them are administering IV therapy >20 times in day.

3.1.3 Discussion related to knowledge of administration of IV Therapy.

Overall knowledge mean score was (14.16%) with (3.60) standard deviations.The study conducted by Wandwalo ER. Morkveo (2000) to determine nurse's knowledge regarding administration of IV therapy is similar to the present study. Results showed that (79%) nurses had satisfactory knowledge regarding administration of IV therapy.

3.14. Discussion related to practice of administration of IV Therapy.

In the present study the overall mean practice score is (38.84%) with (1.40) standard deviations. Similar study was conducted by O'Boyle SJ, *et al* (2002) to determine factors affecting administration of IV therapy among nurses. Most nurses about (59%) of them felt that the administration of IV therapy could be improved by provision of in service educational programme.

3.15 Discussion related to Association between Demographic Variables and Knowledge.

Among the demographic variables analysed in this study, Gender is found to be significant association with knowledge. No significant association was found between Age, professional qualification, total clinical experience, equipment's available in ward, attended of any in service educational programme and frequency of administration IV therapy.

Above results are in par with the study conducted by Crook N (1991) in which there was a significant association between gender and knowledge.

3.1.6 Discussion Related to Testing the Hypothesis

The null hypothesis (Ho) stated in the study is rejected since there is significant change found between the knowledge and practice of staff nurses regarding administration of IV therapy ($r = 0.165$, $p<0.05$). Hence the stated null hypothesis is rejected and research hypothesis (H^1) is

accepted.

4. Conclusion:

The major findings of the study are Findings related to Demographic Characteristics Majority of staff nurses (56%) were in the age group of 31 to 40 years, (79%) of the staff nurses were female and (44%) of them were B.Sc. nursing, (50%) of them had 6–10 years clinical experience. (96%) of staff nurses found that all necessary equipment's available in ward for IV therapy. (56%) of the staff nurses attended in service educational programme related IV therapy and (38%) of them are administering IV therapy >20 times in day. Findings Related to Knowledge staff nurses Overall knowledge mean score was (14.16%) with (3.60) standard deviations. Findings Related to practices of staff nurses Practice means score was (38.84%) with (1.40) standard deviations. Findings related to correlation between knowledge and practice of staff nursesThere is mild positive correlation founded between knowledge and practice of Staff nurses.

Findings related to association between knowledge and selected demographic characteristics of staff nurses There was significant association with demographic variable gender and no significant association with other demographic variables such as age, professional qualification, total clinical experience, equipment available in ward attended any in service education programme.

4.1 Acknowledgement

I wish to thank all the research participants who volunteered to participate in this study.

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