A STUDY TO ASSESS THE KNOWLEDGE ABOUT THE PEDIATRIC MEDICINE ADMINISTRATION IN CONGENITAL HEART INTENSIVE CARE UNIT

Project Report

Submitted in partial fulfillment of the requirements

For the

Diploma in Cardiovascular and Thoracic Nursing

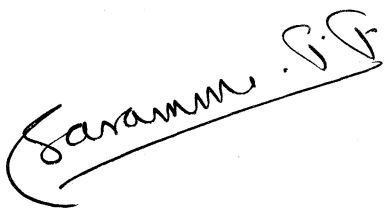
By
VIDYA. S. NAIR
Code No. 6199

Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram

2011

CERTIFICATE FROM SUPERVISORY GUIDE

This is to certify that Mrs. VIDYA S NAIR has completed the project work on **"A STUDY TO ASSESS THE KNOWLEDGE OF NURSES ABOUT THE PEDIATRIC MEDICINE ADMINISTRATION IN CONGENITAL HEART INTENSIVE CARE UNIT in SCTIMST**, Thiruvananthapuram" under my direct supervision and guidance for the partial fulfillment of the Diploma in Cardiovascular and Thoracic Nursing in the University of SCTIMST, Thiruvananthapuram. It is also certified that no part of the report has been included in any other thesis for procuring any other degree by the candidate.



Dr. Saramma. P. P
Senior Lecturer in Nursing
SCTIMST
Thiruvananthapuram

Thiruvananthapuram,
November 2011

CERTIFICATE FROM THE CANDIDATE

This is to certify that the project on **"A STUDY TO ASSESS THE KNOWLEDGE OF NURSES ABOUT THE PEDIATRIC MEDICINE ADMINISTRATION IN CONGENITAL HEART INTENSIVE CARE UNIT in SCTIMST**, Thiruvananthapuram " is a genuine work done by me, under the guidance of Dr. P.P. Saramma, PhD, Senior Lecturer in Nursing, SCTIMST, Thiruvananthapuram. It is also certified that this work has not been presented previously to any other University for award of degree, diploma or other recognition.

Mrs. VIDYA S NAIR
Code No : 6199
SCTIMST,
Thiruvananthapuram

Thiruvananthapuram,
November 2011.

APPROVAL SHEET

This is to certify that Mrs. VIDYA. S. NAIR bearing code no: 6199, has been admitted to the Diploma in Cardiac nursing, in January 2011 and she has undertaken the Project entitled " A STUDY TO ASSESS THE KNOWLEDGE OF NURSES ABOUT THE PEDIATRIC MEDICINE ADMINISTRATION IN CONGENITAL HEART INTENSIVE CARE UNIT" of SCTIMST, Trivandrum, which is approved for the Diploma in cardiac nursing, awarded by the Sree Chitra Tirunal Institute For Medical Sciences and Technology, Trivandrum and it is found satisfactory.

EXAMINERS

(1)……..

(2)……..

GUIDE

(1)……..

(2)……..

Thiruvananthapuram
November 2011

ACKNOWLEDGEMENT

First of all let me thank God Almighty, who accompanied and directed me to achieve success throughout this study.

The present study has been completed under the expert guidance of Dr. Saramma. P. P, Senior Lecturer in Nursing, SCTIMST, Thiruvananthapuram. I express my sincere gratitude to Dr. Saramma P. P, for the valuable guidance, constant support and encouragement given for the completion of the study.

I express my sincere thanks to Dr. A. V. George, Registrar, SCTIMST, Thiruvananthapuram, for giving this opportunity for conducting this study.

I greatly value the favour extended by Prof. Jayakumar. K, Head of the Department of Cardiac Surgery, SCTIMST, Thiruvananthapuram and Mrs. Pennamma K.J, Ward Sister, CHICU.

I would like to acknowledge the contribution of all the participants who kindly agreed to take part in the study. They generously gave their time and attention to the research. This study would have been impossible without their generosity.

Special thanks to computer division and library staff of SCTIMST for granting permission to utilize computer and library.

Vidya S Nair

ABSTRACT

Topic : A study to assess the knowledge of nurses about pediatric medicine administration in congenital heart intensive care unit.

Patient safety is increasingly recognised as essential in the practice of pediatric intensive care unit. Children in the pediatric intensive care unit require high intensity care and may be at high risk for iatrogenic injury. Nurses must know the proper dilutent of each drug and be experts in calculating the dose of medication to prevent errors. Each nurse should be aware of indication, action, contraindication, adverse reaction and interaction of drug. **Objectives :** (1) To assess knowledge of nurses about the common drugs used in congenital heart intensive care unit their dosage and dilution. (2) Find the association between nurses knowledge about common drugs used in congenital heart intensive care unit and selected variables. **Method :** Thirty nurses were purposely selected from CHICU of Sree Chitra Tirunal Institute for Medical Science and Technology, Thiruvananthapuram. Total period of the study was from August 2011 to October 2011. A self prepared validated questionnaire was used in the form of multiple choices to assess the knowledge about pediatric medicine administration. **Result :** Study showed that nurses knowledge on pediatric medicine administration is above average (10.69/15). There was no statistically significant difference in the mean knowledge score and age, year of experience. **Conclusion :** Cardiac nurses in the CHICU have above average knowledge about pediatric medicine administration.

CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVATIONS

CHICU	-	Congenital Heart Intensive Care Unit
CHD	-	Congenital Heart Defect
SCTIMST	-	Sree Chitra Tirunal Institute for Medical Science and Technology
PICU	-	Pediatric Intensive Care Unit
NICU	-	Neonatal Intensive Care Unit
ADR	-	Adverse Drug Reaction

Chapter - 1
INTRODUCTION

1.1 Introduction

A congenital Heart Defect (CHD) is a defect in the structure of the heart and great vessels, which is present at birth. In these defect most of which either obstructed blood flow in the heart or vessel near it or blood flow through heart in abnormal pattern. Heart defects are leading cause of birth defect related death. Some children have no sign but other may exhibit shortness of breath, cyanosis, syncope, heart murmur, under developing of limbs and muscles, poor feeding and growth, respiratory infection. Some CHD need medication, cardiac catheterization and surgery. Surgery is recommended for congenital heart defect that result in lack of oxygen, a poor quality of life or when a patient fails to thrive.

Most children who have an open heart surgery need to stay in the intensive care unit (ICU) for 2 to 4 days right after surgery. They usually stay in the hospital for 5 to 7 more days after they leave the ICU. Stay in the intensive care unit and the hospital are usually shorter for patients who have closed heart surgery.

Medication are often required in the treatment of cardiac problems arising from congenital heart defects or surgeries required to correct such defects. Medication do not cure the underlying problem, but may successfully manage the symptoms. The goal of medication treatment is to improve heart function and limit the progression of disease. Any medication may produce adverse or unexpected Adverse Drug Reaction(ADR). Detection and recording of these is of vital importance. ADR is not synonymous with drug side effect. The anatomic and physiologic characteristic unique to pediatric patient account for most of the

difference in pharmacokinetics and pharmacodynamic behavior of drug in their bodies. The immaturity of organ is the physiologic factor most responsible for this difference. Spontaneous reporting of suspected reaction is particularly valuable for recognizing possible new hazard rapidly. It is the responsibility of the nurse to report the medication errors as early as possible to avoid adverse drug reaction.

Children are at increased risk of medication errors. This is due to a combination of factors including the need for calculation to be performed at all stages of the process. Calculation are required in the prescribing, dispensing, and administration of medicine because drug doses tends to vary with the age and weight of the child. The lack of suitable dosage formulation also means that it is necessary to use vial, tablets and liquid that have been designed for adults. Errors can also be generated because children and their carer tends to remember doses in millilitres rather than microgram or liquid may be available in a variety of strength. It is the responsibility of the nurse to calculate and administrator medication. So the nurse should have thorough knowledge in the medicine administration to children.

1.2. Background of the study

Pediatric medication errors are different from those occurring in adult because doses are individually based according to weight, age and body surface area. Most errors occur in the pediatric department and that too, more so in intensive care unit (Jain,2009). Drugs that affect the function of the heart and blood vessels are among the most widely used medicine. These drugs may exert their primary effect on the blood vessel or on the heart itself (Webster, 2007).

The incidence of medication errors in the neonatal intensive care unit (NICU) setting demonstrated the importance of established safety procedure and guidelines for the prescribing, dispensing, and administering of medication

(NANN , 2009). Medication safety is a major concern and global issue related to the quality and safety of patient care (Sheu, et al 2007). Majority of these errors are preventable if doctors and sisters consult the drug formulary more often and doses and related issues are routinely cross checked during the clinical rounds.

There are certain steps to prevent medication errors

- Take are with calculation- use your head as well as a calculator.
- If possible, always obtain a second independent check of a calculation of dosage.
- Avoid the use of decimal point by prescribing in the whole unit, i.e, 100 microgram rather than 0.1 mg.
- If a decimal point is required always use a leading zero, i.e, 0.5mg
- Never use a trailing zero, i.e state 5mg as 5.0mg.
- There is no accepted abbreviation for microgram, nanogram or unit. Replacing unit by 'U' can be misinterpreted as a zero.
- Remember to take account of any administration issue such as displacement volume for I/V medicine, the correct diluents and administration method.

A drug administration error is defined as any discrepancy between printed or handwritten physician's orders and drug delivery to the patient, in keeping with the classification developed by the American Society of Hospital Pharmacy.

Administration errors were classified in to 10 categories: timing error (greater than 1 hour difference compared with the ordered time), omission, unordered drug, wrong generic drug, wrong dosage, wrong formulation, wrong route, deteriorated drug, technical errors in preparation or administration (eg wrong infusion flow rate or Wrong diluents), and extra dose (Fontan et al 2005).

Research findings warn that more than half of life threatening errors are related to rapid infusion of high alert medication (Glandstone, 1995). From an

education point of view lack of pharmacy technique and a theory practice gap leads nurse to make administration errors is between 44000 and 98000. Nurse's insufficient drug calculation skills contribute to 1.5 to 4.9 % of error rare in infusion preparation task (Parshuram, et al 2004). Research has demonstrated that an educational program can raise nurse's awareness about medication errors and other medication related safety issues (Elnour, et al 2008).

1.2.1 Cardiovascular drugs

The variety and scope of cardiovascular drugs have increased tremendously in the past few decade, and new drugs are being approved annually. In the 1950s, effective oral diuretics become available. These drugs dramatically changed the treatment of heart failure and hypertension. In the mid 1960s a class agent called beta blockers was discovered leading to major changes in the physician ability to treat patients with hypertension and angina. The table 1.1 shows the common drugs used in congenital heart intensive care unit(CHICU).

Table 1.1 Common drugs used in CHICU

CLASS OF DRUGS	EXAMPLES OF DRUGS
Inotropic drugs	Milirinone lactate, Dobutamine, Dopamine Epinephrine, Isoproterenol, Norepinephrine, Vasopressin, Digoxin.
Antiarrhythmics	Adenosine, Atropine, Lidocaine, Propafenone, Amiodarone, Verapamil
Antihypertensives	Captopril, Nifedipine, Nitroglycerine, Nitropruside.
Diuretics	Lasix, Aldactone, Spironolactone, Acetazolamide
Sedatives	Morphine, Dexam, Fentanyl, Propofol
Other Drugs	Prostaglandins, Potassium chloride, Sodabicarbonate, Calcium gluconate, Vitamine supplement, Antipyretics.

1.2.2 Nurses in Sree Chitra Tirunal Institute for Medical Science and Technology.

SCTIMST is a tertiary level referral hospital. Nurse's in SCTIMST regularly engage in activities promoting health care of patient. Nurses carryout in service education programme to improve their professional competency and knowledge. Nurse's carry out health education programme for patients and their relatives.

SCTIMST conduct diploma courses in cardiac and neuronursing. Every year 20 new students are getting admitted to the course. Senior nurse should be competent enough to train and supervise the juniors and nursing students.

1.2.3 Nurses Responsibility in administration of medicine

To ensure safe medication administration the nurses should practice six rights of medication administration which include right medication, right dose, right client, right route, right time, right documentation. Report all medication errors that do and don't harm the patient. Understanding potential errors or near misses may provide key information on how medication errors as a whole can be prevented. Nurses working in an environment where individuals are punished for making mistakes will discourage error reporting and encourage hiding mistakes, ultimately making it difficult to identify errors and to prevent them from happening.

Know the medication before administering. Lack of drug knowledge and lack of important patient information cause medication errors. Regardless of what is ordered, nurses need to be able to recognize when a prescribed dose of medication is too high. More education and experience are associated with improved patient safety. When administering medication nurses are accountable for knowing why the medication is being used, what possible side effect are to be

monitored. Table 1.2 Shows Several Practical Steps to improve Medication Safety.

Table 1.2 Shows Several Practical Steps for medication safety and rationales.

Practical steps	**Rationale**
A) Confirm patient information (Known allergies) before administering medication.	To avoid adverse reactions
B) Double check to verify information.	Any doubt in medication order should be clarified from the prescriber.
C) Minimize distraction during medication administration	Lack of concentration and feeling rushed during medication administration can lead to error.
D) Improve communication during transitioning and handoffs.	Written handoffs may reduce the communication slips.

1.3 Need of the study

Patient safety is increasingly recognized as essential in the practice of nursing and medical profession. Patient in pediatric intensive care unit require high intensity care and may be at high risk for iatrogenic injury. Individual have right to safe and effective quality health care. Cardiac nurses are responsible for preparing and administering potent drugs that affects the patients cardiovascular functions. Nurse must know proper diluents of each drug and they should be expert in calculating the dose of medication to prevent errors. Each nurse should be aware of indication, action, contraindication, adverse reaction and interactions of drugs to prevent errors.

The investigator's experience in cardiac surgical intensive care unit in SCTIMST, showed that the newly joined nurses have inadequate knowledge about the action of various inotropes with changing dosage. Also there is always

a chance for administration errors during prescribing and diluting the medication. Hence the investigator planned to conduct a study to assess the knowledge of staff nurses on administration of pediatric medication in congenital heart intensive care unit.

1.4 Statement of the problem

A Study to assess the knowledge of nurses about the pediatric medicine administration in congenital heart intensive care unit."

1.5 Objectives

The objectives of this study are:-

1. To assess knowledge of nurse's about the common drugs used in congenital heart intensive care unit their dosage and dilution.
2. Find the association between nurse's knowledge about common drug used in congenital heart intensive care unit their dosage and dilution and selected variables.

1.6 Operational definition:-

Knowledge:-

A state of awareness or understanding with conscious mind. In this study investigator assesses the knowledge on pediatric drug administration among cardiac nurses using a self prepared validated knowledge test.

Pediatric medicine:-

Selected cardiovascular drugs commonly given to children undergoing congenital cardiac surgery in the congenital heart intensive care unit.

Assessment:-

The assessment process consists of collection and analysis of data to determine the knowledge of nurse's about the pediatric medicine administration in congenital heart intensive care unit.

Congenital Heart Intensive care unit (CHICU):- congenital heart intensive care unit is a multidisciplinary unit that provide post operative care of infants and adolescents who are undergoing congenital cardiac surgery, in SCTIMST

1.7 Methodology

This is a descriptive survey of nursing staff. The investigator first assesses the knowledge about pediatric medicine administration with a self administered questionnaire. The study setting is CHICU, SCTIMST.

1.8 Delimitation

This study is limited to nursing staff in congenital heart intensive care unit in SCTIMST, Thiruvananthapuram.

1.9 Organisation of the report.

The report is divided in to five chapter the background of the study is outlined, the subject assessing the nurse knowledge about pediatric medicine administration is briefed, the need and significance of research problem stressed, and problem and objectives are stated. An attempt is made to operationally define the terms so as to clarify a brief discussion on methodology adopted for the study. The delimitation is specified.

Chapter - 2

REVIEW OF LITERATURE

2.1 Introduction

Review of literature is an important aspect of any research project from beginning to end. It refers to a broad, comprehensive in depth, systematic and critical review of scholarly publications, print materials and audio-visual materials.

It gives character and insight in the problem and helps in selecting methodology, developing tool and also analyzing data. With these in view an intensive review of literature has been done.

The review of literature relevant to this study is presented in the following sections.

2.2 Studies related to nurses knowledge in administration of medication.

2.3 Studies related to medication errors.

2.2 Studies related to nurses knowledge in administration of medication.

Essani et al (2011) conducted a quantitative descriptive study to identify the knowledge practice gap as perceived by the registered nurses in pediatric unit. The study setting was a tertiary hospital in Karachi, Pakistan. The samples used for the study were nurses involved in pediatric care for more than six months at the time of data gathering in a tertiary care hospital. Among 45 nurses, only 40 who consented to participate in the were included. The investigators developed a questionnaire after extensive literature review which went through content and face validity. This validity was done by two faculty members

teaching pediatric nursing and one clinical nurse instructor from the hospital setting. Later they prepared a final questionnaire.

A pilot testing was also done at Neonatal Intensive Care unit (NICU). The pilot test was done to examine the utility of the interview that might be encountered with the use of tool. After the pilot testing, appropriate revision on the tool/questioning techniques were done from the similar tertiary care hospital from five nurses. The questionnaire included the variables in five major areas: medication, skills/practice, knowledge, code blue/crash handling, knowledge and practice, and ability to operate complex medical device. Each area was subdivided in most frequently identified gaps related to knowledge and practice in each category. In data analysis the data were double entered and validated before final analysis.

The SPSS software (version 14) was used for analyzing the data. The investigator concluded that the findings of this study provided the support needed for the observed gaps in knowledge and practice among nurses, through scientific research. The gaps identified by the respondents were based on their own experiences, as they experience them in their professional practice. The study enabled the researcher to recognize that the attitude for lifelong learning as presented by the respondents. If quality of patient care remains to be the ethos of nursing, then these gaps need to be bridged with both nursing education and nursing services working in unison.

Schneider et al (1998), conducted a prospective study based on the observation of nurses activities associated in the preparation and administration of medication in a pediatric intensive care unit. The data were collected over a period of 10 weeks. The study was conducted at the University Hospital in Lausanne (Switzerland). The objectives of the study were to determine the frequency and the types of errors which occur regarding the preparation and the administration of medication and to identify the main causes of these errors in

pediatric intensive care unit (PICU). In this study the researchers classified errors based in the American Society of Hospital Pharmacy (ASHP) definition. The frequency of errors was calculated as the sum of all noted errors divided by the total administered drugs, plus the sum of all omitted drugs, multiplied by 100. The sum of all given doses plus all omitted doses gives the total opportunity for errors. This total was 275 and the total frequency of errors was 26.9%. The most frequent error were wrong time errors (32.4%), wrong-administration-technique errors (32.4%) and preparation errors (23.0%). In relation with other studies conducted under comparable conditions, a lesser number of omissions and wrong time errors were observed. The investigators concluded the study that a program of systematic assistance and survey by professional pharmacists could improve the quality of the preparation and administration of medication in PICU.

Hajebi et al (2010) performed a study to determine the knowledge, attitude and practice of nurses towards pharmacovigilance in the taleqani medical teaching and treatment center in Tehran before and after an adverse drug reaction education programme. This study was conducted using a questionnaire through two steps. In every steps 150 questionnaire were distributed in various wards of the Taleqani Hospital. According to the statistically less than the knowledge after the seminar (p==0.0001), but there was no significant effect on the attitude (p=0.05). Based on the results of this study, it is necessary to conduct continuous adverse drug reaction educational programme until voluntary monitoring of adverse drug reaction become conventional and habitual among nursing staff.

Stewart et al (2010) performed a study to evaluate knowledge, core competencies, communication and team working skills in pediatric drugs prescribing and administration at under graduate level. The practical, ward based workshop was delivered to fourth year medical and third year nursing students in B.M.C medical education and evaluated using a pre and post work shop questionnaire with open ended response questions. Following the work shop students reported an increase in their knowledge and awareness of pediatric

medication safety and the causes of medication errors ($p<0.001$), with the greatest increase noted among medical students. Highly significant changes in students attitude to shared learning were observed indicating that safe medication practice is learned more effective with students from other health care disciplines. Qualitative data revealed that students participation in the work shop improved communication and team work skills and led to greater awareness of the role of other health care professionals. Study had helped to bridge the knowledge skill gap demonstrating how an inter-professional approach to drug prescribing and administration has the potential to improve quality and safety with in health care.

2.3 Studies related to medication errors.

Kashul et al (2001) conducted a prospective cohort study on medication errors and adverse drug events in pediatric inpatient. The study is conducted in 1120 patients admitted to 2 academic institutions during 6 weeks in April and may of 1999. The objective of the study is to assess the rates of medication errors, adverse drug events, and potential ADEs, and to compare pediatric rates with previously reported adult rates; to analyse the major errors and to evaluate the potential impact of prevention strategies. During the study the investigator identified medication errors, potential ADEs. These are identified by clinical staff reports and review of medication order sheets, medication administration records and patient charts. The investigators reviewed 10778 medication orders and found 616 medication errors(5.7%). 115 potential ADEs (1.1%), and 26 ADEs (0.24%). Of the 26 ADEs, 5 (19%) were preventable. The rate if potential ADEs was significantly higher in neonates in the neonatal intensive care unit. Most potential ADEs occurred at the stage of drug ordering (79%) and involved incorrect dosing (93.4%), anti-infective drugs (28%) and intravenous medications (54%). The researchers concluded that medication errors are common in pediatric inpatient settings, and further efforts are needed to reduce them.

Pourrat et al (2003), conducted a prospective survey in three types of care units(medicine, surgical intensive care and pediatric vascular surgery) over a period of 30 day period in each unit. The objective of the study was to review on the errors in drug prescription in order to implicate the medical professionals in its development. During this survey a resident pharmacist studied the preparation and administration of drugs and compared them to the prescription and recommendation in the literature. The investigator also conducted the pharmaceutical analysis of the prescription (dose, drug interaction, administration timetable). Among the 3,023 drugs prescribed, the error rates was of 0.04, 44% of which scored 2. The errors in preparation or administration were 0.134. Among the 1,632 drug administrations observed, 19% of which scored 2. Regarding errors in prescription and administration, no significant difference was revealed between the three unit ($p>0.09$). This study enhanced the awareness of the nursing and medical staff and the hospital management with regards to the reality of medical errors.

Mark et al (2003), conducted a prospective review of medical records and staff interviews to determine the incidence and causes of adverse drug events and potential ADEs in hospitalized children, and to examine the consequences of these events. The study was conducted in a general pediatric unit and pediatric intensive care unit in a metropolitan medical center. A total of 1197 consecutive patient admission were studied from September 15, 2000, to may 10, 2001. The admission represented a total of 922 patients and 10164 patient-days. In this study the investigators found that the ADEs (6/100 admissions, 7.5/1000 patient days) and potential ADEs (8/100 admissions, 9.3/1000 patient days) were common in hospitalized children. Demographic variables associated with the occurrence of these event were the length of the hospital stay, casemix index, and of medication exposure. After adjusting the length of hospital stay, medication exposure continued to have a significant influence on ADEs and potential ADEs. The researchers concluded the study that both the ADEs and potential ADEs

were common among hospitalized children with greater disease burden and medication exposure. These findings suggest that these events were a consequence, rather than a cause, of more severe illness

McDonnell et al (2009), performed a prospective, observational study in pharmacotherapy in pediatric critical illness. The investigators found that pharmacotherapy is an under evaluated element of critical care medicine. To understand the pharmacotherapy in pediatric critical illness, the researchers evaluated a cohort of emergency admission to a university affiliated pediatric intensive care unit(PICU). The investigators selected the eligible patients were admitted to this medical surgical ICU for atleast 24 hours. They studied 100 patients with median age of 40 months, who were admitted for a total of 851 ICU days. These patients received 4419 drug orders and 11911 intermittent dose administration of 241 different medications, and 58 drug administration while in the ICU. The most frequent orders were for morphine 457 (10.6%), furosemide 337 (7.8%), potassium 237 (5.5%), lorazepam 226 (5.2%), and albuterol (salbutamol) 158 (3.7%). At the end of the study the investigators conclude that pharmacotherapy is an active component in the practice of pediatric critical care medicine. They demonstrated that increasing numbers of ordered medications, drug orders, and drug administration were associated with increasing duration of ICU therapies and the length of ICU stay. These data underscore the potential importance of improved safety and efficiency of medicines used to treat critically ill children.

Benkirane et al (2009), conducted a multicentered study to assess the incidence of adverse drug events and medication errors in intensive care units. The objective of the study was to assess the prevalence rate of ADEs and to ascertain those related to medication errors to develop prevention strategies. The design of the study was a prospective cohort study. The investigators selected 7 intensive care unit. They studied total 696 patients. The investigators identified 108 incidents (15.5%). The reviewers concluded that 56 (70%) of 80 ADEs were

nonpreventable. There were 7.7 medication errors for 1000 patient-days. They noted that the preventable ADEs occurred in the prescribing (71.1%), administration (21.2%), transcription (5.7%), and dispensing stages. Errors of wrong or improper drug use accounted for the majority of potential and actual preventable ADEs (23%), followed by improper dose (21.1%), wrong duration of treatment (19.2%), wrong rate of administration (13.5), errors due to drug omission (9.6%), wrong administration timing (1.9%). The study argues the need for pharmacovigilance to extent its scope to medication errors are likely to be more serious than ADRs.

Franke et al (2007), conducted a study to identify pediatric intensive care unit clinicians' perceptions of high alert medications and to develop a PICU-specific, high alert medications list. This study is conducted in the PICU in each of five institutions participating in the Chicago. During this study the PICU clinicians identified their top ten high-alert medications and their perceptions of each medications risks and frequency of misuse. Weighted responses were calculated and compared to the institute for safe medication practices list and by clinician type. The result of the study were based on 112 surveys collected from 56 nurses (response rate 29%), 26 physicians (79%), and 30 pharmacists (71%), with 90 different medications or medication classes named. The top high alert medication identified included intravenous potassium (weight response: 72%), heparin (63%), and insulin (48%). PICU- specific high alert medications (e.g., calcium [27%], phenytoin [21%], aminoglycosides[15%]) were reported on the institute for safe medication practices list. Nurses more often cited medications with administration error risk (e.g., adenosine, calcium, $p<0.01$), while physician reported those with narrow therapeutic window risk (e.g., insulin, digoxin, $p<0.01$). Clinicians perceived the frequency of risk of misuse of the most common high alert medication to be at least once a year. The study concluded that PICU clinicians identified high alert medications not identified on the institute for safe medication practice list. Risk of the identified high alert

medications were attributed to a wide range of different stages in the medication process as well as clinicians' varying experiences in the medication process.

Vallejos (2007) conducted a study on adverse reactions of antibiotics in a pediatric and neonatal intensive care unit. The objective of the study to assess the adverse reactions detected in patients treated with antibiotics in a pediatric and neonatal intensive care. The study method was a descriptive and observational study of a cohort without a control group. A daily follow-up was administered for a three month period for each patient. Casualty was evaluated on the basis of the Naranjo scale. Eighty five patients were included in the study, 36.5% from the neonatal intensive care unit and 63.5% from the pediatric clinic. Of twenty seven antimicrobial medication administered, 97 adverse reactions were detected for 15 of these, in 37 patients (20 newborn and 17 older children). They were classified as mild (65%), moderate (35%) and serious (0). According to scale of Naranjo, 68% were possible, 32% probable, and defined none. Based on laboratory test results, renal toxicity was detected in 38.1%, hemotoxicity in 24.7%, electrolyte abnormalities in 21.6% and hepatotoxicity in 15.5%. The distribution of adverse antibiotic reaction was as follows: gentamycine 20.6%, vancomycin 17.5%, amikacine 16.5%, ceftriaxone 15.5% and piperacilline tazobactam 13.4 %. The researcher concluded the study that the proportion of adverse reaction was of 43.7%. 55.6% of antibiotics produced adverse reactions. A programme of institutional pharmacovigilance coordinated by a medical pharmacologist or pharmaceutical chemist was recommended by these data.

Wilson et al (1997) conducted a 2 year prospective cohort study to assess the incidence and consequences of medication errors, highlight sources of recurrent error and institute changes in practice to or event their recurrence. A multidisciplinary committee analysed medication error reports, classified them according to type (prescription, supply or administration), severity (serious or not serious) and clinical outcome. The committee implemented changes in policy and practice to reduce the frequency of errors. There were 441 reported

medication errors in the study period, during which 682 patients were admitted for 5315 inpatient days. Errors were more seven times likely to occur in the intensive care setting. Doctors accounted for 72% of errors and prescription errors doubled when new doctors joined the rotation. Most errors (68%) were detected prior to drug administration. Twenty- four serious medication errors were not detected in advance, but only 4 had overt clinical consequences. During the second year of the scheme after the implementation of the policy, the incidence of all reported errors, administration errors and serious errors fell, but the prescription error rate remained constant. The researchers concluded that medication errors occurred commonly in the study, but the adverse consequences were rare. The non punitive, multidisciplinary approach to medication errors utilized in this study increases staff vigilance, highlighted sources of recurrent error, and led to changes in drug policies and staff training, which resulted in improved patient safety and quality of care.

Muga et al (2007) conducted a retrospective study about the treatments administered in the pediatric emergency department during a week in November 2007. The objective of their study was to prescribe the prevalence, type and factors associated with medication errors in pediatric emergency department. The researchers used the protocols and clinical guides at pediatric emergency department at Hospital Universitari Sant Joan de Deu, at Spain, as pattern of reference. They classified the errors in three classes (1) prescription errors: drug involved, indication, dose, and route of administration; (2) severity of the error; and (3) associated factors: triage category, age of the patient, training level of the physician, day of the week, and hour of the day. In 377 of 1906 checked reports, some treatments were prescribed. A total of 92 errors (15%) were detected and all of them were prescription errors: 50 (8%) for inappropriate indication and 42(7%) for inadequate dose. In this 87 were considered insignificant errors, 5 were moderate and none were severe. There was a higher rate of errors among residents with less experience. They did not able to find difference in the triage category neither in the age of the patient. In the weekend and holidays, more

errors compared in weekdays (28% vs 18%, p=0.02). Between 24 and 8 hours ,they identified more errors than between 8 and 16 and between 16 and 24 hours (32.3% vs 17.9% vs 21.2%; p=0.03). The finding of this study revealed that error rates in drugs administered exclusively in the emergency department are slightly higher than others evaluating house orders and emergency department treatments. The high assistance pressure during weekend and holidays and the tiredness during the night are risk factor of prescribing errors.

Warrick et al (2011), conducted a study to determine the effect of electronic prescribing (EP) with a clinical information system on prescribing errors and omitted doses in a pediatric intensive care unit (PICU). The investigators used a prospective audit method for identifying prescription errors and omitted doses for 96 hour period in three approach: (1)before implementation of EP, (2) 1 week and (3) 6 month later. The study result showed that there was a non significant reduction in prescribing errors: 8.8% (95% cl 4.4-13.2) pre implementation of EP versus 8.1% (4.4-11.8) 1 week after implementation and 4.6% (2.0-7.2) 6 month later. The prevalence of omitted doses decreased significantly 6 month following implementation, changing from 8.1% (5.8-10.4) pre implementation to 10.6% (6.5-14.7) 1 week after implementation and 1.4% (cl 0-2.8%) 6 month after implementation ($p<0.05$). The researchers conclude that EP with in a clinical information system increases medication safety in a PICU.

Camara et al (2011) conducted a study on prescription errors in pediatric hospital settings. Through this study the investigator determined the distribution and cost of drugs used and causes of prescription errors in one department of the Albert Royer National Children's Hospital Center in Dakar, Senegal. The study was focused on patients admitted from December 1 to March 3, 2009. Based on 792 expected hospitalization, 1 out of 2 patients was randomly selected to obtain a cohort of 400 patients for whom a total of 1267 prescription were written by pediatrician and intern on duty. These prescriptions were evaluated by pediatric

professors to identify errors. The types of errors taken into account in this study involved indication, dosage schedules, and treatment duration. In this study the investigator identified a total of 216(17.0%) errors which include 121 cases (9.5%) involving indication mainly for antibiotics (30.5%) and antimalarial drugs (28.9%). Dosage schedule errors were observed in 58 cases (4.5%) involving antibiotics (24.1%) and antifungal (25.8%). From these finding the investigator concluded that there was need for training relevant therapeutic staff to optimize health care and improve availability for everyone.

Rainu et al (2001) conducted a prospective cohort study on medication errors and adverse drug events in pediatric inpatients. The study is conducted in 1120 patients admitted to 2 academic institution during 6 weeks in April and may 1999. Through this study the investigator assessed the rates of medication errors, adverse drug events (ADEs), and potential ADEs, to compare pediatric rates with previously reported adult rates etc. One hospital is a freestanding pediatric institution and other hospital treats both adult and pediatric patients. One of the investigator trained the data collectors which include nurses, pharmacists and physicians. These data collectors identified and reported the errors. During the 36 days of study period the investigators included 1120 admissions and 3932 patient days, during which 10778 orders were written. The patients included 183 (16%) neonates, 326 (29%) infants, 223 (20%) preschoolers, 161 (14%) school aged children, 191(17%) teenagers. There were 616 medication errors (5.7%). In total, 320 patients accounted for these medication errors and 64 patients had 3 or more errors. They found 26 ADEs (0.24%), of which 5 (19%) were preventable. The investigators concluded the study that medication errors are common in pediatric inpatient settings, and further efforts are needed to reduce the occurrence.

Chapter -3

METHODOLOGY

3.1 Introduction

This chapter deals with the research approach, setting, the sample and sampling technique, development of tool , description of tool ,pilot study , data collection procedure and plan for analysis.

3.2 Research Approach

Descriptive study approach is used.

The objective of the study is: -

(a) To identify knowledge of nurses about the common drugs used in congenital heart intensive care unit, their dosage and dilution.

(b) Find the association between nurses knowledge about common drugs used in congenital heart intensive care unit their dosage and dilution and selected variables.

3.3 Settings

The study is conducted in CHICU of Sree Chithra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram. CHICU situated in the first block third floor. It is a postoperative surgical unit. Common cases in CHICU are children after the surgery for congenital heart diseases. Nurses have important role in the care of children in CHICU. Drug administration is very much important in CHICU. In-service educations are conducted to maintain the professional competency.

3.4 Sample and Sampling technique

The sample was selected from the staff nurses in the CHICU & Diploma in cardiovascular and thoracic nursing students. The size of the sample was thirty. The purposive sampling technique was used to collect the samples.

3.5 Inclusion Criteria

Staff nurses and specialty nursing students working in Congenital Heart intensive care Unit in Sree Chithra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram.

3.7 Development of tool

An extensive study and review of literature helped in preparation of the tool. A self prepared validated tool is used as the tool for this study.

3.8 Description of the tool

Part I :-

This part contains items such as demographic data which include age, sex, professional qualification, additional qualification, total years of experience.

Part ii :-

Questionnaire about the knowledge of nurses about the pediatric medicine administration**.**

3.9 Pilot study

Pilot study was done in October 2011. Five students were taken for the pilot study. The pilot study was conducted to find out the feasibility and

practicability of the tool and methodology. After pilot study no modification done in questionnaire.

3.10 Data collection

The data was collected from the staff nurses in the congenital heart intensive care unit of Sree Chitra Tirunal Institute for Medical Sciences and Technology, The period of data collection was from August 2011 to October 2011. The assessment of staff was done while they are in CHICU.

3.11 Plan for analysis

The investigator developed a plan of analysis after pilot study. The data were coded , entered in excel sheet and analyzed using Epi info Version 3.5.1

3.12 Summary

This chapter presented the research approach used for the study, setting of the study, sample and sampling technique, development of data collection tool, description of the tool, pilot study, data collection procedure, and plan for data analysis.

Chapter – 4

ANALYSIS AND INTERPRETATION OF DATA

4.1 Introduction

This chapter presents the analysis and interpretation of the data collected from thirty cardiac nursing staff whom working in Congenital Heart Intensive Care Unit, at Sree Chitra Tirunal Institute for Medical Science and Technology, Thiruvananthapuram. Seventeen staff nurses and thirteen students were selected purposely for assessing the knowledge about pediatric drug administration.

Analysis is a process of organizing and synthesizing data in such a way that research questions can be answered. The overall objective of analysis is to organize structure and elicit answers from assessment. Interpretation is the process of making sense of the result and examining the implication of finding with in the broader content.

The finding of the study were analysed and arranged under the following sections.

4.2 Distribution of sample according to demographic data.

4.3 Distribution of sample according to knowledge score.

4.4 Comparison of mean, standard deviation and p value of nurses knowledge about pediatric drug administration and selected variables.

4.2 Distribution of sample according to demographic data.

(1)Distribution of sample according to age:-

The age of sample ranged from 23 to 49 with a mean age of 30.66, standard deviation of 7.03, median age of 29 and mode of 24.

Table 4.1 Distribution of samples according to age category

Age Group	Frequency	Percentage
21-30	18	60%
31-40	9	30%
41-50	3	10%
TOTAL	30	100%

Age categories were made based on the age distribution of sample so as to have a minimum number under each class. The data given in Table 4.1 shows that majority of samples belonged to the younger age category (21-30).

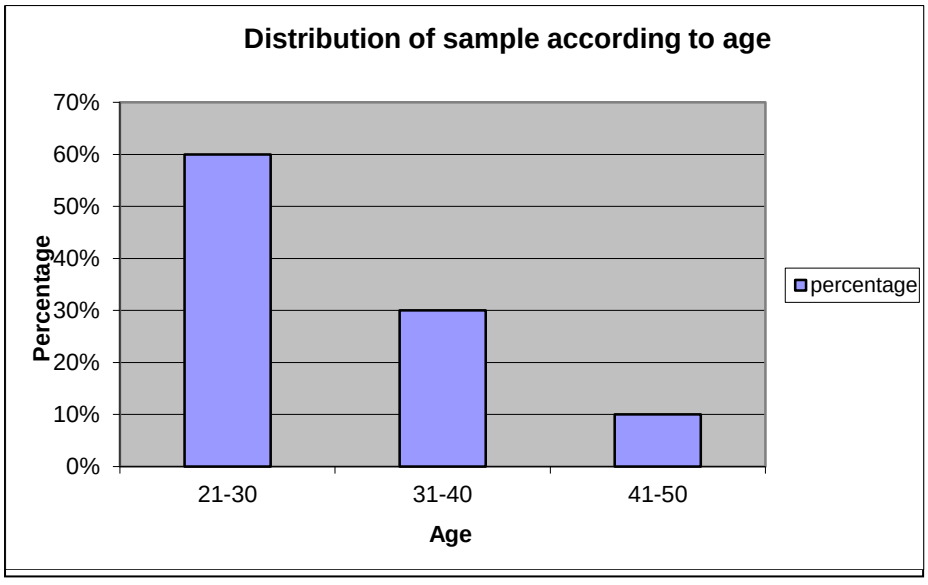


Fig 4.1 The bar diagram showing the distribution of samples according to age category.

(2) Distribution of sample according to educational qualification:-

Data collected from cardiac nurses working in CHICU and student nurses shows that 50% of them are GNM, 43.3% of them are B. Sc nurses, 6.7% of them are M. Sc nurses.

Table 4.2. Distribution of sample according to educational qualifications.

Educational Qualification	Frequency	Percentage
GNM	15	50%
B. Sc(N)	13	43.3%
M. Sc(N)	2	6.7%
TOTAL	30	100%

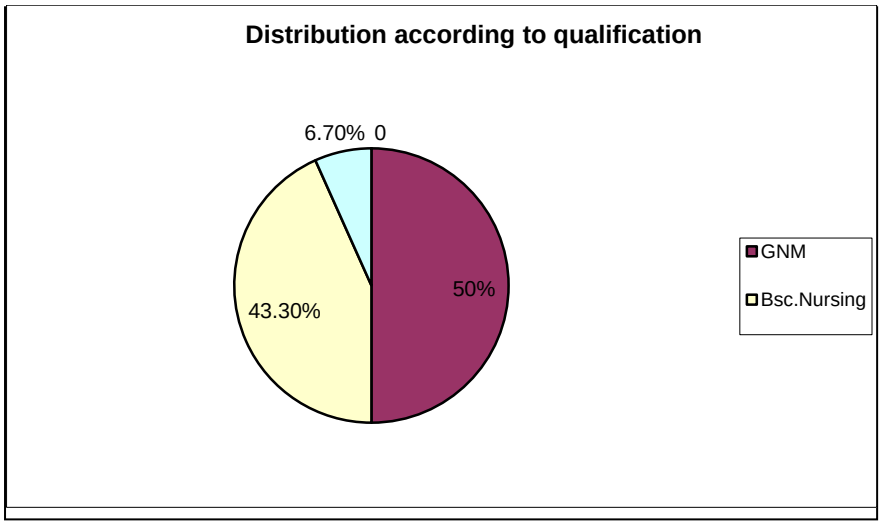


Fig 4.2 The pie diagram shows the distribution of sample according to educational qualification.

(3) Distribution according to year of experience:

Data collected from cardiac nurses with their year of experience, which ranged from 1-23 years.

Table 4.3 Distribution of samples according to year of experience.

Experience	Frequency	Percentage
1-8	22	73.3%
9-16	6	20%
17-24	2	6.7%
TOTAL	30	100%

Data given in Table 4.3 shows that twenty two of them had 1-8 years of experience, six of them had 9-16 year of experience and 2 of them had 17-24 year of experience.

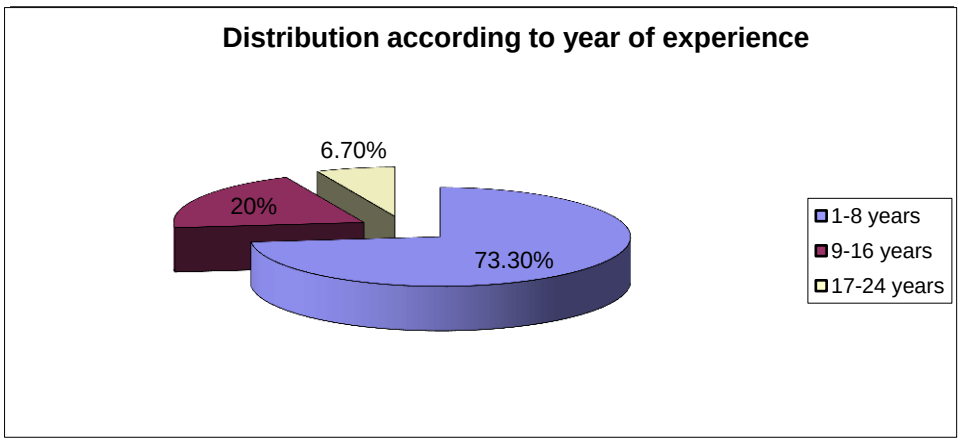


Fig 4.3 The pie diagram showing the distribution of samples according to year of experience.

4.2 Distribution of sample according to percentage of knowledge score

Table 4.4 Distribution of sample according to percentage of knowledge score.

Knowledge score	Frequency	Percentage
4-7	5	16.7%
8-11	15	50%
12-15	10	33.3%
TOTAL	30	100%

There were fifteen questions in the knowledge test related to pediatric drug administration with the maximum score of fifteen. Total knowledge score obtained ranged from 4-15 with a mean of 10.69, standard deviation of 2.13, median of 11, and mode of 12, this shows that the nurses have above average knowledge about pediatric drug administration.

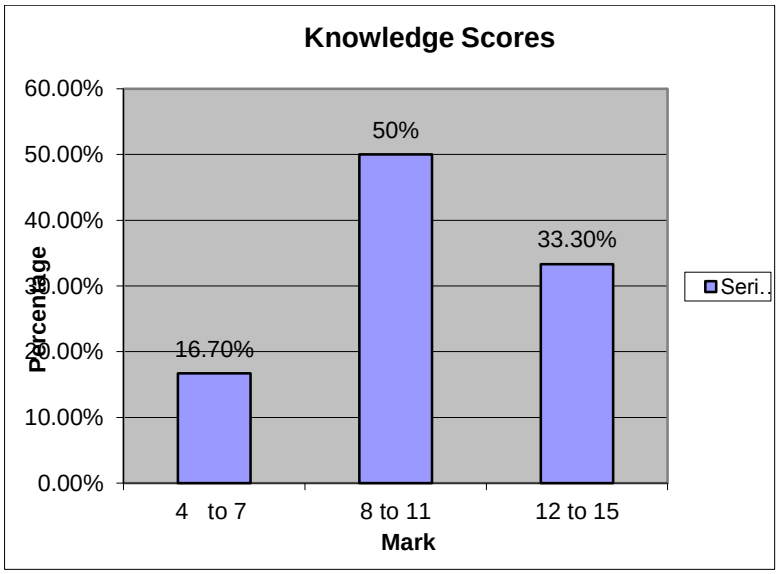


Fig 4.4 The bar diagram shows the knowledge score of nurses about pediatric drug administration.

Percentage of score in the area of knowledge about pediatric drug administration.

The data given in the Table 4.4 shows the percentage of knowledge obtained in each item of the knowledge test on pediatric drug administration. Result shows that the area of lesser knowledge (<50%) are, furosemide infusion (23%), digoxin toxicity (33%), Morphine side effect (46%). The area of higher knowledge (>80%) are dose conversion(90%), Action of aldactone(100%), and calculation of infusion rate (83%).

Table 4.5 Percentage of knowledge about pediatric drug administration in each item of knowledge test among nurses.

Areas of knowledge	**Frequency of correct answers**	**Percentage**
Amiodarone Dilution	24	80%
Dose conversion	27	90%
Administration of oral medicine	22	73%
Calculation of dose for adrenaline infusion.	23	76%
Digoxin toxicity	10	33%
Action of aldactone	30	100%
Dopamine infusion	19	63%
Sideeffect of Morphine	14	14%
Side effect of amiodarone infusion.	22	73%
Calculation of potassium correction	20	60%

Furosemide infuion	7	23%
Normal level of digoxin	19	63%
Half life of Adenosine	19	63%
Action of vasopressin	24	80%
Calculation of infusion rate.	25	80%

AREAS OF HIGHER KNOWLEDGE

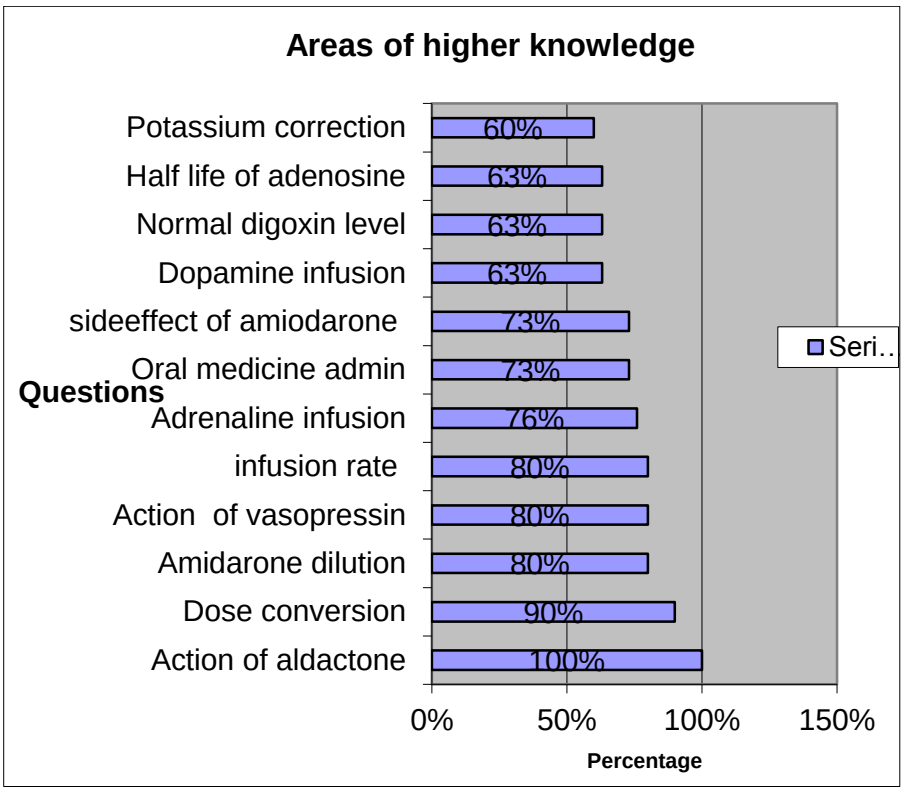


Fig 4.5 Shows the areas of higher knowledge

AREAS OF LOWER KNOWLEDGE

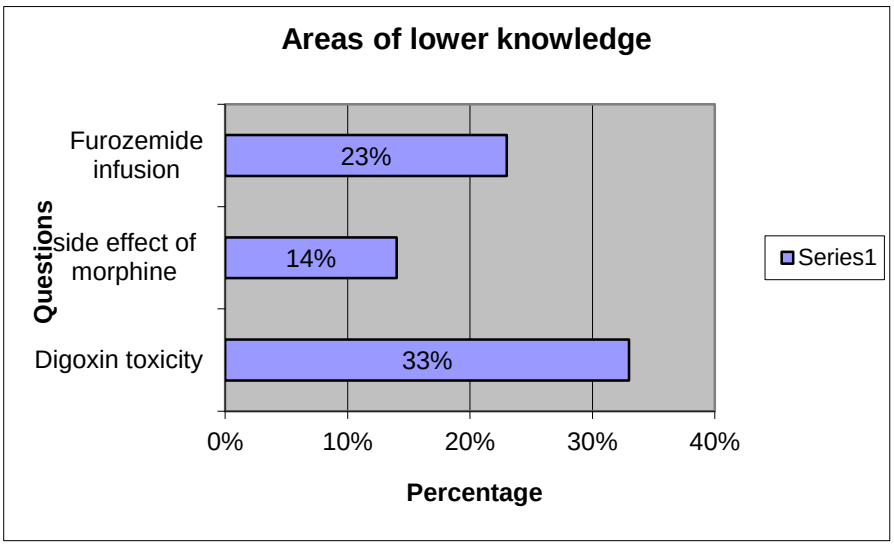


Fig 4.6 Shows the areas of lower knowledge

4.4 Comparison of mean, standard deviation and p value of knowledge score by age group.

Table 4.6 Mean, standard deviation and p- value of knowledge score by age group.

AGE IN YEARS	MEAN	STANDARD DEVIATION	P VALUE
Young age < 29	9.86	2.32	0.54
Older age >29	10.46	2.97	

The median was used to divide the group in to two- young age(< 29 years) and older age(> 29 years).

The knowledge score of younger age group ranged from 5 to 14 with a mean of 9.86 ± 2.32 and that of older age group ranged from 4-15 with a mean

of 10.46 ± 2.97. A student's 't" test was done and obtained a P Value (0.54) shows that there is no statistically significant difference in mean knowledge of both age group. The observed increase in knowledge might be a chance occurrence.

According to year of experience

Table 4.7 Mean knowledge score by year of experience

Year of experience	Mean	Standard deviation	P Value
Lesser experience (1-10 yrs)	10.18	2.34	**0.86**
More experience (>10 yrs)	10.12	3.52	

The knowledge score of less experience group ranged from 5-14 with mean of 10.07± 2.27 and that of higher experience group ranged from 4-15 qith a mean of 10.25 ± 3. A student 't' test was done and obtained a p value (0.086) shows that there is no statistically significant difference in mean knowledge of both experience group. The observed increase in knowledge might be a chance occurrence.

Chapter - 5

SUMMARY, CONCLUSION, LIMITATION, DISCUSSION AND RECOMMENDATION

This chapter gives a brief account of the present study including conclusion drawn from the finding and possible application of the results. Recommendation for further research and suggestions for improving the present study are also presented.

Summary:-

This study was undertaken to assess the knowledge about pediatric drug administration among nurses in CHICU and diploma in cardiovascular and thoracic nursing students in Sree Chitra Tirunal Institute for Medical Science and Technology, Thiruvananthapuram.

The specific objectives of this study:-

1 To identify knowledge of nurses about the common drugs used in congenital heart intensive care unit their dosage and dilution.

2 Find the association between nurses knowledge about common drug used in congenital heart intensive care unit their dosage and dilution and selected variables.

Need for study was that many studies done in abroad and also in India revealed lack of knowledge among nurses about pediatric medicine administration, especially in drug dose calculation. Pediatric nurses are

responsible for preparing and administering potent drugs that affect the patients cardiovascular functions. The investigators experience in Congenital Heart Intensive Care Unit in Sree Chitra Tirunal Institute for medical science and Technology, showed that the newly joined nurses have not much knowledge about the action of various Inotropes with changing dosage. This study was an attempt to find out whether the nursing staff working in Sree Chitra Tirunal Institute For Medical Science and Technology, have adequate knowledge about selected cardiovascular drugs. A self prepared validated questionnaire was used for assessing the knowledge level of nursing staff. After assessment the investigator cleared the doubt regarding pediatric drug administration.

The study was conducted in Sree Chitra Tirunal Institute for Medical Science and Technology, Thiruvananthapuram, Kerala, during the period of August to October 2011. Pediatric nurses were selected by purposive sampling. Total sample size was thirty.

Major finding of the study:-

This study shows that pediatric nurses knowledge on pediatric drug administration is above average (10.69/15). There was no statistically significant difference between the mean knowledge score and age as well as year of experience

Discussion:-

In this study item survey includes specific questions about pediatric drug administration. A total 30 nurses responded to the survey. The data given in Table 4.5 shows the nurses had above average knowledge about pediatric drug administration. Study shows that the nurses knowledge on pediatric drug administration are about 67.77% that is (10.69/15). Essani, et al (2011), conducted a quantitative descriptive study to identify the knowledge practice gap as perceived by the registered nurses in pediatric unit. The investigator concluded

that the findings of this study provided the support needed for the observed gaps in knowledge and practice among nurses, through scientific research. The gaps identified by the respondents were based on their own experiences, as they experience them in their professional practice.The study enabled the resercher to recognize that the attitude for lifelong learning as presented by the respondents. Wilson et al (1997), conducted a 2 year prospective cohort study to assess the incidence and consequences of medication errors, highlight sources of recurrent error and institute changes in practice to prevent their recurrence. . The researchers concluded that medication errors occurred commonly in the study, but the adverse consequences were rare. The non punitive, multidisciplinary approach to medication errors utilized in this study increased staff vigilance, highlighted sources of recurrent error, and led to changes in drug policies and staff training, which resulted in improved patient safety and quality of care. Schneider et al (1998), conducted a prospective study based on the observation of nurses activities associated in the preparation and administration of medication in a pediatric intensive care unit. The investigators concluded the study that a programe of systematic assistance and survey by professional pharmacists could improve the quality of the preparation and administration of medication in PICU.

Limitation:-

The study was limited to nurses working in CHICU in Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram**.**

Conclusion:-

Based on the findings of the study followings conclusions were drawn. Nurses have above average knowledge about selected cardiovascular drugs including flow rate calculation.

REFERANCES

1. Alomar J M, Strauch C C (2010) A Prospective Evaluation of Antihypertensive Medications Safety and Efficiency in United Arab Emirates Private Hospitals. American Journal of Pharmacology and Toxicology 5(2): 89-94.

2.Amy M Karch (2006)Lippincott's Nursing Drug Guide. Lippincott Williams & wilkins, 1387.

3.Balaquer Santamaria J A, Fernandaz Ballart J D, Escribanosubis J (2001) Usefullness of A Software Package To Reduce Medication Errors In Neonatal Care. Anales Espanoles De Pediatria 55(6): 541-5.

4.Benkirane, Raja R, R-Abouqat, Haimeur, Cherkic Cherif EI Kettani, Salma S, Azzouzi, Abderrahim A, M'daghri Alaoui, Asmae A, Thimou, Amal A, Nejmi, Maati M., Maazouzi., Wajdi W., Madani., Naoufel N., R-Edwards., Iralph., Soulaymani, Rachida R (2009) Incidence of Adverse Drug Events and Medication Errors in Intensive Care Units: A Prospective Multicenter Study. Journal of Patient Safety 1(5), 16-22.

5.Camara B, Faye P M, Fall A L, Diagne G N, Sbaa H C, Sow H D(2011) Prescription errors in a pediatric hospital department. Journal of medicine Tropicale 71(1): 33-6.

6. . Elnour A A, Ellahham, H N, Ismail I, Qassaset A,(2008) Raising the awareness of inpatient nursing staff about medication errors. Pharmacy World and Science Springer link Journal 30(9): 182-190.

7. Franke, Hillary A, Woods, Donna M, Holl, & Jane L, (2009) High-alert medications in the pediatric intensive care unit. Journal of pediatric critical care medicine 10(1): 85-90.

8. Gideon Koren (2002) Trends of medication errors in Hospitalized Children. The Journal Of Clinical Pharmacology 42:707.

9.Gladstone J,(1995) Drug administration errors: a study into the factors underlying the occurrence and reporting of drug errors in a district general hospital. Journal of Advanced Nursing 22(1):628-637.

10. Hasan Abdallab (2011) Pediatric Cardiac Medication Inotropic Agent. The Children's Heart Institute.

11. Kaushal R, Bates D W, Landrigan C, McKenna K J, Clapp M D, Federico F, Goldmann D A (2001) Medication errors and adverse drug events in pediatric inpatient. American journal of medical association 285(16): 2114-20.

12. Kraus D M, Stifter J, Hatoum, H T(1991) Program to improve nurses' knowledge of pediatric emergency medications. American Journal of Hospital Pharmacy 48(1): 97-101.

13. . Leyton A, Otero P, Mariani G (2008) Medication errors in pediatric inpatients, prevalence and result of a prevention programe. Official Journal of American Academy of Pediatric 122(3): 737-743.

14. Margaret C Slota Pediatric Critical Care Nursing. Saunders Elsevier, 199-208.

15. Mary Fran Hazinski Nursing Care of The Critically Ill Child. Mosby, 163-69

16. Mark T, Holdsworth, RICHARD E, Maryam Behta, Dennis W, Raisch, Elena Mendez-Rico, Alexa Adams, Melanie Greifer, Susan Bostwick, Bruce M, Greenwald (2003) Incidence and impact of adverse drug events in pediatric inpatient. pediatric adolescent medicine 157:60-65.

17. Mc Donnell C, Hum s, Frndova H, & Parshuram C S,(2009) Pharmacotherapy in Pediatric Critical Illness: a prospective observational study. pediatric drugs 11(5): 323-31.

18.Merry A F, & Anderson B J (2011) Medication errors- new approaches to prevention. Journal of pediatric Anesthesia 21(7):743-53.

19. Morla J, De Jong, Kathryn Escalera, Vicki Coombs, Kenneth Rempher, Duke obion Manno, Conrad Gordon Patient Management: In Cardio vascular.

20. NANN Board of Directors(2009), Medication safety in the neonatal intensive care unit, August 2009.

21. Parshuram C, Eran K, Seto, W, Veriee, Z Khattak S, & Koren G (2004). Prospective observational study on the incidence of medication errors during simulated resuscitation in pediatric emergency department. British medical Journal 329(7478): 1321.

22. Paul J Teiken, Gary E Talsma, Kevin M Creamer, Christine Sutton, Yolanda Flores (2000) Pocket Reference for ICU Staff. Critical Care Medicine Services.

23. Pourrat , Antier D, Doucet O, Dsuchalais A, Lemarie E, Mesny J, Robert M, Meunier P, Rouleau A, Graswsin J (2003) Identification and analysis of errors

in prescription, preparation and administration of drugs in intensive care, medicine and surgery. Presse medicale 32:(19).

24. Rainu Kaushal, David W Bates, Christopher Landrigan Kathryn J McKenna, (2001). Medication errors and adverse drug events in pediatric inpatient. Journal of American Medical Association 285(16):2114-2120.

25. Rozina Roshan Essani, Tazeen Saeed Ali, (2011) Knowledge and Practice Gaps among Pediatric Nurses at a Tertiary Care Hospital Karachi Pakistan. ISRN Pediatrics 2011(2011): 460818.

26. Schneider M P, Cotting J, & Pannatier A (1998) Evaluation of nurses' errors associated in the preparation and administration of medication in a pediatric intensive care unit. Journal of pharmacy world of science 20(4): 178-82.

27. Sheu J S, Tang F I, Yu S, Wei I L, Chen,C.H (2007) Nurses relate the contributing factors involved in medication errors. Journal of Clinical Nursing 16(3): 447-457.

28. Sonia Prot, Jean Eudes fontan, Corinne Alberti, Olivier Bourdon, Caroline Farnoux, Marie Alice Macher, Anita Foureau, Albert faye, Francois Beautifils, Serge Gottot, & Francoise Brion,(2005) Drug administration errors and their determinants in pediatric in-patient. International Journal for Quality in Health Care 5(17): 381-89.

29. Sukswhan Jain, Basu S, Parmar R V (2009) Medication errors in neonates admitted in intensive care unit and emergency department. Journal of Global Infectious Diseases 63(4): 145-151.

30. Vallejos A, (2007) Adverse reactions by antibiotics in a pediatric and neonatal intensive care unit located in Bogota, Colombia Journal of Biomedica 27(1): 66-75.

31. Vila-de-muga M, Colom-Ferrer L, Gonzalez-Herrero M, & Luaces-Cubells C (2011) Factors associated with medication errors in the pediatric emergency department. Journal of Pediatric Emergency Care 27(4): 290-4.

32. Warrick C, Naik H, Avis S, Fletcher P, Franklin B D, Inwald D (2011) A clinical information system reduces medication errors in pediatric intensive care. Journal of intensive care medicine 37(4): 691-4.

33. Webster M (2007) Definition of cardiovascular drugs. www.britannica .com/Ebchecked/…/Cardiovasular drugs.

KNOWLEDGE TEST FOR NURSES ON PEDIATRIC DRUG ADMINISTRATION

SOCIODEMOGRAPHIC DATA

1. AGE : ☐ Years

2. SEX : Male ☐ Female ☐

3.QUALIFICATION : GNM ☐ BSc(N) ☐ MSc(N) ☐

4. ADDITIONAL QUALIFICATION IF ANY:

5. PLACE OF WORK : CHICU ☐ CHWRD ☐

6. TOTAL YEAR OF EXPERIENCE: ☐ Years

Note: Place a tick(✓) mark on the most appropriate answer. Total fifteen questions, each one carries one mark.

1. Which of the following drugs should be diluted in 5% dextrose only?
   a) Lignocaine b) Dopamine c) Amiodarone d) Epinephrine

2. One microgram is = _____ mg
   a) 0.001mg b)0 .01mg c) 1000mg d) 100mg

3. If a three year old child spits up part of a liquid medication, you should
   a) never repeat the dose
   b) call the parents and tell them they must pick up their child.
   c)Guess the amount of medication the child spit out.
   d)Give complete dose of medication again.

4. A child of weight 5kg is admitted in congenital heart intensive care unit. The surgeon prescribed Inj. Adrenalin 0.1 microgram/kg/hr. The dilution of the drug is 1.6mg in 50ml. Calculate the flow ratein ml/hr.
   a) 0.5ml/hr b) 0.9 ml/hr c) 1ml/hr d) 1.2ml/hr

5. Which one of the following increases the digoxin toxicity?
   a)Hypercalcemia b) Hyperkalemia c) Hypermagnesemia
   d) Hypocalcemia

6. Aldactone is an example for
   a) Osmotic diuretics b) Potassium sparing diuretics c) loop diuretics
   d) Thiazide diuretics

7. Find out the drug which should not be infused peripherally ?
   a) Amiodarone b) Dopamine c) Adrenalin d) Propafol

8,. Side effects of morphine include all of the following except
   a)Respiratory depression b) Urinary incontinence c) Constipation
   d) Itching

9. Which drug causes thrombocytopenia in 10% people after 48-72 hours of infusion and which resolves when the drug is discontinued.
   a) Dopamine b) Aminophyllin c) Amiodarone d) Dobutamine

10. A post operative patient has a serum potassium level 3 mEq/L. Find out the amount of potassium chloride to be given to correct the deficit. (weight of the child is 4.0 kg)
   a) 1mEq/L b) 1.5 mEq/L c)2 mEq/L d) 3 mEq/L

11. Furosemide is incompatible with
   a) Calcium chloride b) Dopamine c)Dobutamine d) NTG

12. Normal serum level of Digoxin
   a) 0.5 to 1ng/ml b)0.3 to 1.5 ng/ml c) 0.5 to 2 ng/ml d) 0.3 to 2.5 ng/ml

13. Half life of Inj. Adenosin

a) < 5sec b)< 10 sec c) <5min d)<10min

14. Vasopressin increases the blood pressure by increasing the

a)Cardiac output b) Heart rate c) Peripheral vascular resistance d)stroke volume

15. Total amount of fluid to be to a child is 600ml/day. Find out the Drops/min, if you are using a macro drip set. (Drop factor is 15)?

a) 10 b) 8 c) 6 d) 4

Answer Key

1 (c) 2(a) 3(a) 4(b) 5(a) 6(b) 7(b) 8(b) 9(c) 10(c) 11(c) 12(c) 13(b) 14(c) 15(c)