CHAPTER 1

INTRODUCTION
CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

The largest single occupational category in a country’s health services is that of nursing professionals. Nursing occupation is governed by regulations and norms prescribed by various regulatory bodies. This is because nurses are the backbone of health care system. They play a vital role in providing health care to patients as well as to a community. To play their role effectively nurses need to possess number of technical and interpersonal competencies. These competencies include knowledge and skills needed in managing sick and healthy individuals in varied settings viz. community, hospital or specialized care units. For this purpose, they receive professional education at nurses’ training institutes and practice critical interventions to manage complex live situations in hospitals and community.

Nurses are equipped with a professional qualification and possess skills to provide a wide spectrum of nursing services. They are not only licensed to practice independently, but also to provide nursing service to individuals at home, or in health institutions. They are also licensed to provide nursing in other health establishments like ambulatory clinics, diagnostic centers, therapeutic clinics, maternity and child health centers, schools and industrial units.
The spectrum of nursing services comprise of providing skillful and safe quality services to individuals of all ages, families, communities in all health care settings. Nurses provide nursing services to promote health, prevent illness, restore health and facilitate coping with disability. For providing these nursing services, nurses rely on essential components such as knowledge, technical skills, interpersonal and ethical skills. A fine blend of these components is required to perform various nursing procedures for effective and quality nursing care. Some of these important procedures are health assessment and monitoring, which includes physical examination and carrying out simple laboratory investigations; assisting sick individuals to carry out daily activities; providing treatment for minor ailments; providing preventive and curative services such as immunization and carrying out prescribed treatment orders such as administration of prescribed drugs.

The present system of nursing education is designed and developed to enable a nurse to perform her vital role effectively and efficiently. It would be hence worth to take an overview of system of nursing education.

In India, Indian Nursing Council (INC) is the highest authority, which plays a key role in framing the courses for nurses’ education. The commonly run courses for nurses’ education are as shown in table 1.1.
TABLE 1.1: COURSES FOR NURSES’ EDUCATION IN INDIA

<table>
<thead>
<tr>
<th>S. No</th>
<th>Title of Course</th>
<th>Educational Eligibility Required</th>
<th>Duration of course</th>
<th>Prescribed Theory Hours</th>
<th>Prescribed Hospital Practical Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Auxiliary Nurse &amp; Midwife (ANM)</td>
<td>10+2 Class pass</td>
<td>2 years</td>
<td>1275</td>
<td>2200</td>
</tr>
<tr>
<td>2</td>
<td>General Nursing and Midwifery (GNM)</td>
<td>10+2 Class pass with 40% marks</td>
<td>3.5 years</td>
<td>1415</td>
<td>4200</td>
</tr>
<tr>
<td>3</td>
<td>Post Basic Bachelor of Science (Nursing) (PB B.Sc. Nsg)</td>
<td>Regular =10+2 + GNM Distance =10+2, GNM + 2 years experience</td>
<td>2 years</td>
<td>870</td>
<td>1665</td>
</tr>
<tr>
<td>4</td>
<td>Bachelor of Science (Nursing) (Basic B.Sc. Nsg)</td>
<td>10+2 Class pass with 45% aggregate in PCBE</td>
<td>4 years</td>
<td>2085+285</td>
<td>3760</td>
</tr>
<tr>
<td>5</td>
<td>Master of Science (Nursing) (M.Sc. Nsg)</td>
<td>B.Sc. Nursing/B.Sc. Hons. Nursing/Post Basic B.Sc. Nursing with minimum of 55% aggregate marks.</td>
<td>2 years</td>
<td>900</td>
<td>2500</td>
</tr>
<tr>
<td>6</td>
<td>M. Phil.</td>
<td>M. Sc.</td>
<td>1 year (Full time)</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>2 years (part time)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Ph. D.</td>
<td>M. Sc./ M. Phil</td>
<td>3-5 years</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>8</td>
<td>Post Basic Specialty Diploma Courses</td>
<td>R.N &amp; R.M</td>
<td>1 year</td>
<td>----</td>
<td>----</td>
</tr>
</tbody>
</table>

It can be observed that the training is imparted at different levels. The qualification required, course duration and the course content are different for different courses. Right from the ANM to basic B.Sc. nursing, more or less same basic subjects are taught but; the depth of the contents goes on increasing. The arrangement of the course is somewhat concentric. “Fundamentals of Nursing” is the most important subject in all the courses. For instance, INC suggests 265 theory hours and 650
practical hours for the subject ‘Fundamentals of Nursing’ in first year B.Sc. nursing syllabus. Out of these 650 practical hours, 200 hours are to be devoted in the laboratory and 450 hours in the clinical setting. (Indian Nursing Council, 2004). Clinical training is the heart of professional teaching in the field of nursing education. Hence, more than 50% of their training has a clinical base so that they can acquire the required professional skills. As a part of this subject, students learn many preliminary topics such as 1) Concept of health and illness, 2) Health care, 3) Infection control in clinical setting and hospital 4) Admission and discharge, 5) Administration of medication, 6) Documentation and reporting, 7) Communication and nurse-patient relationship, etc. It clearly shows that this subject is so designed that a nursing student acquires knowledge, skills and techniques of nursing care which they need to practice in clinical settings.

In all the courses, education is imparted to students by using traditional teaching techniques such as lecture and demonstration. At the most, lectures are conducted with the help of teaching aids such as power point presentations. A teacher demonstrates clinical skills in a demonstration laboratory. Students practice clinical skills in the hospital setting directly on human beings under supervision.

Performance of students in theory and practical is evaluated by traditional methods and techniques. Examinations are conducted as per the guidelines provided by statutory bodies such as INC and respective universities. Typically, 100 marks are assigned for each subject, with 25% marks allotted to internal examination at college level and 75% marks for the examination at university level. To pass in a subject, a student has to obtain 50% marks in that subject.
1.2 NEED FOR THE STUDY

From the above discussion, one can notice that many efforts are being taken by various authorities to see that the nurses’ training is almost near perfection, since they are aware that the trained nurses have to deal with patients and any errors from the nurses’ side can be detrimental to the health of the patients. However, many research studies have found that significant number of errors do occur in nursing care.

Amongst all the skills as stated before, drug administration is one of the most vital clinical skills. The administration of injections has become a common nursing intervention in clinical practice. This activity is perceived as fundamental to patient care. Injections are among the most frequently used pharmacological administrative procedures, with an estimated 12 billion injections administered throughout the world on an annual basis. (Nicoll, & Hesby, 2002). The World Health Organization (2006) estimates that 16 billion injections are given per year. (World Health Organization, 2006).

Thomson et al. (2009) conducted a study to investigate the nursing time devoted to medication administration. They observed that medication administration process is accounted for approximately one third of nursing time. (Thomson, Field, Jerry, Gurwitz, & Rochon, 2009). Council of Europe Expert Group on Safe Medication Practices has found that medications are the most common therapeutic intervention used in long-term care (LTC). They have also observed and noted that 40% of working time of the nurses is spent on drug administration. (Shane, 2009).
Drug administration, being a most common clinical procedure performed by nurses has a high chance of being erroneous. A study by Wilkins and Shields (2008) noted that administering the prescribed drug is the prime function and responsibility of the nurse. They also found that 50% of the drug errors occur during drug administration stage. (Wilkins, & Shields, 2008). In 2007, National Patient Safety Agency (NPSA) statistics showed that 59.3% of medication errors occur during the administration stage. (Kumar, Venateswarul, & Ramesh, 2011). Balas et al. (2006) have found that over one quarter of the randomly selected 502 nurses had made at least one error. Total number of errors was 574, amongst which errors in drug administration were found to be most common (56.7%). These errors can become fatal to the patient. (Balas, Scott, & Rogers, 2006). Fanak et al. (2008) have conducted a study to assess the administration errors made by nursing students. They used National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) taxonomy to analyze the frequency, types, severity of medication administration errors. This taxonomy has given different categories of medication errors. They found that most of the administration errors belonged to the Category C (70.57%). Category ‘C’ is when an error has occurred but did not cause harm to patient. Category D accounted (23.29%) error. Category “D” is when an error has occurred that required monitoring to confirm harm to the patient and/or required intervention to preclude harm. (Fanak, Parham, Mehrdad, Rocsanna, & Maria, 2008).

Several studies have been conducted to determine the nature of, and reasons for, errors in medication administration. The critical care safety study has demonstrated that 78% of serious errors in ICU patients are attributed to medications; and these errors are related to miscalculations of doses and improper medication administration.
Wolf et al. (2006) investigated the rationale for medication errors that occurred during the administration phase by over 1,300 nursing students by doing a secondary analysis on MEDMARX, a database operated by the United States Pharmacopeia through the Patient Safety Program. The authors revealed that the most common error was omission of a medication followed closely by a wrong dosage and a wrong route followed by not abiding with procedures or protocol. The main reasons found were deficient knowledge and lack of communication. (Wolf, Hicks, & Serembus, 2006).

In Indian settings, the scenario is more or less similar to that stated above. According to Kumar et al. (2011), drug administration is a complex procedure, which includes different stages like prescribing drug, dispensing drug and administration of drug. They have found that errors do occur at some of these stages and can prove fatal to the patient. (Kumar, Venkateswarlu, Ramesh, 2011). Reddy et.al (2009) conducted a study to identify drug errors and have explored that 38% errors are due to performance deficit. Untrained nurses were another major cause accounting for 13% of adverse medication events. The study revealed that prescription and administration was a root cause for drug administration errors. (Reddy, Modi, Choudhary, Modi, & Patel, 2009).

As stated in preceding paragraphs there are numerous reasons for errors. Many researchers have suggested and explored various ways to prevent drug administration errors.
Bhatt (2000) has made several suggestions for reducing medication errors. They are:
1) reduced reliance on memory by using checklists, protocols, and computerized decision aids for prescription writing, 2) improved information access with availability of computerized medical record at bedside, 3) error proofing by use of forcing functions in computer programmes so that a physician cannot enter an overdose or prescribe a medication to which the patient is allergic, 4) standardization of drug doses and times of administration, of information displays, of equipment and supplies location in hospitals, and 5) training of doctors, nurses and other staff in safe practice. (Bhatt, 2000).

In their work titled ‘Medication errors – a case study’, Reddy et al. (2009) have suggested some recommendations for prevention of errors. They are: 1) training and education of nurses, 2) correction in performance deficit, 3) display of the list of drug names that look or sound alike at the nursing station, 4) installing computer system on nursing station, which must give signals at dosing time to minimize omission errors and wrong time errors etc. (Reddy, Modi, Chaudhary, Modi, & Patel, 2009).

Some of the suggestions also include individual-focused interventions such as Bar-Coded Medication Administration (BCMA), the Computerized Provider Ordering Entry system (CPOE), precise infusion devices, and continuing education. (Rough, Ludwig, & Wilson, 2003).

Some researchers have investigated the rate of medical errors in the medical intensive care unit (ICU) and the effect of bar-code-assisted medication administration
(BCMA) in ICU. (Baldwin, 2002; Crane & Crane, 2006). These Studies have pointed out that implementation of BCMA reduced medical error rate significantly.

However, there are some studies, which have stated results contrary to the above findings. A research study by Patterson et al. (2002) state that healthcare information technology does not always integrate well into daily practice or function as expected. Patterson et al. identified side effects from BCMA implementation such as potential for missed medications resulting from the automatic removal of medications by the software. (Patterson, Cook, & Render, 2002). A research study by Bates et.al. (1999) has revealed that computerized physicians order entry might increase efficiency and productivity among healthcare providers at the hospital setting. The electronic prescribing systems have shown improvement in the clinical processes and productivity but had little impact on the medical error rate. (Bates, Teich, Lee, Seger, Kuperman, Ma'Luf, Boyle, & Leape, 1999).

Out of the measures mentioned above, the measures such as computerized systems for dispensing drug, barcode system, drug administration protocols at nursing stations, system approach etc. are in use at many institutions. The introduction of all these measures has undoubtedly created hope that the incidence of medication errors could be reduced significantly. It is important to note that ‘electronic solutions’ are not a panacea by themselves. A large part of healthcare around the world and especially in India is still dependent on simple hand written prescriptions and manual dispensing and administration. Therefore, effective solutions, which are not technology dependent, need to be developed.
One of the reasons for drug error noted by many researchers is very low knowledge and skill level of nurses. For instance, according to Wolf et al. (2006), the most prevalent cause of the errors was students' performance deficits. For reduction in the errors, the authors have recommended that faculty might consider curriculum revisions that incorporate medication safety throughout each course in nursing. (Wolf, Hicks, & Serembus, 2006). Research findings of Altun et al. (2010) have also demonstrated that the knowledge and skill of participants (staff nurses) was very low in the pretest before intervention. Findings of their study suggest that greater emphasis needs to be placed on nurses’ education regarding administration of injections. They also noted many other studies where they related nurses’ knowledge about medication administration to the rate of complications. (Altun, Dede, Özlem, & Barin, C. 2010).

Here the challenge is to ensure how nurses can master the skills and subject matter that is regarded as essential for avoiding drug errors. The literature review by the present researcher has revealed that in spite of its paramount importance, very little has been done to improve the skill and knowledge of nursing students in the Indian scenario. New techniques in education offer one of the most viable solutions in significant improvement of nursing students’ knowledge and skills. It is, therefore an endeavor in the present research work to study drug administration with a view of finding the way to teach this topic effectively.

Novel approaches, based on sound objectives, must be implemented to train and transform nursing students into reflective and totally active nurses. It is necessary to refine and improve the teaching methods and instructional techniques to realize the
fullest potential of individual trainee nurses. In order to deal with the problems of errors by nurses in the vital skills this researcher feels that learning and teaching strategies, which have a dual advantage of group and individualized learning, should be employed.

Many researchers have proven that ‘Mastery Learning Strategy’ (MLS) provides an efficient and effective means to teachers to transform group instruction into instruction of optimal quality per learner. (Bloom, Hastings, & Madaus, 1971). This strategy can provide almost all students with a successful and rewarding learning. The researcher feels that qualitative improvement in nurses’ education may be achieved by using new techniques like ‘Mastery Learning Approach’ (MLA).

It is logical at this juncture to present a brief description of the Mastery Learning Approach. The concept of ‘Mastery Learning’ is not new; it was introduced into western education over 90 years ago, by Washburne in 1922. The other prominent proponents are Morrison, Carroll, Bloom etc. (Motamedi & William, 2000).

Bloom et.al (1971) have stated that the concept of mastery was explained theoretically by Carroll in 1963 and was transformed into a learning strategy by Bloom in 1968. Mastery Learning is a process whereby students achieve the same level of content mastery but in different time intervals. Students are given specific feedback about their learning progress at regular intervals throughout the instructional period. This feedback helps students identify what they have learnt well and what they have not. Areas that are not learnt well are allotted more time to achieve mastery. Conventional
instruction holds time constant and allows mastery to vary while Mastery Learning holds mastery constant and allows time to vary. (Bloom, Hastings, & Madaus, 1971).

The Mastery Learning starts with the assumption that almost all students can and will master a great deal of what is taught. It requires instruction to be given systematically. Their learning difficulties are diagnosed at the right time; and are helped when and where they have learning difficulties. They are given sufficient time to achieve mastery and there is some clear criterion of what constitutes mastery. Studies conducted by Block in 1971 and 1974 indicate that in many subject areas, all students can achieve some defined level of mastery. (Gruskey, 2005).

Two genotype approaches to the use of Mastery Learning Strategy currently exist. The first is a group-based, teacher-paced approach. In this approach students learn cooperatively with their classmates and the teacher controls the delivery and flow of instruction. The prototype for this approach is Bloom's Learning For Mastery (LFM).

The second approach is individual-based and learner-paced. In this approach students learn independently of their classmates and each student controls the delivery and flow of instruction. Ideas and practices related to this approach lie at the heart of Keller's personalized system of instruction. (Keller, 1968).

Many research studies have been conducted at school level and have found that Mastery Learning Approach is an effective teaching method. Mastery Learning Strategy is a strategy, which provides almost all students with successful and rewarding learning experiences and enables them to master what they are taught in the
classroom. (Bloom, Hastings, & Madaus, 1971). According to Chand (1984), MLS can be implemented in Indian conditions without additional efforts and expenditure. (Chand, 1984). According to Vaidya (1991), it does not require elaborate and expensive technology, except technology for developing instructional material, which suit the needs of students. (Vaidya, 1991).

There are many studies conducted in western countries, which have shown that Mastery Learning is one of the most effective strategies for teaching various subjects. The literature survey has revealed that quite a few studies are also there in the field of health sciences. However, most of these studies are conducted to train doctors and very few studies are there about training students.

In India, to the best of the researcher’s knowledge, there is only one study regarding use of MLA for teaching nursing students. This work is done by Mathur from Department of Education, New Delhi. The title of his study was ‘Effects of mastery level learning programme in statistics on the achievement, self-concept, and attitude towards statistics of nursing students.’ This research proved Mastery Learning Programme to be very effective for learning statistics. (Mathur, 1988). On the backdrop of this, the present researcher has defined the present research problem, which aims at examining the effectiveness of Mastery Learning Model (MLA) in teaching nursing students.

As discussed earlier, drug administration is one of the most common tasks that nurses have to perform. Many studies have noticed that practicing nurses make large number of errors while administering drugs to patients and one of the most important reasons
for the drug errors is very low knowledge and skill level of nurses. Many of these studies also suggest that greater emphasis needs to be placed on nurses’ education of drug administration. It is, therefore, an endeavor in the present research work to apply strategy of Mastery Learning Model (MLM) for teaching the topic of parenteral drug administration to nursing students and to study the effectiveness of this strategy in enhancing knowledge and skill.

1.3 PROBLEM STATEMENT

“To study the effect of Mastery Learning Model on the performance of nursing students with respect to selected drug administration.”

1.4 CONCEPTUAL FRAMEWORK

A framework for a research helps to organize the study and provides a context for the interpretation of the study findings. Conceptual framework helps explain the relationship between concepts. According to Polit and Hungler (1995), conceptual framework refers to interrelated concepts of abstracts that are assembled together in some rational scheme by virtue of their relevance to a common theme. (Polit & Hungler, 1995).

Conceptual theory of Learning for Mastery was first developed by John B. Carroll in 1963. The conceptual framework of present study is based on conceptual theory of Learning for Mastery. Bloom further developed this theory in to a practical model of Learning For Mastery (LFM). As discussed earlier, there are two approaches of
LFM, namely, group-based, teacher-paced approach and individual-based, learner-paced approach. In the present investigation the researcher has used a group-based, teacher-paced approach.

Underlying Mastery Learning Theory and Practice is an explicit conceptual thought about learning and teaching. This thought essentially asserts that under appropriate instructional conditions virtually all students can learn well, that is, can master most of what they are taught. For this, students should have the prerequisite skills necessary to learn the concluding skills. The key element of Mastery Learning Theory is the establishment of a criterion level of achievement held to represent “mastery” of a given concept or skill. This is measured by frequent assessments of a student’s progress towards the mastery criterion with opportunities for corrective instructions, enabling students who do not initially meet the mastery criterion to do so after analogous assessments. Typically, correctness of 80% and above in answering questions in assessments is taken as criterion for mastery. Corrective instructions may take the form of tutoring by teacher, teacher aides, student tutors who did achieve the criterion level. Small group sessions may also be conducted in which students review skills or concepts that were missed. In addition, alternative activities or materials may be created and provided to students for self learning.

There are three factors that affect the time needed in learning and reaching mastery level. These factors are student’s aptitude, quality of instructions, and student’s ability to understand the instructions. Mastery Learning is an instructional strategy and the only factor, which is in teacher’s control, is the quality of instructions. The teacher has to design and implement the instructional strategy and may alter the same to
produce the positive effect. Below given figure 1.1 is the schematic representation of the conceptual framework of Mastery Learning Model used in this study.

<table>
<thead>
<tr>
<th>BEFORE INSTRUCTION</th>
<th>DURING INSTRUCTION</th>
<th>AFTER INSTRUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define mastery.</td>
<td>Develop quality instructions to help each student to master the course objectives.</td>
<td>Conduct summative examination.</td>
</tr>
<tr>
<td>Break the whole course in to sequence of small learning units.</td>
<td>Motivate &amp; engage them in the active learning.</td>
<td>Test for short term and long term retention.</td>
</tr>
<tr>
<td>Specify the learning objectives for each unit.</td>
<td>Assess after completion of unit.</td>
<td></td>
</tr>
<tr>
<td>Prepare various tests for assessment.</td>
<td>Provide feedback.</td>
<td></td>
</tr>
<tr>
<td>Assess prerequisite knowledge.</td>
<td>Correct and re-teach when needed.</td>
<td></td>
</tr>
<tr>
<td>Enhance prerequisite knowledge.</td>
<td>Retest.</td>
<td></td>
</tr>
<tr>
<td>Plan instructional strategy.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**FIGURE 1.1: FEATURES OF MASTERY LEARNING APPROACH**

**1.5 OBJECTIVES OF THE STUDY**

The main objectives of the present investigation are as follows:

- To plan various activities to teach the students belonging to the experimental group using Mastery Learning Model.
- To assess the effectiveness of Mastery Learning Model through comparison of the performance of the students from the experimental group and the control group in the summative tests (cognitive based and psychomotor based).
• To assess the effectiveness of Mastery Learning Model, in retaining knowledge and skills acquired, through the comparison of the performance of the students from the experimental group and the control group in the retention (short duration and long duration) tests (cognitive based and psychomotor based).

These main objectives were further divided in to the following sub-objectives:

• To prepare lesson plans and different instruction tools to implement Mastery Learning Model.

• To prepare different tools for evaluation at various stages.

• To collect base line characteristics of second year basic B.Sc. nursing students in the experimental group and the control group for the purpose of finalizing the sample.

• To quantify and to measure the prerequisite knowledge for learning of new unit of parenteral drug administration of the students in the experimental group and the control group.

• To assess the performance of the students from the experimental group in formative tests (cognitive based and psychomotor based).

• To determine the time taken (measured in terms of number of attempts required to obtain 80% marks in cognitive based formative tests and 100% marks in psychomotor based formative tests) by students in the experimental group to reach mastery level in various units.

• To quantify and to measure the summative performance (cognitive based) in parenteral drug administration of the students in the experimental group and the control group.

• To quantify and to measure the summative performance (psychomotor based) in parenteral drug administration of the students in the experimental group and the control group.
1.6 OPERATIONAL DEFINITIONS OF TERMS USED IN THE TITLE

In order to make clear the title and the objectives of the research the main terms used in the title and the objectives are defined as follows:

**Effect:** Effect is a change in the knowledge and psychomotor skills of second year basic B.Sc. nursing students with respect to drug administration.

**Mastery Learning Model:** According to Bloom, Mastery Learning Model is Learning For Mastery (LFM), which is based on the Mastery Learning Model proposed by Carroll in 1963. Both, Carroll and Bloom have defined mastery in terms of achievement of particular educational objectives. In this model students have to attain mastery in each unit before proceeding to the next unit. An ungraded diagnostic progress test is administered at the completion of each unit to provide feedback on the adequacy of the students’ learning. The performance in the test either indicates mastery, usually set at a level of 80%, or highlights the material the student still has to master. For the student who has not attained mastery, original instruction could be supplemented with appropriate remedial materials, so that he/she can obtain a score reaching the mastery criterion. (Bloom, 1974).

In this study, Mastery Learning Model is stated synonymously as Mastery Learning Strategy, Mastery Learning Approach or Mastery Learning Method. In this study, Mastery Learning Model is used as described here: A subject matter is split into small and convenient units that have predetermined learning objectives. Students learn each unit in groups. After learning of each unit, all the students have to appear for a
formative test on that unit. All these tests are criterion referenced tests based on learning objectives. Students must demonstrate mastery through performance in a formative test after each unit, by achieving minimum score of 80% for cognitive based test, and 100% score for psychomotor based test before moving on to learning of a new unit. Students get feedback on their achievement and performance. Students who do not achieve mastery receive remediation through individual guidance, peer monitoring, small group discussions, or additional practice. Additional time for learning is prescribed for those requiring remediation. Students continue the cycle of learning and assessment until mastery is achieved.

**Performance**: Scores achieved in the tests (cognitive based and psychomotor based) administered.

**Second year basic B. Sc. nursing student**: Student nurse who is taking training in the second year basic B.Sc. nursing programme of Maharashtra University of Health Sciences (MUHS) and from the institutes, which are affiliated to MUHS and Indian Nursing Council (INC). In the present investigation this further means that a student who is studying in the second year of the course in the academic year July 2011- June 2012.

**Selected drug administration**: In the prescribed syllabus of second year basic B.Sc. nursing course of MUHS there is a topic on parenteral drug administration. This topic includes different modes of drug administration. The researcher has selected three modes namely intramuscular, subcutaneous and intradermal drug administration for the present investigation.
Short duration retention and long duration retention: Retention means permanence of what is learnt. The retention is measured in terms of scores in retention tests conducted with the time gap of 15 days (short duration) and 6 months (long duration) after summative tests.

1.7 VARIABLES IN THE STUDY

Present study is based on teaching-learning process. The variables in the study are classified into independent variables, dependent variables, controlled variables and extraneous variables. The variables considered in the study, along with their classification, are mentioned in table 1.2.

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Dependent variables</th>
<th>Controlled variables</th>
<th>Extraneous variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Mastery Learning Model of teaching</td>
<td>1) Summative test (cognitive based) scores</td>
<td>1) Prerequisite knowledge</td>
<td>1) Mother tongue</td>
</tr>
<tr>
<td></td>
<td>2) Summative tests (psychomotor based) scores</td>
<td>2) Topic taught - parenteral drug administration</td>
<td>2) Scores in H.S.C. Exam</td>
</tr>
<tr>
<td></td>
<td>3) Retention tests (cognitive based and psychomotor based) scores</td>
<td>3) Class of students – second year basic B.Sc. nursing students</td>
<td>3) Scores in first year basic B.Sc. nursing university exam</td>
</tr>
<tr>
<td></td>
<td>4) Teacher</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1.8 HYPOTHESES

The central question addressed in this investigation is: “Is the ‘Mastery Learning Model’ of teaching an effective way of teaching subject parenteral drug administration to nursing students?” To investigate the same, two central hypotheses were formulated. These hypotheses are stated below:

1. The Mastery Learning Approach of teaching is more effective than conventional approach of teaching in enhancing the cognitive and psychomotor competencies of second year basic B.Sc. nursing students, in three modes of parenteral drug administration.

2. The Mastery Learning Approach of teaching is more effective than conventional approach of teaching in retaining the cognitive and psychomotor competencies acquired by second year basic B.Sc. nursing students, in three modes of parenteral drug administration.

These central hypotheses were further broken into alternative hypotheses and corresponding null hypotheses for statistical testing. These alternative hypotheses are listed below:

\[ H_{11} : \text{Samples in the experimental group and the control group are equivalent as far as prerequisite knowledge test (cognitive based) scores of the students are considered.} \]
H$_{12}$: There is significant difference between the experimental group and the control group as far as summative test (cognitive based) scores of the students are considered.

H$_{13}$: There is significant difference between the experimental group and the control group as far as summative test [psychomotor (intramuscular drug administration skill) based] scores of the students are considered.

H$_{14}$: There is significant difference between the experimental group and the control group as far as summative test [psychomotor (subcutaneous drug administration skill) based] scores of the students are considered.

H$_{15}$: There is significant difference between the experimental group and the control group as far as summative test [psychomotor (intradermal drug administration skill) based] scores of the students are considered.

H$_{16.1}$: There is significant difference between the experimental group and the control group as far as short duration (15 days) retention test (cognitive based) scores of the students are considered.

H$_{16.2}$: There is significant difference between the experimental group and the control group as far as long duration (6 months) retention test (cognitive based) scores of the students are considered.

H$_{17.1}$: There is significant difference between the experimental group and the control group as far as short duration (15 days) retention test [psychomotor (intramuscular drug administration skill) based] scores of the students are considered.

H$_{17.2}$: There is significant difference between the experimental group and the control group as far as short duration (15 days) retention test [psychomotor (intramuscular drug administration skill) based] scores of the students are considered.

H$_{17.2}$: There is significant difference between the experimental group and the control
group as far as long duration (6 months) retention test [psychomotor (intramuscular drug administration skill) based] scores of the students are considered.

H18.1: There is significant difference between the experimental group and the control group as far as short duration (15 days) retention test [psychomotor (subcutaneous drug administration skill) based] scores of the students are considered.

H18.2: There is significant difference between the experimental group and the control group as far as long duration (6 months) retention test [psychomotor (subcutaneous drug administration skill) based] scores of the students are considered.

H19.1: There is significant difference between the experimental group and the control group as far as short duration (15 days) retention test [psychomotor (intradermal drug administration skill) based] scores of the students are considered.

H19.2: There is significant difference between the experimental group and the control group as far as long duration (6 months) retention test [psychomotor (intradermal drug administration skill) based] scores of the students are considered.

1.9 ASSUMPTIONS

- All students are at par as far as aptitude is concerned.
- All students have same degree of motivation.
- Instructional strategies used in the study are qualitative in nature.
• All students have ability to acquire knowledge and skills supposed to be acquired through learning of the topic parenteral drug administration.

• Knowledge and skills acquired can be measured through the scores obtained in the criterion-referenced tests administered.

• Formative evaluation and immediate feedback will be motivating factor for the students in the experimental group.

1.10 DELIMITATIONS

Considering the constraints on resources, the study had to be limited to the following:

1. The study was confined to the effect of Mastery Learning Approach on cognitive and psychomotor achievement and retention ability of second year basic B.Sc. nursing students in two colleges of nursing affiliated to Indian Nursing Council and Maharashtra University of Health Science.

2. Out of the two approaches of Mastery Learning Strategy, only the group-based, teacher-paced approach was followed.

3. Only selected topic of ‘parenteral drug administration’ within subject fundamentals of nursing was considered.

4. Small number of students intake in the first year of basic B.Sc. nursing course at nursing colleges and also failures in the first year B.Sc. nursing have limited the number of the students in the samples taken for study.
5. Classical method of controlling the teacher variable was not adopted. Before commencing the experiment, the researcher and the teacher of the control group discussed about the textbooks to be followed, content to be taught, and the objectives of the topic. During these discussions, it was agreed that both the teachers would follow same textbooks and would teach same contents with intention of achieving the same set of objectives of the topic.

1.11 SUMMARY

The research study carried out for this Ph.D. work has been presented in this thesis. The study addresses the issue of effectiveness of Mastery Learning Model in teaching nursing students and is entitled as “A Study of the Effect of Mastery Learning Model on the performance of the Nursing Students with Respect to Selected Drug Administration”. The performance of the nursing students is also assessed in terms of their ability to retain the learnt knowledge and skills for short and long duration.

The first chapter deals with the background and need of the study, the conceptual framework applied objectives of the study, definition of terms, research variables in the study, research questions and hypotheses, assumptions, and delimitations of this study.
REFERENCES


