CHAPTER II

LITERATURE REVIEW

2.1. INTRODUCTION

The formal nursing education program in Nepal emerged lately. The nursing education program was embarked in 1956 by His Majesty's Government with the help of the World Health Organization. In the following year the first two Nepalese trained nurses arrived in Nepal after completing their training in India. Before the establishment of nursing school in Nepal, Nepal Government has to send candidates to India for nursing education. In those days, Nepal Government began to realize the importance of nursing care and training for nursing personnel. After the establishment of nursing school under the Ministry of Health, Bir Hospital, the nursing school started to train and produce qualified staff nurses to meet the country's need. During that period the requirement for admission to nursing school was class IX. The candidates had to take entrance examination and interview. The main emphasis was on entrance examination and interview. English was the main subject for the entrance examination.

As the time passed gradual development in nursing

education has been attained in order to meet the immediate need along the way. As a new era of educational development merged in educational system in 1971, it also brought a new change in nursing education. Nursing school became the part of University. (CERID, 1982.). The Institute of Medicine (IOM) was established in 1972 to train health workers needed by the country. Nepal Government decided to put the nursing education program within the Institute of Medicine. The nursing schools were then identified under the new name, nursing campuses. Nowadays there are seven nursing campuses, including UMN (United Mission to Nepal) nursing program. The nursing curriculum was updated little bit according to demand for new nursing skill and knowledge. Since the Alma-Ata Declaration in 1978, the Nepal Government adopted the primary health care approach which is essential for nursing campuses to produce community-oriented nurses according to national policy and need of the country. Therefore the nursing curriculum was revised and implemented in 1987. In 1970 the requirement for admission to nursing education program was raised to school leaving certificate (SLC). The entrance examination and interviews were organized to select and admit the nursing students. The entrance examination emphasized on English, and general knowledge. But there was no systematic system for selection and admission. During that period the applicants were very few so there

was less competitive environment for admission. Until 1979, the selection and admission process remained same. After 1979 there was a change in previous admission system. Now the requirement for admission to nursing campuses is raised to school leaving certificate (SLC) second division with compulsory subjects like Mathematics, Science and English. The aggregate marks of SLC with three compulsory subjects, is the only criterion for entry to nursing education program. This is the single criterion approach. This single criterion approach is seen as relevant, objective and administratively simple. But this single criterion approach relies on the reliability of school leaving certificate aggregate mark. It can be a general predictor of success in tertiary studies. (Feletti, G. I. et al 1985). Regarding to philosophy and goal of nursing education, it requires intellectual skills and personality attributes and to function efficiently as a professional staff nurse. The present single criterion approach admission procedure does not reflect the aptitude of the entering students. Therefore it requires to be examined.

The institute wants to select the ablest applicants that means the applicants with the greatest academic aptitude, not those with the highest level of academic achievement. Many institutes or colleges use aptitude tests to help them to make admission decisions.

The applicants are selected on the basis of their academic ability. The term ability has two meanings which imply different admission policies. Academic ability means an existing [Italics in original] capacity to do academic work and the another usage, academic ability means a potential [Italics in original] capacity to do such work. To make it distinct psychometricians usually call the ability to learn something an aptitude while the mastery over a skill or body of knowledge an achievement. (Schrader, W. B., Editor, 1982.). Nursing education program of Nepal relies on achievement tests rather than the aptitude tests to help them to make admission decisions. It is done because it is thought that the best single predictor of how much a student will learn from studying something in a campus is how much he/she learned from studying something similar in secondary school. The institute wants such type of admission and selection test that would identify outstanding who could be expected to overcome poor preparation and learn a lot if admitted. The need of the institute is a measures of academic aptitude as well as achievement tests.

American colleges and universities shifted from achievement to aptitude tests. Education Testing Service and College Board played a critical role in that movement. Many colleges placed more emphasis on Scholastic Aptitude Test (SAT) and less on traditional

achievement tests. Those colleges which relied entirely on high school grades for screening applicants began requiring applicants to take standardized tests like SAT. The aptitude test is primarily designed to predict success in some future learning activity. An achievement test is customarily used to measure past learning. Although these tests are designed and used differently both have been employed to predict future performance. Similarly standardized entrance tests have been employed in many professions, such as Dental Aptitude Test (DAT) and Medical College Admission Test (MCAT) have been used since 1950s and continue to play major role in admission decisions. In 1960s, the MCAT was heavily criticized by many medical educators. They argued that MCAT predicted academic performances in the basic sciences, but it failed to predict clinical performance during medical school as well as in practice, and the MCAT also failed to measure analytical skills or personal qualities such as empathy, responsibility and flexibility desired in practice of medicine. Because of heavy criticism in 1972-73, the Association of American Medical Colleges National task force revised the MCAT considering the additional noncognitive measures. The old MCAT had four subtests like Verbal, Quantitative ability, General information and Science. The new MCAT has six subtests like Reading, Quantitative, Biology, Chemistry, Physics and Science Problems. (McGuire et al, 1983.).

Jones, R. F. and Thomae-Forgues, M. (1981) compared between old MCAT and new MCAT by factor-analysing the scores of a sample of 1,484 examinees who had taken both batteries during 1976-77. They found that both old and new MCATs assess science achievement and quantitative skills, and no area of assessment in new MCAT seemed to focus specifically on assessing verbal skills and general knowledge except reading subtests. The new MCAT introduces assessment in the area of gathering, evaluating and using information, which were not measured by old MCAT. Regarding to new MCAT, Friedman, C.P. et al (1980) stated that the incremental validity of new MCAT was substantial, with performance prediction improved by 23-38 percent and was higher in that range when nationally standardized performance measures were employed as the outcome variables. (Friedman, C. P. et al 1980).

Nursing schools use many different methods of student selection and admission. Similarly like medical education, the admission procedures are changing in nursing schools too. There is increasing reliance on academic achievement and entrance test scores. The change is due to trends in nursing education like problem-solving, self-directed learning, leadership, and independent judgement. White, R. (1985) described that the wastage of student nurses became the concerning matter because of lack of selection of students. Many

students could not stand up to the learning process and could not pass their preliminary and final examinations. It was reported by National Institute of Industrial Psychology that reasons for wastage were firstly intellectual inferiority then unsuitability of candidates, health and vague reasons and lastly extraneous reasons. The institute also found that the relationship between test score and successful completion of training was significantly positive. (White, R., 1985).

Selection is a process of identifying successful applicant. The selection is concerned with the nature of pool of applicants from which the selection is to be made, their likely performance and the type of applicant that school needs and would like to attract. (Sheldrake, P., 1975.). For the selection of students, various types of standardized test are employed like aptitude tests besides achievement tests. This test needs to be designed carefully for efficiency and effectiveness of selection tools. Regarding to the selection, Rhoads, J. M. et al mentioned that superior science students are no more likely to be better clinicians and that the majority of students judged by the faculty to be superior clinical students are not superior students, selection should focus on more than just academic talent. (Rhoads, J. M. et al, 1974.). It is not only for the schools and students, but probably the community would benefit by a

better selection process. The admission procedure principally concerns with what sort of doctor produced and how they were judged whether they succeed in the role they assume. (Andrew, R. R., 1974).

The characteristics of students are found to be important in selection of entering students. These may be divided by four categories. The first category includes the measures that indicate what an individual is capable of doing intellectually such as grade point average (GPA), class rank, aptitude and achievement test scores. The second category involves such characteristics as interest, motivation, attitudes, values, personal adjustment and social habits. Many procedures are available to assess these characteristics but mainly the interview and recommendation are used widely. The third category contains biographical data like age, sex, race, family status, place of origin, work experience and specific career goals. These data are collected through biographical inventory and written statement. The last group consists of psychomotor skill, which is very important in nursing profession. These characteristics are also measured by some kind of tests. Many nursing schools assess these characteristics. Nepal nursing education program relies on achievement test scores only. (McGuire, C. H., et al, 1983).

2.2.   SELECTION AND ADMISSION.

As it is already mentioned that admission and selection process has relationship with curriculum. Students are selected and admitted according to the goals of the nursing program. The selection and admission process includes precise goals of selection procedure; desired characteristics relevant to the goals such as intellectual, personality characteristics and value characteristics; measures for measuring these characteristics; and the relative weights of the characteristics. The intellectual characteristics are like capacity to master extensive and complex material, self-learning capacity, problem-solving, intellectual curiosity; value characteristics such as desire to assume responsibility for providing help to people, an interest in community health service, and personality characteristics like personal integrity, honesty, empathy, interest in people, sensitivity to their suffering, decision making, leadership, enthusiasm and clear, stable self-identity. The tools of admission and selection should be reliable and valid. In the selection procedure, the reliability of the tool refers to the extent to which the same tools used by the same or other appropriate persons would produce the same choice. The validity refers to the extent to which the candidates selected will indeed fulfil the behavioral goals set by the school. (Antonovsky, A., 1976). There are various

selection categories used by different colleges such as transcripts; standardized tests; reference letters; application essays; interview; work experience; and extracurriculum. (McCabe, B. J., and Koury, S. D., 1990).

In Nepal, the admission criteria of nursing campuses are set by academic section of Dean's office, Institute of Medicine, in accordance with the policy of Tribhuvan University. Those candidates are eligible to apply for admission who has successfully completed SLC in second division. The following is the only prescribed admission criteria for nursing campuses:

a) SLC passed- second division - at least > 45%.

- compulsory subjects - English ------ > 45%.

- Mathematics -- > 45%.

- Science -- > 45%.

b) Age 16 years and above.

c) Nepalese citizenship.

d) Sex - Both male and female.

e) Health certificate.

The selection procedure of nursing education program is simple. The aggregate mark of matriculation or school leaving certificate is the sole criterion for selection for nursing campuses. The candidates are selected on the merit basis. The selection of number of candidates depends upon capacity of the each campuses. The name list of applicants are drawn up for admission by

academic merit based on school leaving results alone. The other admission lists may require in certain conditions for instance if some of the candidates did not come for admission and enrollment.

The admission capacity of the campuses are as follows:

- Maharajgunj Nursing campus ....80.
- UMN Nursing campus ....40.
- Pokhara Nursing campus ....40.
- Biratnagar Nursing campus ....30.
- Birgunj Nursing campus ....30.
- Nepalgunj Nursing campus ....30.
- Bir Hospital Nursing campus ....30.

While selection, 10% of male, 25% of Auxiliary Nurse Midwives (ANM) - inservice candidates and 75% fresh students are selected.

2.3. PHILOSOPHY OF NEPAL NURSING EDUCATION

The curriculum of nursing education program in Nepal is heavily influenced by the national policy of Nepal Government. Nepal Government has adopted a national policy for attainment of "health for All by the year 2000" through primary health care approach. As a result, the present curriculum of certificate level nursing program is based on community-focused, learner-centered and on principles of primary health care.

Educational system is based on philosophy of that institution. The philosophy of the institute should be congruent with national goal and need of the nation. An understanding of any educational system requires an understanding of philosophy of that system. According to the philosophy, the curriculum is designed, planned, implemented, and evaluated. The philosophy determines what we want our learners to become. (Sayer, J. G. and Alexander, W. M. 1974). Ultimately it concerns with the selection and admission process.

The philosophy of Nepal nursing education program also based on national goal. In accord with the national goal of education, the nursing curriculum is intended to develop a nurse who is a self-reliant person, a responsible citizen and a contributing member of the society. Through a systematic process of study and experience, knowledge is gained, skills are developed and attitudes are acquired.

Nursing is a profession recognized and accepted by society. Nursing requires imaginative and creative patterns of care in a variety of setting at each level of the health care system in order to assist individual, families and communities to achieve the highest level of health possible within the country's economic capacity.

Nurses are people who think logically and critically and make sound judgements. They develop

technical skills appropriately. With kindness, empathy and compassion, nurses assist individuals, families and communities to develop self-reliance in promoting health, preventing disease, maintaining and restoring health in order to enhance the quality of living throughout the life cycle. Nurses are also concerned with change in self, groups and social system.

The primary health care approach aims to assist all people to have access to health care which is scientifically and technologically sound, and economically feasible. Primary health care takes into consideration the traditional beliefs and health practices of people. Involvement of the community is essential in the identification of health problems and in the planning, management and evaluation of health services.

The nurse collaborates with members of health care groups and other sectors to help individuals, families and communities meet their basic needs. The goals and activities of other developmental sectors of the community should be understood in order to coordinate efforts to meet the needs of the community.

2.4. THE OBJECTIVES OF THE CERTIFICATE NURSING PROGRAM

Upon completion of the program the graduates will:

1. Utilise a sound knowledge base in giving care to

well and sick individuals, families, and communities.

2. Perform preventive and therapeutic measures directed towards promotion, maintenance and restoration of health.

3. Utilise communication skills effectively with individual and groups in a variety of settings.

4. Utilise the nursing process in providing and improving health care.

5. Assume leadership for planning, directing and evaluating care given by health workers.

6. Teach and supervise individuals, families and community including health care workers.

7. Collaborate with multisectorial groups to develop a healthful environment, including safe drinking water, sanitation and other basic needs of the community.

8. Mobilize the community to participate in the activities of the village health post.

9. Demonstrate a positive attitude and respect for the cultural values in working to meet needs and solve the problems.

10. Continue to seek knowledge for personal and the professional growth.

2.5. CRITERIA FOR SUCCESS ON INSTITUTE FINAL EXAMINATION

The students are assessed at campus level by teachers during the course period. The final examination is employed at the end of each year. The Examination

Section, Institute of Medicine, is responsible for the final year examinations. The assessment on clinical performance practicum is based upon performance assessment instruments such as rating scale, checklist, reports. The assessment on theory is based on paper-pencil test consisting of MCQ, short-questions and essay.

The requirement and allocation of marks for nursing certificate level is as follows:

THE REQUIREMENT FOR FIRST YEAR INSTITUTE FINAL EXAMINATION

| SUBJECTS | THEORY | | CLINICAL | | REMARKS |
	TOTAL MARKS	PASS MARKS	TOTAL MARKS	PASS MARKS	
1. Fundamental of Nursing.	100	40	100	50	* 20 % marks for theory and 50 % marks for clinical is allocated by the campus for each paper at final exam.
2. Community Health Nursing I.	100	40	100	50	
3. Human biology.	50	20	-	-	
4. Microbiology.	50	20	-	-	
5. Pharmacology.	50	20	-	-	
6. Applied Science.	50	20	-	-	
7. Nepali	100	40	-	-	
8. English	100	40	-	-	
9. Nepal Parichaya.	50	20	-	-	

TABLE 2.1.

THE REQUIREMENT FOR SECOND YEAR INSTITUTE FINAL EXAMINATION.

SUBJECTS	THEORY		CLINICAL		REMARKS
	TOTAL MARKS	PASS MARKS	TOTAL MARKS	PASS MARKS	
1. Community Health Nursing II.	100	40	150	75 *	20 % marks for theory and 50 % marks for clinical is allocated by campus for each paper at final examination.
2. Social psychology.	100	40	-	-	
4. Adult Nursing I.					
-Medical Nursing	50	20	75	37.5	
-Surgical Nursing.	50	20	75	37.5	
5. Adult Nursing II.					
-Gynecological	25	10	25	12.5	
-Eye & E.N.T. O.T.	25	10	25	12.5	
6. Nutrition.	50	20	-	-	

TABLE 2.2.

THE   REQUIREMENT   FOR   THIRD   YEAR   INSTITUTE   FINAL
EXAMINATION.

SUBJECTS	THEORY		CLINICAL		REMARKS
	TOTAL MARKS	PASS MARKS	TOTAL MARKS	PASS MARKS	
1. Midwifery A.	50	20	50	25	
2. Midwifery B.	50	20	50	25	* 20% marks for theory and 50%
3. Midwifery C.	50	20	50	25	marks for clinical is allocated by
4. Ward Management.	100	40	100	50	campus for each paper at final examination.
5. Community Health Nursing III.	50	20	50	25	
6. Child nursing.	50	20	50	25	

TABLE 2.3.

The criteria for passing final examination is as
following:-----

* The pass marks for theory is 40 %.

* The pass marks for practicum is 50 %.

* Students will be graded into 4 divisions.

   - Distinction 80 %.

   - Merit   > 60 %.

   - Pass   > 40 %.

   - Fail   < 40 %.

2.6.   PREDICTING STUDENT PERFORMANCE.

The performance of student nurses is and will continue to be of interest to nursing educators. The performance on institute final examination is also concern for the students. Nursing educators have to examine periodically their curriculum in order to identify those constituents most predictive of their students' ultimate success. The satisfactory performance only indicates that a nurse practioner meets the legal requirement for safe practice. The students with potential for success in the licensing examination should be admitted to and retained the program.

The numerous studies examining the prediction performance of nurse graduates published in journals. For instance, eleven were found dealing specifically with State Board Examination (SBE); one with predictor of college grades and one with the model of prediction from 1968 - till now. Among these studies, the investigators' five studies were concerned with baccalaureate nursing programs, five with associate degree (A.S.) program in nursing and three studies were mixed programs like baccalaureate, associate degree and diploma. Most of the studies are retrospective designs.

Literature review revealed that most of the studies investigated the relationship of State Board Examination and pre-admission criteria, National League

of Nursing Achievement test (NLN) or NLN Pre-Nursing and Guidance Examination performance. There have been one study which compared and determined the degree of correlation between admission criteria and student academic performance in upper division courses of the Intercollegiate Center. This study showed that the prerequisite grade point average (GPA) and GPA of all courses taken before admission were correlated significantly. The prerequisite courses consist of Anatomy and Physiology, Chemistry, Microbiology, Nutrition, introduction to psychology, introduction to sociology and growth and development. But the result of interview and letter of recommendation did not serve as predictors of future performance. In this study no mention was made about the statistical analysis. (Stronck, D. R., 1979).

There have been seven studies related between SBE and NLN. NLN was the main predictor variable but some of the researchers included other variables like ability and aptitude, personality, SAT, semester GPA, and family background. (Mueller, E. J., and Lyman, H. B., 1969; NLN, 1970; Muhlenkamp, A. F., 1971; Melcolm, N. et al, 1981). Regarding SBE and NLN study, the NLN (Let's examine department 1970) examined the correlation between NLN achievement tests score and State Board Test Pool Examinations (SBTPE) by the type of program. Their work revealed that the best predictors were Medical-Surgical

Nursing achievement tests and followed closely by Child Nursing and Diet Therapy and Applied Nutrition in baccalaureate degree program. In diploma program, the best predictor was Medical-Surgical Nursing. Sample size was too small in associate degree program to conclude. Similar result was demonstrated in the study of Melcolm, N. et al (1981). It was found that NLN achievement test scores highly correlated with SBE scores (Mean r =.53) followed by graduating GPA (Mean r = .46.). Medical-Surgical NLN Achievement test score and Nursing of Children NLN Achievement tests were substantial predictor for SBE. The study of Baldwin et al (1968) revealed the also similar type of result. Their study showed that the relationship between theory grades and NLN Achievement Examination scores and performance on State Boards were positive. They concluded that NLN Achievement Examination scores provide a basis for predicting State Boards scores but theory grades correlation was too low. In another study, it was again found that NLN achievement test scores continued to show significant correlation with State Board Test Pool Examination scores. This study exhibited a significant correlation between course grades in Fundamental of Nursing, Zoology, Microbiology, and Chemistry, and between SBTPE scores on Medical Nursing, Surgical Nursing, Nursing of Children and Obstetric Nursing. (Shelley, B., Kennamer, D. and Raile, M., 1976). They found significant correlations between SBTPE score and the course grades in Psychology,

Psychiatric Nursing, Nutrition, Gynecology and Maternity Nursing, Nursing of Children and English. It was also surprising that Psychology course grades and Psychiatric Nursing SBTPE scores were correlated very low. Muhlenkamp, A. F. (1971) used a combination of GPA and NLN test scores in regression analysis and found high multiple correlations (.66 to .83). But there was no evidence of cross-validation. She stated that the seventh semester GPA emerged as the most effective for Medical Nursing, Surgical Nursing, Obstetric Nursing and Pediatric Nursing in her first part of the study. The combination of SAT verbal score and Psychiatric Nursing Theory grade was best predictor for Psychiatric Nursing SBE score. In her second part of study, the NLN Natural Science Test score produced the best prediction for all criteria except Pediatric Nursing. The seventh semester GPA was again identified as good predictor with Medical, Obstetric and Pediatric Nursing in second part of study.

Mueller, E. J. and Lyman, H. B. (1969) employed many potential predictors in their study like measures of ability and aptitude, personality and family background and NLN achievement tests. Their purpose of the study was to formulate regression equations which could be used to predict success or failure on the SBE. They reported that aptitude and ability predictors were generally highly positively correlated with tests on licensing examination. The personality factors were less effective

predictors. The multiple correlation was as high as .82. None of the family background factors were significantly correlated. Brandt, E. M. et al (1966), in a study using Pearson Product moment technique, reported grades received in nursing theory courses, scores on the National Science and Social Science test and scores on the NLN Basic Medical-Surgical Achievement test may be useful in predicting performance on SBE. Deardorff, M. et al (1976) concluded that NLN raw scores yielded higher multiple correlations with SBE score than did the NLN percentile scores. Regression equations, using NLN test, the NLN test scores on Nursing of Children and Obstetric Nursing were consistently the best indicators of performance on SBE in each equations. (Bell, J. A. and Martindill, C. F. 1976). Morman, R. R. et al (1965) studied the correlation between TAV Selection System and subsequently earned GPAs. TAV Selection System was generally highly reliable ranging from .79 to .94 and homogeneously constructed, but no multiple R was significant.

Backman, M. E. and Steindler, F. M. (1971) investigated the relationship of specific admission criteria to success in the A.S. program and performance on SBE. Their data indicated that SAT verbal test was highly correlated with the college, and high school rank also appeared as a good predictor of college GPA. Because of homogeneous sample it is considered to be

conservative estimate of the predictive validity. There is another type of study done by Miller, C. L. et al (1968). They employed various categories of predictor variables such as SAT verbal and Mathematics; father's and mother's occupation and education; age in months; high school graduation percentile; number of college credits prior to entering the nursing program; graduation index; test anxiety; Taylor anxiety; two memory tests; and clinical variables consisting of introduction to nursing; Maternal-child Nursing; Medical-Surgical Nursing; Psychiatric Nursing and high school grade average. They reported that three or more of SBE scores were significantly correlated with SAT verbal and Mathematics; amount of advanced education prior to entering nursing; graduation index; test anxiety; introduction to nursing; Maternal-child Nursing; Medical-Surgical Nursing; Psychiatric Nursing; High school English; high school grade average overall. There were no significant correlations noted for Taylor anxiety; memory test; father's and mother's education or occupation; high school grade average in Mathematics; and high school rank. It was also mentioned that cross-validation is required to test accuracy of prediction formula. (Miller, C. L., Feldhusen, J. F., and Asher, J. W., 1968).

Two additional studies of the prediction of SBE have been done. Reed, C. L. and Feldhusen, J. F. (1972)

correlated SAT verbal and Mathematics; age in months; percentile high school rank; and college GPA with SBE. Their study result demonstrated that taking SBE's was best predicted by the interaction of high school rank and SAT verbal. It was reported multiple correlation as high as .69 with SBE scores. In contrast with other studies, this retrospective study used the pre-admission predictors such as pre-admission GPA; race; individual course grades; cumulative GPAs; the school from which the greatest number of prerequisite course were completed; previous academic degree and number of credit hours earned prior to admission, to predict SBE performance. (Yocom, C. J. and Scherubel, J. C. 1985). They indicated that pre-admission liberal arts GPA and cumulative GAP were important predicting factors for SBE, and Science GPA was also helpful. The report exhibited cumulative clinical nursing theory GPA were more highly correlated with SBE performance than cumulative clinical nursing practicum GPA. Owen, S. V. and Feldhusen, J. F. (1970) compared the effectiveness of three model of multivariate prediction of academic success in identifying the criterion variance of achievement in nursing education.

In summary, prior research had identified a variety of pre-admission predictors of SBE success. The most frequently identified were SAT verbal and mathematics; and high school rank. The best predictor for SBE in nursing programs were NLN scores, seventh

semester GPA, and nursing theory GPA. The prerequisite courses GPA and GPA of all courses taken before admission were best predictors for nursing academic performance. Nursing education program of Nepal does not have SAT, NLN, and SBE systems. The system is entirely different. Nepal Nursing Education program has only simple admission criteria and institute final examination. Hence it needs a careful study to demonstrate the correlation between preprofessional admission criteria and performance on institute final examination. The information regarding prediction of admission criteria for final examination will be helpful for nursing educators. There is also no evidence of recent studies on prediction of students' performance on SBE too.

Regarding medical education, the tests designed to measure or predict success have been used since about 1930. It was devised by F. A. Moss which was known as Scholastic Aptitude Test for Medical school. Later on it was replaced by new name Professional Aptitude Test (PAT), which in 1948 was renamed the Medical College Admission Test (MCAT). That was also replaced by new MCAT. Since the predictive power of new MCAT scores was unknown, many researchers have investigated the new MCAT. McGuire, F. L. (1980) studied the predictive power of new MCAT. In his study, he used new MCAT; undergraduate GPA; undergraduate science-point average; and class standing. He found that nearly all of the new MCAT subscales

correlated significantly with class standing. Undergraduate GPA and undergraduate science-point average also correlated at similar level, except Reading subtest. These correlations were higher than the old MCAT. His stepwise multiple regression yielded that the maximum predictability was achieved by undergraduate GPA and new MCAT Science Problem and others were not significant. His sample was freshman students and based on only one class so it may be difficult to predict with freshman result only, the further study is required. Similar type of study was conducted by Cullen, T. J. et al (1980). Their aim was to make a preliminary estimate of the predictive validity of the new MCAT by examining it's relationship to performance measure of medical students at the end of their first quarter of study. It was reported that Chemistry, Science-problem and Physics were correlated significantly with each of the examinations except ages of man. They concluded that new MCAT scores made a significant predictors of success in the first quarter of medical school. Again the study was based on end of the first quarter of study which may not provide us reasonable accuracy in predicting. The other study was designed to predict the overall academic performance in undergraduate course work with reasonable accuracy by using grades from initial college level courses rather than total premedical GPA. The overall undergraduate science GPAs and initial grades were correlated with

National Board of Medical Examiners (NBME) I and II scores and with MCAT subscale scores. The correlation were low to moderate ranging from 0.04 to 0.38. The multiple correlation using combined results of the MCAT and overall GPAs were higher than those obtained for either measure alone. (Scott, C. S.; Greig, L. M.; Brock, D. M.; Hunt, D. D.; Shaad, D. C.; and Carline, J. D., 1988.). On the other hand, Markert, R. J. (1986) pointed out that the supervisor's rating of the resident and the new MCAT were not correlated significantly and multiple regression was also unproductive in finding a relationship between supervisor's rating of resident and the new MCAT. But in his another study, he found that pre-admission academic variables (undergraduate GPA and MCAT) were useful in screening for academic success in medical school and licensability, especially NBME Part I and II. (Markert, R. J. 1985.).

Ronai A. K. et al (1984) compared previous academic performance with the results of specialty - specific in-training examinations in anesthesiology and orthopedic surgery in their study. They found that for the anesthesia group, the best predictors of in-training examination performance were the MCAT Verbal Ability score, the college grade-point average for nonscience subjects and MCAT Science, General Information and Quantitative Ability scores. For the orthopedic group, the best predictors were the MCAT Verbal Ability score,

the college grade-point average in nonscience subjects, the MCAT Science score and NBME Part I and II examinations scores. The nonscience college subjects were not correlated with the in-training examination results.

A prospective study was conducted by Gough, H. G. and Hall, W. B. (1975). They examined personality inventory, cognitive and application data of admission time and commented that the personality tests appeared to forecast outcome somewhat more accurately than did the MCAT. The findings were derived from a single school of medicine, so generalizability was limited. Clapp, T. T. and Reid, J. C. (1976) reported that the addition of institutional selectivity significantly increased prediction over raw GPA, but scaled Science GPA plus MCAT Science did not increase prediction significantly. That shows selectivity was as effective as predicting examinations and subjective ratings as MCAT Science scores. The scaled science GPA versus unscaled science GPA models for applicants was hard to identify because the scaled science GPA predicted admission committee ranking significantly better than unscaled GPA for 1972 applicants and differed for 1973 applicants. Their results indicated that GPA adjusted by institutional selectivity was considerably more useful than raw GPA. Sarnacki, R. E. (1982) grouped the students of two medical classes into one of four categories depending on

the selectivity rating of their premedical undergraduate institution. He assessed the group differences according to premedical GPA, MCAT Science subtest score, medical school course work and NBME Part I and II. The data depicted that although the group differed significantly on premedical GPA, on all other dependent measures were not significant. He concluded that "raw" premedical GPA was susceptible to a number of extraneous sources which required to be identified and eliminated for it's effectiveness in assessing individual differences in past academic achievement and in predicting future medical school performance. The subjects in the study were 194.

Some of the studies focused on predicting clinical performance too. Keck, J. W., et al (1979) reported that a combination of cognitive and noncognitive predictor variables function much better than any individual variable in predicting the postgraduate clinical performance of physicians. Hobfoll, S. E. et al (1982) investigated the personality factors as predictors of medical student performance, but found limited support for the relationship between selected California Psychological Inventory scales and interview ratings. The clinical performances were not correlated with California Psychological Inventory variables. They found much more difficult to predict. Powis, D. A. et al (1988) suggested that selecting interview criteria that are relevant to institutional goals may contribute to

improve student performance. Richards, P. et al (1988) also demonstrated reliability of interviewing in medical students. Mawhnney, B. S. (1971) studied the relationship between pre- and one year post medical school entrance examination results and found that A level examination result was an indicator of a student's ability to pass medical science examination.

It was mentioned that raising the GPA level necessary for acceptance without consideration of personal traits will not necessarily increase the quality of the class. Quality of the students performance might be enhanced by a screening process based on both cognitive and personal traits. (Murden, R. et al 1978). On the whole, these studies are based on American or British students and their educational system. Because of lack of studies about Nepalese nursing students, a closer examination of relationship between admission criteria and academic achievement in nursing education is needed.