

Comparison of critical thinking skills in students of nursing in continuous and interrupted BS sections of Semnan University of Medical Sciences

Babamohamdi H, MSc; Khalili H, MSc

Faculty members of Semnan University of Medical Sciences

ABSTRACT

Background: Critical thinking is a cognitive activity for the purpose of perception and evaluation of findings and phenomena on the basis of skills such as reasoning and analysis. In Iran the students of nursing may achieve their BS degree in two forms of continuous and interrupted.

Purpose: As the students of continuous and interrupted BS in nursing are regarded as a BS degree holder in nursing after their graduation, and the society expects a same level of critical thinking skills from both of the groups, we decided to compare the level of critical thinking skills in the students of continuous and discontinuous BS in nursing in Semnan university of medical sciences.

Methods: This study is a comparative study to compare the level of critical thinking skills in students of continuous and interrupted BS of nursing in Semnan University of Medical Sciences. The sample volume includes all the students of continuous Bs in nursing from juniors to seniors ($N = 70$) and the students of interrupted BS in nursing who were passing their first or second years of study during the first semester of year 2000 – 2001. The tool used in this study is California test of critical thinking skills form B that contains 34 multiple-choice questions with one true answer in five aspects of cognitive skills of critical thinking (analysis, evaluation, inference, deductive and inductive reasoning). All of the subjects completed the above mentioned test which has been validated by the second author in another study beforehand. Data were analyzed by software SPSSWIN and also ANOVA and t statistical tests.

Results: Mean scores of continuous Bs students and interrupted ones were 12.34 with $SD = 2.45$ and 11.27 with $SD = 3.10$ respectively and the difference between the mean scores of the two groups was statistically significant. ($t = 1.76$, $p = 0.005$). There was a meaningful difference between the mean scores of the students of different years in the continuous BS group. ($F_{3,60} = 4.28$, $P = 0.000$) but the difference between the mean scores of the students of first and second year of interrupted BS in nursing (11.28 and 11.51 respectively) was not statistically significant. In both groups there were no significant correlation between the age or sex of the students and their mean score in California critical thinking skills test (CCTST) but there was a positive and significant but weak correlation between the average of past terms and the mean score of CCTST. ($r = 0.31$, $p = 0.01$)

Conclusion: The results of the study showed that the students of continuous BS level in nursing had a higher level of critical thinking skills than the students of interrupted BS studies. Also in this group the students in advanced years of study own higher level of critical thinking skills than those in lower terms. In other words nursing education and higher education has led to a development of critical thinking skills in students.

Keywords: CRITICAL THINKING SKILLS, STUDENTS OF NURSING, CONTINUOUS BS, DISCONTINUOUS BS.

Journal of Medical Education Winter 2005 6(2);169-175

Introduction

Nursing is the art and science of care. In fact it is to understand the feelings, needs, and experiences of individuals. One of the main and important goals of nursing education is to train nurses who can use their special knowledge and skills to offer valuable services to the healthy and the ill in the society and different health care centers. This requires nurses owning critical thinking skills and effective learning (1). Learning is an individual process and does not take place without

comprehensive thinking activity. So the teacher has only the role of a facilitator and director of learning and by creating planned opportunities, paves the way to learner's behaviour changing. (2) On the other hand developing students' thinking skills has always been a complex issue in education because the society's out put of information has increased beyond the individual's ability to handle all pieces of information. So experts in training have become strongly concerned about student's inability in critical thinking in recent years (3). Because the common

educational methods train persons with lots of theoretical information which results in graduates who are not educated for solving the problems of the society in future. In fact the conventional educational method in the universities mostly offers a mixture of information and concepts to the students but leaves them alone in analysis, priority setting, and organizing the novel knowledge which is a requisite of critical thinking and leads to effective, meaningful learning (4). The interest in developing critical thinking skills is not a new phenomenon. The origin of such an interest goes back to Plato's Academy, a model which western universities originated from and gradually have paid more attention to information transfer because of different scientific improvements and simultaneous changes in educational goals. (5) But nowadays the amount of information accessible for individuals is far more than their ability to use the information. As Malcom Nais (1980) writes: "In an era when textbooks become old before being finished with publishing and most jobs are experiencing rapid and constant innovations, facts learned in youth are not sufficient, and in most cases a notable proportion of what has been learned also lose their effectiveness as technology improves, so the ultimate goals of education and training should necessarily changed because lecturing is the dominant method in many educational and training in which critical thinking is either only implicitly taught or never taught. (6) on this basis one of national goals of education in USA until 2000 (fifth goal) was allocated to promoting the level of student's critical thinking skills during studies in a way that it is an expectable outcome of higher education in the level of BS and higher levels (7-9). Therefore the role of educational centers as source of information and professors as lecturer and information transmitter should be changed and instead of student's just obtaining and memorizing information, they should promote their skill in thinking and reasoning and process the information and apply them(5 & 10). On the same basis, McPack believes that higher education in BS level and higher levels should lead to growth and development of students critical thinking skills (11). Thus the National Nursing Union and Academic Nursing Organization of US has set the growth and development of critical thinking skills as an essential part of assessing students of BS and higher levels and also as a mandatory part of confirming the validity of nurses registration (9,

12). That's because nowadays considering the responsibilities and expansion of nursing field and essence of making correct, decisive and some times decisions directly affecting the patients' life in nursing services, nurses not only need to obtain knowledge and skills but also have to be capable of making judgements in serious clinical conditions and making decision for the purpose of surviving in complex problems (13 , 14). Dr Marylan (1997) one of the researchers on nursing from the Wayne State University defines the critical thinking in nursing and writes: critical thinking is a logic and rational thinking about nursing problems (e.g. nursing diagnoses) which leads to making appropriate decisions in complex situations. He believes critical thinking enables nurses to correctly judge and reason about the problems of the patient. (15) In Iran the students of nursing may achieve their BS degree in two ways: registering in a BS nursing program; associate nurse have the possibility to enter a two year program and take BS degree in nursing. The students with associate degree hold their degree in "anaesthesiology" or "operation room" and after being accepted in an entrance exam have entered a two-year BS program in nursing. These students have encountered with a variety of educational patterns and clinical experiences and the majority of them were female students who had long been far from studying and some of them have had a weak previous academic experience. Since both group of students are regarded as a BS degree holder in nursing after their graduation, and the society expects the same level of critical thinking skills from both of the groups, and since some studies have confirmed the capability of critical thinking skills test in predicting success in nursing, (17 , 18) we decided to compare the level of critical thinking skills in nursing students who had different educational background; the students attending a four year nursing program (i.e. continuous BS degree), and the students held an associate nursing degree and study in a two-year program to graduate as a BS nursing degree (i.e. interrupted BS degree) .

Materials and Methods

This study is a comparative study to compare the level of critical thinking skills in students studying for a BS degree in nursing in Semnan University of Medical Sciences. The participants includes all the

students of continuous BS in nursing from juniors to seniors (N = 70) and the students of interrupted BS degree in nursing who were passing their first or second year of study during the first semester of 2000-2001. The tool used in this study is California critical thinking skills test form B (CCTST:FB) that contains 34 multiple choice questions with one correct answer in the field of cognitive skills of critical thinking (analysis, evaluation, inference, deductive and inductive reasoning) for specific measurement of the level of critical thinking skills in post high school stages.

In this test one score is given to every correct answer and the sum total score of correct answers is considered the total score (maximum 34 scores) and the correct answer is the answer that is correctly selected in accordance with test key. One has 45 minutes to answer the test questions. The 34 questions of the test are chosen from a series of 200 questions and beside the test validity and reliability, the power of distinguishing and degree of test difficulty have been calculated. On this basis, it seems that this tool is more comprehensive than other tools of critical thinking assessment. (7) The range of the questions includes cases which measure the conceptual analysis from one sentence to a more complex integration of critical thinking. To answer to some cases of this test needs explicating a correct inference from a case's needs evaluation and rational justification of a conclusion.

Answering to another group of questions needs objecting to the provided reasons and justifications and evaluation of these objections.

Performing this test should be done in accordance with guide to performing critical thinking skills test.

In designing this questionnaire a general knowledge background which can be achieved as an outcome of natural maturation and in primary and high school studies, is taken into consideration. No content knowledge in the academic level which is specific for disciplines is needed for answering these questions. The questionnaire is edited and accessible in two equivalent forms of A and B (7).

Validity and reliability of the test have been determined and standardized beforehand by the second author.

Internal consistency of the test was 0.62 as estimated by Kuder Richardson 20 formula and the result of factor analysis showed that the test is consisted of five factors (analysis, inference,

assessment, inductive and deductive reasoning) which all have a high positive correlation with the total score of the test. The test has also been able to distinguish the difference between the level of critical thinking skills of students of nursing and philosophy. ($t = -4.95$, $p = 0.0001$)(3);

All the subjects filled in the test. Data were analysed by ANOVA statistical test for comparing mean scores of students of different grades and by t statistical test for comparing mean scores of students of different educational background. SPSS 10 was used for data analysis.

Results

The average age of continuous BS students was 21.24 (± 1.78) years and that of the interrupted BS students was 22.96 (± 3.40) years. 78% of continuous BS students and 64% of interrupted BS students were female. Mean scores of continuous BS students and interrupted BS ones were 12.34 (± 2.45) and 11.27 (± 3.10), respectively and the difference between mean scores of the test between students of continuous and interrupted BS degree was statistically significant. ($t = 1.76$, $P = 0.005$) (table 2).

There was a significant difference between mean scores of students of different grades studying continuous nursing BS. ($P = 0.000$) (table 1).

TABLE 1. Comparison of mean score of critical thinking test in students of nursing in different grades in Semnan University of Medical Sciences.

Central and distributional grade	Mean	SD
First grade	10.44	3.82
Second grade	11.23	3.08
Third grade	12.08	2.64
Fourth grade	13.35	2.34
ANOVA test	F3,60=4.28 , P = 0.000	

The above table shows that mean scores of students of higher grades are more than the students of lower grades and the difference is statistically significant ($F_{3, 60} = 4.28$, $P = 0.000$)

But the difference between mean scores of first and second year students studying interrupted BS was not significant (11.28 and 11.51 respectively) in both groups of students there was no significant correlation between students age or sex and their mean scores in California critical thinking skills

test (CCTST) but there was a significant and positive but weak correlation between last terms average marks and mean scores of the test. ($r = 0.31$, $p = 0.01$).

TABLE 2. Comparison of mean score of critical thinking test in students of continuous and interrupted BS in nursing in Semnan University of Medical Sciences

Central and distributional Section of study	Mean	SD
Continuous BS	12.34	2.45
Interrupted BS	11.27	3.10
T test	T = 1.76, p = 0.005	

The above table shows that students of continuous BS in nursing own a higher level of critical thinking than students of interrupted BS ($t = 1.76$, $P = 0.005$)

Discussion

Critical thinking is a cognitive activity for perceiving and evaluating data and phenomena based on skills like reasoning and analysis (19). Based on the importance of growth and promotion of the critical thinking skills during academic studies, the essence of assessing and surveying these skills is apparent (8).

In contrast with other previous tests which are based on subjective definitions of critical thinking. California critical thinking skills test is based on a conceptual framework of critical thinking. (8,20)

In some studies the ability of critical thinking skills test as a test for predicting success in nursing is approved. (17,18).

The results of this study showed that students of continuous BS in nursing had a higher level of critical thinking than students of interrupted BS in nursing and in this group the students of upper grades had a higher level of critical thinking skills than those in lower grades. In other words nursing education and higher education leads to the development of critical thinking in students.

Our findings indicate that there is a statically significant difference between the scores of critical thinking test of students who have experienced academic studies in associate degree program before their entrance to nursing discipline (interrupted BS program) and of those who have entered this discipline directly after finishing high school and have not experienced any particular

education (continuous BS). These findings support the findings of studies carried out by Bet and Sullivan (1997), Carol (1997) and Kiang (1998). (5,20,23).

In the researcher's viewpoint the foundation of education and learning in country's educational system in primary (before university) and higher (university) levels mostly tries to increase and reinforce memorized facts and knowledge area and pay less attention to the development and growth of thinking, criticism, and appraisal. However more analysis and offering appropriate strategies in this field are essential. Fortunately test of mean scores of critical thinking showed a significant difference between students of continuous and dis continuous BS students and also between firs graders and upper grader students of continuous BS students. Regarding these results, it seems that in spite of all existing obstacles, the procedure of education in university, has to some extent been efficient in improving students critical thinking score, as the score of critical thinking has been better in senior students than the juniors. The results of Hoseini's and Bahrami's study (2002) also are consistent with these results. (21)

It seems that existence of relation between critical thinking score and student's grade and type program of study can be a result of more carefulness of students of continuous BS and higher grade students in answering the questions of the test. In other words because critical thinking has a more remarkable growth in senior students than in students of interrupted BS and first year students, a better level of carefulness is achieved in them this finding supports the results of Carols study (1997) which indicates a positive significant correlation between total score of the test and students term of studies (20).

Also our findings indicate that there has not been a significant correlation between the age or sex of the subjects and their mean score in California critical thinking skills test. This finding supports findings of studies carried out by Bet and Sullivan (1997), Carol (1997) and Kiang (1998) and is consistent with Fashion's finding (1993) in the process of standardizing the test in USA (5,20,23,7).

It is worth mentioning that in order to teach critical thinking skills to students many strategies are required. The first strategy for teaching these skills in the shape of major of study, is creating a balance between content of lessons and process of education. Because with present volume of lesson

contents one can not simply teach these skills in limited time of the sessions, where as many parts of lesson contents are not essential and sometimes repeated. With distinguishing and applying students needed lesson priorities in every discipline and subject of study, we can devote one lesson only to its essential cases by correct planning and setting general and special goals of lessons so that we may reach to needed inputs through expectable outputs. In other words in addition to teaching essential content, the way of applying critical thinking skills in that subject be taught. So that in addition to meaningful and consistent applying, students thinking power expand for independent studies. (16) the second strategy for organizing the session for teaching critical thinking skills in the shape of major of study is creating a balance between lecture and reaction (considering enough) time for exchanging ideas with learners.) and the third strategy is creating discussion in the class. (22) Unfortunately none of these strategies can be applied for students of interrupted BS with heavy volume of the lessons and limited time of the session compared with continuous BS students. This can be a reason why mean scores of discontinuous BS nursing students in critical thinking skills test are lower. Results of the study carried out in Korea also confirm this study's results. (23)

Many professors are happy with devoting most of the sessions' time to attracting students interest and challenging their existing thinking processes and creating an atmosphere in which caution and passiveness give their place to active thinking and exchanging ideas. But the facts like intense educational curriculum, large classes, limited time of sessions, and compact and complex contents of subjects are main obstacles against creating such positive learning environments. Teaching skills and methods of critical thinking requires re-thinking about professors role as lecture and source of information however we can also teach critical thinking skills in the shape of major of study by correctly planning and applying special strategies.(3)

Researchers suggest methods effective in creating critical thinking be considered in student's education and attention be paid to student's critical thinking improvement and the educational process be offered on this basis. Also it is recommended that studies on critical thinking be performed in other universities of medial sciences in the country.

References

- 1- Talyor et al, fundamental of nursing. 5th ed. New York: J.B. Lippincott company; 1995.
- 2- Sagharvanian M. Surveying the effect of program education and lecture on student's level of cognition about ways of preventing AIDS transission. Thesis of MS in nursing. Nursing and Midwifery faculty, Mashhad university of medical sciences, 1993.
- 3- Meyers C. Teaching students to think critically. 1st ed. Sanfrancisco, CA: Jossey – Bass;
- 4- Ataolahi Z. Compariso of the effect of two educational methods of lecture and problem solving on the degree of learning in nursing students. Thesis of MS degree. Nursing and Midwifery faculty, shaheed beheshti university of medical science, Tehran. 1996. P. 40-5.
- 5- Bet, Sullivan. Evaluating critical thinking skills of Baccalaureate nursing students. Journal of nursing education 1997 Dec; 36(10): 485-8.
- 6- Knowles M. the modern practice of adult education. 1st ed. Chicago: Follet; 1980.
- 7- Facion PA, Facion NC. The California critical thinking skills test: form A and from B, test manual. Millbrae, CA: California Academic Press ; 1993.
- 8- Marshal et al. Critical thinking as an educational outcome, an evaluation of current tools of measurement. Nurse educator May Jan 1996 21 (30).
- 9- Council of Baccalaureate and higher degree programs. Criteria and guidelines for evaluation of baccalaureate and higher degree programs in nursing. 1st ed. New York: National league for nursing Press; 1991.
- 10- Myser c. teaching critical thinking . translated by Abili Kh. 3rd ed. Tehran: Samt Publication; 1995.
- 11- Mc Peck J. Critical thinking and education. 1st ed. New York: st Martins press; 1984.
- 12- National league for nursing criteria and guidelines for the evaluation of baccalaureate and higher degree programs in nursing. 1st ed. New york: Author; 1997.
- 13- Nikravanmofrad F. Education in psychomotor field. Summary of articles of 1st seminar on nursing and midwifery education. Tehran: Shaheed Beheshti University of Medical sciences. Jan 1990.
- 14- Bandman E, Bandman. Critical thinking in nursing. 2nd ed. Norwalk conn: Appleton; 1995.

- 15- Evaluating critical thinking in clinical practice. *Nurse Educator* 1997 22 (5): 25-8.
- 16- Khalili H. of scores of California critical thinking 5 kills test form B. thesis of MS degree . Shaheed Beheshti University of medical science, 1999.
- 17- Baunes E, Gerhard G. the use of Watson – Glaser critical thinking appraisal to predict success in a baccalaureate nursing program. *Journal of Nursing Education* 1987 26 (7): 278-81.
- 18- Behrans P. the Watson – Glaser Critical thinking appraisal and academic performance of diploma school students. *Journal of Nursing Education* 1996: 34-6.
- 19- Deroil L. Application of psychology in teaching. Translated by parsia M. 3rd ed. Tehran: Besat publication fnstitute; 1377 p 2-5.
- 20- Carol J. stand ardized measures of critical thinking experience with the California critical thinking skills test. *Nurse Educator* Sep Oct 1997 22 (5).
- 21- Hoseini a, Bahrami M. Comparison of critical thinking in students of first and last year of BS degree in Isfahan University of medical sciences *Iranian Journal of education in Medical sciences* 6: 21-5.
- 22- Smith d. College classroom interactions and critical thinking. *Journal of education psychology* 1984 145 (4) : 1320-40.
- 23- Shin R K. Critical thinking ability and clinical decision making skills among senior nursing students in associated baccalaureate programs in korea. *Journal of Advanced Nursing*; Feb 1998 27 (2): 414-8.