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### Original Research Article

## Experiences of Electrolyte and Acid-base Disorders Teaching in Anesthesia Students

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### ABSTRACT

**Introduction:** Since the topic of water and electrolyte disorders in the field of medical sciences is a very important topic and this issue in anesthesia students compared to other students due to the nature of Anna's field is several times more important, we decided to study the present study with the aim Experiences of electrolyte and acid-base disorders teaching in anesthesia students. **Material and Methods:** This study was conducted as a clinical experiment in Tabriz University of Medical Sciences with the participation of anesthesia students [before the internship]. The relevant professor conducted the topic of water and electrolyte disorders in two ways of group discussion [problem solving] with the method of lecture on clinical reasoning for students and finally their scores were compared with each other. **Results:** A covariance analysis model was used to investigate the relationship between different factors and clinical reasoning score. The results show that there is only a significant relationship between pre-internship score and clinical reasoning score [p-value <0.05]. **Conclusion:** In this study, it was found that in comparing the two methods of teaching lecture and problem solving, although the amount of learning in the two methods did not show a statistically significant difference, but the interns' clinical reasoning scores in the problem-solving method were higher than the lecture method.

**Keywords:** Anesthesia, Anna's field, **Water, Acid**, Clinical Reasoning.

## Introduction

Man in today's complex world does not need education [1]. Educational systems and efforts to stop them are constantly changing due to the progress of societies and educational transformation is the result of social change, science and technology. Educational skills and expertise are so effective and important that they should always be accompanied by training design before training, while providing symbols and patterns, and after training with measurement [2, 3]. In educational programs, two general teaching patterns are manifested: the teacher-centered model in which the teacher is the all-encompassing fulcrum with the aim of shaping behavior based on a predetermined pattern. In this model, learners learn and soon forget. Another model that pays special attention to the learner, his needs and abilities is called student-centered [4, 5]. For many years, theoretical courses in medicine and related disciplines have been taught in the traditional way of lecturing in the classroom, a practice that is considered as a homework assignment for both the teacher and the student [6]. Teaching through collaborative learning groups is based on the assumptions that motivation arises from cooperation and cooperation overcoming competition and individualism, group members learn from each other [7], achieve higher levels of mental processes, increase positive emotions towards other learners, strengthen dignity These include self-improvement and general social skills. The role of the teacher is in the form of a consultant, advisor and friend of the critic [8]. Studies have shown that students who have participated in problem-solving methods, compared to students who have been taught in the traditional way, in addition to deep learning, skills such as interpersonal communication, critical thinking, decision-making, reasoning, use of multiple information sources, group work, gain respect for team members, curiosity and patience, which will greatly affect their future job performance [9, 10]. In explaining brain-compatible training methods, the effects of nutrition and sleep [working hours of general and specialized medical students], individual differences, the role of emotion in learning and creating motivation and positive attitude in the learner should be carefully considered [11]. Many scientific principles of education are well generalized in the field of medical education. Medical education includes its various dimensions, including the characteristics of the subject, educational environment before and during the clinical course, good responsibility, organizational affiliation to the hospital, clinic or university and the relationship with peers, professors and patients [12]. Since the topic of water and electrolyte

disorders in the field of medical sciences is a very important topic and this issue in anesthesia students compared to other students due to the nature of Anna's field is several times more important, we decided to study the present study with the aim Experiences of electrolyte and acid-base disorders in anesthesia students.

## Material and Methods

### Design and methodology of experience

This study, which was selected as educational experiences by purposive sampling method based on the purpose of two groups of anesthesiology interns for review. The two groups were matched in terms of scientific background, meaning that the scores of pre-internship exams and the average of their entire internship period were compared so that the groups were homogeneous and the intervening cases were eliminated. The subject of water, electrolyte, acid and base was taught by a professor fluent in water and electrolyte disorders to one group as usual and to the other group as a method of problem solving and group discussion. In the problem-solving method, first the intern students were divided into groups of 6 to 7 people, then they were presented with generalities related to the topic, then a clinical case was presented to the groups as a question so that they could discuss it separately. After the students have focused on the topic in the groups and understood the objectives of teaching the topic, each group was asked to express their result separately, and here the teacher fixes their problems or in some cases the educational materials when He added that their minds are ready to accept it. Demographic characteristics of the subjects were completed in pre-prepared forms. Evaluation in the final exam of each course was done by the same professor through a standard and special test of clinical reasoning called script concordance. This test is a standard format whose validity for clinical reasoning as well as its reliability has been proven. This test has two diagnostic and therapeutic areas, in each area, after presenting a clinical case, variables are given to the student [these variables are all common clinical cases that will definitely be discussed for him in the future and on patients' beds]. It must be decided in the field of diagnosis what their effect is on a particular diagnosis or in the field of therapy what variables have an effect on the use of a particular treatment, all of which range from very high to very low, respectively, from +2 to -2. The test takers are answered and finally the answers are entered into a table that is actually the key questions, which is similar to the four-

choice exams, with the difference that a question may have two close answers, one answer is one hundred in One hundred marks and the other has a percentage of the grade according to the scientific discretion of the examiner. Finally, the average grade is expressed as a percentage for each student. This test was the same for both lecture and problem-solving groups. Finally, based on statistical analysis, the scores of the two groups of lectures and problem solving were compared with each other and also sub-objectives such as age, gender and marital status were analyzed to see which of the two teaching methods of lectures or problem solving had a deeper impact. Will promote the level of clinical reasoning that is the ultimate goal in medical education.

### **Ethical considerations**

This study is licensed by the Ethics Committee of Tabriz University of Medical Sciences [IR.TBZMED.REC.1398.936]; Students participating in this study entered the study voluntarily and after obtaining informed consent. Participation or non-participation in this study had no effect on their final score.

### **Data analysis**

In describing the data, appropriate tables and statistical indicators such as mean, etc. have been used, and in data analysis, first the normality of the data using a one-sample Kolmogorov-Smirnov test [Kolmogorov- Smirnov] has been studied by modifying Lilliefors, which confirms its normality by using appropriate parametric methods such as the Student test, and if it is not normal, the Mann-Whitney test has been used. In data analysis with scale Nominal Chi-square test [Pearson Chi-Square] has been used to evaluate the results of multiple linear models. The software used in this study is SPSS v.20 and the significance level of the tests is less than 5% in options have been asked.

## Results

In this study, 41 interns in two consecutive courses in the pediatric ward of Mashhad Azad University were studied, and the results are as follows. The results show that there is no significant difference between the two groups in terms of total adequacy [p-value = 0.059], ie the two groups are similar.

**Table 1:** Comparison of clinical scores between the two groups based on gender

Groups		SD	Mean	Test
Female	Lecture method	3.18	1.77	Mann-Whitney U=1.491 p-value=0.624
	Problem solving method	7.22	5.78	
Male	Lecture method	1.17	5.72	Mann-Whitney U=2.39 p-value=0.017
	Problem solving method	9.7	7.95	

The table above shows that a significant difference between the two groups in terms of clinical score is observed only in men [p-value = 0.017] A covariance analysis model was used to investigate the relationship between different factors and clinical reasoning score. The results show that there is only a significant relationship between pre-internship score and clinical reasoning score [p-value <0.05].

**Table 2:** Analysis of covariance of clinical skill score in study participants

Source	Sig.	F	Mean Square	df	Type III Sum of Squares
Corrected Model	151.0	596.1	601.5	6	665.3
Intercept	142.0	854.1	015.6	1	153.5
Group	145.0	652.3	125.1	1	954.4
Age	352.0	596.0	838.3	1	365.9
Married	954.0	625.0	058.1	1	669.9
Total Score	300.0	552.5	741.1	1	598.6
Age	855.0	036.0	196.8	1	200.8

## Discuss

For many years, theoretical courses in medicine and related disciplines have been taught in the traditional way of lecturing in the classroom, a practice that is considered as a homework assignment for both the teacher and the student [13]. Teaching through collaborative learning groups is based on the assumptions that motivation arises from cooperation and cooperation overcoming competition and individualism, group members learn from each other, achieve higher levels of mental processes, increase positive emotions towards other learners, strengthen dignity These include self-improvement and general social skills. The role of the teacher is in the form of a consultant, advisor and friend of the critic [14-16]. Studies have shown that students who have participated in problem-solving methods, compared to students who have been taught in the traditional way, in addition to deep learning, skills such as interpersonal communication, critical thinking, decision-making, reasoning, use of multiple information sources, work A group gains cooperation, respect for group members, curiosity and patience, which will greatly affect their future job performance [17-19]. In this study, a total of 41 interns of two consecutive courses in the pediatric ward of Tabriz University were studied [20-22]. The normality of the data for age, pre-internship score and clinical reasoning score were examined, although the pre-internship score had a normal distribution; But the age and score of clinical reasoning did not have a normal distribution. In total, 21 people in the lecture method group and 20 people in the problem-solving method group were studied and the article was studied [23-25]. And 7 gentlemen were present; Therefore, the difference between the two groups was not significant in terms of gender. 13 people in each of the two input groups in 1986 and 8 people in the lecture group and 7 people in the teaching group were 85 and less in the input problem solving method. Again, the two groups did not differ significantly in terms of input. But although in the lecture teaching group 85.7% were single and 14.3% were married, in the problem-solving group 50% were single and 50% were married [26-28]. Therefore, the difference between the two groups was significant. There was no statistically significant difference between the two groups in the study of how the pre-internship score was distributed. Finally, the clinical skill score in the group was compared [29]. Although the students' score in the group that was taught by problem solving method was higher than the group that was taught by lecture solution method, but the difference between the two groups was not significant. In a study similar to ours, PBL participants performed better on the written, clinical, and overall performance tests than students who were

taught in the traditional way. Contrary to our study in another study in China, students trained in the conventional method showed an improvement in attitudes, knowledge and performance scores, but this improvement was not known in the PBL method. Another study [16], like ours, found that students in most areas of education preferred problem-based learning to lecturing. Another researcher during a study on a group of medical students in Hormozgan showed that students were satisfied with the teaching method in small groups and their average grades were higher than their average grades in the traditional way. In another study, trainees' scores in the areas of diagnostic procedures, clinical hypothesis and problem solving showed a significant increase compared to the scores of the lecture group. In a similar study, the mean scores of nursing students in the problem-solving group were higher than the lecture group. But no significant difference was observed between the learning levels of the two groups [30].

## Conclusion

In this study, it was found that in comparing the two methods of teaching lecture and problem solving, although the amount of learning in the two methods did not show a statistically significant difference, but the interns' clinical reasoning scores in the problem-solving method were higher than the lecture method.

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