Opinion Paper

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Determining knowledge of the nursing students about biochemistry laboratory samples

Hemşirelik öğrencilerinin biyokimya laboratuvar örneklerine ilişkin bilgilerinin belirlenmesi

Abstract

Objective: The aim of the study is to determine knowledge of nursing students about taking and transferring of biochemical laboratory samples.

Methods: The study is descriptive and was conducted during the spring semester of the 2016–2017 academic year and 118 volunteer final year nursing department students were included in the study. As a data collection tool, a questionnaire which was prepared by the researcher.

Results: Eleven percentage of the final year students of the nursing department answered the information that should be in the laboratory sample request document and 83.9% responded correctly to the optimal blood-letting time for the biochemical analysis. It was determined that 52.5% of the students correctly know whether the sitting, lying or on-foot blood-letting positions affect the blood values or not, and 45.8% know the reason why blood-letting is performed in sitting or lying positions. 57.1% of the students correctly identified the medium urine sample and 14.3% correctly understood the 24-h urine collection practices.

Conclusion: It was determined that the students lacked information on the taking, storage and transfer of the biochemical laboratory samples and it was detected that the missing information was provided in the curriculum.

Keywords: Student nurse; Biochemical analyses; Laboratory evaluation; Sample taking.

Introduction

Numerous analyzes are required from the biochemistry laboratory from the various body fluids to be used for diagnosis and prognosis, especially complete full blood and complete urine analysis. The clinical laboratory's
analysis results are very important for the clinical diagnosis and prognosis in respect of the patient and healthcare team. For this reason, the laboratory analysis results should be reliable. The most important stage that determines the reliability of laboratory test results is related to sample taking and delivery [1–4]. When the sources of errors related to the laboratory results were searched, it was determined that about 68% of the errors occur in the pre-analytical stage, 20% of them in the post-analytical phase and only 12% of them in the analytical phase [3]. Apart from the analytical phase, this responsibility lies on the nurses to a large extent in the clinics. This inquisition study was conducted in order to control the knowledge of the student nurses about the biochemical analyzes such as the proper sample taking, the storage of the samples in appropriate conditions, delivery to the laboratory and ensuring that especially urgent requests are promptly delivered to the laboratory, the timely evaluation of the results, which make up some part of the responsibilities that the student nurses will undertake when they start their professional life.

Methods

The study is descriptive and was conducted during the spring semester of the 2016–2017 academic year and 118 volunteer final year nursing department students out of 130 were included in the study.

As a data collection tool, a questionnaire, which was prepared by the researcher in the line with the literature [2–6] and included “Indicative characteristics of the students and information questions about the taking and transferring of the biochemistry laboratory samples”, was used. The questions were prepared as multiple choices and their answers were evaluated as True and False. The students were briefed and informed before application of the questionnaire and participation of the volunteers was provided.

Results

As seen on Table 1, 11.0% of the students answered the information that should be in the laboratory sample request document and 83.9% responded correctly to the optimal blood-letting time for the biochemical analysis. It was determined that 52.5% of the students correctly know whether the sitting, lying or on-foot blood-letting positions affect the blood values or not, and 45.8% know the reason why blood-letting is performed in sitting or lying positions. 57.1% of the students correctly identified the medium urine sample and 14.3% correctly understood the 24-h urine collection practices.

Twenty two percentage of the students correctly answered the sample to be firstly taken from the patient during blood-letting, and 45.8% of them correctly answered for which analyses the blood sample taken into purple-cover tube is used.

As seen on Table 2, it was determined that 69.5% of the students know within how many minutes at maximum the blood samples should be sent to the laboratory after drawing, and 28.8% of them correctly know which values increase in case of delayed delivery of the blood samples to the laboratory. They gave correct answers to the questions related to storage conditions of urine container respectively as 44.1%, 50.8% and 68.6%.

| Questions related to pre-sample taking                                                                 | Correct answers |
|-------------------------------------------------------------------------------------------------------|-----------------|
| Information required in the laboratory sample request document                                      | 13              |
| The optimal blood-letting time for the biochemical analysis                                       | 99              |
| Whether the sitting, lying or on-foot blood-letting positions affect the blood values or not        | 62              |
| The reason why blood-letting is performed in sitting or lying positions                            | 54              |
| Finding in serum samples arising as a result of an error in blood-letting timing                    | 7               |
| Proper blood sample taking                                                                         | 92              |
| The most widely preferred vein in arterial blood-letting                                            | 48              |
| Sample used in the blood gases test                                                                 | 81              |
| Definition of medium urine sample                                                                  | 68              |
| Applications related to 24-h urine collection                                                      | 17              |
| Definition of spot urine                                                                           | 81              |

Table 1: Knowledge of the student nurses about pre-sample taking (n: 118).
Discussion

Nurses usually assume the responsibility for ensuring the appropriate sample collection and labeling and delivering them to the laboratory for analysis [4, 5]. Very few students (11.0%) in the study exactly knew the information that should be in the laboratory sample request document. The steps of sample taking, labeling, preservation and delivery to the laboratory should be followed carefully.

The number of students, who knew the most appropriate blood collection time for biochemical analysis, was detected to be the highest (83.9%) among the information on pre-sample taking (Table 1). It is extremely important to control the errors on the pre-analytical stage, which most affect the quality of the result produced by the laboratory and in which the most errors are seen, in respect of producing correct and at the same time quality results [6–8]. Seventy eight percentage of the students responded correctly to the proper blood sample taking. The correct answer related to the anti-coagulated blood sample is 51.7% and it is 68.6% related to blood gases. In study conducted by Aykal et al. [1], it was determined that the samples taken into anticoagulant tubes such as coagulation and blood gas were the most rejected samples [1]. In a study conducted by Lowe et al. [9], 5.6% of blood samples were haemolysis and it is necessary that blood is taken by the experienced nurses [9]. Attention should be drawn to these issues in the education and training of the nurses and the personnel, who perform blood-letting transactions.

Twenty two percentage of the students correctly answered the sample to be firstly taken from the patient during blood-letting, and 45.8% of them correctly answered for which analyses the blood sample taken into purple-cover tube is used (Table 3). The content of the firstly drawn blood shows best the composition of the circulating blood. Therefore, the first sample taken should be used for important tests in critical medical decisions (such as Ca) [3, 5, 10]. Blood is taken on the anticoagulant, since some tests such as hemoglobin, blood gas, ammonia, and lactate require complete blood. Since the anticoagulant used affects some tests, a tube suitable for the parameter to be analyzed should be used. It is necessary that these sources of errors should be known as much as possible and correctly determined and controlled. These subjects should be emphasized during the education of the students.

Conclusion

It was determined that the students lack knowledge about taking, storage and transfer of the biochemistry laboratory samples, and a “clinical biochemistry” course was introduced in the schedule starting from the 2017–2018 academic year for the final year students of the nursing department in order to include the missing information in the curriculum. These results will be compared
and resharred with new studies in the coming education years.

In addition, it may be advised to provide in-service training for all the personnel involved in all stages as from the provision of the clinic-laboratory dialogue, and receipt of the samples and up to delivery of the results to the clinic.

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