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Commentary on the Analysis of the Results of a Written Test Aimed at Detecting the Physical and Technical Literacy of Nurses

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Commentary

The rapid development of science and technology and the introduction of technology inventions into medical practice have led us to the need to detect the level of physical literacy of practicing nurses. The level of their ability to use physical knowledge in order to solve problematic tasks in nursing was determined using an original didactic test. The commentary indicates the factors that could significantly affect the results of the tested nurses.

The introduction of new scientific knowledge and technologies into healthcare practice is very rapid and nurses cannot avoid handling instrumentation during their work. In accordance with Directive 77/453/EEC [1], acquiring the right habits, attitudes and skills when handling medical technology requires the consolidation and acquisition of basic physical knowledge and skills already during the pre-university education of nurses.

Physical literacy of 266 practicing nurses (the average length of nursing practice was 13.47 ± 9.53 years) was investigated using an original didactic test [2,3]. The test was aimed on the knowledge retention and the ability of nurses to use physical knowledge to solve elementary nursing problems. It was developed according to recommended procedures [4-6] and validated according to the syllabuses and recommended study literature for the 1st year of the Nursing bachelor program of study in Slovak universities.

The test contained 11 tasks focused on medication, detection of human vital functions, reading from calibrated scale or chart and patient handling. Respondents could choose one correct answer from three answer options. Binary score was used for evaluation. Time limit for completion was not determined. The tests were anonymous and directly administered [3].

Respondents gave correct answers to an average of (6.7 ± 1.6) of questions i.e. (61.00 ± 14.45) %. There were 2 respondents who scored 100% correct and 1 respondent who scored 0%. The median number of points was 7. The largest number of respondents gave 6 correct answers out of 11 [2].

The process of evaluating the results that were published [2] also included determining the difficulty of the test questions.

According to the published criteria [6], the test contained 3 very easy and 1 very complicated questions.

Very easy test questions

1. Medication can be delivered intravenously without endangering the patient's health in a

- a) Hypertonic solution
- b) Hypotonic solution
- c) Isotonic solution

2. Where is a person's centre of gravity?

- a) Outside their body
- b) In the vicinity of the chest
- c) In the vicinity of the pelvis and the abdomen

3. After an operation on their appendix, it is easier for a patient to get out of bed if they start on their

- a) Stomach
- b) Back
- c) Side

Very complicated test question

What volume is the volume of the liquid (in dm^3) in the measuring cylinder? (Test included a picture of a measuring cylinder which was calibrated in milliliters.)

It is possible that physical nature was not sufficiently highlighted in some of the tasks. Most respondents answered these questions spontaneously, using experience from practice. This was, for example, the question where respondents should have identified the reason for not hearing when auscultating a patient, where nearly a third of respondents stated the patient's medical condition [3].

We assumed that the results of students could be influenced by the didactic methods and the forms of teaching preferred by individual faculties, the nature of the test sample and, last but not least, the medical practice of the respondents [2,3].

The impact of didactic methods and forms of student teaching

The testing was attended by external students of 1st-2nd year of the Nursing program of study from two faculties of medicine and one faculty of health professions. The forms, methods and, ultimately, the content of student education may not be the same at all faculties and could have affected the final test results. Although the content of the learning topic may be apparently identical from the formal point of view, discrepancies may also occur in the depth of knowledge required. The statistical processing of the results has repeatedly confirmed that the didactic methods and forms used in nursing students did not have a statistically significant impact on their success or the type and number of errors in their responses ($p > 0.66$).

The impact of respondents' health care practice

Other objective factors that could have affected the test results included the length of nursing practice and the wider focus of the hospital department (chirurgical and internist nursing departments) were the respondents work or used to work. The results repeatedly revealed that none of these factors significantly affected the success of the test solution from the statistic point of view ($p = 0.32$).

The nature of test sample

We believe that the results of the tests can be significantly affected by the form of study of respondents at universities.

Our test sample consisted of external nursing students. These students are more burdened with many other job-related or family-related obligations compared to day-to-day students. Testing was carried out in the faculty premises, in writing. During the testing, it was not investigated whether the students solved the test questions, for example, after a night shift in a health facility.

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