Using Case Study Method for Forming Clinical Thinking Ability in Nursing and Midwifery Education

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Abstract – **This paper aims to examine the formation of clinical thinking within the case study method in teaching midwifery and nursing students. Statistical methods include the Kolmogorov-Smirnov test and the Mann-Whitney U test. After the analysis of the data, it was concluded that the use of the method develops the necessary medical competence for quality realization in the chosen profession.**

Keywords – **case study, clinical thinking, midwives, nurses education, statistical analysis.**

1. Introduction

Professional clinical thinking is a necessary competency for the midwife and the nurse. It is built with practical activities in the education of students and on the theoretical basis of knowledge. In practice, clinical thinking takes place where, in the event of problematic medical situations, the existing experience (accumulated knowledge, concepts, ways of action) necessary for quality organization of healthcare is used.

The main situation that triggers the clinical thinking process is the problematic medical situation [4], [9].

The case study method presents students with problematic professional situations. Identifying the problem is the beginning of the clinical thinking. As a follow-up step, trainees suggest ideas and propositions, which will lead to conclusions and solutions to the given problem. This process is determined by the specifics of the content of the individual clinical case. And here lies the importance of the student's mental activity and mental activities needed for developing both their clinical thinking and conscious attitude to the act of learning (personal needs and motives for learning) [7].

Our society needs people with high levels of educational and vocational training that are able to quickly orient themselves in the complex situations arising in medical practice [1].

2. Exposition

The pedagogical research includes 296 respondents - students from their 2nd, 3rd and 4th year of their nursing and midwifery bachelor's degrees. The numbers of students who are trained in the traditional didactic approach are 146, and they form the control group (CG). The students trained with the individual clinical case method form make the experimental group (EG – 150 students):

- All respondents are females;
- Students are trained on a full-time basis, bachelor degree;
- Students' average age is 21;
- The number of students in the experimental and control groups are almost equal. This is a vital prerequisite, which has to exist in order the study is to be considered successful.

The presented facts indicate that the study has been designed correctly for both the experimental and control groups.

Statistical methods include the Kolmogorov-Smirnov test and the Mann-Whitney U test. Data are analyzed with IBM SPSS Statistics software for Windows [5], [10], [11].

The assessment criterion for the clinical thinking indicator is made by identifying problems in individual clinical cases. It is then evaluated by experts - educators in the relevant professional medical field [6], [8], [12].

The following problems have been solved to prove the relationship between the case study method and the clinical thinking-forming process:

- Proving "equal start" i.e. a lack of statistically significant difference between both groups at the beginning of the experiment;
- Verification of the statistically significant difference in the evaluation of the control and experimental group at the end of the didactic experiment [5], [12];
- Determining the effect of the application of the individual clinical case method (case study) on the experimental group to establish the healthcare management professional competency;
- Determining the effect of applying the traditional learning methods (excluding the case study method) on the control group;
- At the initial phase of the didactic study, 77.4% of the students in the CG do not find a problem(s) in the suggested individual clinical cases. 22.6% of these students reported problem(s). The statistics are reflected in Figure 1.
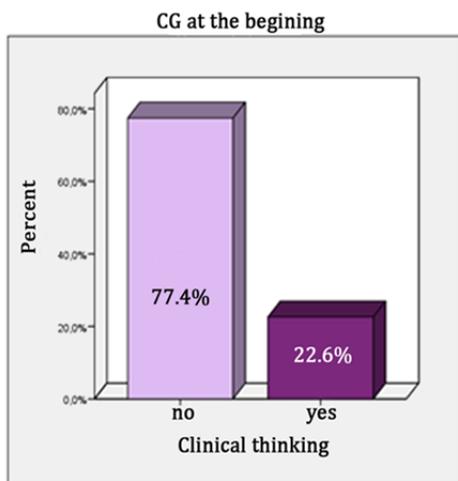

Figure 1. Identifying problems in the case study from CG at the begining of the survey

At the end of the didactic experimental study in the CG, the problem(s) in the individual case were detected by 23.3%, not found by 76.7% of the students, Figure 2.
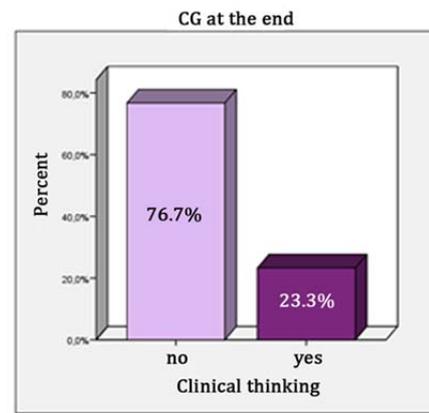

Figure 2. Identifying problems in the case study from CG at the end of the survey

The presented problematic medical situations are the same for both groups of students, experimental and control. They are of different content for students in the professional field of midwifery and nursing. They disclose theoretical material that has already been delivered in a lecture course and taught in hospitals.

In the same individual clinical cases, 30% of the EG students, at the beginning of the study, found a problem(s), Figure 3.
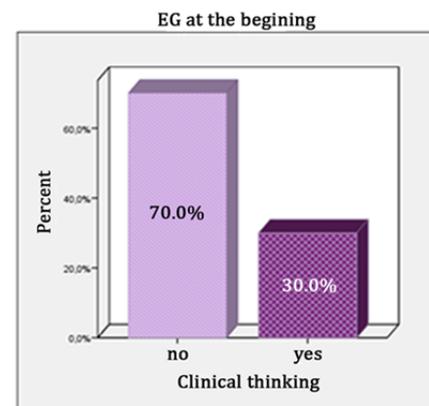

Figure 3. Identifying problems in the case study from EG at the begining of the survey

At the end of the experimental study, 75.3% of the EG students identified the problem(s) in the given individual clinical case, Figure 4.
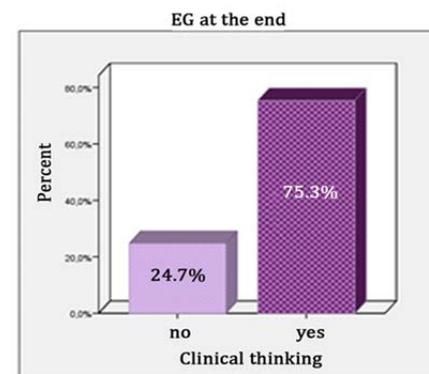

Figure 4. Identifying problems in the case study from EG at the end of the survey

The students who identified the problem were more than the half of the EG members and double the number of those who discovered the problem/s at the beginning of the study.

In the observed clinical thinking trait, a key indicator is the proportion (in percentages) of respondents who successfully solved the problem in the clinical case. The main numerical characteristics (mean $\bar{X}$ and standard deviation s) and 95% confidence interval for mean of the "clinical thinking" parameter at the beginning and the end of the conducted research in both groups of students are presented in Table I.

Table 1. Main numerical characteristics of the conducted research of the "clinical thinking" parameter, (CG, EG)

"clinical thinking"	Mean $\bar{X}$ in %	Standart deviation s	Confidence interval of mean $\gamma = 0.95$т
CG starting point	22,60	41,970	(15,74; 29,47)
EG starting point	24,67	43,252	(17,69; 31,64)
CG endpoint	23,29	42,412	(16,35; 30,23)
EG endpoint	75,33	43,253	(68,36; 82,31)

The data show that mean $\bar{X}$ in percentage, for those who were able to identify the problem in suggested the individual clinical cases, for both groups of students (CG, EG) at the beginning of the experiment have approximately the same value: CG – 22,6%, EG – 24,7%. At the end of the study, the mean $\bar{X}$ of the students who have completed the assignment is bigger in the EG (75.3%) than the CG (23.3%). The data of the mean $\bar{X}$ at the beginning and the end of the study with both of the groups (means are presented in relative shares) are demonstrated in Figure 5.
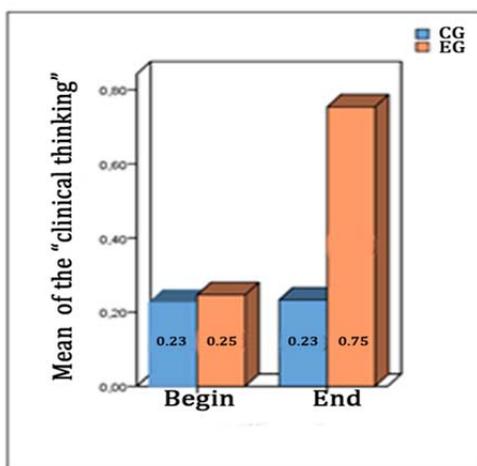

Figure 5. Mean $\bar{X}$ of the "clinical thinking" parameter in CG and EG at the beginning and the end of the conducted research

To determine the appropriate statistical test, verification for normal distribution of variables is made – Table II.

Table 2. Kolmogorov–Smirnov normality test of the "clinical thinking" parameter in CG and EG.

One-Sample Kolmogorov-Smirnov Test			
Group			"Clinical thinking"
Control group starting point	N		146
	Normal Parameters	Mean	0,2260
		Std. Deviation	0,41970
	Most Extreme Differences	Absolute	0,479
		Positive	0,479
		Negative	-0,295
	Kolmogorov-Smirnov Z		5,786
	Asymp. Sig. (2-tailed)		0,000
Control group endpoint	N		146
	Normal Parameters	Mean	0,2329
		Std. Deviation	0,42412
	Most Extreme Differences	Absolute	0,476
		Positive	0,476
		Negative	-0,291
	Kolmogorov-Smirnov Z		5,747
	Asymp. Sig. (2-tailed)		0,000
Experimental group starting point	N		150
	Normal Parameters	Mean	0,2467
		Std. Deviation	0,43252
	Most Extreme Differences	Absolute	0,469
		Positive	0,469
		Negative	-0,284
	Kolmogorov-Smirnov Z		5,745
	Asymp. Sig. (2-tailed)		0,000
Experimental group endpoin	N		150
	Normal Parameters	Mean	0,7533
		Std. Deviation	0,43252
	Most Extreme Differences	Absolute	0,469
		Positive	0,284
		Negative	-0,469
	Kolmogorov-Smirnov Z		5,745
	Asymp. Sig. (2-tailed)		0,000

Table II shows that Asymp. Sig. (2-tailed) < 0.05 for all cases which means that the data are not normally distributed.

This requires the usage of non-parametric tests - the Mann-Whitney U test for two independent samples CG and EG at the beginning and the end of the period to prove equality/difference.

Table III shows the analysis of the initial ranked values from the clinical thinking benchmark tests.

Table 3. Clinical Thinking Measurement Tests, Ranked initial conditions in CG and EG

Parameter	Group	N	Mean Rank	Sum of Ranks
clinical thinking	CG starting point	146	146,95	21455,00
	EG starting point	150	150,01	22501,00
	Total	296		

From the data presented in Table IV, Asymp is observed that Asymp. Sig. (2-tailed)=0,677>0,05, meaning that the relative proportions of students that found problem(s) in the CG (22.60%) and the EG (24.67%) were statistically insignificant at the beginning of the experimental study - there is an "equal start".

Table 4. "Equal start" - clinical thinking measurement tests, CG and EG

	"clinical thinking"
Mann-Whitney U	10724,000
Wilcoxon W	21455,000
Z	-0,417
Asymp. Sig. (2-tailed)	0,677

Table V shows the final ranked values from the clinical thinking benchmark tests in both groups.

Table 5. Final ranked values - clinical thinking measurement tests, CG and EG

Parameter	Group	N	Mean Rank	Sum of Ranks
clinical thinking	CG endpoint	146	109,47	15982,00
	EG endpoint	150	186,49	27974,00
	Total	296		

Statistical data processing at the end of the period was done identically (Table VI).

Table 6. Different end - clinical thinking measurement tests, CG and EG

	"clinical thinking"
Mann-Whitney U	5251,000
Wilcoxon W	15982,000
Z	-8,939
Asymp. Sig. (2-tailed)	0,000

Table VI shows that Asymp. Sig. (2-tailed)<0,05 and prove the statistical significance of the difference in relative proportions of the students that found a problem(s) at the end of the experimental study in the two groups i.e. there is a "different end".

The "equal start" and the proven statistically significant differences at the end of the study ("different end"), as well as the higher EG rank at the end of the experiment, prove that the case study method forms clinical thinking in students. The success rate of CG is 23,29% and of EG 75,33%.

3. Conclusion

Clinical thinking is an important condition for organizing the necessary medical care for the patient. Therefore, it is a requirement that midwifery and nursing students are to be provided with practical training –practical exercises and pre-diploma practice [2].

The effective service to patients by medical teams largely depends on the optimal course of interaction between members, on their communicative competence, their abilities to solve problems, disputes and conflicts.

This paper has examined the key role of the case study method within the clinical thinking-forming process when teaching nursing and midwifery students by exploring the ability to find a problem in individual clinical cases. The respondents were divided into two groups - control and experimental. Statistical analysis proves the "equal start" of both groups. At the end of the experiment, the confidence interval of the mean for CG is (16,35; 30,23) and for EG is (68,36; 82,31). The Mann-Whitney U test for two independent samples CG and EG at the end of the period prove the difference between them. Moreover, the higher EG rank at the end of the experiment (EG Mean rank 186,49 vs. CG Mean rank 109,47) proves that the case study method is effective when it comes down to forming clinical thinking in midwives and nurses.

The method of the individual clinical case, in the training of future healthcare professionals, furthers the theoretical and practical knowledge and skills, and thus the necessary competencies required for deriving greater fulfilment in the profession.

In the events of the current epidemiogical situation, the case study method has been successfully implemented in the distance-learning environment [3].

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