



Factors Affecting Results of Pre-clinical Phase1 of Medical Students: A Research in Mekong Delta

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ABSTRACT

Published Online: September 15, 2023

Training preclinical skill for medical students plays a vital role in medical education, contributing into examining, diagnose, treat and follow patients. The research identified factors that impact results of pre-clinical phase 1 of medical students at a university in Vietnam. The research was carried out to collect data from examination results of 850 sophomores (school year: 2019-2020) after they finished pre-clinical phase 1. The research was to find out the relationship between the affecting factors and preclinical outcomes by SPSS. The finding shows that 97.6% obtained high results from fair level to excellent level. There was a correlation between learning preparation and preclinical results. The findings also help students know their scores in detail, building a suitable and positive learning scheme.

KEYWORDS:

preclinical, factors, medical education, medical skill

1. INTRODUCTION

Medical skill is a particular skill of healthcare field, defined as skills taught and learned based on practical practice at patient beds. Medical skill appeared in the world a long time ago, introduced by Henk Schmidt and has been applied in training since 1976 at Maaschrct University (Holland) (Virginie F.C, 2019). Teaching medical skill on models, realistic situation conditions help students access before perform directly on patients in the hospitals. It is an advanced step in training. This program has been deployed in Can Tho Medical and Pharmacy University since 1995 to equip knowledge of pre-clinic and integrate basic medicine into realistic situations taking place at patient's bed (Maria Rosa Fenoll-Brunet, 2017).

Evaluating affecting factors on learning outcomes indicates groups of factors: learning motivation, learning steadiness, learning competitiveness, impression with the university, learning method (Vo Thi Tam, 2010). Three groups of factors including student-related factors, university-related factors, and family-related factors influence bad learning results of students (Nguyen Quoc Nghi, 2011). Two groups of factors consisting of learning objective orientation and teaching methodology impact learning motivation of students

(Nguyen Binh Phuong Duy, 2016). In medical field, there were some evaluations on students' clinical skill preparation in hospital practice (Mohammad et al., 2008; Lilach Eyal et al., 2006). Learning outcome is one of important criteria to assess training quality, and value of long-term learning process as well. However, result of this subject is not noticeably evaluated as it has less influence on the score of whole course (Maria Rosa Fenoll-Brunet, 2017; Lindsay C. Strowd, 2022). Several researches in Vietnam were done on other training fields, not on medical students about preclinical skill. Therefore, it is necessary to identify whether affecting factors on pre-clinical 1 of medical students via training program, teaching and learning knowledge, ability of using teaching methodology are suitable with students' ability in order to equip students well in clinical practice and ways to evaluate training results of preclinical skill (Jackson et al., 2009). The research also determines which factors motivate medical students to prepare for preclinical skill (Aalbers et al., 2013). The purpose of the research helps to improve results of preclinical training skill (Fenoll-Brunet M et al., 2017).

II. LITERATURE REVIEW

Skill is the ability to do something fluently. Skill is often achieved or learned in our life, not natural. Skill can be classified into common and specific skills. Common skills are time management skill, teamwork skill, leadership skill, autonomy skill, ect.,. Specific skill is for specific field with its particular requirements.

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**Cite this Article: Dang Thanh Hong (2023). Factors Affecting Results of Pre-clinical Phase1 of Medical Students: A Research in Mekong Delta. International Journal of Social Science and Education Research Studies, 3(9), 1883-1888*

Practicing clinical skill brings basic benefits in training medical students and postgraduates. This process provides students with learning environment which helps to practice preclinical skill safely and protectively before perform realistically on patients in preclinical environment. Medical students are not only good at knowledge of examination and treatment but also medical skill. Understanding the effects of medical skill will aid students orientate their learning objective, training, practice and self-study effectively, achieve good study scores in the university to carry out healthcare better nowadays.

To estimate students' skill is important in medical training and select suitable evaluating method will increase students' adaptability more. Assessing the effectiveness of medical skill is carried out worldwide to increase the professional training effectiveness of examination and treatment. 70% of students stated that they were not taught fully preclinical skill for later hospital practice, only 33.3% said that they were equipped completely skill and knowledge before realistic practice (Mohammad et al., 2008); 40% was not equipped fully preclinical skill, 50% stated that they did 26/36 important preclinical skill and only 33% agreed to have complete knowledge, skill, behavior and essential values for medical students before graduation (Lilach Eyal et al., 2006). Learning result measures the level of knowledge, skill or awareness to be acquired in a certain field (learning subject) (Nguyen Duc Chinh, 2004). Assessing the results of students is an activity of synthesizing, analyzing and applying the proofs of teaching and learning quantity and quality. They are used to check the suitability with objectives, purposes proposed and provide feedback to encourage the progress (Vlăsceanu L. et al., 2004; Barbara E. Walvoord et al., 2009). There are many viewpoints on evaluating learning results. The first opinion states that evaluation is used to confirm the results of learners. The second opinion claims that evaluation helps to improve learning of students. The third point of view thinks that evaluation is a combination of the two viewpoints above. It is a process of confirming the results of learners and improving their learning. It is a general evaluation of students' knowledge and skills that they absorb during the learning process of specific subjects (Dinh Thi Hoa, 2018).

When students do not have good learning results, it is due to their inadaptability with the environment, the learning method in university. Many factors influence learning results, but focus on two factors consisting of their own performance (acquired knowledge and learning motivation) and teacher's competence. The three factors affecting learning results consist of equipment, teaching-served technology, learning and teaching methodology (Mark R. Young et al., 2003). There are many research using different scales on teacher's competence. Among them, there are three popular scales related to i) teaching, ii) course organization, iii) class interaction. The research shows that three influencing factors

are active teaching methodology, after-class learning method and school facilities (Phan Thi Hong Thao, 2020).

46 medical skills to teach medical students are divided into three groups: communicative skill (CS), examination skill (EK) and surgery skill. These skills are trained in two modules: preclinical phase I and preclinical phase II. These two basic skills are common, essential, risk-easy for patients in practice so they need to be well-trained before practicing on real patients. Evaluation of learning process requires to be performed on students' score cards and standard system to identify those scores. A progressive education needs to standardized system of scores which expresses both adequate purpose of education and help society evaluate exactly level of students' competence. It also helps learners orient purposes and adjust their behavior to enhance their own learning result. Enhancing the quality of assessing and evaluating as well as improving evaluating system is a must.

III. RESEARCH METHODOLOGY

The research is carried out in a medical university in Mekong Delta. Cross-section was used in the research methodology with 850 medical sophomores. The data were collected from results of final examination of pre-clinical 1 and relative factors in training medical students. The research records the result of pre-clinical 1 (module result) in training medicine. The results are divided into different scales: excellence, good, fair, average, weak and poor. The questionnaire includes 23 items including the following information: gender, nationality, address, kind of training and questions on evaluating training issues including preparation, learning materials and organizing activities and is measured by 4-degree scale (1-completely agree, 2-agree, 3-disagree, 4-completely disagree). Impacting factors on the result of pre-clinical 1 consist of learner (gender, nationality, living place, and training form); teachers (organizing training process, class interaction, learner's preparation when joining the lesson; content, purpose, updated knowledge. Among them, i) 10 questions measure students' preparation of learning activity, students' interest, ii) 6 questions measure curriculum of pre-clinical 1, iii) 7 questions measure training organization.

10 questions measuring preparation for learning activity include setting up a schedule before starting learning, knowledge consolidation, lesson preview, and references lesson-related information, time of learning, health during and whole process of learning. The group is divided into two groups of preparation (from very adequate to inadequate) based on average value and standard deviation of analyzing descriptive statistics. The learning program of pre-clinical 1 consists of 6 questions: clear training objective, logical distribution rate between theory and practice, suitable, updated content of the lecture, updated, comprehensible textbook, self-study of students before class, total evaluating score on training program pre-clinical 1. The level is divided

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into 2 groups consisting of adequate pre-clinical 1 (adequate, suitable, comprehensible materials and adequate and suitable materials) and inadequate pre-clinical 1 (inadequate, need supplementing materials and inadequate, difficult self-study materials) based on average value and standard deviation of analyzing results of descriptive statistics. Assessing training activity consists of 7 questions on learning schedule, self-study time, number of students every lesson, time distribution for each lesson, self-practice to enhance professional major, lesson preparation before class, end-course evaluation. The level is divided into adequate and inadequate organization (well-prepared supporting activity, problem-solving support activity, and ill-prepared activity) based on average value and standard deviation of analyzing results of descriptive statistics.

IV. RESEARCH RESULTS

Training pre-clinical 1 was focused to increase practical ability before direct practice on real patients in the hospital.

Table 1: Common features of research sample

Common features	content	Quantity (n)	Rate (%)
Gender	Male	417	49,1
	Female	433	50,9
Living place	Boarding house	737	86,7
	With family	113	13,3
Training mode	Freedom	400	47,1
	Admission	29	3,4
	Using address	421	49,5

Learning result is one of important criteria to evaluate training quality and the whole value of learning process.

Table 2: Results of pre-clinical 1

Results of pre-clinical phase 1	Quantity (n)	Rate (%)
Excellent	69	8,1
Good	529	62,2
Fair	232	27,3
Average	20	2,4
Total	850	100

Factors affecting learning results

During training students of healthcare science, female students predominate in learning process of all majors.

Table 3: gender factor affecting results of pre-clinical phase 1

Gender	Results		p, χ^2 , OR (KTC)
	Average	Fair – Good - Excellent	
Male	13 (3,1)	404 (96,9)	0,149 ; 2,08 ; 1,95 (0,77 – 4,96)
Female	7 (1,6)	426 (98,4)	
Total	20 (2,4)	830 (97,6)	

The government has supporting policy to help ethnic students in training health major to enhance healthcare work for people.

Table 4: ethnic factor affecting results of pre-clinical phase 1

Ethnic people	Results		p, χ^2 , OR (KTC)
	Weak - Average	Fair – Good - Excellent	
Kinh people	17 (2,3)	732 (97,7)	0,77 ; 0,19 ; 0,75 (0,22 – 2,64)
Others	3 (3,0)	98 (97,0)	
Total	20 (2,4)	830 (97,6)	

Living condition in the learning process of students was considered to influence results of pre-clinical phase 1

Table 5: Living place affecting results of pre-clinical phase 1

Living place	Results		p, χ^2 , OR (KTC)
	Weak - Average	Fair – Good - Excellent	
Boarding house	16 (2,2)	721 (97,8)	0,33 ; 0,80 ; 0,61 (0,20 – 1,84)
With family	4 (3,5)	109 (96,5)	
Total	20 (2,4)	830 (97,6)	

Training mode reflects the status of students learning at school in aspects of freedom, admission, and using address (Government, 2006)

Table 6: Training mode affecting results of pre-clinical phase 1

Training mode	Results		p, χ^2 , OR (KTC)
	Weak - Average	Fair – Good - Excellent	
Admission, using address	14 (3,1)	436 (96,9)	0,122 ; 2,39 ; 2,11 (0,80 – 5,54)
Freedom	6 (1,5)	394 (98,5)	
Total	20 (2,4)	830 (97,6)	

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In order to promote learning ability to enhance learning results of students, lecturers need to increase their knowledge and using diverse teaching method to motivate students' participation in class, interaction actively with the lecturer (Dang Thu Ha, 2017).

Table 7: Preparation factor affecting results of pre-clinical 1

Learning activity	Results		p, χ^2 , OR (KTC)
	Weak - Average	Fair – Good - Excellent	
Not prepared yet	7 (5,6)	119 (94,4)	0,019 ; 6,60 ; 3,22 – (1,26 8,23)
prepared	13 (1,8)	711 (98,2)	
Total	20 (2,4)	830 (97,6)	

Curriculum of pre-clinical phase 1 includes contents of theory and practice, self-study textbook. The lessons with clear objective, content module were introduced logically, systematically for students in the learning process.

Table 8: Curriculum factor affecting the results of preclinical phase 1

Learning materials	Results		p, χ^2 , OR (KTC)
	Weak-Average	Fair – Good - Excellent	
Inadequate content	0 (5,4)	52 (94,6)	0,63 ; 0,22 ; 0,88 (0,52 – 1,49)
Adequate content	20 (6,0)	778 (94,0)	
Total	20 (2,4)	830 (97,6)	

Fully-organized training activities, specifically-instructed preparation, suitable distribution of students for each class and regularly-attended students were main contents for training activity of pre-clinical 1.

Table 9: Training organization affecting results of pre-clinical phase 1

Training organization	Results		p, χ^2 , OR (KTC)
	Weak - Average	Fair – Good - Excellent	
Not thoughtful	4 (4,2)	110 (95,8)	0,329; 0,77 ; 1,64 (0,54 – 4,99)
Thoughtful and sufficient	16 (6,8)	720 (93,2)	
Total	20 (2,4)	830 (97,6)	

IV. DISCUSSION

The gender of students in each major is presented in table 3.2, which shows that female students make up a higher

percentage than male students (50.9% / 49.1%). Usually, accommodation is occupied by 86.7%, self-directed learning mode accounts for 47.1%, address of use learning mode accounts for 49.5%.

The survey of students in pre-clinical phase I results shows that excellent academic performance accounts for 8.1%, while the proportion of good performance is 89.5%. The results show that students have achieved good outcomes in the process of studying pre-clinical phase I, which is a fundamental practical area in the field of medical studies. Students are equipped with basic medical practice skills through training on models and simulated patients before performing procedures on real patients in the hospital.. In the first academic year, students receive meticulous guidance on how to conduct examinations and perform procedures correctly. This is carried out systematically and through the integration of related content. The academic results in the first year also play a crucial role in laying the foundation for the curriculum development for students in the pre-clinical phase I.

The results of the pre-clinical phase 1 show that the percentage of female students achieving at the levels of fair, good, excellent is higher than that of male students. However, with a p-value of 0.149, which is greater than 0.05, it indicates that there is no statistically significant difference in academic outcomes based on gender. This implies that gender does not have a significant impact on the results of the pre-clinical phase 1. Many studies have indicated that female students tend to have higher average scores compared to male students. This demonstrates a positive aspect in the learning process of students that is not influenced by gender factors (Do Huu Tai, Lam Thanh Hien, & Nguyen Thanh Lam, 2016; Le Thị My Trang, Nguyen Hoang Giang, & Vo Van Si, 2021). Therefore, the author can conclude that academic performance is not significantly correlated with gender. In the field of medicine, it requires learners to be responsible and patient in honing their skills. Typically, females tend to excel in these aspects compared to males. However, this does not imply a direct link between gender and academic outcomes. What matters most is the dedication and individual effort of each student.

The students participating in the school come from various ethnicities. When examining the relationship between the Kinh ethnic group and other ethnicities with pre-clinical 1 result, we can observe success rates in the categories of 'fair,' 'good,' and 'excellent.' Specifically, the success rate for the Kinh ethnic group is 97.7%, while the other ethnicities achieve 97.0%. The difference in pre-clinical 1 results among students from different ethnicities is not statistically significant (p=0.77 > 0.05). The pre-clinical 1 program is designed to guide all students, and they all have the potential to achieve their individual successes. There is no influence of ethnicity in this process.

The percentage of students achieving 'fair' 'good,' and 'excellent' results in pre-clinical phase 1 shows no significant difference between the group of students living in rented accommodation and the group living with their families, both exceeding 96% ($p=0.33>0.05$). Therefore, it can be concluded that the factor of residence does not influence the results of pre-clinical 1. At present, the school does not have dormitory facilities to accommodate students during their studies. Therefore, each student will have the freedom to choose their residence based on their family's economic situation. There may be options such as living alone in a rented accommodation, sharing with friends, or choosing to stay with family for care throughout the period of study. When conducting a survey on this factor regarding the results of the pre-clinical 1, there is no evidence to suggest that the factor of residence while studying at the school significantly influences academic performance.

The percentage of students achieving fair-good-excellent results in the pre-clinical 1 program is over 96% in both residence training approaches. The correlation analysis between the residence training approach and the results of the pre-clinical 1 yields a p-value of 0.122, which is greater than 0.05. Therefore, there is no significant difference in the proportion of students achieving different levels of course performance based on the residence training approach. The curriculum is uniformly applied to all participants engaged in learning activities at a given time, are evaluated together. Therefore, this result further demonstrates that the level of academic performance among students is consistent and does not differentiate based on the incoming qualifications or the category of university admission. This further demonstrates the government's policy direction in allocating educational resources to disadvantaged areas, especially in providing challenging environments for the study of health sciences. This is essential to ensure a balanced distribution of healthcare professionals across different regions.

The preparation for student learning has an agreement rate of 98.2%. Students are encouraged to proactively develop effective and reasonable study methods, cultivate basic skills (comprehension of lectures, actively seek relevant reference materials for the subject, create a study schedule, engage in creative thinking, etc.). The factor of preparation for learning activities in the pre-clinical 1 the results indicates that the percentage of students achieving fair-good-excellent grades in both well-prepared and less-prepared groups is above 90%, with a p-value of 0.019, which is less than 0.05, signifying statistical significance in this difference. This result demonstrates that studying pre-clinical phase 1 helps students enhance their self-learning abilities and equips them with knowledge before entering the classroom. Students who are well-prepared for their study activities tend to have a lower average weak performance rate of 1.8%. Conversely, for those who are not well-prepared, this rate reaches nearly 10%. Hence, the correlation between the results of the pre-clinical

1 and the preparation for learning activities clearly reflects a reciprocal influence. Academic performance is positively correlated with the preparation for learning activities. Students who are not well-prepared for these activities tend to have a 3.22 times higher likelihood of achieving an average-weak grade in the pre-clinical 1 compared to students who prepare their assignments well.

The pre-clinical 1 curriculum encompasses both theoretical and practical aspects, including lecture content and self-study textbooks. Research results indicate that the study materials do not significantly impact the proportion of students achieving fair-good-excellent results in pre-clinical 1. This suggests that the materials are user-friendly, with lecture content suitable for independent student learning and pre-class reference. This result indicates that the study materials provided for pre-clinical 1 enhance students' understanding, improve their ability to absorb information, and enhance their knowledge of pre-clinical 1. The study materials equip students with knowledge for pre-reading, preparing the content to discuss with the instructor during the lecture. Due to the nature of pre-clinical 1 study, which emphasizes practical skills gained through observation, emulation, and post-class practice, the study materials have less impact on students' pre-clinical 1 outcome.

The learning process is fully implemented, providing specific instructions to students on the preparation steps, with an appropriate number of students per lecture. Students closely follow the instructor's guidance during the class, which is the main focus of organizing pre-clinical 1 training activities. This factor includes the class schedule, the number of students in the class, class duration, additional practice sessions after class, and exam content closely aligned with the lectures. Table 9 demonstrates that the organization of training activities, whether thorough or less thorough, results in a proportion of students achieving good-excellent-outstanding performance in pre-clinical 1 above 93%. With a p-value of 0.329, which is greater than 0.05, this difference is not statistically significant. This indicates that the results of the pre-clinical 1 are not significantly affected by the factor of training activity organization. This is likely due to the application of a standardized organizational process for classes, covering how they are structured, arranged, equipped, and the tools and teaching methods employed.

V. CONCLUSION

According the research results, the rate of medical students who obtained fair, good and excellent results of pre-clinical 1 was 97.6%. The results showed that there was a relationship between learning preparation activity and the results of pre-clinical phase 1. There was no relationship between gender, ethnic group, living place, training form, learning materials, training organization and results of pre-clinical phase 1.

Learning results is one of important criteria to evaluate the quality of training, and long-term learning process of

students. Students must know skill examination results in detail, to know their weakness and improve their skill to equip themselves a suitable learning scheme. The university needs to organize active learning, promote self-study ability, explore learning materials and increase learning responsibility of pre-clinical 1.

We need to do more research in other medical schools to confirm and modify other factors affecting results of pre-clinical 1 to increase the quality of medical training.

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