DETERMINANTS INFLUENCING THE MASTERY OF PRECLINICAL MEDICAL SKILLS: A STUDY FROM THE MEKONG DELTA

DETERMINANTES QUE INFLUENCIAM O DOMÍNIO DAS HABILIDADES MÉDICAS PRÉ-CLÍNICAS: UM ESTUDO DO DELTA DO MEKONG

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Abstract. This study was conducted at Can Tho University of Medicine and Pharmacy, a leading health sciences institution in the Mekong Delta region, to evaluate the adequacy of the medical skills training program for fifth- and sixth-year medical students. This study utilizes a quantitative methodology, gathering data from survey questionnaires completed by fifth- and sixth-year medical students at Can Tho University of Medicine and Pharmacy. The research aims to evaluate students' proficiency in medical skills practice and to investigate how variables such as academic year, academic performance, and post-graduation career preferences influence students' perceptions of the medical skills training program. A quantitative study involving 462 fifth- and sixth-year medical students demonstrated a high level of responsiveness to the medical skills training program ($p < 0.001$). However, no statistically significant correlation was observed between students' perceptions of the program and their competency in medical skills practice. This study reveals that a positive perception of the medical skills training program does not directly translate into superior practical competency. Academic performance emerged as a key determinant, with students in the 'Good-Excellent' category demonstrating a significantly higher responsiveness rate (90.3%) than their 'Average-Poor' counterparts (77.9%) ($p < 0.001$). Furthermore, students' intended post-graduation workplace influenced their perception, with those planning to work at the provincial level reporting a more favorable evaluation than those targeting district-level positions. However, no significant differences in practical competency were observed between these groups. These findings highlight the critical need for curriculum enhancements, improved infrastructure, and increased engagement of clinical faculty to ensure the effectiveness of medical skills training programs.

Keywords: Medical Education; Clinical Medical Skills; Curriculum Evaluation; Medical Students; Program Effectiveness

Resumo. Este estudo foi conduzido na Can Tho University of Medicine and Pharmacy, uma instituição líder em ciências da saúde na região do Delta do Mekong, para avaliar a adequação do programa de treinamento de habilidades médicas para estudantes de medicina do quinto e sexto ano. Este estudo utiliza uma metodologia quantitativa, coletando dados de questionários de pesquisa preenchidos por estudantes de medicina do quinto e sexto ano na Can Tho University of Medicine and Pharmacy. A pesquisa visa avaliar a proficiência dos alunos na prática de habilidades médicas e investigar como variáveis como ano acadêmico, desempenho acadêmico e preferências de carreira pós-graduação influenciam as percepções dos alunos sobre o programa de treinamento de habilidades médicas. Um estudo quantitativo envolvendo 462 estudantes de medicina do quinto e sexto ano demonstrou um alto nível de responsividade ao programa de treinamento de habilidades médicas ($p < 0,001$). No entanto, nenhuma correlação estatisticamente significativa foi observada entre as percepções dos alunos sobre o programa e sua competência na prática de habilidades médicas. Este estudo revela que uma percepção positiva do programa de treinamento de habilidades médicas não se traduz diretamente em competência prática superior. O desempenho acadêmico surgiu como um determinante-chave, com os alunos na categoria 'Bom-Excelente' demonstrando uma taxa de responsividade significativamente maior (90,3%) do que seus colegas 'Médio-Ruim' (77,9%) ($p < 0,001$). Além disso, o local de trabalho pretendido pelos alunos após a graduação influenciou sua percepção, com aqueles que planejam trabalhar no nível provincial relatando uma avaliação mais favorável do

que aqueles que visam cargos no nível distrital. No entanto, nenhuma diferença significativa na competência prática foi observada entre esses grupos. Essas descobertas destacam a necessidade crítica de aprimoramentos curriculares, infraestrutura aprimorada e maior engajamento do corpo docente clínico para garantir a eficácia dos programas de treinamento de habilidades médicas.

Palavras-chave: Educação Médica; Habilidades Médicas Clínicas; Avaliação Curricular; Estudantes de Medicina; Eficácia do Programa

1. INTRODUCTION

Medical education serves as a cornerstone in strengthening healthcare systems, demanding systematic improvements in curriculum design and instructional methodologies (Harden R. M., 2002). At the core of this educational framework is medical skills training, which encompasses a wide range of clinical competencies, from patient examination and procedural execution to effective communication and laboratory result interpretation (P Bradley et al., 2003).

Such competencies are crucial for preparing future physicians to meet the evolving demands of modern medical practice. The medical skills training program aims to provide medical students with a robust foundation prior to engaging with real patients. This initiative aims to enhance learning efficiency and reduce medical errors in the early clinical practice phase (S Barry Issenberg et al., 2005).

Globally, many medical schools have adopted innovative simulation-based training models, with Maastricht University in the Netherlands leading the way. Known for its pioneering role, the university has integrated a learner-centered approach that combines simulation and scenario-based training. This approach not only enhances clinical skills but also fosters critical thinking, making it a model for modern medical education (B. De Wever et al., 2006).

In Vietnam, Can Tho University of Medicine and Pharmacy has established a dedicated skills training unit to enhance students' proficiency in fundamental clinical skills, such as effective communication in patient interactions, comprehensive physical examination techniques, mastery of medical procedures, and competence in performing laboratory tests. Clinical skills training is crucial for shaping competent physicians (Heba Al-Omary et al., 2024).

Emphasis on preclinical training is growing, ensuring students integrate theoretical knowledge into safe and effective practice (Alanazi AA et al., 2017). Simulation-based teaching methods have proven effective in enabling students to engage with complex clinical scenarios without patient risk.

However, some studies indicate that not all students find these programs engaging or perceive their importance, presenting challenges in refining teaching strategies to enhance student participation and motivation (Lucy Abell et al., 2023; Yu-Ru Lin et al., 2021).

Medical education quality assurance is a crucial factor in ensuring the effectiveness of training programs. The Ministry of Education and Training of Vietnam has issued policies to promote the quality evaluation process in higher education, including medical education (Bộ Giáo dục và Đào tạo, 2010).

Quality assurance not only enhances teaching standards but also aids in adjusting curricula to align with changes in clinical practice and healthcare system demands. Additionally, assessing medical students' competencies through exams and clinical practice tests plays a vital role. Recent studies have focused on evaluating the effectiveness of simulation in medical training, particularly in critical care and intensive care areas, which not only enhance clinical skills but also significantly improve soft skills such as communication, decision-making, and teamwork, optimizing clinical performance in high-intensity environments (Nouf Sulaiman Alharbi, 2024).

2. METHODS

2.1. Research design

This study employs a quantitative approach to assess the responsiveness of the medical skills training program at Can Tho University of Medicine and Pharmacy. Data collection was primarily conducted through a survey questionnaire distributed to fifth (Y5) and sixth-year (Y6) medical students who had completed the basic medical skills training program.

The study does not include control or experimental groups but focuses on evaluating the responsiveness and related factors within a specific group. Correlation and regression analyses were performed on the data processed using SPSS 18.0 software to identify relationships between the research variables (Louis Cohen et al., 2018).

2.2. Research participants

The study participants are medical students from Can Tho University of Medicine and Pharmacy. The specific focus of the research is the responsiveness of the medical skills training program for fifth- and sixth-year students who have completed the basic medical skills curriculum.

The study sample includes all students from these two academic years. Faculty members and clinical doctors are excluded from the study, as the aim is to evaluate students' perceptions and competencies regarding the program.

2.3. Assessment tools

The primary tool used in this study is a survey questionnaire, which is structured into three main sections: (1) Evaluating the responsiveness of the medical skills training program through questions on the importance, perceptions, and responsiveness of each skill category (communication, examination, procedures, and testing); (2) Assessing students' learning competencies regarding the program; and (3) Evaluating factors influencing perceptions of the program's responsiveness.

The questions were designed using a Likert scale ranging from 1 to 4 to measure students' agreement with various aspects of the training program (Likert, 1932). The questionnaire was developed and refined based on feedback from experts in skills training to ensure its validity and alignment with the research objectives.

2.4. Data collection process

Data were collected by distributing questionnaires to students, who were instructed to complete the response forms independently. The questionnaires were distributed through class representatives. Students were clearly informed about the purpose of the study and assured that their personal information would remain confidential.

To ensure objectivity and comfort, students were given the option to return the completed surveys the following day. After collection, the data were sequentially coded and entered into Epi-Data 3.0 software. The data were then converted into SPSS 18.0 format using StatTransfer 7 software for analysis.

The statistical methods employed in the study included descriptive analysis, t-tests, correlation analysis, and regression analysis to assess the relationships between the variables (Andy Field, 2024).

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3. RESULTS

3.1. Evaluation of the responsiveness of the medical skills training program

The research results indicate that the medical skills training program at Can Tho University of Medicine and Pharmacy achieves a high level of responsiveness among medical students. The responsiveness of the program is assessed through students' learning outcomes, as reflected in their responses to questions regarding practical skill proficiency. Students' practical skills are divided into four main categories: communication skills, examination skills, procedural skills, and testing skills. The assessment questions cover all four skill categories, and the program's responsiveness is determined by calculating the average response scores for each skill category.

The results show that students' responsiveness to the medical skills training program is high, with average scores ranging from 3.29 to 4.05 (on a 4-point scale). The study indicates a statistically significant correlation between students' competency levels and the responsiveness of the medical skills training program. Specifically, the 75% competency threshold indicates that students' competency levels are high, with statistical significance at the 95% confidence level ($p<0.001$) (Table 1).

Table 1. Mean Differences and Competency Scores of Y5 and Y6 Students

Student Group	Δ Mean (95% CI)	Mean Score ± SD	p-value	Adj. p-value
Y5	3.25 (2.68 – 3.81)	59.67 ± 3.96	<0.001	0.031
Y6	4.08 (3.57 – 4.59)	60.07 ± 4.28	<0.001	
Overall	3.67 (3.29 – 4.05)	59.25 ± 4.13	<0.001	-

Abbreviations: CI = Confidence Interval, SD = Standard Deviation.
Significance threshold: p-values < 0.05 are considered statistically significant.

The study reports that 95.5% of students rated the responsiveness of the skills training program as satisfactory, while a small proportion of students (1.3%) rated it as low (Figure 1).

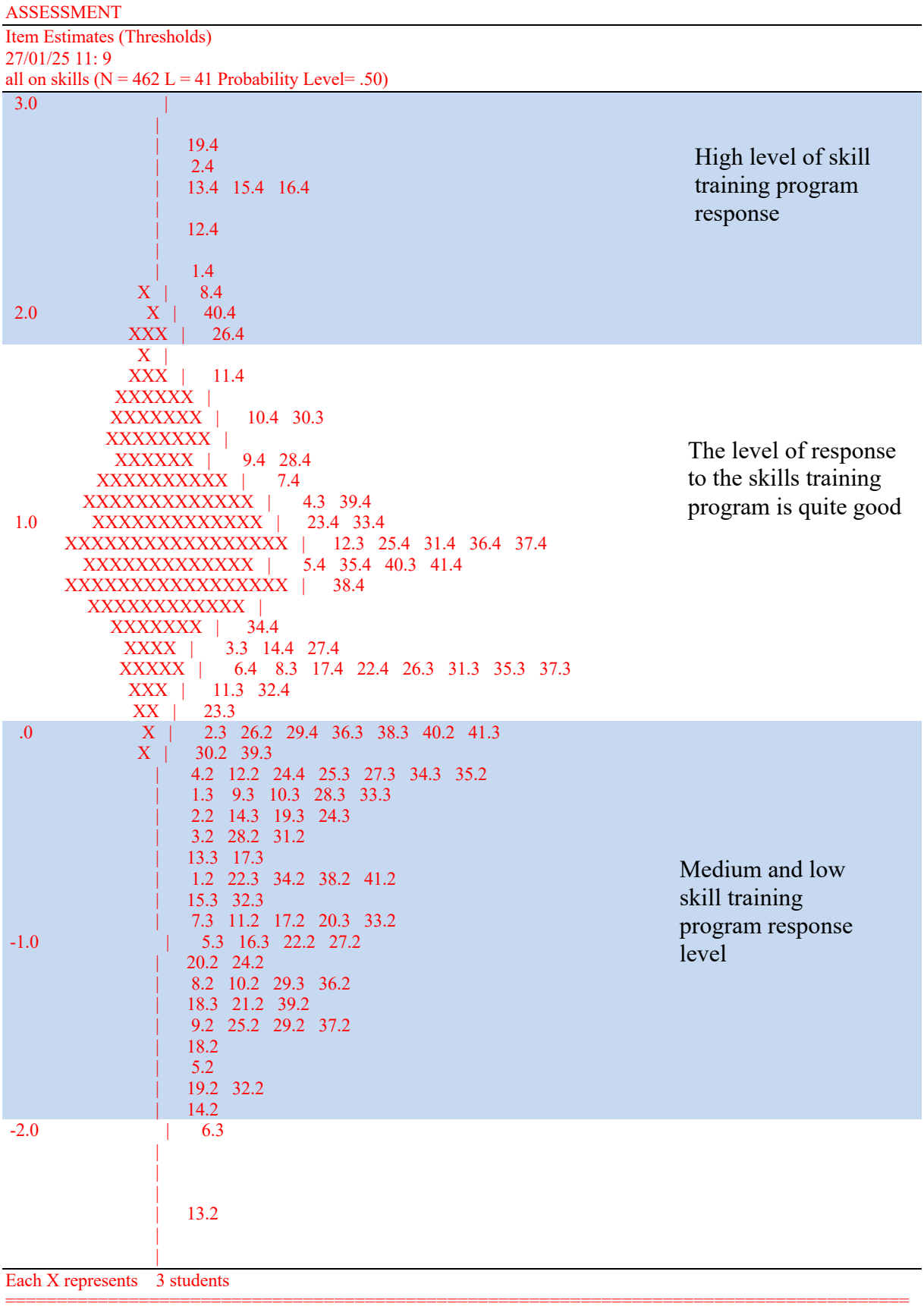

Figure 1. Assessment of the responsiveness of the medical skills training program (RASCH model analysis)

3.2. Results of the analysis of learners' feedback

Students highly value the necessity of the medical skills training program in the general medical doctor training process. The majority of students (86.2%) agree or strongly agree with the program's role, while only a small proportion (0.2%) disagree. Most students (72%) enjoy the medical skills training program and wish to continue with it.

Students believe that the learning process requires considerable effort to achieve good results. Furthermore, 82.2% of students feel confident performing learned skills, such as auscultating the heart and lungs and conducting abdominal examinations on patients (Table 2).

Table 2. Evaluation of students' feedback on the pre-clinical medical skills cours

Evaluation content	Strongly Disagree (%)	Disagree (%)	Uncertain (%)	Agree to Some Extent (%)	Strongly Agree (%)	M (SD)
The course is necessary due to its clinical applications	0.2	1.5	7.6	18.8	71.9	4.61 (0.713)
The course simulates reality, creating interest	3	6.7	33.5	40.3	16.5	3.60 (0.941)
Indispensable for general practitioners	1.9	3	8.9	22.3	63.9	4.43 (0.917)
Not of much interest as it focuses only on specialization	61.5	18.6	9.5	5	5.4	1.74 (1.154)
Boring due to unclear practical relevance	47	25.1	16.9	9.1	1.9	1.94 (1.085)
Only the essential parts are needed, the rest should be handled by nurses	54.3	22.3	9.3	12.3	1.7	1.85 (1.125)
Enjoy the course, wish to study more	3	6.7	17.1	35.7	37.4	3.98 (1.043)
Requires significant effort during learning	1.9	11.5	26.4	32.9	27.3	3.72 (1.047)
Takes up a lot of time in training	18.6	23.8	32.3	18.2	7.1	2.71 (1.171)
Helpful with appropriate guidance	1.9	4.5	10.2	16.9	66.5	4.41 (0.977)

Note: "M" refers to the mean, and "SD" refers to the standard deviation.

Students' perception of the medical skills training program was positively rated and statistically significant. Those with a positive perception showed better proficiency in medical skills. However, some students found the program monotonous and unclear in its practical relevance.

3.3. Factors Affecting the Response Level to Pre-Clinical Medical Skills

The study found no statistically significant correlation between students' perception of the medical skills training program and their practical skills proficiency. This indicates that a positive evaluation of the program does not necessarily correlate with higher practical proficiency, and vice versa. These results align with previous studies on the relationship between learning motivation and clinical performance (Clode N. J. et al., 2021; Dunham L. et al., 2017).

Moreover, data analysis indicates that the academic year had no significant impact on students' perception of the program ($p = 0.505$, > 0.05), with similar perceptions observed among fifth- and sixth-year students. However, the academic year did affect practical skills proficiency, with sixth-year students performing better than fifth-year students, consistent with the theory of clinical competence development over the course of training (Harden R. M., 2002).

Similarly, academic performance was not significantly correlated with students' perception of the program ($p > 0.05$), but it influenced practical skills proficiency. Students with "Good - Excellent" performance had a higher response rate (90.3%) compared to the "Average - Poor" group (77.9%), with a statistically significant difference ($p < 0.001$). These findings support the view that academic performance can be a predictor of practical medical skills proficiency (P. Bradley et al., 2003).

Moreover, career aspirations after graduation also influenced students' perception of the program, with those planning to work at the provincial level showing a higher positive evaluation (66.8%) compared to those intending to work at the district level (50%). However, no significant statistical difference was found in practical skills proficiency between these two groups ($p = 0.291$), suggesting that the desired work location is not a determining factor for practical medical skills proficiency (Nasrin Mohammadiaghdam et al., 2020; Sonu Goel et al., 2019).

4. DISCUSSION

4.1. Significance of the Research Findings

The study demonstrates a high level of student response to the medical skills training program at Can Tho University of Medicine and Pharmacy, as measured through students' practical skills and perceptions.

The fact that students possess strong practical skills and exhibit a positive attitude confirms that the medical skills training program is on the right track, meeting the essential need to equip skills prior to the clinical phase (John Spencer, 2003).

However, positive perceptions do not necessarily equate to better practical performance, highlighting the importance of deliberate practice alongside an effective learning environment (Ericsson K. Anders, 2004).

4.2. Factors Influencing the Response Level to Pre-Clinical Medical Skills Training Program

Academic performance is a prominent factor influencing the response level to pre-clinical medical skills training. Students with good academic performance tend to rate the program's response higher than those with average or poor performance.

Students demonstrating strong performance in preclinical training develop essential skills through simulation before engaging in real-patient practice (Dang Thanh Hong, 2023). Additionally, students who aspire to work in provincial areas tend to have a more positive perception, although the difference in responses did not reach statistical significance.

This finding reinforces the role of career counseling and academic support for students with lower performance (Isa Ado Abubakar, 2013) during pre-clinical medical skills training.

4.3. Comparison with Prior Research

In Vietnam, most previous studies focused on evaluating the content and teaching methods, with limited attention to the actual responsiveness of students after completing the medical skills program.

Applying knowledge enhances students' competence, hones their skills, accumulates practical experience, and narrows the gap between theory and clinical practice (Van De Tran

et al., 2022). This study fills that gap, aligning with domestic research that indicates student satisfaction with the program (Ahmed Mujamammi et al., 2024), while also highlighting the desire for improvements in assessment processes, equipment, and internship opportunities.

Internationally, early clinical simulation programs have been positively evaluated for reducing student stress when interacting with real patients (Amitai Ziv et al., 2003), emphasizing the importance of communication, examination, procedural, and diagnostic skills (Harden R. M., 2002).

4.4. Limitations

This study is limited to the medical skills training program at Can Tho University of Medicine and Pharmacy, focusing on fifth- and sixth-year students, excluding other academic years and feedback from healthcare facilities. Data were primarily collected through self-administered questionnaires, which may introduce subjectivity, recall bias, and lack of detailed information.

The assessment of preclinical medical skills was based on students' perceptions, which may not fully reflect real-world application capabilities. The study duration was short (9 months), and the lack of qualitative analysis and sample representativeness may affect the generalizability of the findings. These limitations should be considered when interpreting and expanding the study in future research.

4.5. Recommendations for Improving the Medical Skills Training Program

First, medical skills should be standardized according to a unified set of criteria, ensuring consistency and effective statistical analysis (Harden R. M., 2002). Second, the medical skills training program should be regularly updated, adopting modern teaching methods that integrate theory with practice.

Third, it is crucial to improve infrastructure, providing opportunities for students to practice simulations alongside clinical practice in hospitals. Fourth, regular assessments of learning outcomes should be conducted, allowing timely support for underperforming students while enhancing the strengths of high-performing ones. Finally, career counseling and collaboration with employers are essential to ensure the program meets real-world demands (H. Barrows et al., 1980).

5. CONCLUSION

The study confirms the high engagement of students with the medical skills training program at Can Tho University of Medicine and Pharmacy, as evidenced by their skill performance and positive perceptions of the program (John Spencer, 2003).

This program is critical in preparing students for clinical practice, enhancing their confidence in patient interactions and improving the practical application of medical skills (Harden R. M., 2002).

However, a notable finding is the absence of a direct correlation between positive perceptions and practical competence, underscoring the need for improvements in content and teaching methods to better support skill development (Ericsson K. Anders, 2004).

Additionally, the study shows that factors such as academic performance and career aspirations significantly influence students' program engagement.Specifically, students with higher academic performance often exhibit better practical skills, while those intending to work in provincial areas rate the program more positively.

However, no significant difference in practical skills was observed between the groups (Amitai Ziv et al., 2003). These findings underscore the critical need to refine the medical skills training program to align more closely with healthcare industry demands, improve training effectiveness, and optimize students' skill development (P Bradley et al., 2003).

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