

# Effect of clerkship modification during the COVID-19 pandemic towards competency achievement in hospital pharmacy

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## ABSTRACT

Pharmacist as one of the health care team is characterized by specific competencies mostly achieved during formal education. Direct experiences are the main activity in clerkship programs which was then limited since the COVID-19 pandemic. To analyze students' competency achievement of modified hospital pharmacy clerkship program in the Department of Pharmacist Profession Education, Universitas Muhammadiyah Yogyakarta (UMY) during the pandemic. Students' competency outcome was analyzed from the comprehensive examination score obtained after their clerkship program. Data was collected from three batches of students (a total of 163 students) who undertook the clerkship during the pandemic. The difference in competency outcome was analyzed using the Kruskal-Wallis test. An in-depth interview with student representatives was conducted to gain perspective on the modified program. The method of the hospital pharmacy clerkship program in the three batches was different mostly related to the proportion of online and offline activities. There were no significant differences ( $p$ -value  $< 0.05$ ) in competency outcomes seen in all three areas of competence in hospital pharmacy, such as drug management, pharmaceutical care, and drug use, as well as management support. This finding indicates that the modification of the clerkship program was able to maintain the quality of the learning process and resulted in similar outcomes. Modifying clerkship programs in pharmacy should be evaluated to assure quality and result in competency achievement. Additional efforts should be taken to fill in the gap from lack of practice and direct experiences during the pandemic.

**Keywords:** COVID-19 pandemic, Hospital pharmacy, Clerkship, Competency

## Introduction

The COVID-19 pandemic has led to a major impact on various aspects of life. The impact in the educational sector has affected the way of teaching and learning from pre-kindergarten level up to the university level, where the use of information technology becomes the most occupied innovation throughout the sector [1]. Managing virtual learning has been challenging for many professional teachers or educators [2]. Educators, learners as well

as parents or caregivers have been demanded to learn and use technology to maintain the quality of the learning and teaching process. The shifting process from face to face toward online classes did not occur smoothly, especially in developing countries such as Indonesia where information technology capacity varies throughout the provinces. Obstacles mostly mentioned in many studies were lack of connectivity, lack of student engagement or feedback, and difficulty in conducting practical experiments which for sure could affect learning outcomes [3-5]. On the other hand, several advantages seen in distance or online learning include comfort in learning, availability of information, and objectivity in assessment [6]. Although faced with many challenges, a study on online learning in pharmacy education has revealed that students were mostly ready to conduct online learning during the pandemic situation [7].

Pharmacist profession education as a learning continuation after Bachelor of Pharmacy had also undergone adaptation to the pandemic through various innovations in the learning and

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teaching process. As the nature of the learning process at the professional level was through real-life practice in many pharmacies' workplaces such as the community pharmacy, primary healthcare centers, hospital pharmacies, industrial pharmacies, etc., a debate emerged about whether using online methods of learning would result in the expected competence of a fresh graduate pharmacist. Achievement of skill competencies was usually the main issue to overcome due to the complexity of transferring skills through online methods. [8] mentioned that students' direct practice in the workplace will develop their understanding and cognitive skill. Knowledge and skill competencies in healthcare education are important aspects that would eventually affect the work quality and performance of healthcare providers towards future patients (directly or indirectly) [9]. Another aspect that should be considered by the faculty is the preferred learning style of the students which is important in order to optimize their learning comprehension [10]. Therefore, continuous evaluation of new programs or methods must be conducted to confirm the effectiveness of the program.

The hospital pharmacy clerkship program is one of the main clerkship programs in almost all pharmacy profession education in Indonesia. Based on the Regulation of Indonesian Ministry of Health No 72 [11] regarding the Standards of Pharmacy Service in Hospital, there are three major aspects of pharmacy service in the hospital settings: 1) Drug Management; 2) Pharmaceutical Care; 3) Management Support. Pharmacists-to-be must be familiar with all three aspects since their study in the pharmacist profession education program. The institution must make sure to give the minimum requirement of competence for their students to be able to work in the three areas of hospital pharmacy. Good competency in these areas will contribute to the goal and maintenance of patient safety in the hospital.

Universitas Muhammadiyah Yogyakarta (UMY) 2017 has begun the pharmacist profession education program with a 2-month hospital clerkship program as one of the main clerkship programs given to the students [12]. A clerkship module has been used to make sure the students get the expected learning outcomes and competencies in several hospitals around the Special Region of Yogyakarta collaborating with UMY. Continuous evaluation and feedback from students and preceptors were conducted routinely to improve the program.

Due to the COVID-19 outbreak in March 2020, the pharmacist profession education program in UMY had to withdraw some of the students from several workplaces based on the regulation of the workplace to avoid virus transmission. This was also strengthened by The Association of Indonesian Pharmacy Higher Education (AIPHE) who released an information letter to all pharmacy schools to make adjustments regarding clerkship programs, especially in hospitals where the high transmission would probably occur. Suggestion to maximize the use of online methods compared to the face-to-face method was also informed in the letter. UMY responded to this situation by conducting online clerkship programs and adjusting them periodically based on routine evaluations and the pandemic situations. The adjustment resulted in a variety of clerkship methods in each

batch. The objective of this study was to analyze students' competency outcomes of the modified hospital pharmacy clerkship program in the Department of Pharmacist Profession Education, Universitas Muhammadiyah Yogyakarta (UMY) during the pandemic.

## Materials and Methods

### *Study design*

This study was conducted using a non-experimental, descriptive design to describe the clerkship adjustment during the pandemic in UMY as well as the difference in competency achievement from each student batch. The quantitative method was occupied to collect and analyze the comprehension examination scores of the students, while a qualitative method was used to collect clerkship perceptions from the students' representatives.

### *Study subjects*

This study analyzed data from three batches of students who conducted hospital clerkship programs from March 2020 until July 2021, namely, batch 6; batch 7; and batch 8 of the Pharmacist Profession Education Program UMY. Data of comprehension examination score from a total of 107 students from the three batches was used for the analysis of competency achievement, while 6 student representatives (2 from each batch) were recruited for interviews for their perception of the modified clerkship program.

### *Data collection*

There were two main data collected in this study. Firstly, data on comprehension examination score of the hospital clerkship program from 107 students (from 3 batches) was obtained from the administrative staff of the Pharmacist Profession Education Program UMY. Each student obtained a mean score from two examiners which consisted of three scores based on the three major areas of competence in hospital pharmacy: 1) Drug Management; 2) Pharmaceutical Care; 3) Management Support. The mean score from each area was entered into Microsoft Excel data.

The second data was perception data which was collected through in-depth interviews with 2 representatives of the students from each batch. Representative students were recruited with the help of the student batch coordinator to choose students that have experience hospital clerkship programs during the pandemic era. In-depth interview was conducted by two methods, direct or face-to-face interview and by the online platform for students who are not in Yogyakarta during the study. An interview guideline and recording tools were prepared to make sure the full information required for analysis was obtained. Informed consent was given by the representative before the interview was conducted.

### *Data analysis*

### Analysis of students' perception

Students' perception regarding the method used for the hospital clerkship program was analyzed descriptively from what was mentioned by the respondents. Important points were written down and combined for similar points to obtain the highest perceptions of the clerkship program.

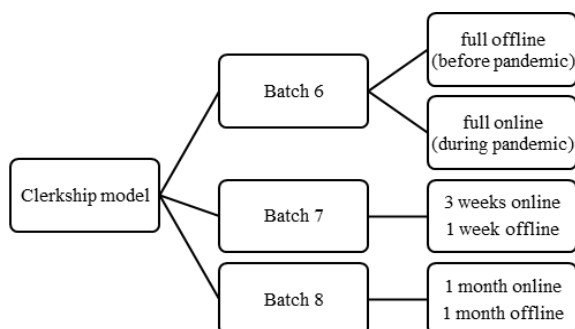
### Analysis of competence achievement

Students' knowledge competence in hospital pharmacy was analyzed from the score of comprehension examination after the hospital clerkship program ended. The mean score for each area of competence was then tested using the Kruskal-Wallis test to determine the difference between batches 6, 7, and 8 to see whether different methods used in each batch affected competency achievement (knowledge competency).

## Results and Discussion

### Overview of hospital clerkship

Below is a scheme of the different methods of hospital clerkship programs conducted by the 3 batches during the COVID-19 pandemic (**Figure 1**).



**Figure 1.** Hospital clerkship model from the three batches

### Batch 6

Based on the results of the interviews, there were two groups of students in batch 6 who carried out hospital clerkship with different methods, a full offline and full online method. The group of students with the full offline method was carried out in February-March 2020 when the COVID-19 pandemic had not yet appeared in Indonesia, while the full online method began in April-May 2020. The implementation of the online clerkship was carried out for two months where the first month of online activities was provided by UMY through regular tasks using the e-learning system. The clerkship program for the next month was then conducted in the hospital. For the first three days, the hospital provided orientation materials by watching videos and competency achievements that must be achieved during their offline clerkship. The hospital also gave assignments every week, the tasks given were in the form of individual tasks such as counseling.

The impact experienced by students was that they lack mastery in practice because they only studied theories. However, students felt confident in answering questions related to the theories given by the examiner during the comprehensive exam. To support the achievement of competence in hospitals, students asked other senior students who have carried out offline clerkship to get an overview of what activities are carried out in the hospital.

The full online clerkship method was considered less effective because there were obstacles and challenges in its implementation. Students did not get the real picture of pharmaceutical work in hospitals if clerkship was done fully online. This is not following one of the goals of clerkship in hospitals based on APTFI [13], namely, students should get a real picture of the problems of pharmacy work in hospitals. Online learning can also affect students' engagement in the means of emotional, behavioral and social engagement which must be considered and monitored by the faculty [14].

### Batch 7

Clerkship at the hospital in batch 7 used a combination of online and offline methods at the hospital for one month. The reduction of clerkship duration was taken following the progressive situation of the pandemic in Indonesia. In the first three weeks, students participated in an online clerkship which was organized by the hospital. Students were given directions and an introduction related to the hospital. Then an explanation was given regarding what competencies must be achieved during clerkship. Every week students got assignments and conduct discussions and presentations on these assignments.

In the last week, students took clerkship offline with strict health protocols where before implementation students must quarantine for 14 days and show a clear COVID test. Clerkship activities were carried out in hospitals including visits to inpatient, outpatient, and warehouse departments. However, activities in inpatient stations were very limited, only a few wards could be visited. In outpatient care, students conduct counsel to patients, while in the logistic unit they observe the storage and distribution of drugs. During activities, students were required to use Personal Protective Equipment (PPE). The experience gained was very little because visits to the ward were limited, therefore it was difficult to meet with patients. The practice time was also very short where in one week all stations must be completed.

The online-offline combination method in this batch was also considered less effective because the implementation was more dominant using the online method. Students preferred hands-on learning in practice. This is under [15], which stated that 93.5% of students prefer face-to-face offline learning compared to online learning. Another study also revealed similar results where students prefer classroom-based approach although online method was seen more flexible [16]. Hence, a well-standardized process should be prepared when conducting a mixed method [17].

### Batch 8

Based on the results of interviews with informants, a clerkship in hospitals in batch 8 was carried out using a combination of online and offline methods. In the first month, students were given a briefing, then delivery of materials related to the hospital pharmacist, and also given assignments. All coincided with the implementation of the second wave of clerkship in batch 6 so that the implementation of clerkship was carried out fully online. In batch 7, clerkship was carried out in a combination of online and offline for one month, whereas in practice the online method was more dominant. Offline activities were very limited with a short time so the achievement of competencies obtained was not maximal. In batch 8, clerkship was carried out in a combination of online and offline for one month each. students consider the method used is quite effective.

During the early phase, online activities were organized by the main academic hospital. Then continued with an offline clerkship for one month at various hospitals. Before implementing the offline clerkship, students were required to first conduct an antigen swab. Activities in the hospital were very limited because they were only allowed to enter a few wards, so cases are obtained from very few patients. The discussion process was carried out directly with the preceptors at the end of the session. The method of implementing clerkship in hospitals in batch 8 was carried out in combination online offline or known as the blended learning method. This method is often used with a 50/50 pattern, in the available time allocation of 50% online and 50% offline [18]. In batch 8 the online and offline combination method has been running quite effectively. It is known that through blended learning, students can increase interest in learning compared to fully online learning [19].

**Table 1. Inadequate experience of competency**

	Batch 6	Batch 7	Batch 8
Drug Management	√	√	
Pharmaceutical Care	√	√	√
Management Support			

Based on **Table 1**, students of batches 6 and 7 considered that experiences related to competence in drug management and pharmaceutical care during their hospital clerkship program were inadequate. Class 6 students consider the implementation of online clerkship to lack direct experience. Likewise, batch 7 only carried out clerkship offline for one week, which was mentioned as not optimal. Meanwhile, for batch 8 only pharmaceutical services in the use of drugs are considered not optimal. The components of competence above are considered not optimal because according to [20], to achieve maximum competence, it should be through practical experience in the field to achieve competence cognitively, skills, and attitudes.

**Table 2. The difference in Competency Score**

	Batch 6	Batch 7	Batch 8	p-value
Drug Management	79.34	80.25	80.59	0.926

Pharmaceutical Care	78.27	80.64	80.79	0.346
Management Support	78.12	79.33	80.91	0.198

Based on the table above, there were no significant differences in the average score of hospital clerkship competencies from the comprehensive exam in batches 6, 7, and 8. However, the highest score was obtained by batch 8 students with an average score of 80.59. Better experiences gained by batch 8 students have led to better performance regarding competency achievement.

The three main areas of competencies as a hospital pharmacist are crucial to be achieved (by minimum standards) as a prospective pharmacist. Competence in pharmaceutical supply management is important for prospective pharmacists to learn. Pharmacists are responsible for all pharmaceutical supply management activities by applicable regulations to ensure the safety, benefits, and quality of drugs used in the hospital. Pharmaceutical care is services that are provided directly to patients related to pharmaceutical preparations. The purpose of pharmaceutical service standards in hospitals is to improve the quality of pharmaceutical care as well as to protect patients from irrational use of pharmaceutical preparations. Although mentioned as a supporting factor, management support in the drug management cycle in the hospital plays an important role in ensuring effectivity of the cycle, such as information management systems, human resources as well as financial support [11, 22].

Clerkship competence in hospitals in batch 8 has the highest average score in all aspects of hospital competence whereas the learning method used in batch 8 was a combination of online and offline with a 50/50 proportion. On the other hand, Batch 6 obtained the lowest average score among other batches where the methods used by batch 6 were fully offline or fully online (most of the students conducted the full online method following the beginning of the pandemic break in Indonesia). The lack of direct practice and real experiences could be the main problem affecting the result. Having to learn in a health -care facility is different from classroom settings where only a two-way relationship is seen between the teacher and student. A more triadic relationship happens in learning activities in the hospital where teacher, students, and patients come together to build a learning environment that not only tries to complete the students' need but also acknowledge patient safety [23-25].

Several factors can affect comprehensive test scores, namely blended learning, clerkship location, and self-study motivation. This is in line with the results of research conducted by [26], which stated that the blended learning method and learning motivation have a significant influence on student learning outcomes. Therefore, the insignificant differences resulting in this study could be influenced by the additional efforts conducted by the institution to increase the achievement of hospital clerkship competencies during the pandemic. Lecturers providing intensive guidance by discussion and assignments, sharing and discussions with preceptors, and Focus Group Discussions (FGD) before the comprehensive exam were several activities organized by the institution to fill in the gap of lack in practice or offline activities in the hospital.

The limitation of this study is that the competency achievement was only analyzed from mostly cognitive values represented by the comprehension examination score. A more complete view of the achievement of hospital clerkship competencies should be further analyzed by adding results on psychomotor and affective skills evaluation such as Objective Structured Clinical Examination (OSCE) results.

## Conclusion

There were no significant differences (p-value <0.05) in competency outcomes seen in all three areas of competence which are drug management, pharmaceutical care, and drug use, as well as management support. Additional activities were conducted to give better outcomes for the students. This finding indicates that the modification of the clerkship program was able to maintain the quality of the learning process during the pandemic, but additional efforts must be planned to complete competency achievement. Modifying clerkship programs in pharmacy should be routinely evaluated to assure the quality and result in competency achievement by the students.

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**Conflict of interest:** The first and second authors are staff from the Pharmacist Profession Education, Universitas Muhammadiyah Yogyakarta. We declare that the data collected was managed objectively throughout the study.

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**Ethics statement:** None

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