

# EVALUATION OF THE CLINICAL SUPERVISION TO CLINICAL ROTATION STUDENTS IN A FACULTY OF MEDICINE

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## ABSTRACT

**Background:** The clinical education at the Faculty of Medicine, University of Muhammadiyah Makassar, must be completed in four semesters. During that period, the students are educated and supervised by specialists or doctors on duty at the hospital. Since the first implementation of the clerkship clinical system at this university, evaluation on the implementation of clinical supervision provided by lecturers to the students for their clinical clinic had never been conducted. Therefore, it was necessary to evaluate the clinical supervision provided by the clinical instructor to the students for their clinical clerkship at FK-Unismuh. This study aims to evaluate the clinical supervision provided by lecturers to the clinical clerkship students at FK-Unismuh Makassar.

**Method:** This study was a descriptive survey. The subjects were 123 clinical clerkship students of FK-Unismuh Makassar who had completed clinical rotation at the department of Internal Medicine, Pediatric, Surgery, and Obstetrics and Gynecology. The research subjects were grouped based on their clinical rotation that had been undertaken. The instruments used were the Clinical Teaching Effectiveness Instrument (CTEI) and the students' log book for their clinical activities. The collected data were analyzed descriptively.

**Results:** The effectiveness of clinical supervision showed that the overall average total score of CTEI was more than 3 with a range from 3.52 (internal medicine) to 3.84 (surgery). The lowest clinical supervision was at setting up a good time for both services and teaching (3.50). The average frequency of supervision received in Internal Medicine was 91.2 times. The average number of timely, late, and delayed supervision was 40 times (44%), 23 times (26%), and 28 times (30%), respectively. The average supervision duration of under 30 minutes, 30-60 minutes, and more than 60 minutes was 63 times (69%), 16 times (18%), and 12 times (13%), respectively.

**Conclusion:** The effectiveness of the overall clinical supervision at 4 departments was rated 'good' by clerkship students. However, there were some items of the clinical supervision which were still undervalued by the students. At the Department of Internal Medicine, the number of students accepted uneven supervision, much clinical supervision was carried out not on time, and duration of supervision was inadequate.

**Keywords:** clinical supervision, the effectiveness of clinical supervision, clinical education, clinical instructor

## ABSTRAK

**Latar belakang:** Fase pendidikan klinik di Fakultas Kedokteran Universitas Muhammadiyah Makassar dijalani selama 4 semester. Selama pendidikan klinik, mahasiswa dididik dan diawasi oleh dokter spesialis atau dokter yang bertugas di rumah sakit tersebut. Namun tidak semua dokter tersebut mengenal prinsip-prinsip pendidikan kedokteran dan memiliki keterampilan mengajar yang baik. Sejak mulai pertama kali dilaksanakan sistem kepaniteraan klinik, belum pernah dilakukan evaluasi tentang pelaksanaan supervisi klinik yang diberikan oleh dosen pembimbing klinik kepada mahasiswa kepaniteraan klinik. Oleh karena itu perlu dilakukan evaluasi terhadap supervisi klinik yang diberikan oleh pembimbing klinik kepada mahasiswa kepaniteraan klinik FK Unismuh. Penelitian ini bertujuan untuk mengevaluasi supervisi klinik yang diberikan oleh dosen pembimbing klinik kepada mahasiswa kepaniteraan klinik FK Unismuh Makassar.

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**Metode:** Penelitian ini adalah survey deskriptif. Subjek adalah 123 mahasiswa kepaniteraan FK Unismuh yang telah menempuh rotasi di bagian Penyakit Dalam (Interna), Anak (Pediatric), Bedah, serta Kebidanan dan Kandungan (Obgyn). Subyek penelitian dikelompokkan berdasarkan rotasi bagian kepaniteraan klinik. Instrumen yang digunakan adalah Clinical Teaching Effectiveness Instrument (CTEI). Data yang telah terkumpul dilakukan analisis deskriptif.

**Hasil:** Data keefektifan supervisi klinik dapat diketahui bahwa secara keseluruhan rerata total skor CTEI seluruhnya >3 dengan rentang 3,52 (bagian interna) sampai dengan 3,84 (bagian bedah). Item supervisi klinik yang paling rendah adalah mengatur waktu yang baik untuk pelayanan maupun pengajaran (3,50). Frekuensi supervisi yang diterima di Bagian Ilmu Penyakit Dalam (Interna) rata-rata 91,2 kali. Rata-rata jumlah supervisi yang tepat waktu 40 kali (44%), terlambat 23 kali (26%), tertunda 28 kali (30%). Rata-rata durasi supervisi dibawah 30 menit sebanyak 63 kali (69%), 30-60 menit sebanyak 16 kali (18%), lebih 60 menit sebanyak 12 kali (13%).

**Kesimpulan:** Keefektifan supervisi klinik secara keseluruhan pada 4 Bagian Kepaniteraan Klinik dinilai baik oleh mahasiswa. Namun ada beberapa item supervisi klinik yang masih dinilai rendah oleh mahasiswa. Pada Bagian Penyakit Dalam, jumlah supervisi yang diterima mahasiswa tidak merata, supervisi klinik banyak yang dilaksanakan tidak tepat waktu dan durasi supervisi yang kurang.

**Kata kunci:** supervisi klinik, keefektifan supervisi klinik, pendidikan klinik, pembimbing klinik.

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## INTRODUCTION

Clinical education is an education process of students to deliver healthcare to patients directly. In practice, clinical education needs clinical supervisors' ability to ensure students to develop their clinical reasoning and professionalism.<sup>1</sup>

Clinical learning stimulates students to actively participate in thinking and behaving professionally. In clinical learning, students gain experiences in the form of clinical skills, empathy, and decision making. To solve a complex problem in clinical education, a continuous and planned supervision process is needed.<sup>2</sup>

Several studies were conducted to identify the characteristics of ideal clinical learning environment. From a few variables of clinical learning environment, quality clinical supervision is the main key to achieve effective clinical learning process.<sup>3,5</sup>

Effective and quality supervision not only improves students' professionalism development, but also has a positive impact to patient care because supervision is needed to ensure patient safety.<sup>6</sup>

The phase of clinical education in Faculty of Medicine, Universitas Muhammadiyah Makassar (FK Unismuh) is undertaken in 4 semesters. Students undertake clinical rotations in 15 departments.

During clinical education, students were taught and supervised by specialists or doctors working in certain hospitals. However, not all of those doctors know the principles of medical education and have good teaching skills. Since the first time clinical rotations started, clinical supervision by clinical supervisors to clinical rotation students have never been evaluated. Furthermore, there is not a standardized guidance model to be a reference for clinical supervisors, so the learning process in the clinical rotations depend on the subjectivity of each supervisor. Therefore, an evaluation is needed on clinical supervision by clinical supervisors to clinical rotation students in FK Unismuh.

## METHODS

This is a descriptive survey study. The subjects were all clinical rotation students of FK Unismuh who already undertook clinical rotations in the Departments of Pediatrics, Internal Medicine, Surgery, and Obstetrics & Gynecology. Students were handed a questionnaire about the evaluation of clinical supervision by clinical supervisors they received/felt during clinical rotations. After that, data were collected by giving log books to students who were about to undertake a rotation in the Department of Internal Medicine. Students were

asked to write clinical supervision activities that were the development of clinical supervision items that had the lowest mean score.

Subjects in this study were clinical rotation students of Faculty of Medicine, Universitas Muhammadiyah Makassar who already undertook clinical rotations in the Department of Pediatrics, Internal Medicine, Surgery, and Obstetrics & Gynecology.

The quality of clinical supervision is students' perception level towards the quality of supervision by clinical supervisors during a clinical rotation in a certain department (Emilia, 2008). The quality of a supervision was measured using CTEI instrument using 5-point Likert scale (1 = low, 2 = moderate, 3 = good, 4 = very good, 5 = outstanding). Resulted mean of the total scores from 15 question items about clinical supervision was interpreted as: 1.0-1.9 = low; 2.0-2.9 = moderate; 3.0-3.9 = good; 4.0-4.9 = very good; 5 = outstanding.

This study used CTEI instrument (Clinical Teaching Effectiveness Instrument) developed by Cleveland Clinical Foundation to reveal the variables of clinical supervision quality. This instrument consists of 15 questions reflecting the roles of a supervisor, they are: 1) creating good learning environment; 2) stimulating students to learn independently; 3) allowing students to do clinical tasks according to students' level/experience/competence; 4) managing time for both teaching and patient care; 5) giving feedbacks periodically; 6) giving details clearly about what students are expected to know and do during education period; 7) adjusting teaching according to students' needs; 8) asking questions to stimulate students' learning; 9) giving clear explanations/

reasons for each opinion, suggestion, action, etc.; 10) adjusting teaching in varying places (bedside, operating theatre, examination room, laboratory, etc.); 11) supervising students when performing clinical skills/techniques (anamnesis, examination, procedural actions, etc.); 12) using study data and or practical guide in teaching; 13) teaching how to make a diagnosis (clinical reasoning, examination selection/interpretation, etc.); 14) teaching effective communication skills with patients and or their family; 15) teaching principles of cost-effective healthcare (selecting examination tools, using financial resources, etc.). This instrument is reliable to assess individual supervision quality, where 1 supervisor is assessed by 1 student ( $g$  coefficient = 0.742) and its reliability increases when 1 supervisor is assessed by 7 students ( $g$  coefficient = 0.953).<sup>7</sup> This instrument had been adapted into Indonesian language and its reliability tested. The result of reliability test was very high (0.9) or 1 supervisor assessed by 1 student.<sup>8</sup>

Collected data were then input and analyzed using SPSS ver. 16 and analyzed descriptively to know the proportion size.

## RESULTS AND DISCUSSION

The number of samples meeting the inclusion criteria and already filled the questionnaire fully was 123 students. 56 were males and 65 were females. The distribution based on class was 56 students were from class of 2009, 67 students were from class of 2010. The number of clinical supervisors was 27. The distribution of clinical supervisors and clinical rotations students are presented in Table 1.

Table 1. Distribution of clinical supervisors and clinical rotation students

No	Subjects	Departments				Total
		Obstetrics & Gynology	Pediatric	Internal Medicie	Surgery	
1	Students					
	2009	20	-	-	36	56
	2010	-	34	33	-	67
	2011	-	-	-	-	-
	Total					123
2.	Supervisor	8	6	7	6	27

Descriptive analysis of clinical supervision quality in four departments of clinical rotations in FK Unismuh Makassar was done to get the picture on how the quality of clinical supervision received by FK

Unismuh clinical rotation students was. The results of supervision quality questionnaire data in clinical rotations of FK Unismuh are presented in Table 2.

Table 2. The quality of clinical supervision in four departments

No	Items	Departements				Mean
		Obsgyn	Peds	Int Med	Surgery	
1.	Creating good learning environment (approachable, non-threatening, enthusiastic in guiding, etc.)	3.60	3.62	3.70	3.44	3.59
2.	Stimulating me to learn independently (e.g.: giving assignments)	4.10	3.85	3.85	3.58	3.85
3.	Allowing me to perform clinical tasks according to my level/experience/competence	3.90	4.09	4.06	3.78	3.96
4.	Managing time for both teaching and patient care	3.30	3.44	3.79	3.39	3.48
5.	Giving feedbacks/responses/inputs periodically, both compliments and criticisms	4.00	3.97	3.97	3.56	3.87
6.	Giving details of what I am expected to know and do during clinical rotation in that department	3.60	3.97	4.00	3.53	3.77
7.	Adjusting teaching according to my needs (learning objectives, experiences, competence, interests, etc.)	3.65	3.53	3.82	3.44	3.61

8.	Asking questions that stimulate learning (clarification, investigation, reflective questions, etc.)	3.85	4.06	3.91	3.64	3.86
9.	Giving clear explanations/reasons for each opinion/suggestion/action, etc.	3.60	3.59	3.76	3.39	3.58
10.	Adjusting teaching in varying places (bedside, operation theatre, examination room, laboratory, etc.)	3.60	3.44	3.70	3.47	3.55
11.	Supervising me when I am performing clinical skills/techniques (anamnesis, physical examination, procedural skills, etc.)	3.80	3.68	3.61	3.47	3.64
12.	Using study data and or practical guide in teaching	3.65	3.50	3.70	3.42	3.51
13.	Teaching how to make a diagnosis (clinical reasoning, examination results selection/interpretation, etc.)	3.95	3.97	3.48	3.67	3.94
14.	Teaching effective communication skills with patients and/or their family	3.90	3.91	4.18	3.47	3.82
15.	Using principles of cost-effective healthcare (examination tool selection, financial resources usage, drug selection, etc.)	3.95	3.74	3.76	3.58	3.76

From the descriptive analysis results, clinical supervision quality data in four departments generally had general CTEI mean total scores of > 3 with a range from 3.52 (Department of Internal Medicine) to 3.84 (Department of Surgery). Meanwhile, the analysis results of each clinical supervision quality in 4 departments are as follows: 1) creating good learning environment, the lowest score was in the Department of Internal Medicine (3.44) and the highest was in the Department of Surgery (3.70); 2) Stimulating students to learn independently, the lowest score was in the Department of Internal Medicine (3.58) and the highest was in the Department of Obstetrics & Gynecology (4.10); 3) allowing students to perform clinical tasks according to their level/experience/competence, the lowest score was in the Department of Surgery (3.78) and the highest was in the Department of Pediatrics (4.09); 4) managing time for both patient care and

teaching, the lowest score was in the Department of Obstetrics & Gynecology (3.39) and the highest was in the Department of Surgery (3.79); 5) giving responses/feedback periodically, both positive and negative, to students' clinical ability, the lowest score was in the Department of Internal Medicine (3.56) and the highest was in the Department of Obstetrics & Gynecology (4.00); 6) giving details clearly of what students are expected to know and do during clinical rotation in that certain department, the lowest score was in the Department of Internal Medicine (3.53) and the highest was in the Department of Surgery (4.00); 7) adjusting teaching according to students' needs, the lowest score was in the Department of Internal Medicine (3.44) and the highest was in the Department of Surgery (3.82); 8) asking stimulating questions to students, the lowest score was in the Department of Internal Medicine (3.64) and the highest was in the Department of Pediatrics (4.06); 9)

giving clear explanations/reasons for each opinion, suggestion, action, etc., the lowest score was in the Department of Internal Medicine (3.39) and the highest was in the Department of Surgery (3.76); 10) adjusting teaching in varying places, the lowest score was in the Department of Pediatrics (3.44) and the highest was in the Department of Surgery (3.70); 11) supervising students when performing clinical skills/ techniques, the lowest score was in the Department of Internal Medicine (3.47) and the highest was in the Department of Obstetrics & Gynecology (3.80); 12) using study data and or practical guides in teaching, the lowest score was in the Department of Internal Medicine (3.42) and the highest was in the Department of Obstetrics & Gynecology (3.65); 13) teaching how to make a diagnosis, the lowest score was in the Department of Internal Medicine and the highest was in the Department of Surgery

(4.18); 14) teaching effective communication with patients or patients' family, the lowest score was in the Department of Internal Medicine and the highest was in the Department of Surgery (4.00); 15) teaching cost-effective healthcare, the lowest score was in the Department of Internal Medicine (3.58) and the highest was in the Department of Obstetrics & Gynecology (3.95).

Clinical supervision given by clinical supervisors was generally rated good. Similarly, not one quality item of clinical supervision was rated < 3.

Lowest rated clinical supervision item was managing time well for both patient care and teaching (3.50), while the item rated the highest was allowing students to perform clinical tasks according to their level/ experience/competence (3.96).

Table 3. Clinical Supervision Quality Data

No	Items	Mean	SD	Minimum	Maximum
1.	Creating good learning environment (approachable, non-threatening, enthusiastic in guiding, etc.)	3.59	0.97	1	5
2.	Stimulating me to learn independently (e.g.: giving assignments)	3.81	0.89	1	5
3.	Allowing me to perform clinical tasks according to my level/experience/ competence	3.96	0.82	1	5
4.	Managing time for both teaching and patient care	3.50	1.82	0	5
5.	Giving feedbacks/responses/inputs periodically, both compliments and criticisms	3.85	0.76	1	5
6.	Giving details of what I am expected to know and do during clinical rotation in that department	3.82	0.92	0	5
7.	Adjusting teaching according to my needs (learning objectives, experiences, competence, interests, etc.)	3.60	0.88	1	5
8.	Asking questions that stimulate learning (clarification, investigation, reflective questions, etc.)	3.86	0.89	0	5

9.	Giving clear explanations/reasons for each opinion/suggestion/action, etc.	3.58	0.98	0	5
10.	Adjusting teaching in varying places (bedside, operation theatre, examination room, laboratory, etc.)	3.54	1.00	1	5
11.	Supervising me when I am performing clinical skills/techniques (anamnesis, physical examination, procedural skills, etc.)	3.62	1.09	0	5
12.	Using study data and or practical guide in teaching	3.50	1.13	0	5
13.	Teaching how to make a diagnosis (clinical reasoning, examination results selection/interpretation, etc.)	3.93	1.05	0	5
14.	Teaching effective communication skills with patients and/or their family	3.80	1.09	0	5
15.	Using principles of cost-effective healthcare (examination tool selection, financial resources usage, drug selection, etc.)	3.73	0.98	0	5

Time Management of Clinical Supervision in the Department of Internal Medicine

Department of Internal Medicine was 91.2 times on average. The lowest number of supervision was 12 times and the highest was 170 times.

Table 4 describes that the frequency of supervision received by students during clinical rotation in the

Table 4. Description of the number of supervisions received by students during clinical rotation in the Department of Internal Medicine

	Mean	SD	Minimum	Maximum
<b>Number of Supervision</b>	91.2	48.8	12	170

Table 5 presents that on average the number of punctual supervisions was 40 or 44% of all supervisions, 23 started late or 26% of all

supervisions, and 27 were postponed or 30% of all supervisions.

Table 5. Description of the percentage of mean clinical supervision quality based on punctuality.

	Mean	%	Minimum	Maximum
<b>Punctual</b>	40	44	1	112
<b>Postponed</b>	23	26	5	43
<b>Start late</b>	28	30	2	52

Table 6 presents that the number of supervisions with a duration of less than 30 minutes was 63 on average or 69% of all supervisions, the number of supervision with a duration of 30-60 minutes was

16 or 18% of all supervisions, and the number of supervision with a duration of more than 60 minutes was 12 or about 13%.

Table 6. Description of the mean percentage of clinical supervision based an supervision duration

	Mean	%	Minimum	Maximum
< 30 minutes	63	69	9	123
30-60 minutes	16	18	1	49
> 60 minutes	12	13	2	29

Table 7 describes that the mean number of clinical supervisions in the polyclinics was 58 times or 64% of all clinical supervisions in the Department of

Internal Medicine, the number of supervision in the ward was 22 or 24%, and in the ER was 11 or 12%.

Table 7. Description of clinical supervision in the Department of Internal Medicine based on the places

	Mean	%	Minimum	Maximum
Polyclinics	58	64	8	117
Ward	22	24	3	43
ER	11	12	1	37

This study aimed to know the quality of clinical supervision for clinical rotation students in FK Unismuh Makassar. Firstly, the **quality of clinical supervision in 4 departments of clinical rotations**. The results of descriptive data obtained clinical supervision quality of four departments with mean scores of more than 3, so it can be concluded that according to students' perspective, the quality of clinical supervision in FK Unismuh is good. However, there were aspects of clinical supervisions rated low-moderate by students. This was may be due to many challenges in the clinical environment. Spencer<sup>2</sup> expressed that several unique challenges that might be met in clinical teaching were: time pressure, clinical supervisors' workload, teaching students with various competence, challenges related to patients (short hospitalization period, patients in severe pain, and patients not willing to be involved in clinical teaching process), little incentives and appreciation for teaching, and uncomfortable

physical environment to teach. A few aspects of clinical supervision rated low were:

- a. The ability of supervisors to create good learning environment. What was meant as creating good learning environment was approachable, non-threatening, and enthusiastic in teaching. Positive interpersonal relationship between students and supervisors support good learning environment.<sup>2</sup>
- b. Supervisors' ability to manage time for patient care and teaching. This might be due to the high pressure in clinical environment, especially clinical supervisors' time management for teaching, research, and patient care, so learning process in the clinics became more complex and unstructured compared in the preclinical period.<sup>9</sup> Moreover, healthcare law in Indonesia permits a doctor to practice in three places. This allows clinical supervisors to practice



in other hospitals. The little time caused clinical supervision to be weak.<sup>10</sup> Therefore, a further exploration is needed on how much time is allocated to teach students by clinical supervisors.

- c. Supervisors' ability to adjust teaching according to students' needs (learning objectives, experiences, competence, and interests). This might be caused by the lack of clinical supervisors' understanding about how to apply clinical supervision style based on students' competence level or experience. In fact, students had different competence level or experiences, so they needed different clinical supervision style according to their experiences and task skills.<sup>11</sup> Furthermore, to be able to give effective clinical supervision, a clinical supervisor must know and understand the competence to be achieved by students and the needs of the institution.<sup>6</sup>
- d. The ability to give clear explanations/reasons or each opinion, suggestion, action, etc. A clinical supervisor has two tasks at once, to care for patients and to teach students. When the clinical situations are busy, clinical supervisors have less time to explain the reasons for every opinion, suggestion, and action.

**Secondly, items of the clinical supervision.** The lowest rated clinical supervision item was time management for patient care and teaching (3.50), while the highest rated clinical supervision item was allowing students to perform clinical tasks according to their level/experience/competence (3.96). The low rate of clinical supervision item of good time management was caused by clinical supervisors' tight schedule to teach, to do research, and to care for patients, so learning process in the clinics became unstructured and not well-scheduled.<sup>9</sup> This was also caused by the lack of strict rules or regulations about clinical supervision scheduling in all clinical rotations in FK Unismuh.

**Thirdly, clinical supervision in the department of internal medicine.** Table 4 describes that the frequency of clinical supervision received by students during rotation the Department of Internal

Medicine was uneven. Some students received very few supervisions (12 times) and some received many supervisions (170 times). This showed that clinical supervision was not well-planned and well-scheduled, so that many students did not get enough supervisions. If students did not get enough supervisions, the clinical competence they get during clinical rotations would decrease.

Table 5 depicts unpunctual clinical supervision in the Department of Internal Medicine (44%). This was caused by clinical supervisors' tight schedule. Bad time management between patient care and teaching caused clinical supervisions did run on time.

Table 6 shows that clinical supervision in the Department of Internal Medicine generally lasted for less than 30 minutes (64%). This showed that there were no rules or technical guide for clinical supervision in the hospital. This may also be caused by clinical supervisors' lack of time to do clinical supervision. Lack of time caused weak clinical supervision.<sup>10</sup>

Table 7 shows that generally clinical supervision was held in the polyclinics (64%). This demonstrated that clinical supervisors had more time to supervise students in the polyclinics. Moreover, polyclinics had many and varying cases for students to discuss.

## CONCLUSIONS

This study has concluded in which the quality of clinical supervision by clinical supervisors was rated well by clinical rotation students. However, a few items were still rated low and moderate by students. Furthermore, the department of internal medicine is the department with the lowest clinical supervision score and Department of Surgery has the highest clinical supervision score. In addition, a good time management item for teaching is the item of clinical supervision with the lowest score. However, students did not get the same number/frequency of clinical supervisions evenly, where there were even a high imbalance between one student and the others. Finally, many clinical supervisions, especially in the Department of Internal Medicine, do not run on time with quite short durations.

## SUGGESTIONS

This study suggests some recommendations. Firstly, the evaluation of clinical supervision quality needs to be conducted routinely with more samples, so that it may be able to give feedbacks to clinical supervisors. Secondly, a study is needed to know clinical supervisors' perceptions about the quality of clinical supervision for clinical rotation students. Thirdly, an evaluation is needed for clinical learning environment in the hospitals used by FK Unismuh as clinical education sites, including the number and variation of cases handled by students, the quality of feedbacks by clinical supervisors, the duration of clinical rotations, and the assessment of clinical rotation students. Finally, a further study is needed about clinical rotation students' learning motivation and their readiness for independent learning.

## REFERENCES

1. McAlister L, Lincoln M, McLeod S, Maloney D. Facilitating Learning in Clinical Settings. School of communication in The University of Sydney Australia: Stanley Thornes (publisher) Ltd.; 1997.
2. Spencer J. ABC of learning and teaching in medicine: learning and teaching in the clinical environment. *BMJ*, 2003;326.
3. Dolmans DHJM, Wolfhagen IHAP, Essed GGM, Scherpbier AJJA., Van der Vleuten CPM. The Impacts of Supervision, Patient Mix, and numbers of Students on Effectiveness of Clinical Rotation. *Acad Med*, 2002;77(4):332-5.
4. Dealmens HEM, Hoogenboom RJI, Donker AJM, Scherpbier AJJA, Stehouwer CDA, Van der Vleuten CPM. Effectiveness of clinical rotation as a learning environment for achieving competences. *Med Teach*, 2004;26(4):305-12.
5. Wimmers PF, Schmidt HG, Splinter TA. Influence of Clerkship Experiences on Clinical Competence. *Med Educ*, 2006;40:450-8.
6. Kilminster S, Cottrel D, Grant J, Jolly B. AMEE Guide No 27: Effective educational and clinical supervision. *Med Teach*, 2007;29:2-19.
7. Copeland HL, Hewson MG. Developing and testing an instrument to measure the effectiveness of clinical teaching in an academic medical center. *Acad Med*, 2000;75:161-6.
8. Suhoyo Y. Pembelajaran keterampilan klinis. *Jurnal Pendidikan Kedokteran dan Profesi Kesehatan Indonesia*, 2006;1(4):101-6.
9. Hoffman KG, Donaldson JF. Contextual tensions of the clinical environment and their influence on teaching and learning. *Med Educ*, 2004;38:448-54.
10. Busari JO, Koot BG. Quality clinical supervision as perceived by attending doctors in university and district teaching hospital. *Med Educ*, 2007;41:957-64.
11. Grant J, Kilminster S, Jolly B, Cottrel D. Clinical Supervision of SpRs: where does it happen, when does it happen and is it effective? *Med Educ*, 2003;37:140-8.