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Medical student impressions of general surgery clinical clerkships conducted during the COVID-19 pandemic

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I. INTRODUCTION

The ongoing COVID-19 pandemic has a significant impact on medical education, forcing changes in the curriculum (Rose, 2020). Since the COVID-19 pandemic began, governments and authorities in many countries have imposed online learning on medical students and in many institutions, medical students were not permitted to participate in in-person clinical clerkships or other practical training at university hospitals (Mian & Khan, 2020). Although the surgical clerkship is an important contributing factor to nurture student interest in a surgical career (Khan & Mian, 2020), medical students were excluded from the operating room due to lack of personal protective equipment, and participation in ward duties and training facilities were restricted (Calhoun, et al., 2020).

The purpose of this study is to analyse how the lack of in-person surgical experience and ward duties (online clerkship), among the most important components of a surgical clerkship, affected student interest in a career in surgery. The impact on student perceptions of surgery comparing online learning and onsite clinical clerkship (typical in-person clerkship) was assessed by comparing student satisfaction with the surgical clerkship, changes in interest in a career in surgery, and changes in the image of surgery at the beginning and end of rotations for online and onsite training groups.

II. METHODS

This study was reviewed by the Ethical Review Committee of Jichi Medical University, and no ethical review was required (Reference No. 20-186). A total of 133 fifth-year medical students, all in the same academic year, participated in surgery clerkships from April 2020 to February 2021. All 133 medical students completed clerkships in internal medicine during the previous academic year. The 133 students were divided into eight groups, with 16 or 17 students per group, rotating in surgery every three weeks. The first five groups of that academic year had online lectures only and the last three groups had onsite practice (typical clerkship experience).

Of the 133 students, 124 who provided consent were included in this study. Of these, 79 received online training from April through September 2020, and 45 received onsite clerkship training from October 2020 through February 2021. Moodle, an online learning management system, was used as the platform for online learning, and designed content to be studied on demand. An orientation and lecture with a comprehensive explanation of each aspect of surgical training were synchronous, and online communication with individual students was also conducted. Faculty also communicated online with individual students using Moodle, and individual questions were answered via email as appropriate.

Questionnaires for students in the clerkship were administered using the Moodle platform regardless of whether the clerkship was onsite or online. Questionnaire items addressed: 1. anxiety about surgery, 2. Opinion about difficulty of surgery compared to internal medicine, and 3. interest in surgery. Responses were given as a single choice and were scored using a four-point scale: 1: disagree, 2: somewhat disagree, 3: somewhat agree, and 4: agree.

Comparisons between responses at the beginning and end of the three-week clerkship for all participants were made with the Wilcoxon signed rank test. After calculating differences between the beginning and end of the clerkship, the online and onsite groups were compared using the Mann-Whitney U test. A $p < 0.05$ was considered statistically significant. Cohen's d was used as an index of effect size, with 0.2 as a small effect size, 0.5 as a medium effect size, and 0.8 as a large effect size. The statistical software used was R 3.6.1 with GUI 1.70 (The R Project for Statistical Computing, Vienna).

III. RESULTS

The results for the 124 students enrolled in this study showed that after three weeks of practice compared to the beginning of the study, they were less anxious about surgery ($p < 0.00001$, effect size 0.43), less likely to find surgery difficult compared to study in other departments ($p < 0.00001$, effect size 0.57), and were more interested in surgery as a career ($p < 0.0001$ and effect size 0.38) (See Table 1).

The onsite clinical clerkship resulted in less anxiety about surgery ($p = 0.017$, effect size 0.41) compared with the online clerkship. There was no significant difference in change of the image of surgery as hard compared to other departments ($p = 0.293$, effect size 0.21) or change of interest in surgery ($p = 0.407$, effect size 0.09) in comparing the onsite and the online groups, and the effect size on change of image and interest were also small (See Table 1).

		Average			p^*	$p^\#$	Cohen's d
		Beginning	Ending	Beginning - End			
How anxious are you about the surgery rotation?	Total (n=124)	3.31	2.99	-	< 0.00001	-	0.43
	online clerkship (n=79)	3.38	3.19	0.19	-	0.017	0.41
	onsite clerkship (n=45)	3.20	2.64	0.56			
How difficult is the surgery rotation compared to other departments?	Total (n=124)	3.40	2.99	-	< 0.00001	-	0.57
	online clerkship (n=79)	3.62	2.99	0.63	-	0.293	0.21
	onsite clerkship (n=45)	3.53	3.00	0.53			
How interested do you feel in surgery as a career?	Total (n=124)	3.06	3.32	-	< 0.0001	-	0.38
	online clerkship (n=79)	3.00	3.29	-0.29	-	0.407	0.09
	onsite clerkship (n=45)	3.16	3.38	-0.22			

Table 1. Changes in the results of responses at the beginning and end of online and onsite clerkships

p^* : Wilcoxon signed rank test, $p^\#$: Mann-Whitney U test

IV. DISCUSSION

During the COVID-19 pandemic, medical schools have established integrating digital technology and novel pedagogy (Tan, et al., 2022). Regardless of the clerkship format, three weeks of surgical clinical clerkship resulted in less anxiety about surgery than initially felt, a less daunting image of surgery in comparison to other departments, and significantly higher interest in surgery.

However, the effect sizes were moderate (0.43, 0.57, and 0.38), suggesting a positive change in the image of surgery, especially in comparison with other departments. The onsite clinical clerkship group showed a greater decrease in change in anxiety about surgery than the online clinical clerkship at the end of the surgical clinical clerkship (effect size 0.41). The effect size was moderate, suggesting the effectiveness of the onsite clinical clerkship. This study also shows that there were

no statistical differences in the feeling of difficulty or interest in a surgical career between the onsite and the online groups. We believe that online content via Moodle was attractive for medical students. Also, medical students could feel the realism of the surgical workplace using Moodle.

V. CONCLUSION

Face-to-face communications with senior physicians are essential to foster an image of the role of physicians to medical students. It is desirable to develop a hybrid type of clinical clerkship that takes advantage of the advantages of the realism of surgery provided by an onsite clinical clerkship and the easy accessibility of educational content of an online clinical clerkship.

Notes on Contributors

Kawahira, Maeda and Suzuki designed the study. Asada and Kawahira constructed the Moodle platform. Kaneda, Lefor and Sata conducted surgical clinical practice. Kawahira and Maeda analyzed data. Kawahira and Lefor wrote the manuscript.

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Declaration of Interest

The authors declare that they have no competing interests.

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