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# Continuing medical education for general practitioners in Indonesia: Moving toward accountability<sup>☆</sup>



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## ABSTRACT

**Objective:** The purpose of this study is to determine the effect of an online continuing medical education model on learning outcomes of general practitioners (GPs) in Indonesia.

**Methods:** The method used in this research is a pre-experimental pre-test, post-test group design. 1449 GPs originating from the major islands of Indonesia participated in this study. One hundred fifty questions from 10 disease systems were prepared for the pre-test and post-test with a total score of 100. The results of the pre-test and post-test were tested with paired sample *t*-test and Independent *t*-test.

**Results:** The paired sample *t*-test revealed significant differences in the learning outcomes of GPs before and following the online module's continuing medical education approach. What is remarkable is the disparity in average post-test results between GPs in West and East Indonesia. The independent *t*-test revealed that the average post-test score of general practitioners in western Indonesia was higher than that of general practitioners in eastern Indonesia.

**Conclusion:** The findings of this study suggest that continuing medical education in the form of online learning can help general practitioners enhance their knowledge and abilities in disease management. This paradigm of online continuing medical education could be adapted for other professions.

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## Introduction

The issue of health care employees' continual education is not new. In the 1980s, America debated the importance of ongoing education, particularly for nurses.<sup>1</sup> In the field of radiography, continuing education is also not a new issue. The half-life of health sciences professionals' knowledge has been estimated to be between 2 and 5 years. All health professionals are responsible for maintaining an up-to-date body of knowledge and skills to practice efficiently.<sup>2</sup>

Physicians must also enhance their knowledge and skills in medical physics, particularly in the use of cutting-edge medical technology equipment.<sup>3</sup> In a unique situation, research has been conducted on the level of knowledge of general practitioners on hypertension prevention in China. Continuing education in hypertension is critical to ensuring that general practitioners are informed and follow national hypertension prevention guidelines.<sup>4</sup>

The facts and data that have been described previously can be concluded that continuing medical education is essential. So, one of the problems that must be answered is an effective continuing medical education model for general practitioners. Continuing

medical education that is widely used today is an online learning model.

Due to the coronavirus epidemic, this trend has been accelerated, either temporarily or permanently.<sup>5</sup> Online continuing professional education classes enable healthcare professionals to learn about their schedules and issues pertinent to their professional practice, allowing for just-in-time learning. Healthcare practitioners choose web-based education courses because they are self-paced and can be studied from any location at any time.<sup>6</sup> The negative is that when such interactions are absent from a course, a student's drive dwindles. Additionally, evaluations in areas requiring applied skills are challenging to conduct online.<sup>7</sup> In addition, with continuing professional education (CPE) available at any time and practically anywhere, web-based learning for professional development has a lot to offer self-directed self-education.<sup>8</sup>

The engagement of GPs significantly aided in the creation of the online intervention. The usability assessment demonstrated that the intervention's material was appropriate, readily available, engaging, and provided at an appropriate degree of intensity, validating the development strategy used.<sup>9</sup> Availability of materials or cases of the disease is only one of them. In addition, technical matters of online learning services, such as internet access, need to be considered.<sup>10</sup>

In line with the exposure of the positive effects of continuous learning through online learning, the Indonesian General Practitioners Association (PDUI) has designed a continuing medical education model for its members, general practitioners. Based on

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**Table 1**  
Participants.

Islands	Invited	Participated	%
Java	1535	495	34.16
Sulawesi	886	242	16.70
Kalimantan	683	248	17.12
Other Islands	884	26	1.79
Bali	935	166	11.46
Sumatera	541	272	18.77
TOTAL GPs	5464	1449	26.52

the explanation in the introduction and literature review, the two research questions to be answered are:

1. Does the continuous medical education approach in online courses increase GPs knowledge and abilities in addressing ten cases of disease?
2. Are there any differences in post-test learning outcomes between GPs who live in the nation's capital city (Java) and GPs who live outside Java?

**Methods**

*Participants*

The researchers utilized pre-experimental pre-test post-test group design. Participants involved as samples in this study were GPs who lived in Jakarta, the capital of Indonesia, and who lived live outside Java.

*Data collection*

The data collection will be based on the pre-test and post-test findings, which can be found at <https://modul.pdui.org>.

*Data analysis*

The data will be analyzed in stages, beginning with descriptive analysis and continuing with a normality test and paired sample t-test to see if the scores are normally distributed. Additionally, before doing the independent t-test, the data will be verified for homogeneity.

**Result**

*Participants*

5464 general practitioners registered with the PDUI. The research team included Indonesia's largest islands, including Java, Kalimantan, Sulawesi, Sumatra, Bali, and smaller islands. Only 1449 of GPs, meet the criterion for being used as research samples.

The following table details the total number of GPs involved (Table 1).

**Table 2**  
Descriptive statistic.

Descriptive statistics	N	Minimum	Maximum	Mean	Std. deviation	Skewness	Std. error
Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic
Pre-test	1449	36.8	61.3	48.999	9.9535	0.01	0.064
Post-test	1449	61.3	100	83.778	9.0786	-0.005	0.064
Valid N (listwise)	1449						

**Table 3**  
Pre-test frequency.

	Scores	Frequency	Percent	Valid percent	Cumulative percent
Valid	36.8	480	33.1	33.1	33.1
	49.0	493	34.0	34.0	67.1
	61.3	476	32.9	32.9	100.0
Total		1449	100.0	100.0	

**Table 4**  
Post-test frequency.

	Scores	Frequency	Percent	Valid percent	Cumulative percent
Valid	61.3	65	4.5	4.5	4.5
	70.0	55	3.8	3.8	8.3
	80.0	802	55.3	55.3	63.6
	90.0	330	22.8	22.8	86.4
	100.0	197	13.6	13.6	100.0
Total		1449	100.0	100.0	

**Table 5**  
Paired samples statistics.

Pair 1		Mean	N	Std. deviation	Std. error mean
Pre-test	Pre-test	48.999	1449	9.9535	0.2615
	Post-test	83.778	1449	9.0786	0.2385

*Modules*

PDUI prepared 10 modules, namely Bell's Palsy disease system, tension headache, diabetes mellitus, typhoid fever, bronchial asthma, hypertension, dengue fever, dyslipidemia, tuberculosis, and dermatitis. PDUI provides 15 cases for each disease system. One hundred and fifty questions were prepared for the pre-test and post-test with a total score of 100.

*Pre-test and post-test result*

Based on Skewness, which is 0.07, the findings of this post-test score can be deemed to be normally distributed (Table 2).

As can be shown, GPs achieve a score between 36,8 and 61.3. The average proportion is not far off and typically falls within the range of more than 30%. Therefore, 49.0 is the modus score (Table 3).

The following table summarizes the frequency of post-test outcomes. The score appears to be 61.3–100. Therefore, 80.0 is the modus score (Table 4).

**Discussion**

The following table of paired sample statistics shows that the post-test score is higher than the pre-test score, provides a temporary conclusion that continuing medical education through online modules affects GPs learning outcomes (Tables 5 and 6).

The significance of continuing medical education through the online module will be seen in the following paired sample t-test results.

The paired sample t-test shows that the sig. (two-tailed) is 0.000 < 0.05, which indicates there is a difference between the pre-test and post-test mean. In other words, continuing medical

**2** **Table 6**  
Paired samples *t*-test.

		Paired differences				<i>t</i>	df	Sig. (two-tailed)	
		Mean	Std. deviation	Std. error mean	95% Confidence interval of the difference				
					Lower				Upper
Pair 1	Pre-test–post-test	–34.7790	12.2324	0.3214	–35.4093	–34.1486	–108.228	1448	0.000

**17** **Table 7**  
Group statistics.

Indonesia		N	Mean	Std. deviation	Std. error mean
Learning outcomes	Post-test West Indonesia	767	84.913	9.0384	0.3264
	Post-test East Indonesia	682	82.501	8.9598	0.3431

**1** **Table 8**  
Independent *t*-test.

		Levene's test for equality of variances		<i>t</i> -Test for equality of means						
		F	Sig.	<i>t</i>	df	Sig. (two-tailed)	Mean difference	Std. error difference	95% confidence interval of the difference	
									Lower	Upper
Learning outcomes	Equal variances assumed	10.835	0.001	5091	1447	0.000	2.4121	0.4738	1.4828	3.3414
	Equal variances not assumed			5.094	1430.045	0.000	2.4121	0.4735	1.4832	3.3410

education through online modules affects increasing knowledge and skills of GPs (Table 7).

According to the independent *t*-test, sig. (two-tailed) is  $0.000 < 0.05$ . Thus, significant inequalities in learning outcomes exist across GPs from western and eastern Indonesia (Table 8).

## Conclusions

The findings of this study suggest that continuing medical education in the form of online learning can help general practitioners enhance their knowledge and abilities in disease management. This paradigm of online continuing medical education could be adapted for other professions.

## 11 Conflicts of interests

The authors declare that they have no conflict of interest.

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