

Summative Assessment of Physician Education Training under Government Quality Improvement Program for Breast Cancer Suspicious Cases Management in Taiwan

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Abstract:

Breast cancer is major women public health burden in Taiwan. Over two million consecutive screening mammography examinations was yield over 10 years via the breast screening program, and lead to a huge demand on the management for breast cancer suspicious cases. The related education training is demanded to help the practitioners to engage with the updated information and correctly managements for suspicious cases. This study aimed to conduct a summative assessment of physician education training under government quality improvement program for breast cancer suspicious cases management in Taiwan. A total of 20 education training courses were conducted within year 2016 and 2017 in north, middle and south Taiwan. The examination records of each physician were retrospectively collected and analyzed. The study results revealed the continuing education training courses could improve the performance of physicians in annual comparison, which might help in their clinical practice. Furthermore, the education training also benefits for the quality improvement for breast cancer suspicious cases management including examination and early diagnosis, in order to render high quality clinical practice for early breast cancer population.

Keywords:

Breast Cancer, Physician, Education Training

1. Introduction

According to the cancer registry annual report of Taiwan, the incidence rate of breast cancer was 70.7 per 100,000 person-year in 2014 [1]. The breast cancer mortality cases were increased from 987 to approximately 2000 since 1996 until 21st century, and become the fourth leading death cause in women [1]. Thence, breast cancer has become a major women public health burden in Taiwan. Breast cancer mammography is the most common and effective breast cancer screening tools, in order to achieve the early diagnosis and treatment for breast cancer patients, and decrease the poor prognosis and mortality outcome [2,3].

The breast screening programs in Taiwan have been administrated since 2004, to provide nationwide and free mammographic screening service for high-risk population [4]. Nowadays, there were approximately 600 well-trained practitioners doing their good works on breast cancer screening. The image findings in breast cancer screening, mostly the breast mammogram will be report according to the breast image reporting and data-analyzing system (BI-RADs), which is published and updated by American College of Radiology [5,6]. The breast cancer screening cases with mammography reported by BI-RADs category 0 (incomplete assessment: need additional imaging evaluation), 4 (suspicious of malignancy) and 5 (highly suspicious of malignancy) are considered as the breast cancer suspicious cases in general [7,8].

Over two million consecutive screening mammography examinations was yield over 10 years efforts of the breast screening program [4], and lead to a huge demand on the management for suspicious cases reported from breast cancer screening. Therefore, Health Promotion Administration, Ministry of Health and Welfare of Taiwan has implemented the quality improvement program of breast cancer suspicious cases management, with the cooperation of Breast Cancer Society of Taiwan (BCST) for over 10 years. BCST is a government-certified breast cancer specialist certification organization, and organizing the education training courses for breast cancer suspicious cases management since 2012.

Education training is an effective approach to increase the practitioner knowledge, and hence improve practice behavior [9]. The participants with good performance in education training usually obtain better achievement [10]. In addition, breast cancer issue is a huge challenge with endless updates information nowadays. Hence, the continuing education training is demanded to help the practitioners to engage the updated information and correctly managements for breast cancer suspicious cases. Moreover, previous studies have showed hospitals with large case volumes could achieve better performance in breast cancer care [11,12]. Education training could play a role to decrease the gap between high-and low-volume hospitals, to avoid the regional health care quality disparity. This study aimed to conduct a summative assessment of physician education training under government quality improvement program for breast cancer suspicious cases management in Taiwan.

2. Materials and Methods

2.1. Data Sources

In year 2016 and 2017, 9 and 11 education training courses for quality improvement program of breast cancer screening suspicious cases management were conducted in north (7 courses), middle (6 courses) and south (7 courses) Taiwan, respectively. North area indicates Taipei city, middle area indicates Taichung city, and south area includes Tainan and Kaohsiung city. The education training courses were classified

into elementary and advanced courses, each area would be conducted at least one elementary and advanced course in each year. The elementary course including the breast cancer suspicious cases management guideline, basic knowledge of breast disease, examinations for breast cancer suspicious case and breast imaging interpretation. The advanced courses will be additionally included the breast sonography evidence-based medicine, advanced breast image interpretation, medical audit explanation and updated guideline for breast cancer suspicious case. Each participant is required to take the examination in the end of the courses.

2.2. Data Collection

Interactive response system (IRS) is a student response system which comprises controllers for students to give feedback or answer the questions. Each participants of education training courses would receive an IRS controller before examination started. All participants are required to answer the examination by using the IRS controller under the instruction of lecturer. The examination records were collected by the information receivers and generate a data set according to the participant's identification number. This study retrospectively collected examination records of physician's participants among 20 education training courses from January 2016 to December 2017. The data set including the physician's specialist, course conducted area, date and examination records.

2.3. Statistical Analysis

The education training examination records of physician participants were summarized in mean and standard deviation (SD). The comparison of education training performance within group was evaluated by using one-way ANOVA test. Performance comparison between different type of physician specialist in each year was evaluated by using paired t-test. The scatter plot with overlaid linear prediction plot was used to visualize the education training examination performance in each course by different area and specialist. All p-value were two-sided and the significance level was set as 0.05. All statistical analyzed was performed by Stata version 14.0. (StataCorp. 2015. Stata Statistical Software: Release 14. College Station, TX: StataCorp LP).

3. Results and Discussion

Total of 552 and 474 valid education training examination records from physicians in year 2016 and 2017 were included. The performance of education training for breast cancer suspicious cases management of physician is presents in Table 1.

Table 1. Performance comparison of education training courses for breast cancer screening suspicious cases management.

	Year 2016		Year 2017		P^a
	Participants	Mean \pm SD	Participants	Mean \pm SD	
Physician	552	72.1 \pm 10.3	474	75.1 \pm 10.5	0.438
Surgeon	319	73.7 \pm 9.6	299	73.0 \pm 9.1	0.526
Radiologist	194	70.1 \pm 10.8	116	78.3 \pm 10.2	0.102
Others	39	72.3 \pm 11.2	59	74 \pm 12.1	0.833
P^b		0.763		0.459	

P^a : Performance comparison within group in year 2016 to 2017.

P^b : Performance comparison between different type of specialist in each year.

According to Table 1, the mean scores of physicians were 72.1 ± 10.3 in year 2016, and 75.1 ± 10.5 in year 2017 ($P = 0.438$), showed a slight improvement in overall comparison of performance in education training courses. Similarly, the mean scores of radiologists (70.1 ± 10.8 in year 2016 and 78.3 ± 10.2 in year 2017, $P = 0.102$) and others specialists (72.3 ± 11.2 in year 2016 and 74 ± 12.1 in year 2017, $P = 0.833$) have similar findings with overall performance. Although the mean scores of surgeons were 73.7 ± 9.6 in year 2016, and 73.0 ± 9.1 in year 2017, there was only a little reduction with no statistically significant ($P = 0.526$). The examination performance between different type of specialists in each year also showed no significant different.

Table 2 shows the comparison of education training performance for breast cancer suspicious cases management in different conducted area. The overall performance of physicians in middle area showed significant improvement from 2016 to 2017, the mean scores of education training examination increased from 60.5 ± 9.6 to 78.6 ± 11.9 ($P = 0.025$). Although surgeons, radiologists and others specialists also showed good improvement performance, no statistically significant was found. A similar result was showed in south area physicians and different type of specialists, but no significant findings. Otherwise, the reduction performances were found in physicians, surgeons and others specialists, and there were only statistically significant in physicians (74.6 ± 7.5 in year 2016 and 66.5 ± 7.0 in year 2017, $P = 0.017$) and surgeons (76.3 ± 5.4 in year 2016 and 64.7 ± 5.0 in year 2017, $P = 0.025$). However, the radiologist showed slightly improvement from 71.5 ± 8.0 to 72.6 ± 8.0 with no statistically significant. In addition, the examination performance between different type of specialists in each year and each area also showed no significant different.

Table 2. Performance comparison of education training courses for breast cancer suspicious cases management by different conducted area in Taiwan.

	Year 2016		Year 2017		P^a
	Participants	Mean \pm SD	Participants	Mean \pm SD	
North					
Physician	336	74.6 ± 7.5	138	66.5 ± 7.0	0.017
Surgeon	166	76.3 ± 5.4	91	64.7 ± 5.0	0.025
Radiologist	148	71.5 ± 8.0	22	72.6 ± 8.0	1.000
Others	22	75.4 ± 9.6	25	62.2 ± 3.9	0.099
P^b		0.6507		0.1567	
Middle					
Physician	112	60.5 ± 9.6	124	78.6 ± 11.9	0.025
Surgeon	79	61.3 ± 14.3	82	77.1 ± 12.5	0.355
Radiologist	27	59.8 ± 14.4	32	78.2 ± 13.1	0.165
Others	6	60.4 ± 6.8	10	80.5 ± 13.5	0.165
P^b		0.9918		0.9303	
South					
Physician	104	76.0 ± 9.4	212	78.1 ± 7.7	0.749
Surgeon	74	77.6 ± 7.7	126	75.2 ± 1.6	0.480
Radiologist	19	75.2 ± 10.6	62	82.8 ± 8.6	0.480
Others	11	75.1 ± 13.4	24	76.2 ± 9.6	1.000
P^b		0.9509		0.3475	

P^a : Performance comparison within group in year 2016 to 2017.

P^b : Performance comparison between different type of specialist in each year.

In order to further inspect the performance of participated physicians, the performance of each education training courses for breast cancer suspicious cases management by different type of specialists and conducted area in year 2016 and 2017

are illustrate in Figure 1 and Figure 2. The mean scores of each education training courses were labeled according to the conducted time sequence, and the linear prediction line were assumed using fitted values.

The examination performance between different type of specialists and conducted area in year 2016 is presented in Figure 1. The mean score of each course were labeled by the filled circle symbol in the scatter plot. The fitted line showing the tendency of the mean score along with the conducted time. In north area, four courses were conducted, three of the courses included surgeon, radiologists and others specialists. The remaining courses included only surgeons and others specialists. The north area performance tendencies of surgeon, radiologists and others specialists showed a slight decline along with the conducted time sequence. In middle area, surgeon, radiologists and others specialists were included in all two courses. The middle area performance tendencies showed larger decline along with the conducted time sequence compare to other areas. In south area, surgeon, radiologists and others specialists were included in all three courses. The south area surgeons and other specialists showed incline tendencies in the examination performance. Although the south area radiologist showed slightly decline tendency, the mean score of second courses still higher than the first courses. Similarly, the north area surgeons, radiologists and other specialists also showed increase mean score from first to third score, but decreased mean score in fourth courses. In general, the elementary courses will be conducted at an earlier time. Hence, according to the scatter plot and prediction line of year 2016, the performance of physicians in more advanced education training courses were usually lower than elementary courses.

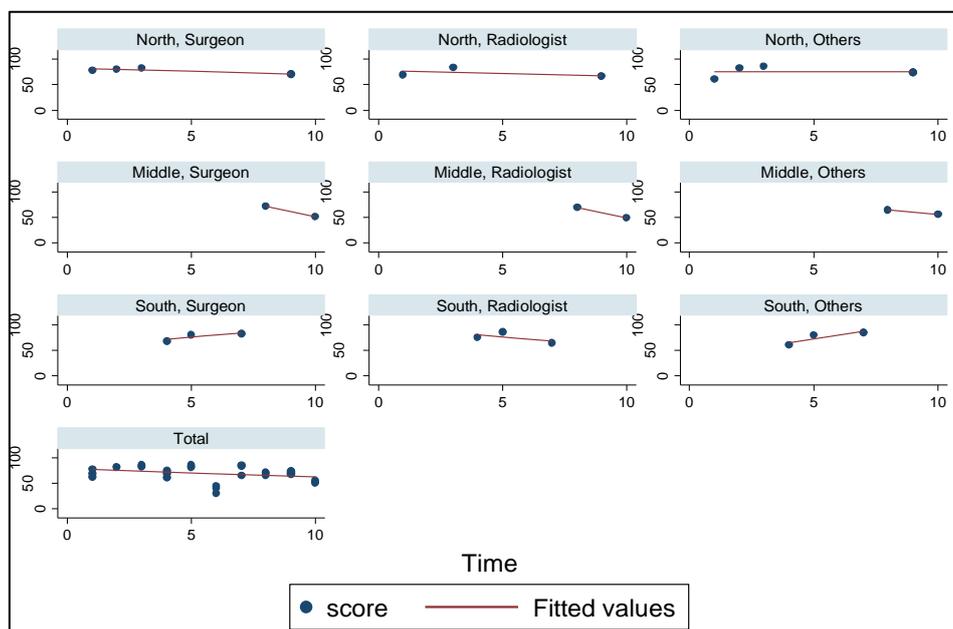


Figure 1. Performance of each education training courses for breast cancer suspicious cases management by different type of specialists and conducted area in year 2016.

Figure 2 illustrates the examination performance between different type of specialists and conducted area in year 2017. The mean score of each course were labeled by the filled circle symbol in the scatter plot. The fitted line showing the tendency of the mean score along with the conducted time. In north area, three of the courses had included surgeon, radiologists and others specialists. The north area performance tendencies of surgeon, radiologists and others specialists showed a slight

decline along with the conducted time sequence. In middle area, surgeon, radiologists and others specialists were included in all four courses. The middle area performance showed incline tendencies along with the conducted time sequence. In south area, surgeon, radiologists and others specialists were included in all four courses. The south area radiologist showed incline tendencies in the examination performance. Although the south area surgeons and others specialists showed slightly decline tendency, the mean score of more advanced courses had no large instances compare to the first courses. Similarly, the north area surgeons, radiologists and other specialists also showed approximate mean score from first to third score. Overall, the performances of physicians in more advanced education training courses were usually lower than elementary courses. However, it is worth noting the performance tendencies in middle and south area in year 2017 had been improved compare to the previous year. This might due to the total number of conducted courses in middle and south area had been increased. Hence, the number of education training courses might potentially play a role to improve the performance of local physicians.

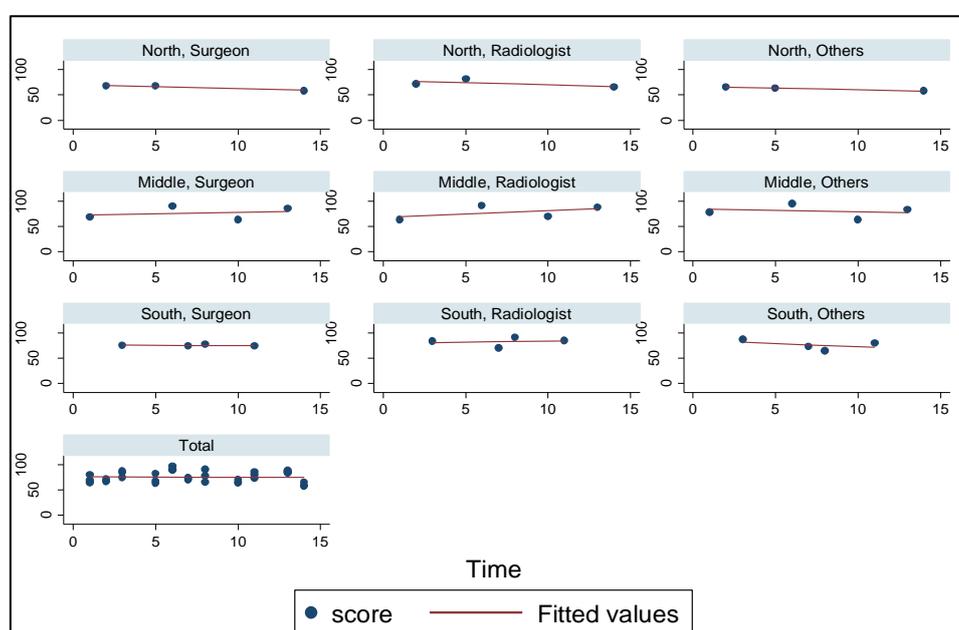


Figure 2. Performance of each education training courses for breast cancer suspicious cases management by different type of specialists and conducted area in year 2017.

4. Conclusions

This is the first summative assessment report of physician education training under government quality improvement program for breast cancer suspicious cases management in Taiwan. This summative assessment report could provide a reference for the related organization to review the effectiveness of annual education training for breast cancer suspicious cases management among physician’s participants. Thence, the professional could further adjust or improve the content of related education training courses according to these findings.

The study findings revealed the continuous education training courses might improve the performance of physicians in education training. Although the performance in advanced courses showed relatively lower than elementary courses, the overall improvement was found in annual comparison. These findings indicating the continuity of education training for breast cancer suspicious cases management is

required for related practitioners, which might help and improve their clinical practice. Furthermore, the education training also benefits for the quality improvement for breast cancer suspicious cases management including early diagnosis and treatment, in order to render high quality clinical practice for early breast cancer population.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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