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Continuous Personal Competency Improvement by Remote Education

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ABSTRACT

Quality assurance concept concerns not only non-human factors, but also human competency. In this study, we evaluated two phase competency assessments in hematological techniques from the same group of Thai laboratory staffs with 78% and 75% response rate. Laboratory staffs who participated in our program would receive informed consent forms and the assessment materials via mail. Cell and blood smear identifications and quality control process were assessed in the first phase. Case scenarios derived from improper answers of the first phase were tested in the second phase. The answers were assessed and graded as 3 levels (3 = very good, 2 = good and 1 = fair) and compared between both phases. The results showed an average grade of 2.27 ± 0.55 and 2.31 ± 0.29 for the first and second phase. The distribution of participant's grade in the first and second phase were 42.4%, 47.2%, 10.4% and 30.0%, 68.8%, 1.2% for grade 3, 2, 1, respectively. This result implies the improvement of laboratory personal competency, especially those who earned a low grade demonstrated a dramatic improved (p<0.01).

Key words: quality assurance, competency assessment, human resource

INTRODUCTION

Laboratory quality includes all performances that result in good quality of laboratory tests. Competency of laboratory staff is one of the important compositions in laboratory service quality (ISO 15189, 2003). Although there are very good instruments, as well as high technologies available widely, but any unqualified laboratory staff may lead to miss information for patient management. The competency of laboratory staff is considered as a heartware of laboratory service. Therefore, technical and quality knowledge of laboratory staff is necessary for good laboratory practices (Batjer, 1990). In this study we showed the hematology competency evaluation of laboratory staffs from every region of Thailand. There were cell identifications, blood smear examinations and problem solving and case scenarios which were the main competency assessment in clinical hematology.

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MATERIALS AND METHODS

Competency of 160 hematology laboratory personals throughout the country was assessed for 2 phases. In each phase, a competency assessment form was sent with a compact disk containing blood pictures or figures related to the questions. Informed consent form was sent in the first phase. Cell and blood smear identifications and laboratory quality control process with figures were assessed in the first phase as described in previous report (Vattanaviboon *et al.*,2004). After first phase evaluation, laboratory personals had received their assessment scores and tested-answer with explanation documents for their self-studies. Six months later, second phase was launched with case scenarios derived from improper answers of the first phase assessment and delivered to the same group of laboratory personals who returned reports of the first trial (120 laboratory staffs). An iron deficiency anemic case and a beta-thalassemic case with similar laboratory results were selected as the case questions (Figure 1 and Table 1). The case composed of question documents with histogram and scatter plot figures from automated cell analysis, various fields of blood pictures from light microscope of 400X and 1000X magnifications (Figure 1) as well as a figure of hemoglobin electrophoretic pattern related to the case question. Their answers were evaluated and graded into 3 levels; 3 = very good, 2 = good and 1 = fair. Average grades of their competency evaluation were calculated and compared between two-phase assessments as a whole group.

RESULTS AND DISCUSSION

There were 120 and 94 answers reported

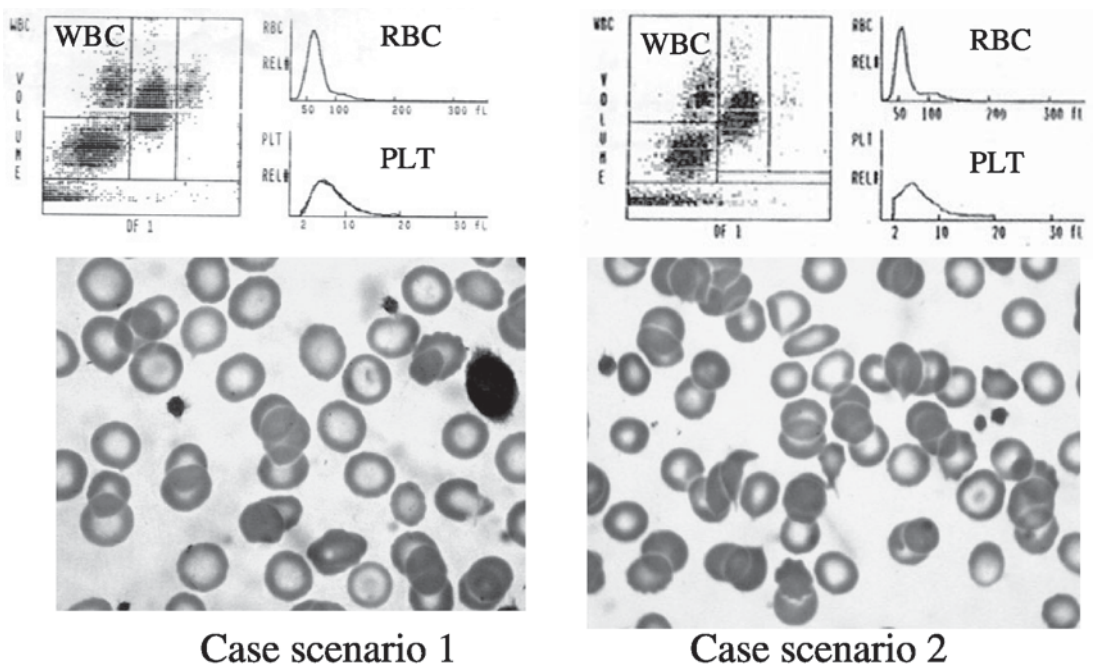

Figure 1 Cell scattergram and histograms from automated cell analyser of case scenario 1 and 2 (Upper left and upper right, respectively, WBC = white blood cells, RBC = red blood cell, PLT = platelet) and 400X-field examples of blood pictures of both (Lower left = case scenario 1, lower right = case scenario 2).

from laboratory personals for the first- and second-phases with response rate as 75 and 78 %, respectively. The average evaluation scores of the first (from 120 complete answers) and the second phases (from 80 complete answers) were 2.27 ± 0.55 and 2.31 ± 0.29 (mean ± standard deviation), respectively. The distribution of number participants who received each grade of the second phase was 30.0% for grade 3, 68.8% for grade 2, and 1.2% for grade 1, comparing to 42.4, 47.2, and 10.4% for grade 3, 2, 1, respectively, of the first phase assessment (Figure 2). This should note that there was a dramatic improvement (p<0.01) of those who earned a low grade (at level of fair) in the previous phase. They moved from fair to good in the second phase. This indicates the good

Table 1 Blood cell analysis.

Parameters	Case scenario 1	Case scenario 2	Reference ranges	Unit
White blood cell count	6.1	6.5	4-11	$\times 10^9$/L
Differential white blood cell count				
Neutrophil	56.4 (3.4)	57.4 (3.7)	45-75	% ($\times 10^9$/L)
Lymphocyte	28.5 (1.7)	33.8 (2.2)	20-45	% ($\times 10^9$/L)
Monocyte	10.8 (0.7)	7.6 (0.5)	2-10	% ($\times 10^9$/L)
Eosinophil	4.1 (0.3)	0.7 (0.05)	4-6	% ($\times 10^9$/L)
Basophil	0.2 (0.01)	0.5 (0.00)	0-1	% ($\times 10^9$/L)
Red blood cell count	3.56	5.61	4.6-6.2	$\times 10^{12}$/L
Hemoglobin	6.7	11.0	13.5-18.0	g/d/L
Hematocrit	22.1	34.5	38-54	%
MCV	62.1	61.5	80-98	fL
MCH	18.7	19.7	27-32	pg
MCHC	30.1	31.9	32-35	g/dL
RDW	19.2	16.0	11.5-14.0	%
Platelet count	402	350	150-400	$\times 10^9$/L

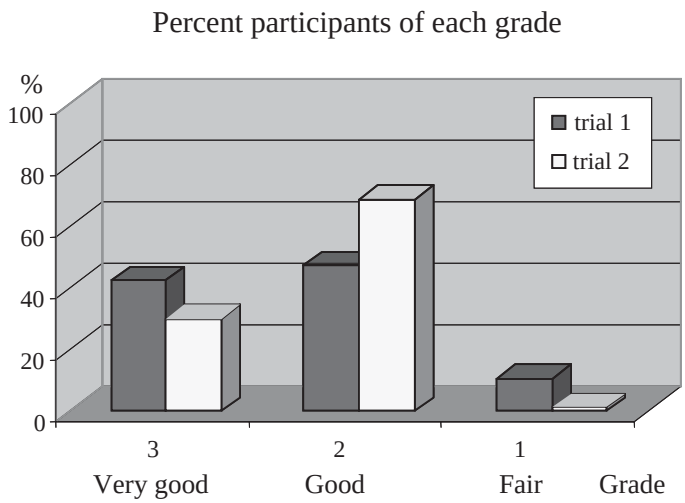

Figure 2 Distribution of participants earned of each grade.

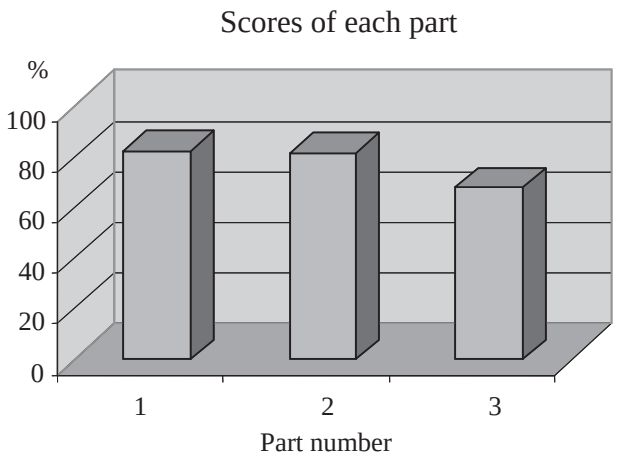

Figure 3 Score distribution of second phase questions for each part.
Part 1 = questions from automated cell analysis.
Part 2 = questions from blood picture examination.
Part 3 = questions of electrophoretic patterns.

trend of laboratory personal competency. However, laboratory personals who used to get a very good grade are able to maintain their status. The previous assessment showed 68.0% correct answers for iron deficiency anemia blood picture whereas a rocket high of 81.3 % correct answers were found in the second phase assessment (data not shown). This dramatic increase of correct answers demonstrated that this remote education tool enhanced their competency. When each part of the second phase questions was evaluated. The results showed 82.0 % correct answers for automated histograms and scatter plots, 81.3 % for blood picture examination and 67.8 % for other laboratory analysis (Figure 3). This implies the less experience of the laboratory personals for special laboratory tests such as hemoglobin electrophoretic patterns. In order to achieving laboratory quality assurance, human being must be concerned as a critical factor. Since a quality process is accomplished by competent person. So, human resource development is the most important factor. This study showed the effectiveness of continuous personal competency improvement by remote education.

LITERATURE CITED

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