



COMPETENCY ASSESSMENT FOR NEWLY GRADUATED STUDENTS FROM OMDURMAN AHLIA UNIVERSITY, FACULTY OF MEDICAL LABORATORY SCIENCES –HEMATOLOGY DEPARTMENT

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ABSTRACT

Purpose: The assessment of technical staff members' competency has been a challenge for laboratory workers, to ensure patient safety and high quality services. The aim of this study was to assess the competency of the newly graduated students from Faculty of medical lab Sciences of Omdurman Ahlia University, to assess the curriculum content for the Faculty of Medical Laboratory science at OAU through the assessment of the competency, in addition to test personnel for each test included in the questionnaire sheet, moreover to determine the gaps and weakness area that require education and training.

Methods: A cross-sectional case study, descriptive survey conducted, followed by questionnaire about a proposed competency assessment program that included all the procedural elements of laboratory personnel competency assessment in Sudan. A proposed competency assessment program was circulated to laboratory supervisors who agreed to be enrolled through structured questionnaire.

Results: Twelve laboratories responded to the questionnaire. Eighty respondents participated in this study. Five main parameters selected to be assessed. Results obtained by this study 69.6% performance for overall parameters with grade good. Moreover, average degree in the parameters of coagulation, special tests and reporting the results around (50%). Also the study found that (58.3%) of participated laboratories used assessment as a tool for a purpose of evaluation the new employees, while (41.7%) did not used. On other hand, the quality control and documentation parameters reveled about less than 40% evaluation (below the average).

Conclusions: In this study the proposed competency assessment program overcomes, challenges for the competency assessment for medical laboratories. Moreover, this study represents an important step towards the implementation of a standardized laboratory competences assessment program at a national level, beside it reflect the gaps and weakness in the curriculum of the faculty of medical laboratory Sciences, so it may resemble a diagnostic and measuring tool towards the development for the curriculum.

KEYWORDS: Competency. Haematology. Omdurman Ahlia University. Laboratory. Students.

INTRODUCTION

Competence evaluation is any system in place to measure, document, or otherwise evaluate whether employees were capable of doing their jobs. Participants were instructed to distinguish or differentiate competence from job performance, which we defined as how well employees actually performed their jobs.^[1] The assessment of the technical staff competency has been a challenge for laboratory workers to ensure patient safety and high quality services. There should be a program to assess the ongoing competency of laboratory workers. The method used should be standardized and consistently applied. Communication skills, interprofessional

competence, and developmental skills including utilizing technologies should be added as parts of professional assessment skills of workers. Safety checklists should be added and applied. Health professionals should be knowledgeable of universal safety precautions, which all laboratory workers should know and practice. The participants had very positive attitudes towards the proposed competency assessment program. Competency is the ability of personnel to apply their skill, knowledge, and experience to perform their laboratory duties correctly.^[2] The field of laboratory medicine is evolving, containing diverse and complex testing methodologies. Staff competency and development is the best way to

improve practice and provide a safe service to patients. The local medical laboratories colleges lack for the important tools and measures to represent the feedback for the curriculum outcome. Then the competency assessment of the technical staff as well as compliance that meet the international standards, operative procedures, policies and guidelines, bearing a big role through the laboratory directors, managers, and accrediting and certifying bodies in Sudan with the aid of the obtained feedback from this study. However, unfortunately, very few laboratories have adopted structured competency assessment programs, only for evaluating new employees, staff assessment and recertification was usually done in a subjective manner, using basic annual evaluation forms, continued medical education hours, and letters of recommendation. Given the stakes involved in laboratory medicine and the researchers have highlighted the need for an ongoing CA as an effective method to ensure staff competency.^[3,4,5and6] Hematology is the branch of medicine concerning the study of blood, the blood forming organs, and blood diseases. Hematology tests include laboratory assessments of blood formation and blood disorders. Some examples of these tests are full blood count a count of the total number of red blood cells, white blood cells and platelets present in blood. Blood film Blood is smeared over a glass slide that is stained with specific dyes and viewed under a microscope. The number, shape and size of blood cells and the presence of any abnormal cells or immature cells are noted.^[7] The stain used for reticulocytes or immature red blood cells is Heilmeyer's reticulocyte stain. Staining may flag up abnormally shaped red blood cells such as sickle cells or spherocytes. Staining may also detect blood parasites such as malaria, toxoplasmosis, and microfiliariasis. Assessment and staining of immature platelets or megakaryocytes may also be performed. Assessment of granulocytosis. The erythrocyte sedimentation rate (ESR) may be tested.^[8] The bone marrow may be examined. Iron status and anemia are assessed using tests such as serum ferritin, vitamin B12 and folate levels. The Coombs' test or antiglobulin test may be used for blood typing and blood matching prior to blood transfusion, for example. Platelet function in bleeding and coagulation may be checked using a test called prothrombin time. Diascopy is a technique used to determine whether a lesion is vascular, nonvascular or hemorrhagic.^[9] D dimer assessment may be performed to check for thrombotic disorders. Electrophoresis may be used to examine proteins in the blood such as hemoglobin and to check for hemoglobinopathies such as thalassemia or sickle cell anemia. The enzyme G6PD may be assessed in sickle cell disease. Fine needle aspiration of lymph nodes and tumors. Examination of spleen biopsy. Immunocytochemical techniques for detecting antigens both inside and on the surface of cells. Assessment of storage diseases such as Gaucher's disease, Niemann Pick disease and glycogen storage disease. Assessment of chronic myeloproliferative disorders using bone marrow and blood examination.

Assessment of hemophagocytic syndromes. Karyotyping to look for chromosomal disorders and abnormalities.^[10]

MATERIAL AND METHODS

Study design

This study is descriptive cross sectional case study using surveys administered between June 2015 and Feb 2016. Laboratory group interviews and discussions were also administered, to gather and synthesize ideas to develop a competency assessment program proposal for clinical laboratory.

Study population

This study included all graduated student from the FMLS-OAU batch 2013 and 2014 majoring Hematology and agreed to participate in the study, in Sudan-Khartoum state who were distributed in twelve hospitals.

Sample size

Including, medical laboratory specialist (Graduated from OAU –FMLS). The eighty medical laboratory specialist who graduated mainly from Hematology department and who agreed to participate in this study.

Study tools

The research tool is a questionnaire and checklist containing sociodemographic data including age, sex, and the competencies intended to be assessed. The main part of the questionnaire (included relevant data about practices in their institutions concerning competency assessment techniques and degree of evaluation.

Data collection method

The qualitative component of the study was conducted through structured questionnaire included checklist of main competencies (Hematology specimen, Reticulocytes count, Complete Blood count, Erythrocytes sedimentation rate and Coagulation) by the laboratory senior supervisor were grouped and was conducted by the researcher.

Statistical analysis

Data were transferred from survey monkey to IBM SPSS statistics version 22. The results of the structured questionnaire were analyzed using both quantitative and qualitative techniques.

RESULTS

Competency is the ability of personnel to apply their skill, knowledge, and experience to perform their laboratory duties correctly (Woodruffe 1993). Competency assessment is used to certify that laboratory personnel are satisfying their obligations. This study conducted in Sudan – Khartoum state, eighty medical laboratory specialists participated, and who were graduated from the faculty of Medical Laboratory Science at Omdurman Ahlia University, the study conducted through constructed questionnaire included the main important competencies in hematology

department of 24 sub parameters. The below results were obtained from the study.

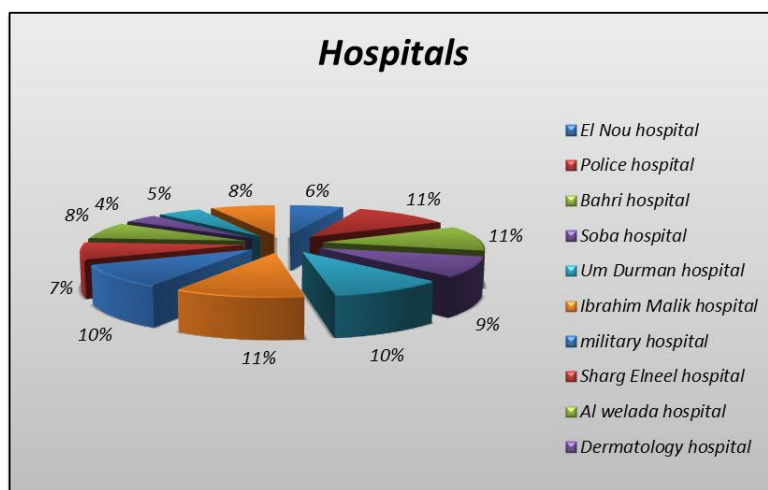


Figure 1: The Frequency and Percentage of participants from twelve hospitals.

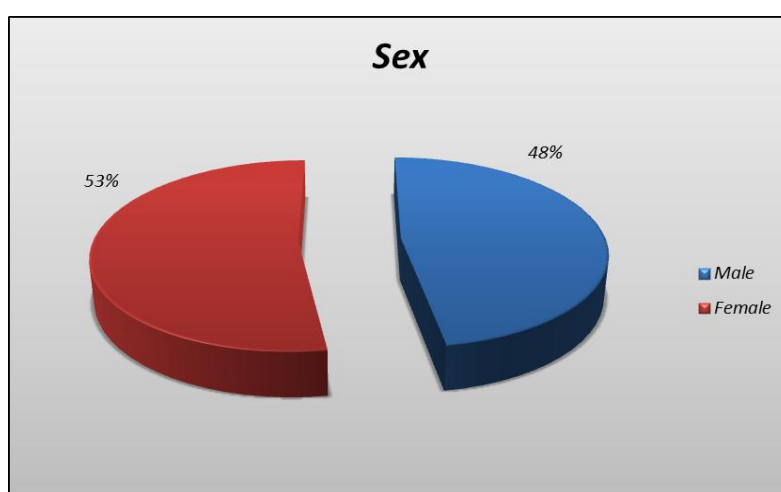


Figure 2: The gender frequency and percentage of the participant.

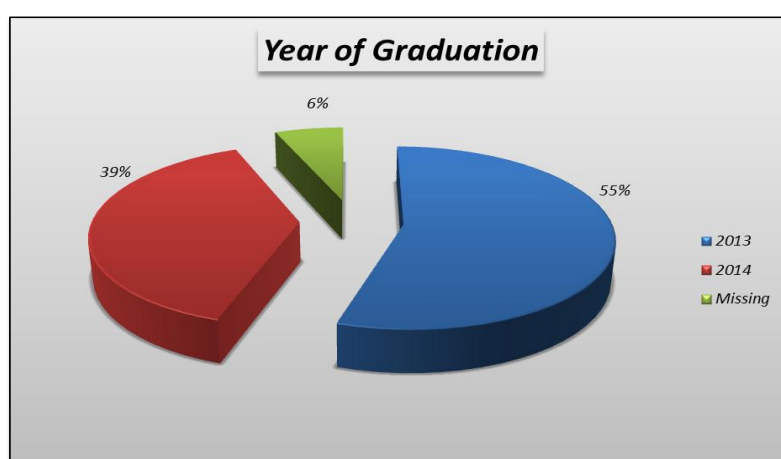


Figure 3: Frequency and percent of graduated students.

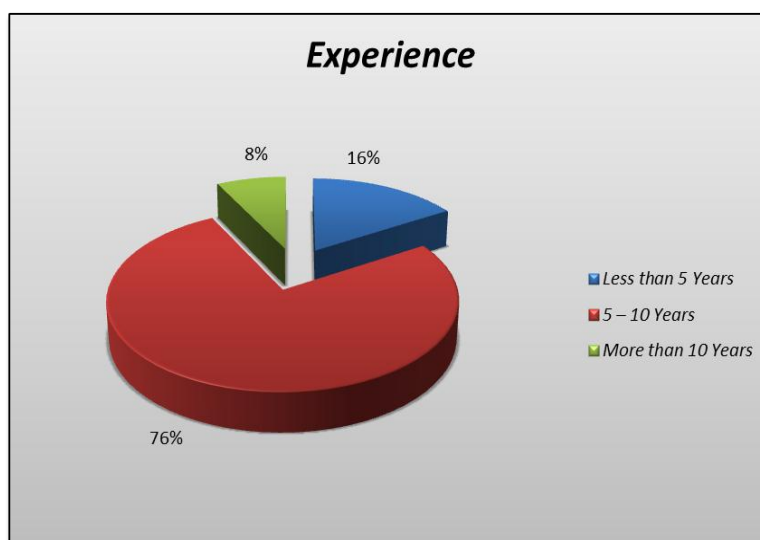


Figure 4: Frequency and Percent of senior staff experience.

Table 1: Shows the comparison of overall degree for each parameter sub-type and it appears there is no variations while the (The value of p is .007565. The result is significant at $p < .05$).

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Degree obtained	percentage	Po or		Below the Average		Average		Good		Excellent		Sub types parameters		
Good	68	0	0	10	8	28	22	45	36	18	14	Procedure requirements		
Good	71	0	0	8	6	23	18	50	40	20	16	Anticoagulant / blood ratios		
Good	71	0	0	6	5	23	18	54	43	18	14	Patient personal data		
Good	70	0	0	4	3	27	21	56	44	14	11	Labeling criteria		
Good	75	0	0	16	12	11	8	31	23	42	31	Read the procedure manual, Understand the principle of the analyzer operation		
Good	75	0	0	14	11	13	10	33	26	41	33	Perform automated CBCs using a multiparameter instrument with minimal supervision for at least 5 morning runs.		
Good	76	0	0	10	8	15	12	36	29	39	31	Run start up, shut down and change reagents.		
Below average	39	0	0	3	2	19	15	45	36	34	27	Perform QC including documentation		
Good	76	0	0	14	11	10	8	35	28	41	33	Read and understand the procedure		
Good	75	0	0	15	12	9	7	36	29	40	32	Perform a minimum of 5 patients reticulocytes counts		
Good	80	0	0	1	1	20	16	39	31	40	32	Recognize sources of error		
Good	75	0	0	16	13	14	11	23	18	47	37	Perform a minimum of 50 patient ESRs		
Good	76	0	0	13	10	15	12	27	21	45	35	Establishing method correctly.		
Good	78	0	0	4	3	23	18	32	25	41	32	Evaluating the result		

	Excellent	81	0	0	3	2	17	13	35	27	46	36	Reporting the result
	Good	79	0	0	4	3	14	11	44	34	38	29	Comment on the result
	Average	60	0	0	3	2	14	10	42	31	42	31	Recognize sources of error
	Good	76	0	0	17	13	9	7	28	22	46	36	Specimen requirements and processing
	Good	75	0	0	13	10	15	12	32	25	41	32	Read and understand the procedure regarding specimen acceptability and storage
	Average	60	0	0	12	9	13	10	29	23	46	36	Perform a minimum of 25 patients PT,PTT by established method
	Average	49	0	0	6	5	13	10	36	28	44	34	Evaluating and reporting the results
	Average	56	0	0	8	6	15	12	34	27	43	34	Perform mixing experiments evaluating and reporting results
	Average	59	0	0	4	3	16	13	35	28	44	35	perform factor assay evaluating and reporting results

Parameters statistics key

The answers were classified to 5 weights as follows:

1. "Excellent" when the mean of answers is more than 80.
2. "Good" when the mean of answers is less than or equal 80 and more than 60.
3. "Average" when the mean of answers is less than or equal 60 and more than 40.
4. "Below the Average" when the mean of answers is less than or equal 40 and more than 20.
5. "Poor" when the mean of answers is less than or equal 20.

Table 2: Shows the comparison of overall degree for each main parameter (The value of p is 1. The result is not significant at $p < .05$).

Significance	percentage	Main parameters	No.
Good	70%	Assess hematology specimen acceptability considering	1
Good	63%	CBC	2
Good	77%	Reticulocyte Counts	3
Good	78%	Erythrocyte sedimentation rate (ESR)	4
Average	60%	Coagulation	5
Good	69.6%	All parameters	#

DISCUSSION

The assessment of the technical staff competency has been a challenge for laboratory directors, managers, and accrediting and certifying bodies to ensure patient safety and high quality services. Competency assessments programs are strongly recommended to combine different competency assessment methodologies for

better outcomes (Baartman *et al.*, 2006). Laboratory personnel competency assessments programs are emerging and many agencies have started to adopt various methodologies to ensure patient safety (Reed *et al.* 2008). Such programs are not yet mandated by certifying and registration bodies in Sudan while they are mandatory for certification and recertification in western countries. The goal of competency assessment is to develop the laboratory's performance by recognizing areas necessitating education and/or training of the staff, and thus ensuring patient safety system. The first step in developing a competency program is to determine which staff members should be assessed, which areas of the laboratory should be included, the frequency with which staff member should be evaluated, and how to measure competency (Centers for Medicare & Medicaid Services 2012; Desjardins & Fleming 2014). In this study, we investigated the current competency assessment programs applied in different health care facilities in various areas of Sudan. In this study a total of twelve participating hospitals. Eighty medical laboratory specialists was participated 38 (47.5%) were males and 42 (52.5%), were females, with percentage of 55% and 38.8% respectively. The actual percent is much higher than results obtained by (M Dalal *et al.*, 2017) where only 47 workers participated. It was found that annual evaluation forms were the most prevalent assessment method administered in 78.7% of hospitals, followed by skills tests (59.6%), then proficiency test (48.9%), staff interview (40.4%), performance reporting done in 21.3% of hospitals and to a lesser extent, continuous assessment (17.0%), while in comparing to this study which only twelve hospitals participating in the study seven hospitals (58.3%) used assessment sheet before, and which it was much lower, beside the laboratory used competency assessment only for the purpose to assess the new employee after a period of training. This study conducted all necessary tests beside the QC measures which agreed

with study conducted by the A committee of the American Society of Clinical Pathologists (ASCP) studied with exception for the computer skills and continuing education assessments were not included. In addition, the study included the test and QC results were used most commonly in major Hematology disciplines to assess competence, through direct observation used most frequently throughout the entire laboratory. Evaluation of preventive maintenance, automated equipment, and frequently in phlebotomy and specimen processing which as recommended and conducted by the ASCP with almost good performance. However, with low or below the average in QC including documentation. Moreover, average degree in the parameters of coagulation, special tests and reporting the results those considered as failure as we know the lab results should guarantee a higher degree of reliability, in such cases the Personnel who failed competence examinations were not allowed to assume their usual duties. During this short period, they do laboratory work, and if they fail the reassessment, they are assigned to another assessment. If fail a third time, or if they fail a third time, they are offered another position in the laboratory or they are terminated. To conclude, this study aimed to assess the newly graduated student in hematology form OAU faculty of MLS and concentrated in the main parameters with sub parameters as a tool for spiral assessment of the curriculum, the overall performance was good, but the entire performance for the sub parameters varied and ranged from below the average to excellent, and when compared the value revealed significant variation within the different sub parameter, so this variation lead for recheck or reassessing the curriculum of the faculty.

RECOMMENDATIONS

This program should be validated by a group of experts then implemented as part of a core curriculum for laboratory colleges, in their assessment, certification, recertification, registration, evaluation and licensure in medical laboratories in Sudan. Monitoring and evaluating the program during and after implementation for processes and outcomes also being recommended.

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