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Knowledge, Attitude and Practices for Internal Quality Control in Medical Laboratory Professionals, Wad medani, Gezira State, Sudan

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Abstract*: *Background: *Internal quality control (IQC) it is all the steps taken by the staff inside the laboratory included improve performance, equipment's, reagents, and operational processes to insure the credibility of results.* ***Objective****: To analyze the internal quality control practice, knowledge and altitudes of medical laboratory personal among participants.* ***Methods****: This was cross sectional study carrying out in wad madani city in Gezira state, Sudan which includes 101 participants from selective health centers. Data was collected by questionnaires and analyzed with SPSS version (19); the results were presented as tables and graphs.* ***Result:*** *This study was carrying out in wad madani city in Gezira state, Sudan. A total of one hundred and one participants from private and governmental laboratory health sectors, the overall result optioned show having a positive side in knowledge 68 (67.5%), The respondents' education level and IQC approaches were related 26 (44.1%).* ***Conclusion:*** *study conclude that the higher knowledge and attitudes about IQC, the while their practice insufficient documentation among majority of them. Therefore, to motivate the use of IQC and reduce the rate of error for laboratory findings, a lot of educational and motivational efforts as well as improvements to IQC practices are required.*

Keyword: Knowledge, Attitude, Practice, Internal quality control, laboratory improvement, and accreditation.

Introduction

Internal quality control (IQC) is a set of policies used by staff members to observe processes and measurement products to determine if they are accurate enough to be reported (1). Controls should be regularly placed throughout each analytical run and analyzed with each run to identify analytical imprecision. Assay values in controls should also be within clinically relevant ranges (2). Studies of laboratory mistakes hold documented so much a greater proportion regarding errors take place in the pre-analytic yet post-analytic approaches than in analytic procedures (2). Pre-analytic errors account for 45 percent of errors, analytic errors account for 10%, and post-analytic errors account for 45 percent (actual estimates, 45.5 percent , 7.3 percent , and 47.2 percent , respectively). As end result concerning this predicted outgiving on errors, laboratories are entreated in conformity with focus their attention of pre-analytic or post-analytic techniques in conformity with improve patient protection (3). Analytic techniques account because a higher percentage on experimental errors than analytic processes, according in imitation of studies. Pre-analytic errors calculation because 45 percent about errors. Analytic errors estimate because of 10%, or post-analytic mistakes calculation for 45 percent (actual estimates, 45.5 percent, 7.3 percentage, yet 47.2 percent, respectively). As end result concerning that estimated e distribution (3). According to ISO15189 (International) necessities "The laboratory shall plan internal quality government structures up to expectation verify the advancement on the meant quality regarding outcomes (4, 5).Taken together, internal quality control is an indispensable piece regarding the scientific laboratory trying out processes so much remain accurately observed as much by set pointers regarding each laboratory (5,6). In Ethiopia in that place are partial longevity initiatives to put together elected health facility yet Health Center laboratories because accreditation based about the WHO-AFRO check list (7, 8). This undertaking who is believed in accordance with improves the quality over the clinical laboratory employment (9, 10). To the beneficial regarding our knowledge, no such research has been posted describing the knowledge, attitude or practices about usage about internal quality control (IQC) because of scientific laboratory assessments in Sudan. Therefore, the purpose of this study was to evaluate selected health facilities' knowledge, attitudes, and behaviors regarding the use of IQC.in Wad medani Gezira state, Sudan.

Materials and Methods

Study design and study sitting:

This is a cross-sectional study was undertaken to examine the knowledge, attitudes, and practices of medical laboratory employees at selected healthcare institutions using Internal Quality Control (IQC) for clinical laboratory tests, included about 101participants from governmental and private laboratories. Laboratories determining the sample size which the study comprised all medical

laboratory specialists who were employed by the chosen health facility during the study period in Wad madani city Gezira State Sudan.

Analysis of data and collection

Data was collected through the use of scientifically designed questions .Software SPSS 19.0 was used to enter, purify, and analyze the data. For the majority of the study variables, descriptive statistics were calculated. Tables of frequency distribution were employed to present the results.

Ethical clearance

The study was complied with the guidelines of the ethical consideration of the researches so ethical clearance was taken from the followings:

• Ethical and technical approval from the University of Gezira.

• Ethical approval from Gezira state ministry of health.

• Permission from medical laboratories managers.

Results

This study directed to information about the knowledge, self-reported attitudes and practices towards IQC among medical laboratory professionals in Wad medani, Gezira state, Sudan. A total of one hundred one study participants were included from both public and private laboratories in Wad medani, Gezira state, Sudan. Socio-demographic characteristics of respondents findings regarding to gender: 58 (57.4%) of study participants were male and 43 (42.6%) were female, age group 20 – 24 years 22 (21.8%), 25 – 29 years 3 (29.7%), 30-34 years 28 (27.7%) and over 35 years (21) (20.8%) and the study show that 26 (25.7%) was a head department, 2 (2%) Quality officer and 73(72.3%), general Staff with experience less than one year 13 (14.9%), 1 to 3 years 20 (19.8%),3-5 years was14 (13.9%) and over 5 years was 53 (52.5%) with education level BSc 37 (36.6%), MSc 59 (58.4%) and PhD 5 (5%).

Table (1): Socio-demographic characteristics of medical laboratory experts working at chosen public and commercial laboratories

	Range	Number	Percentage
Age	20 – 24	22	21.8%
	25 – 29	30	29.7%
	30 – 34	28	27.7%
	>35	21	20.8%
Gender	Male	58	58%
	Female	43	43%
Occupation	Dpt. Head	26	25.7%
	Quality officer	2	2.0%
	Staff	73	72.3%
Experience	<1 year	14	13.9%
	1- 3 years	20	19.8%
	3-5 years	14	13.9%
	> 5years	53	52.5%
Education level	BSc	37	36.6%
	MSc	59	58.4%
	PhD	5	5.0%

Table (2): General KAP of laboratory practitioners on Internal Quality Control operating in public and commercial labs

Task		Yes
Have workers been trained in how to perform quality control?		64(63.4%)
After instruments repair in your lab is there any quality process to be conducted		86 (85.1%)
Do you have a quality officer in your laboratory		44(43.6)
Have you ever been involved in an external quality assessment program?		40(39.6)
Does the laboratory implement an internal quality control program?		58(57.4)
Is there an internal quality control system in place that controls every batch of examinations?		44(43.6)
Average frequency of IQC	Batch	11(10.9%)
	Daily	29(28.7%)
	Weekly	26(25.7)
	Monthly	35(34.7)
After calibration is there any quality control process well be conduct in your lab		73 (72.3%)
Are there quality control process to be followed after changing the lot number of reagents		83 (82.2%)
How do you know about IQC (yes)		68 (67.5%)

Table (3): General altitude and laboratory professionals' use of internal quality control personnel in regards to educational levels

Question		BSc	MSc	PhD
Is there an internal quality control system in place that controls every batch of examinations?	Yes	16(43.2%)	26(44.1%)	3(60%)
	No	21(56.8%)	33(55.9%)	2(40%)
Have you ever been involved in an external quality assessment program?	Yes	12(32.4%)	28(47.5%)	0(0.0%)
	No	25(67.6%)	31(52.5%)	5(100%)
Does the laboratory implement an internal quality control program?	Yes	16(43.2%)	40(67.8%)	2(40%)
	No	21(56.8%)	19(32.2%)	3(60%)
Average frequency of IQC	Batch	5(13.5%)	6(10.2%)	0(0.0%)
	Daily	7(18.9%)	20(33.9%)	2(40%)
	Weekly	8(21.6%)	18(30.5%)	0(0.0%)
	Monthly	17(45.9%)	15(25.4%)	3(60%)
After calibration is there any quality control process well be conduct in your lab	Yes	31(83.8%)	38(64.4%)	4(80%)
	No	6(16.2%)	21(35.6%)	1(20%)
Are there quality control process to be followed after changing the lot number of reagents	Yes	33(89.2%)	46(78%)	4(80%)
	No	4(10.8%)	13(22%)	1(20%)
After instruments repair in your lab is there any quality process to be conducted	Yes	28(75.5%)	54(91.5%)	4(80%)
	No	9(24.3%)	5(8.5%)	1(20%)
Have workers been trained in how to perform quality control?	Yes	29(64.9%)	37(62.7%)	3(60%)
	No	13(35.1%)	22(37.3%)	2(40%)

Table (4): General altitude and laboratory professionals' use of internal quality control personnel in regards to experience levels

Question		<1 year	1- 3 years	3-5 years	> 5years
An internal quality control system in place that controls every batch of examinations?	Yes	12(85.7%)	22(41.5%)	6(30%)	4(28.6%)
	No	2(14.3%)	31(58.5%)	14(70%)	10(71.4%)
Have you ever been involved in an external quality assessment program?	Yes	8(57.1%)	22(41.5%)	2(10%)	8(57.1%)
	No	6(42.9%)	31(58.5%)	18(90%)	6(42.9%)
	Yes	14(100%)	30(56.6%)	10(50%)	4(28.6%)

Does the laboratory implement an internal quality control program?	No	0(0.0%)	23(43.4%)	10(50%)	10(71.4%)
Average frequency of IQC	Batch	5(35.7%)	3(21.4%)	4(28.6%)	2(14.3%)
	Daily	2(3.8%)	24(45.3%)	13(24.5%)	14(26.4%)
	Weekly	0(0.0%)	0(0.0%)	8(57.1%)	6(42.9%)
	Monthly	4(20%)	2(10%)	10(50%)	4(20%)
After calibration is there any qaulity control process well be conduct in your lab	Yes	14(100%)	31(58.5%)	18(90%)	10(71.4%)
	No	0(0.0%)	22(41.5%)	2(10%)	4(28.6%)
Are there quality control process to be followed after changing the lot number of reagents	Yes	14(100%)	45(84.9%)	16(80%)	8(57.1%)
	No	0(0.0%)	8(15.1%)	4(20%)	6(42.9%)
After instruments repair in your lab is there any quality process to be conducted	Yes	14(100%)	48(90.6%)	12(60%)	12(85.7%)
	No	0(0.0%)	5(9.4%)	8(40%)	2(14.3%)
Have workers been trained in How to perform quality control ?	Yes	14(100%)	36(67.9%)	6(30%)	8(57.1%)
	No	0(0.0%)	17(32.1%)	14(70%)	6(42.9%)

Discussion

Laboratory quality control is crucial to patient care as is ensuring the parts of internal quality control, that which affects to miss diagnosis and the wrong medical drug choices (11). It well know that the presence amount the knowledge, attitudes and practices durability between scope of IQC leading to increase enchantment on work and secure the reliability of result (12). This study search in scope of information related to knowledge, attitudes and practices durability of IQC among private and governmental medical laboratory in Wad medani, Gezira State, Sudan. The study was conducted in one hundred and one laboratories in wad medani city from both governmental and private, the results show that 57.4% of study participants were male, age 25 – 29 years 29.7, while the distribution of participants according to occupation was 25.7% head department, 2% quality officer and 72.3%, according to staff experience less than one year 14.9%, 1 to 3 years 19.8%, 3-5 years 13.9% and over than 5 years 52.5%, and education level of participants that the BSc was36.6%, MSc was 58.4% and PhD was 5%. The study shows the majority of participants were male 57.4% that similar to study done by Dereje Mamuye found 58.8% respondents were male, that means male more tolerance to work load than female , general Staff with experience over 5 years 52.5% the high number of experience yeas among participants which lead to qualify work, almost participants awarded master degree 58.4% that may be due to the fact that through time personnel try to educate themselves through different approach also may due to high number of graduated of medical laboratory students .this agree to study done by Marta Ayele in Addis Ababa in Ethiopia and disagree to study of Dereje Mamuye which found majority of participants was first degree 165 (62.4%). Among study subjects age groups the high numbers of participants found between 25 – 29 years (30) (29.7%) that agree with Dereje Mamuye which found 130 (52%) from (21-30) (13). The study found that 73 (72.3%) general Staff that similar to result obtained by Dereje Mamuye which found 122 respondents (69.7%) have been mostly staff members in ordinary laboratory tasks (14). The participants of this study had low outcome of knowledge information (67.5%) when compare with previous studies such as study done by Dereje Mamuye (81.7%) and Marta Ayele (88.0%), this may be due to uninterested of staff to enrolling in quality control issue and also there is no quality stander wanted by any governmental body. The majority of laboratory personnel practice on IQC, 86 (85.1%) conducted quality process after instruments repair , 83 (82.2%) quality control process to be followed after changing the lot number of reagents, 73 (72.3%) quality control process well be conduct after calibration, 64(63.4%) were rained how to perform quality control. Exactly these positive results were lead to improve and insure consistency of work and results of laboratories. On the other hand 44 (43.6) have quality officer in the laboratories , 40 (39.6) were involved in external quality control program, 58 (57.4) implementation of internal quality control program, 44(43.6%) that causes lead to lessens of quality control among laboratories and violation of quality standard and international standardization organization ISO 15189 (15, 16) were an internal quality control in place that controls every batch of examinations, and the average frequency of internal quality control were 11(10.9%) every batch, 29 (28.7%) daily , 26 (25.7) weekly, 35(34.7) monthly , According to the response, the workload, the challenge of preparing IQC materials for various tests, the cost of materials, and the scarcity of supplies are all contributing factors (17). The respondents' level of education level and IQC approaches were related 26 (44.1%) Is there an internal quality control system in place that controls every batch of examinations 54 (91.5%) According to the finding 46 (78%) quality process to be conducted after instruments repairing .that apparently respondents with degrees and postgraduate or master's degrees had more experience and knowledge and information with IQC than those with only BSc degrees. In a similar vein, it was discovered that respondents with more work experience have better IQC practices than those with less experience.

Conclusion

As conclusion, primarily based over the findings about it study, the accordant conclusions may stay drawn: In this learning no matter the learning individuals have higher Knowledge and Attitude as regards IQC, dominance hold bad documentation Practice, that may affect negatively in accordance with achieve the targets multiplication laboratory yet additionally it may liven so higher Knowledge or Attitude does no longer constantly leads in imitation of honest IQC Practice.The main elements for good IQC act between that instruction shows educational level, work experience.

Limitation

- Due to proportional sample altar calculation we should not in a position according to recruit even participants from public and private hospitals.
- Lack of related literature was also one of the major challenges that we faced during the study period Since the instruction layout old was once cross-sectional, the discovering account in conformity with elements associated along capabilities yet action would possibly now not stand integral casual
- The limitation concerning it lesson was, also although the pattern altar used to be too small, more in all likelihood in imitation of lie concerning great interest in conformity with the scientific neighborhood who examine the journal attracted with the aid of the findings in accordance with lift outdoors stern researches in that thematic vicinity and additionally one-of-a-kind researchers do uses the discovering of that bill so notice because of in addition similar study.

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