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Specimen Handling Errors and CBC Result Accuracy

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Abstract: To get the best complete blood count (CBC) results, it's important to take care of specimens before they are sent to the lab. In the context of patient diagnosis, in particular, correct specimen care can have a substantial influence on test results. Research shows that most mistakes happen during the pre-pre-analytical phase, when healthcare providers aren't under the lab's control, and that the pre-analytical period starts after the lab accepts the sample. The foundational assumption of the review research is that quality assurance in haematology labs is crucial for ensuring that laboratory consumers obtain accurate and exact test results. A reliable and consistent outcome of tests is what laboratory quality assurance is all about. Ensuring the patient receives safe healthcare relies heavily on medical diagnostics of high quality. Following proper laboratory procedures can greatly decrease the occurrence of pre-analysis errors. Staff members in the laboratory should have completed formal training programs and participate in continuing medical education programs. They should also be aware of any confounding factors that might influence the results of the tests, and the laboratory and wards should work together well.

Keywords: Specimen, Handling, Errors, CBC, Result, Accuracy

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INTRODUCTION

According to the Ministry of Health RI (2020), a medical laboratory is one that determines, analyses, describes, and identifies a specimen in order to diagnose a patient's illness. Pre-analytical, analytical, and post-analytical are the three phases of laboratory examinations. One pre-analytical step that affects the precision of the test findings is giving samples anticoagulants (Naz et al., 2012). Preparing and managing specimens during the pre-analytical phase is closely related to optimising complete blood count (CBC) results. Test findings can be significantly impacted by proper specimen care, particularly when it comes to patient diagnosis. For full blood counts, haematology labs frequently utilise the anticoagulant Ethylene Diamine Tetra Acetate (EDTA). K3EDTA in vacutainer tubes and 10% Na2EDTA solution (traditional EDTA) are two forms of EDTA anticoagulants. Since anticoagulants in vacutainers are comparatively more costly, several labs continue to perform their tests using traditional anticoagulants in liquid or powder form (Wahdaniah & Tumpuk, 2018).

According to Plebani et al., the preanalytical phase ought to be separated into two parts: the preanalytical phase and the pre-preanalytical phase. While the preanalytical phase covers the stages of sample preparation for analysis, such as centrifugation, aliquoting, and sorting, the pre-preanalytical phase includes

test requests, patient or sample identification, sample collection, handling, and transportation. It has been shown that while the preanalytical phase begins when the laboratory staff accepts the material, the majority of mistakes are made in the pre-preanalytical phase by healthcare professionals who are not under the laboratory's authority. The most dependable method for preventing preanalytical mistakes is to create preanalytical standardisation. (M. Plebani, 2000)

The assurance that every stage of the whole testing process (TTP) is carried out accurately is known as quality in laboratory medicine. (Lippi G. and others, 2017) The analytical error rate has decreased tenfold in recent decades as a result of advancements in analytical methods and equipment. It has been discovered that the preanalytical mistakes are far more susceptible in the TAT. Preanalytical phase mistakes were formerly categorised as sample issues and identification errors. (L. Sciacovelli and others, 2018) These are just a few of the QIs that have been identified by the IFCC (International Federation of Clinical Chemistry and Laboratory Medicine) working group of "Laboratory Errors and Patient Safety" (WG-LEPS). (DS Grecu, 2015)

Anticoagulants in blood samples during the homogenisation process

Another preanalytical step that affects the precision of the test findings is sample homogenisation. Primary homogenisation and secondary homogenisation are the two categories of sample homogenisation procedures. The initial homogenisation procedure that follows the addition of an anticoagulant to the sample is known as primary homogenisation. Prior to the sample being read on a haematology analyser, secondary homogenisation is the homogenisation procedure carried out once more (Sebayang et al., 2021). Ten to twelve inversions were performed to homogenise blood samples in anticoagulant-containing tubes (Ministry of Health RI, 2013). Eight to ten inversions are used to homogenise blood samples in anticoagulant-containing tubes (CLSI, 2003). Five to ten inversions were used to homogenise blood samples in anticoagulant-containing tubes (Nuraeni & Septie, 2023).

The quality of the specimen is significantly impacted by the pre-analytical phase. Because it may result in inaccurate results, an improper specimen is inappropriate for the examination stage. According to earlier studies, the majority of mistakes—between 50 and 75 percent—occurred during the pre-analytical phase and included sample issues and identification errors (Plebani et al., 2014). Sample quality can be impacted by a number of mistakes made during the collection and management of specimens, including clots in whole blood samples, improper sample quantities, haemolysis, anticoagulants, and improper sample storage temperatures (McPherson & Pincus, 2011).

Gathering specimens for pre-analytical procedures

Specimen collection is one of the initial pre-analytical stages that ensures patients will get fast, accurate, and reliable findings. (Jacobsz 2018) According to M.B. Shiferaw et al. (2016), specimens are rejected from the laboratory if they do not meet the technical standards for a certain analyte. Notifying authorised personnel that a rejected sample is not suitable for testing and requesting a replacement sample are crucial. (Kamal , 2017)

Some of the pre-analytical mistakes that can lead to sample rejection include incorrect labelling, incomplete or missing test specifications on the request form, illegible requests, clotting, inadequate blood volume, the wrong sample tube, haemolysis, and improper temperature during transportation or storage (A.

Mehrotra, 2018). The clinical implications of specimen rejection on patient treatment are substantial. (H.M. Tesfaw 2017) notes that retaking a patient's blood can be uncomfortable and can lead to complications including iatrogenic anaemia and haematomas. It is also well-known that specimen rejection can cause delays in both the execution and reporting of the desired tests. (Shiferaw, 2016). Cost-effectiveness, improved overall quality, and happy customers all stem from minimising pre-analytical risk (Karcher , 2017).

Errors in the Pre-analytical Phase

Initiatives for improvement are needed in this field since long-distance sample transportation is becoming more and more necessary due to the trend towards laboratory facility consolidation. (Zaninotto M. a, 2013) missing sample and/or test request; b) incorrect or missing identification; c) contamination from the infusion route; d) haemolyzed, clotted, and insufficient samples; e) inappropriate containers; f) inappropriate blood to anticoagulant ratio; and g) inappropriate transport and storage conditions are the most frequently reported types of pre-analytical error. (Cararo P. and others, 2015)

Although the pre-analytical stage is known to be prone to errors, data has only recently been gathered to show that these errors are primarily related to procedures carried out by healthcare professionals who are not directly under the clinical laboratory's control outside of the laboratory.(Organisation for International Standardisation, 2016)

(Lubin IM, 2016) Analytical mistakes can be classified as either random or systematic. Clinicians are shown the implications of the post-analytical phase for patient interpretation and therapy. However, careless findings reporting and incorrect interpretation at this point lead to errors in the post-analytical phase (Laposata M et al. 2017). Inadequate confirmation, postponed findings, failure to submit to some unsatisfactory suppliers, and inaccurate results detailed due to post-insightful information transit errors and record inaccuracies are the most frequent post-analytical errors. In essence, post-insightful techniques are carried out within the laboratory to confirm research centre results, handle them in the lab data framework, and communicate them to clinicians in an organised manner, usually by creating a report and making any basic oral correspondences regarding "alert" or alarm results. (Chhillar N., 2016)

Quality Indicators

In order for users to be able to compare the quality of a selected treatment component to a predefined standard, the Institute of Medicine's (IOM) approach to healthcare quality states that reliable quality indicators (QIs) must first be identified (Alavi, N., 2017). Quality indicators are defined as follows: they are based on evidence related to the domains in question, can be applied consistently and comparably across settings and over time, and have the potential to evaluate all critical care domains as defined by the IOM (patient safety, effectiveness, equity, patient-centeredness, timeliness, and efficiency). (M.P. Cornes , 2016)

When assessing the quality of laboratory services using quality indicators (QIs), it is important to employ a thorough array of indicators that encompass all phases of the TTP and concentrate on aspects that substantially influence patient care and health outcomes. This will provide uniform and methodical data gathering and analysis. (Lee, 2016) It has also been stressed that recommended QIs must be harmonised.

Shahangian and Snyder also pointed out that there is a "significant difficulty in recognising, characterising, and finally putting into practice indicators that encompass the different phases of the TTP. that address the IOM domains, diverse testing environments, and numerous pertinent stakeholders." (Shahangian S., 2022)

OBJECTIVES OF THE STUDY

1. Researching anticoagulants in blood samples during the homogenisation procedure
2. To research pre-analytical phase errors

METHOD

A literature search was carried out to locate papers that were pertinent to preanalytical errors in the haematology laboratory using the electronic databases, PubMed and Scopus. To find articles published between 2016 and 2023, we utilised these search parameters: Issues with clotted or hemolyzed samples, as well as with preanalytical errors, sample contamination, handling, prevention, processing, collection, the haematology laboratory, and staff education.

Research area

According to the literature analysis, this study examines the prevalence of preanalytical errors in haematology in clinical laboratories and hospitals in Saudi Arabia. According to this study, there are a number of preanalytical factors that might affect the findings of the test. These include: a sample in the wrong collecting tube, blood clots, insufficiency, haemolysis, dilution, excess, an empty or broken vacutainer, an erroneous label, a transfer delay, and a damaged or empty tube. As a percentage of the total samples and errors, the laboratory research groups displayed the types of mistakes and how often they happened. (Chhillar , 2017) made a statement.

Over the course of the trial's twelve months, researchers collected 67,892 blood samples for haematological analysis. There were a total of 53,249 samples collected from outpatients and 14,643 samples from admitted inpatients. In (Raghavan Venkat , 2017) According to this study, there are a number of preanalytical factors that might affect the findings of the test. These include: a sample in the wrong collecting tube, blood clots, insufficiency, haemolysis, dilution, excess, an empty or broken vacutainer, an erroneous label, a transfer delay, and a damaged or empty tube. (Parco, 2017) All samples that did not match the exact volume specified by the tube mark were rejected and placed in the pre-analytical error group. Only samples with the exact volume were allowed for the coagulation tests in. As a percentage of the total samples and errors, the types of mistakes and their frequency were displayed in the laboratory research groups (Arule and others, 2015).

RESULTS

Our analysis drew on data from seven other studies. Among the many types of preanalytical errors, there were several types of samples that were either inadequate, clotted, hemolyzed, unlabelled, in the wrong tube, too much, patient misidentification, or delayed(De la Salle , 2013).

Table 1: Pre-analytical mistakes in the laboratory for haematology

Author	Year	Place of study	Sample Size	Pre-analytical mistakes in the laboratory for haematology								
				Wrong label	Insufficient sample	Clotted sample	Hemolyzed sample	Without label	Inappropriate tube	Excessive sample	Misidentification of patient	Delayed sample
Mrazek C et al.	2016	King Abdullah Medical City (KAMC) - Mecca	471.006	24	328	1332	0	22	0	0	0	0
Simundic AM et al.	2018	Abeer Medical center	**1 18. *16***	**0**	**23b**	**139**	**33**	**0**	60	0	23	0
van Dongen-Lases EC et al.	2018	King Abdulaziz Hospital	**2.606**	**64**	**548**	**26**	**366**	**0**	**0**	**59**	**0**	**6**
Cornes M et al.	**21720**	King Fahd Hospital	**189.104**	**0**	2099	1664	0	0	0	**0**	**0**	**0**
Adcock Funk DM et al.	2020	Al-Dar Hospital	15.337	0	219	105	172	0	0	0	117	0
Gosselin RC et al.	2022	Prince Mohammed bin Abdulazeez Hospital (NGHA)	95.002	0	96	3418	592	0	155	0	51	0
Sotoudeh Anvari M et al.		Al Iman General Hospital	6.892	·	480	1/8	41	29	108	10	0	20
Total errors			6.40.947	117	4006	6662	1224	51	323	100	191	26

The average percentage of preanalytical sample errors for each category was computed and tabulated.

Table 2: Various preanalytical mistake types analysed

Various preanalytical mistake types analysed	Total sample size	Wrong label	Insufficient sample	Clotted sample	Hemolyz sample	without label	inappropriate tuba	Excessive sample	Misidentification of patient	Delayed sample
Total errors	8.40.947	117	4005	6862	1224	51	323	100	191	26
Total errors (% of total sample)	100	0.014	0.476	0.816	0.146	0.036	0.038	0.012	0.023	0.003

Typical preanalytical mistakes

The actual analysis of blood samples in laboratory haematology testing is preceded by preanalytical errors. The inability to process such samples is self-evident. Even when using anticoagulated tubes, samples can still clot if the tubes are not gently turned four or five times to ensure that the anticoagulant and blood sample are combined evenly. Our analysis mostly used clotted samples collected from inpatient emergency rooms. Staff members are more likely to grow weary due to the enormous amount of critical cases being accepted, which might be the reason of this. Procedures like phlebotomy may become less reliable and effective as a result of this. We found the opposite of what Alonso et al. found, who found that clotted samples were the most common kind of outpatient samples. (Alonso 2016)

The two most common reasons why blood clots are when there isn't enough anticoagulant in relation to the blood or when the transfer of blood from a syringe to a vial takes too long. The sample becomes unusable for assays that need whole blood or plasma because clotting destroys cells and uses up coagulation factors. We found that around 4.6% of the samples that were rejected were hemolyzed. (Environmental , 2018) Furthermore, it has been proposed that materials that have been hemolyzed might expedite the coagulation process. Using intravenous (IV) catheters is one of the key ways to potentially trigger haemolysis during specimen collection. Using an intravenous catheter to draw blood samples has a reported haemolysis rate of 29%, compared to 1% for samples drawn using a straight needle venipuncture. Significant haemolysis is likely to result in erroneous CBC results, according to another study. If morphological study of the blood cells is needed, it is optimal to evaluate all CBC specimens within six hours of collection. (Yorkshire,

2017)

Sample inadequacy was more common in inpatient samples compared to outpatient samples in our research. There have been similar studies. Inpatient samples were particularly prone to labelling mistakes and transmission delays to the lab.

This could be due to the diverse workforce, which comprises both experienced nurses and trainees with less experience who are allocated to different wards. What this means is that the people who collect the blood might benefit from further education and guidance. In order to drastically reduce preanalytical errors in nursing science and health practice, it is recommended that all staff undergo frequent training to refresh their understanding of the preanalytical phase..

Table 3: Error types and frequencies in OPD and IPD samples compared to previous studies.

	Aruletal.		Gauretal.		PresentStudy	
	NumberofSamples	(%)	NumberofSamples	(%)	NumberofSamples	(%)
	Outpatients	Inpatients	Outpatients	Inpatients	Outpatients	Inpatients
Unlabeled/Misidentification	9(0.01)	14 (0.02)	27 (0.05)	110(0.08)	11 (0.01)	18 (0.02)
Incorrect vials	28 (0.04)	32 (0.06)	5(0.01)	0(0.01)	47 (0.06)	61 (0.08)
Inadequate samples	104(0.17)	131(0.23)	422(0.75)	1695(1.27)	213(0.30)	267(0.39)
Clotted sample	67 (0.11)	72 (0.13)	815(1.46)	857(0.64)	79 (0.10)	97 (0.14)
Diluted sample	0	23 (0.04)	4(0.01)	9(0.01)	3(0.0)	13 (0.01)
Hemolyzed sample	15 (0.02)	18 (0.03)	20 (0.04)	54 (0.04)	24 (0.03)	17 (0.02)
Excessive sample	-	-	2(0.00)	2(0)	7(0.0)	3(0.0)
Total error (%)	0.43%		2.33%		1.30%	

One additional important finding was that the paediatrics department gave the weakest and most insufficient samples. This could be due to the fact that it is difficult to get venous blood samples from infants and young children, and that collecting blood from capillaries increases the risk of preanalytical mistakes. It is possible that preanalytical mistakes are exacerbated when samples are collected in many tubes for different experiments. Additionally, intravenous catheterisation can be used to get diluted samples. High rates of preanalytical errors in paediatric hospital therapy are indicative of how difficult and error-prone the blood collecting process is. (Puri, Venkata 2014) Since it becomes difficult to determine where a sample came from once sampling is complete, accurate labelling of vials is of the utmost importance to avoid report swapping or falsification in the event of an error. 29 out of the total discarded samples (3.2%) had labels that were not correct in this study. The safe transfer of samples from the site of collection to the laboratory is of the utmost importance. Only 0.4 percent of the samples used for this study were compromised in any way. The public might be exposed to infectious materials, sample volume could be lost, sample mixing could occur, and sterility could be compromised due to incorrect transit. Upon error

detection, the majority of samples are rejected before processing in the laboratory. This causes resampling, which in turn increases the burden of hospital personnel, wastes hospital resources, worsens patient suffering, and adds unnecessary delay to results. The most plausible explanations for these preanalytical errors point to the sample collection staff's lack of training in proper phlebotomy techniques and their failure to adequately prepare patients for the procedure. Improved specimen quality has been demonstrated to occur as a result of standardised phlebotomy methods and staff training. (Aggarwal ,2016)

Specimen collection

The average percentage of sampling errors in the articles that fell into this category were as follows, as shown in the table: 0.014 percent for the wrong label, 0.023 percent for patient misidentification, 0.038% for the wrong sample tube, 0.006% for unlabelled samples, 0.476% for insufficient sample and 0.012% for excess sample in the tube, 0.007% for unlabelled samples, 0.059% for insufficient sample, and 0.0014% for excess sample in the tube. (Goswami, 2016)

In order to keep everyone on the same page regarding patient identification, this crucial safety measure is in place. Asking the patient open-ended queries such as "What is your name and birthdate?," which allow for direct identification, is useful when dealing with conscious patients. Among the three identities recommended by the Preanalytical Phase Working Group of the King Abdullah Medical City (KAMC)—Mecca for Clinical Chemistry and Laboratory Medicine—is the use of the patient's entire name, as certified by the designated individual, sometimes called the "verifier." Positive patient-sample matching must occur at the time of collection. Following sample collection, not before, the recommendations stress that the patient should be present when tubes are labelled. (Chen, B.H., 2012)

A wrong choice of tube might lead to clotted samples and an incorrect measurement of sample volume. Temperatures that are too high or too low could also cause test specimens to be rejected. Clotting has degraded the specimen's integrity, rendering it unsuitable for inspection. Inadequate volume for testing occurs when collection tubes are underfilled, and clotting may occur when the sample-to-anticoagulant ratio is too high. It follows that the specimen may be rejected if any of these errors were to occur. (Wang & colleagues , 2016) If the blood is not drawn into the tube to the recommended extent, the specimen's integrity might be compromised during processing and transportation, leading to erroneous test findings. Avoid freezing whole blood samples to avoid red blood cell (RBC) haemolysis. In order to keep samples from spoiling, it is important to keep them out of hot environments, such as summertime drop boxes and postal cars.

Transport and management of specimens

Several preanalytical processes employed when preparing and managing laboratory specimens might lead to inaccurate test outcomes. Precise results from tests necessitate sticking to all the correct procedures for data gathering and processing. Following established protocols is essential for phlebotomists to ensure their work is accurate. It is ideal to get samples sent to the lab as quickly as feasible. On rare occasions, samples may need to be refrigerated or protected from extremely high temperatures and light in order to keep them intact. In the articles that were analysed, a delay in sample delivery to the processing facility occurred around 0.003% of the time. (Lippi, 2016)

If you want to check the form of your blood cells, you should look at your complete blood count (CBC) specimen within six hours after collecting it. The MCV, RBC count, and mean cell haemoglobin concentration can all rise when whole blood specimens are subjected to severe temperatures, rendering the CBC specimens unsuitable for analysis. When storing samples for later examination, keep them between 2 and 4 degrees Celsius. If any of the above factors are suspected to have affected the results, it is advised to collect a new patient sample. "(Ercan , 2013)"

Processing and preparation of samples

One of the most important steps in a haematology laboratory's testing procedure is sample preparation to provide reliable findings. In this way, we know that the results of these analyses will be a true reflection of the analyte concentration in the patient's blood. According to (Corrons-Vives , 2017) One example of incorrect sample processing is the use of sodium citrate tubes for coagulation tests that do not adequately centrifuge whole blood. Within two hours of collection, the plasma must be fully depleted of red blood cells and platelets. The results of the coagulation research might be at risk if the tubes are not spun fast enough or for long enough to prevent these cells from remaining in the plasma, although undetected.

Laboratory, medical, and research results can be seriously compromised by careless sample handling, which in turn affects their validity, accuracy, and dependability. The articles that were analysed had about 0.816% clotted samples and 0.146% hemolyzed samples. Contamination, coagulation, and haemolysis are the primary areas of focus in the following description of possible consequences: (1) Incorrect results from the tests: Possible factors that might affect the sample's composition and lead to erroneous test results include haemolysis (the breaking down of red blood cells), clotting, or contamination. Misdiagnosis, inefficient therapy, and neglected or delayed therapies can all lead to patient harm. (2) Incorrect sample handling can lead to erroneous results in tests, which could lead to unnecessary medical treatments or a wrong diagnosis. (3) Wasting Resources: In the event that misleading test results arise from improper sample processing, it may be necessary to recollect samples and conduct new tests. (B. Pavani, 2016) The time, energy, and resources of patients and healthcare providers are wasted, and the validity of the study is compromised, which impacts the results. Poor sample management can lead to inaccurate data, flawed statistical analysis, and unreliable outcomes. Ethical and legal issues, particularly in healthcare contexts, might arise from inappropriate sample administration. Patients have a right to expect reliable testing results, and medical professionals and institutions might face legal consequences for negligent sample handling.

Techniques to avoid preanalytical mistakes

Systems for managing quality

Reducing preanalytical errors in sample handling and processing requires the use of quality management systems. The major components of these systems are standard operating procedures (SOPs), frequent audits, and timely staff education programs. Standard operating procedures (SOPs) guarantee that all employees and departments handle samples consistently. This not only keeps the quality of sample management at a high level but also makes it less likely that mistakes caused by different procedures would occur. Once errors have been found, steps may be taken to fix them and prevent them from recurring again. Staff members are equipped with the knowledge, skills, and information needed to efficiently handle

samples when employee education sessions are arranged and executed on a regular basis. Labs should undergo regular audits, either from inside or outside the organisation, to find out what kinds of preanalytical issues they have, how they've dealt with them, and how well their quality management system is working. For this reason, preanalytical errors can be minimised by establishing and adhering to a quality management system in the laboratory. Patient safety is enhanced as a result of a decreased likelihood of inaccurate diagnosis and improper treatment. (Per Arslan , 2017)

Training and education for employees

Training should focus on the correct ways to collect, transport, and prepare samples. In order to carry out their responsibilities competently and consistently, laboratory personnel should stay current on all relevant standards and best practices. Lab workers get a better grasp of the preanalytical process through regular training sessions, which improves the reliability of test findings. (Hjelmgren , 2016) Staff members in the laboratory are able to efficiently identify the root cause of errors and effectively address the subsequent issues because of the regular training they get. They get good at dealing with problems with sample quality and figuring out where the problems may be coming from. The training sessions provide a wonderful environment for the laboratory staff to work together and communicate more effectively.

Automation and technology

A vital use is the automated specimen labelling system, which takes the role of technicians manually marking specimens. These systems prevent incorrect labelling or data input by efficiently linking patient and sample data using barcode or RF identification technology. The overall accuracy of the testing workflow is maintained by automating the labelling step, which significantly reduces the threat of sample mismatches and inaccurate patient identification. Furthermore, electronic data capture technology has transformed the preanalytical stage of data management by making it simpler to obtain patient, test, and sample information in real time. (Iqbal, MS, 2017)

To further streamline the process of handling and preparing specimens, automated specimen processing equipment has been implemented. These devices reduce the risk of contamination or haemolysis by centrifuging and aliquoting samples with precision. We can ensure the quality and consistency of the test findings by automating these time-consuming operations, which considerably limit the potential of human mistake. The total efficiency of preanalytical operations is increased by automation and technological integration, which also reduces the rates of human error. Automated systems can handle more samples in less time, allowing medical professionals and patients to get laboratory findings more rapidly.

Cooperation and dialogue

Accurate and prompt patient treatment is only possible when medical professionals participating in the preanalytical stage work together and communicate effectively. This collaboration involves phlebotomists, laboratory workers, and clinicians. Clinicians, as the first point of contact for patients, rely on reliable results from laboratory tests to make educated decisions on diagnosis and therapy. (Huang , 2015)In order to ensure that the laboratory orders the correct tests and is aware of any unique considerations or concerns, clinical personnel should keep an open line of communication with the laboratory staff. The effective collaboration between phlebotomists and doctors ensures that the right tests are taken and that any specific

requirements or time-sensitive testing are given priority. (T.F. Ashavaid , 2015)

Technicians and technologists work in laboratories and are responsible for processing and analysing specimens. Their competence establishes the validity and reliability of the test results. Collaborative discussions between phlebotomists, doctors, and laboratory personnel can include clinical situations, patient medical histories, and specific testing needs. As a consequence of everyone's combined efforts, lab workers can spot anomalies and put the findings in the right clinical context. When medical staff work together and communicate well, they may be able to share patient records more readily. A thorough explanation, possible retesting, and informed patient care decisions can result from timely communication in the event of discrepancies or issues during the preanalytical process or the interpretation of test results. Furthermore, it encourages a respectful and collaborative work environment, which are crucial in a healthcare facility. (R.D. Le , 2017)

CONCLUSION

All laboratories still deal with the serious issue of pre-analytical errors, even if the majority of the factors that contribute to them are outside their control. We can lessen their impact, but we can't get rid of them entirely. If a haematology lab wants to improve patient care and the accuracy of their results, they should implement a quality management system, train their employees, conduct periodic audits, and automate the pre-analytical step. It is essential to standardise laboratories in terms of the error rate across the whole testing process. Barcoding samples is essential, as is regular training for sample collectors, and making full use of the vacutainer system's evacuation tubes. Following proper laboratory procedures can greatly decrease the occurrence of pre-analysis errors. This may be avoided by formal training and continuing medical education programs for paramedical and laboratory staff, as well as through better communication and collaboration between the lab and the wards. Other factors to consider include the intervening circumstances that could impact laboratory results.

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