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Factors affecting to degenerate clinical samples received for Clinical Biochemistry laboratory at the Medical Research Institute, Sri Lanka

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The quality of a patient's sample collection, handling, storage and transport to the testing laboratory affect the outcome of the diagnostic test. Laboratory testing can be broadly categorized into three phases: pre-analytical, analytical, and post-analytical. Notably, a significant portion, around 70% of laboratory errors originate from the pre-analytical phase, resulting in suboptimal samples. Analysis of factors affecting to degenerate clinical samples will help us to improve the overall quality of samples. This research endeavor aims to pinpoint the contributing factors behind the rejection of unsatisfactory samples within the Clinical Biochemistry Laboratory at M.R.I. Unsatisfactory samples rejected by the clinical biochemistry laboratory, M.R.I., at the reception of the samples from January 2021 to December 2022 have been included in the study. Throughout this period, a total of 31824 samples were received in 2021, and 28544 samples were received in 2022. The total number of samples received by the laboratory during the study period was acquired from the Laboratory Information Management System (L.I.M.S.), and details of rejected samples were extracted from the specimen rejection register. Detailed analysis revealed several factors, such as haemolysis (37.3%), Incomplete details of the request form (22.0%), clotting (12.9%), and insufficient volume (7.1%), as key culprits for unsatisfactory samples. Notably, the prevalence of pre-analytical errors resulting in sample rejection within the biochemistry laboratory at M.R.I. during 2022 is lower compared to 2021 (0.75% in 2021 and 0.66% in 2022). Specifically, haemolysis emerged as the primary concern, constituting 37.3% of total rejections in 2021 and 29.3% of total rejections in 2022 during the pre-analytical phase. HbA1C test samples exhibited the highest percentage of rejections, 30.7% and 46.6% respectively in both years. In conclusion, haemolysis stands out as a primary error within the pre-analytical phase. The findings of this study demonstrate the progressive mitigation of pre-analytical errors, with a noticeable enhancement in 2022 relative to 2021. Haemolysis may be due to errors in phlebotomy, sample storage, and transportation. Recommendations include analysing the root causes of haemolysis and providing additional training to hospital staff to decrease sample rejection rates attributed to pre-analytical errors.

Keywords: Clinical Biochemistry Laboratory, Haemolysis, Pre-analytical errors, Unsatisfactory samples