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Development of a Novel RBC Histogram and a RDW-CV Parameter for Improved Diagnosis and Monitoring of Iron Deficiency Anemia using a Computatational Mathematical Tool

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Reduced amounts of body iron stores lead to Iron Deficiency Anaemia (IDA), often because of blood loss or pregnancy. IDA progresses in stages and it continues to be an important global health issue impacting people of all ages and nationalities. RDW-CV carried under complete blood count (CBC) plays a crucial role in the differentiation of iron deficiency anaemia (IDA) from thalassemia minor. It reflects the degree of anisocytosis and the results are interpreted in values along with RBC histograms. Since the RDW-CV is elevated in other diseases that associate with the inflammation, all-cause mortality and post red blood cell (RBC) transfusion cannot be used as a specific indicator for IDA. Therefore, various research groups have attempted to modify the RDW by combining with the other RBC parameters in different iron deficiency (ID) and IDA states. In such grounds, this review describes the possibilities of developing a novel RBC histogram and a RDW-CV related parameter by modifying the existing histogram and a RDW-CV. The pathway of developing the said parameters will be discussed. Once developed, it is expected to use it as a computational mathematical tool to study the response of the iron treatment of IDA to those who are undergoing iron treatment. Furthermore, new avenues are expected to be created to the novel RBC histogram and the RDW-CV to be applied in a wide range of inflammatory diseases that are associated with the elevated RDW-CV.

Keywords: *Iron Deficiency Anaemia (IDA), Red Blood Cell Distribution Width-Coefficient of Variation (RDW-CV), novel RBC histogram, computational & mathematical tools*