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Letter to the Editor

Author response to comment on: Hematological parameters and early-onset coronary artery disease: a retrospective case-control study based on 3366 participants

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Dear Editor,

We are grateful to Dr Frater for taking an interest in our article and for providing insightful comments.[1]

The red cell distribution width (RDW) is a crucial part of the complete blood count (CBC) as it measures the degree of variation in erythrocyte volume. Specifically, it is calculated as the percentage of the red cell volume's standard deviation divided by the mean corpuscular volume. Over the past two decades, extensive studies have elucidated the correlation between RDW and cardiovascular disease. These studies have yielded some evidence supporting RDW as a promising predictor and prognostic marker in diverse cardiac conditions, including heart failure, coronary artery disease (CAD), and arrhythmia. Nonetheless, the moderate sensitivity and specificity of RDW limits its clinical usefulness as a predictive factor for adverse clinical outcomes. The association between RDW and CAD is often described as a phenomenon; however, the underlying pathophysiological mechanisms of this relationship are potentially intricate. Chronic subclinical inflammation is a well-documented condition that often occurs prior to the onset of cardiovascular events. It has the potential to adversely impact erythropoiesis through various mechanisms. For instance, the release of immature red blood cells into the peripheral blood circulation due to inflammation can lead to anisocytosis.[2] Moreover, it is possible that high oxidative stress levels and nutritional deficiencies might lead to an elevation in RDW, which could potentially be implicated in the pathogenesis of CAD.[3] In addition to the aforementioned factors, there may be many other unknown variables that could impact RDW, and eliminating numerous confounding variables when analyzing correlations is a challenging task. It must be acknowledged that the world presents us with far more uncertainties than we can understand.

The preanalytical and analytical phases are two critical stages in the laboratory testing process. They are essential in obtaining accurate and reliable laboratory results. The preanalytical phase encompasses all the steps and procedures that occur before the actual analysis of the specimen in a laboratory. Factors such as improper collection techniques, incorrect sample handling, delays in transport, or inadequate sample preparation can significantly affect the accuracy and reliability of the laboratory results and compromise the quality of the test results. The analytical phase refers to the actual analysis of the specimen in the laboratory. The analytical phase requires skilled laboratory professionals who follow standardized protocols and quality control measures to ensure accurate and precise measurements are obtained. Quality control checks, calibration of instruments, and adherence to standardized testing procedures are essential elements for the analytical phase. Therefore, Dr Frater's perspective is reasonable because every operational step in preanalytical and analytical phases has the potential to act as a confounding factor that may affect

RDW measurement. However, to date, there is still a lack of systematic research on how the variables in the preanalytical and analytical phases specifically influence the RDW.

A significant benefit of conducting retrospective case–control studies is the capacity to include a greater number of samples. Although confounding factors cannot be entirely eliminated, the inclusion of large sample sizes and a control group can be advantageous in reducing their impact.[4] For preanalytical quality control, all specimens were collected using EDTA-K_2 anticoagulant blood collection tubes on the morning of the second day of admission. Trained nurses collected the specimens and ensured the time of collection to arrival at the laboratory was relatively consistent (at <2 h). The specimens were promptly analyzed upon their arrival at the laboratory. We have also noted a previous research report stating that the coefficient of variation for RDW remains consistent within 8 h after blood collection at room temperature.[5]

The Sysmex XN series automated hematology analyzers are extensively utilized worldwide in clinical testing and scientific study. To ensure precise and reliable test results during the analytical phase, our clinical laboratory implement stringent quality control measures. These measures encompass rigorous calibration and performance verification of the automated hematology analyzers, along with real-time monitoring of temperature and humidity, all in accordance with the instrument's specifications. Laboratory staff diligently adhere to standardized operating procedures (SOP) documents, guaranteeing the consistent execution of instrument operations. In addition, daily internal quality control assessments and analyses are conducted to ascertain the accuracy and reliability of the testing process. Consequently, clinical samples are only tested when the internal quality control measures meet the established standards. Our laboratory participates in the semi-annual external quality assessment for blood cell analysis, with consistently satisfactory results over several years. While there are multiple quality control measures in place during the analytical phase, it cannot be denied that the existence of confounding factors may affect RDW measurement. These confounding factors may sometimes go beyond our imagination, such as the impact of laboratory power voltage stability.

The prevalent use of automated blood cell analyzers has ignited significant interest in researching RDW.[6] The reason behind this trend may stem from the fact that CBC is a standard test in clinical laboratories, and RDW serves as an affordable and straightforward indicator. Nevertheless, further exploration is necessary to unearth the unrevealed secrets of RDW's potential association with various pathophysiologies.

Declarations

Ethics approval and consent to participate
Not applicable.

Consent for publication
Not applicable.

Author contributions
Chao Xuan: Investigation, Data curation, Writing the manuscript.

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