49th Annual Conference of ISBTI
TRANSCON 2024
Educate, Excel, Elevate, Empower

Poster ID : ePoster040

Analysis of Hemoglobin values estimated using Portable hemoglobinometer and Automated Haematology Analyser in Blood Donors

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Background:

Hemoglobin (Hb) estimation in blood donors is an essential part of the donor screening to ensure both donor safety and the quality of donated blood. Adequate Hb level shows that the donor has enough iron reserve to donate without risking anaemia. It prevents anemic blood donor to donate blood. This also ensures that the patient who received packed red cell transfusion has optimum hemoglobin dose. Hb estimation is a crucial step in blood donor screening. In India accepted donors must have Hb level of ≥12.5 gm/dl to donate blood as per the Drug and Cosmetic Act, 1940 rules 1945 amended from time to time, below this level of Hb donors are often deferred from donation.

Various methods of hemoglobin estimation have evolved over the period of years. Today we have various options like CuSO4 specific gravity, HemoCue as Portable hemoglobinometer and automated hematology analyzer methods for hemoglobin estimation in blood donors. The gold standard method for hemoglobin estimation is cyanmethemoglobin method.

Objective:

The primary objective of this study is to evaluate the performance, accuracy, and practicality of portable hemoglobinometer and automated haematology analyser

Materials & Method:

In This analytical study, total of 95 donors were randomly selected and their capillary and venous blood samples were collected.

- For capillary sample a finger prick was made using a sterile disposable needle after thorough cleaning with a spirit swab. The first drop was wiped and the second drop was used to fill the hemoCue microcuvette. The cuvette was placed in the hemoCue device and hemoglobin level was recorded. Container of the cuvette was closed in between measurements.
- Separate venous sample was collected from each donor in EDTA vials. Hb estimation of venous blood was done by Automated Haematology Analyser. Both data were collected, analysed and expressed as 95% confidence interval

Result:

The HemoCue and Automated haematology analyser's results correlated well. Table 1 shows data of Mean and Standard deviation of two methods and table 2 shows data of confidence interval for same.

Method	Mean	Standard Deviation
Capillary sample by hemoCue	13.96 gm/dl	1.81
Venous sample by automated hematolology analyser	14.14 gm/dl	1.85
Difference between two methods	0.2 gm/dl	0.9

Tab.1 Mean and Standard deviation of Capillary hemoCue and Venous cell counter

Method	Confidence Interval
Capillary sample by hemoCue	13.96 ± 0.03 gm/dl
Venous sample by automated hematolology analyser	14.14 ± 0.04 gm/dl

Tab.2 Confidence Interval for both methods

Conclusion:

Hemoglobin levels given by HemoCue were within acceptable range of Hb level confirmed by Automated Haematology Analyser for same donors. Hence, HemoCue's practicality in on-site screening ensures accuracy, accessibility and rapid assessment, supporting blood donation efforts across diverse settings

- Although hemoglobin measured by automated hematology analyzer is gold standard but it is not easy to transport, requires electricity and venous blood sample. While HemoCue is portable, easy to transport, battery operated instrument, fingerprick capillary blood sample required and easy to use with minimum staff training.

As we discussed above , we concluded that HemoCue as portable hemoglobinometer is reliable for point of care screening for blood donors.

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