Accuracy of haemoglobin estimation by non-invasive Pulse Co-oximetry method: A prospective observational study among Neonates, Children and Young Adults

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Abstract Background: At present, laboratory estimation of haemoglobin requires withdrawing of blood; a quick non-invasive technique without the requirement of blood sampling could be an ideal alternative provided it can consistently generate accurate values in the different subsets of the population.

Aims & Objectives: The aim of this study was to evaluate the accuracy of non-invasive pulse co-oximetry based haemoglobin estimation (SpHb) in comparison with invasive laboratory-based haemoglobin values (IHb) with an objective to find out the feasibility of applying non-invasive Pulse Co-oximetry method for bed side haemoglobinometry.

Study Design: This was a prospective, comparative and observational study; each subject when having their Hb estimated by auto-analyzer acted as a control in a cross over manner. Setting: This study was conducted in various clinical settings of K P C Medical College & Hospital, Jadavpur, Kolkata. Materials and

Methods: Two hundred and twenty-five haemodynamically stable patients of different age groups from both sexes, divided into 3 equal groups of 75 patients each (Group 1 – neonatal population, Group 2 – patients around 10 years of age and Group 3 – patients around 20 years of age) were included to complete this study in a cross-over manner.

Statistics: Data were tabulated in the computer and were later analyzed with statistical Student's t-test and Chi-Square test for parametric data and categorical data, respectively. P value of <0.05 was taken as significant.

Results: Neonatal mean SpHb was insignificantly higher (p = 0.90) than the IHb (14.39 ± 1.23 g/dl vs. 14.38 ± 1.05 g/dl); whereas, mean SpHb values were insignificantly lower than that of IHb in both the groups having ages around 10 years [p=0.28; (11.25± 0.67 g/dl vs.11.30 ± 0.78 g/dl) and around 20 years [p=0.49; (12.89 ±1.7 g/dl vs.12.93 ± 1.78 g/dl).

Conclusions: Therefore, our study demonstrates that non-invasive pulse co-oximetry based haemoglobin estimation method (SpHb) is feasible in clinical setup and can generate comparable values to that of invasive laboratory-based auto-analyzer method of haemoglobin estimation (IHb) in a population of neonates to young adults.