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# Platelet Count: Automated Versus Manual Estimation On Blood Smear In Sree Balaji Medical College, Chennai, Tamil Nadu, India.

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**ABSTRACT**

To evaluate the accuracy of manual platelet count by comparing the results of platelet count using the automated counter with the manual method using blood smear for the same sample at the same time in the central lab at sree balaji medical college. This is a cross-sectional study, which was conducted at SBMCH, where we randomly selected blood specimens of patients which we recieved in our central lab, from june to september 2015. Platelet is counted by the automated method and the manual method simultaneously. The manual method for counting platelet gives values that are not significantly different from the counts by the automated method on the Sysmex KX21 automated counter at $p < 0.05$. Though the platelet count values with the manual method are slightly higher than the automated method; it is a reliable technique. The study concludes that the traditional method of estimating platelet counts from blood smears to evaluate automated results appears to provide adequate quality assurance.

**Keywords:** Platelet counting; Automated method; Manual method;

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## INTRODUCTION

Platelets have proved more difficult to count than red or white cells [1]. Platelets are small anucleate cell which helps in generation of thrombin.In the smear made from anticoagulated blood and stained with Leishman's stain, platelets appear as small, pinkish, oval to round structure.

Normal platelet count is 150-400x$10^9$ Platelets per liter of blood [2]. The count is higher in women.Since many laboratories use automated instruments that count a platelet along with other cells. To get an accurate platelet count by the use of an automated analyzer may be misinterpreted by the presence of particles of similar size and/or light scatter properties (red cell fragments, microcytic red cells, apoptotic white blood cell fragments) and by giant platelets and platelet clumps [3]. Platelet counts can be done manually using a hemocytometer, blood smear and a microscope.

### Objectives

To evaluate the accuracy of manual platelet count by comparing the results of platelet count using the automated counter with the manual method using blood smear for the same sample at the same time in the central lab at sree balaji medical college

## MATERIAL AND METHODS

This is a cross-sectional study, which was conducted at SBMCH, where we randomly selected blood specimens of patients which we recieved in our central lab, from june to september 2015.

200 blood specimens were randomly selected in EDTA anticoagulant Vacutainer tubes of patients more than 25 years old coming to the laboratory with any diagnosis during the study period.

Age and gender of the patients were taken from the lab requests form.All sample was given a numeric identifier.

The specimens were processed by trained haematology technician

### Automated Method

Each blood specimen is mixed on an automated mixer for 10 min, a CBC including the platelet count was analyzed using the well maintained and calibrated automated hematology analyzer, Sysmex KX21.

### Manual Method

Thin air-dried blood smears made and were stained manually with a Leishman's stain and examined under light microscopy with X100 oil-immersion lens. The slides were scanned for platelet aggregates and/or giant platelets and, if present, the specimens were excluded. platelets were counted by the average number of platelets seen per 100x oil immersion field in the single layer. 10 oil immersion fields were counted and the results averaged . Then the following formulawas used:

Estimated platelet count/µL = average count in 10 fields x20,000.

The processing of the data was performed using the (SPSS 18).

Simple regression analysis and coefficient of determination (r) for correlation analysis between the two methods was used. All tests were applied at a level of significance ($\alpha$=0.05). P-values of $\leq$ 0.05 were considered as statistically significant.

The mean for the automated platelet count was 290,000/µL, the manual platelet estimation gave a mean of 284,000/µL.

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## RESULTS

The manual method for counting platelet on blood smears gives values that are not significantly different from the counts by the automated method on the Sysmex KX21 automated counter at $p < 0.05$. The platelet count values with the manual method are slightly higher than the automated count, but are accurate enough to provide platelet count values from peripheral blood smears for quality assurance purpose.

**The results are:**

| Number of patients | Group | Platelet count |
|---|---|---|
| **142** | Normal | 150-450 |
| **37** | Low | Less than 150 |
| **21** | High | Greater than 450 |

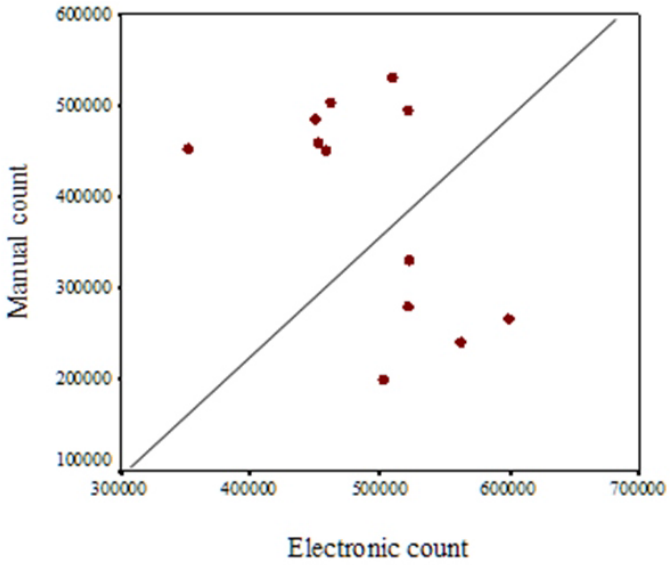


**Figure 1: Samples of high platelet count by the manual method Versus the automated method (n= 21)**

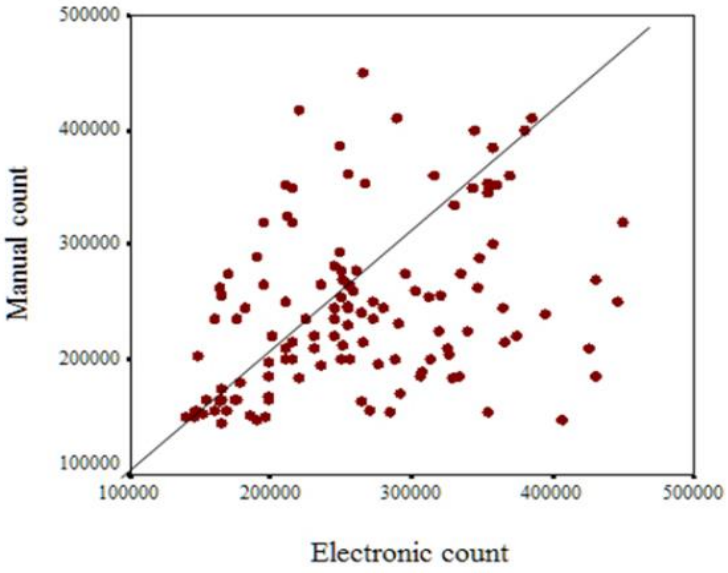


**Figure 2: Samples of normal platelet count by the manual method Versus the automated method (n=142)**

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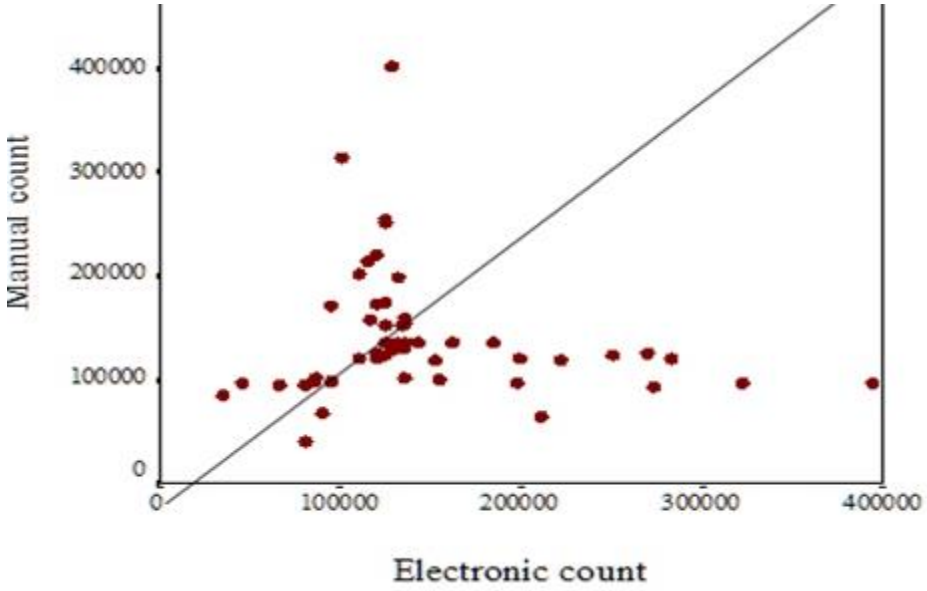


**Figure 3: Samples of low platelet count by the manual method Versus the automated method (n=37)**

## DISCUSSION

Accurate platelet count by the use of an automated hematology analyzer may be difficult due to the presence of particles of similar size or light scatter properties (white blood cell fragments ,microcytic red cells) and by giant platelets and platelet clumps or aggregates [4]. Even the most expensive and accurate hematology analyzers are not designed to avoid peripheral blood smear study, and platelet counts should be validated [5].

Using the manual method of platelet count estimation on thin air dried blood smears appears to have good accuracy to provide quality assurance; some authors stated the risk of error estimated up to 10-20% [6]. But, automated method is fast, taking only few minutes per patient, with good precision.

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