

**Universal Precautions - In Haematology Practicals and Their Benefits**

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**Introduction**

Human blood, blood products, unfixed human tissue and certain body fluids should be handled with universal precautions and care as they can be infectious due to bloodborne pathogens. Universal Precautions, Environmental Health and Safety of Stanford university states that Universal Precautions include- frequent hand

washing, no mouth pipetting, no food or drink in the lab and proper disposal of biomedical waste (1). In the recent Biosafety Primer 2018 of Food and Agricultural Organisation (FAO); Laboratory Code of Practice states that mouth pipetting should not be used under any circumstance.(2).

In India, every year health science students admitted in medical, dental, pharmacy and paramedical courses (medical laboratory technology) do haematology practicals in physiology and pathology. In haematology practicals they do haemoglobin concentration, total white blood cell (WBC) count, total red blood cell (RBC) count and platelet count. A recent article in American Journal of Physiology - Advances in Physiology Education by Dr Savitha and Dr Taniya (Physiology department, St. Johns Medical College, Bangalore, Karnataka, India.) stated that their Ist MBBS students felt haematology practical work is a necessary part of their training. 96 percent of students noted that haematology practicals helps them to understand physiology of blood. 86 percent of their students noted that there is relevance of haematology practicals in clinical practice. Haematology practicals, helps the students to understand physiology of blood, and also to notice the difference between normal and abnormal values, improves their knowledge, skills, attitude; and also helps them empathetic and more confident doctors.(3).

In haematology practicals, Haemoglobin pipette, RBC pipette and WBC pipette are used in India and neighbouring countries. These glass pipettes have plastic tubes attached to the upper end of pipette and a mouth piece at the other end of plastic tubing (Fig 1). Mouth pipetting is done for collecting blood sample by finger prick and also for drawing dilution fluid to mix the blood. These pipettes are also used in primary health centres and small private diagnostic laboratories. The first recorded incidence of laboratory infection due to mouth pipetting was noted in 1893 (7). The two major hazards due to mouth pipetting are due to accidental aspiration of blood or fluid in the pipette and

contamination of the mouthpiece from practical performer's contaminated finger (7).

Many text books for practical physiology and practical pathology describe the use of mouth pipetting for collecting blood sample by finger prick (by Haemoglobin pipette, WBC pipette and RBC pipette) and also to draw diluting fluid in these pipettes (4-6). Mouth pipetting is still used in many clinical laboratories and it has been used in various studies (8-10).

In a recent article, Dr Kanchana and Dr Pushpa used mouth pipetting to estimate haemoglobin in Ist MBBS students to study prevalence of anaemia (10). In many hospitals a complete blood count is performed by running a blood sample on an automated analyzer which is rapid and more accurate.

Medical Council of India (MCI) in Foundation Course for the Undergraduate Medical Education Program has suggested that biosafety and universal precautions should be followed (11). MCI has stated that Hb estimation, RBC count, and WBC count should be done by Ist MBBS students and these are considered for level of competency- Shows How (SH- interpret, demonstrate a complex procedure requiring thought, knowledge and behaviour). These practicals have to be conducted in DOAP (demonstration, Observation- Assistance- Performance) sessions (12).

According to World Health Organization (WHO) essential biosafety equipment like pipetting aids should be used in haematology practicals to avoid mouth pipetting (13).

Recently, we have shown that haemoglobin pipette with rubber bulb can be used as pipetting aid to avoid mouth pipetting (fig 1 Haemoglobin pipette with rubber bulb (Borosil) and glass capillary) (14).

For total WBC count and total RBC count. Dilution for WBC count and RBC count is 1: 21, and 1: 201 respectively. Diluting fluid can be taken in a test tube with the help of glass bottle top dispenser or 0.5, 1 and 5 ml syringes. After adding blood sample to the test tube containing diluting fluid, mixing can be done by gentle shaking and also with the Glass capillary. Glass capillary can be used to charge the Neubauer chamber. This helps in avoiding dilution and charging errors. Haemoglobin pipette is accurate in volume (20 microliter) and easier to clean. 10 microliter blood sample can also be collected by Haemoglobin pipette for Blood cell count (15). Thus, mouth pipetting can be avoided with a simple modification of haemoglobin pipette with rubber bulb for haemoglobin estimation and blood cell count. This modification will be of great help to students as they will be able to avoid mouth pipetting in haematology practicals. This modification will be of great help to students as they will be able to avoid mouth pipetting and observe universal precautions in haematology practicals. Haematology practicals have many benefits like understanding of physiology of blood and they are relevant in clinical practice.

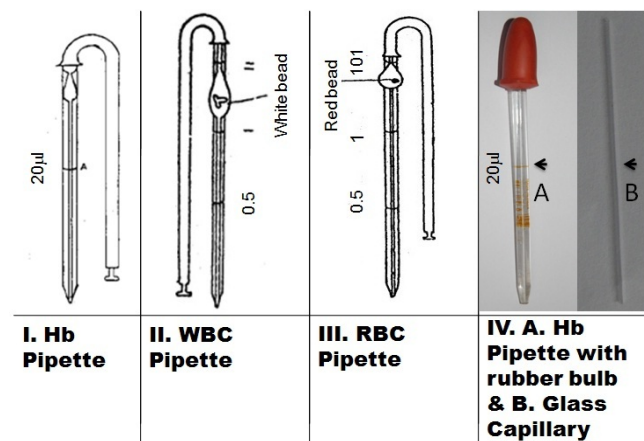


Fig.1. Pipettes

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