

# Vertical Integration: A Teaching Tool of Anaemia in Pregnancy

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**Abstract- Background :** A medical student has more than just academic needs. A medical student needs to understand the basic preclinical subjects and in a short span of one year translate it into patient care. A problem based learning method was initiated in the final year curriculum of medical students to integrate the basic knowledge of anaemia in pregnancy with the final outcome of reducing maternal deaths due to anaemia in pregnancy.

**Methods:** All the basic sciences and their translation into clinical skills was explained pertaining to the problem of anaemia in pregnancy. Plenary discussion of each clinical case of anaemia in pregnancy was done in a galaxy of experts from each department.

The teaching faculty of the Department of physiology, biochemistry, pathology, community medicine, Haematology, General Medicine, Anaesthesia and Obstetrics and Gynaecology, provided a learning module in the Web forum of University website for the final year medical undergraduate students. The students were able to comprehend anaemia in pregnancy from its basics and decide on the relevant clinical implications. A case based discussion was done the constellation of experts from all disciplines of Medicine. This was followed with Mind Mapping of concepts developed. Pretest and posttest helped the teaching faculty to assess the impact of knowledge generated. Feedback was obtained to improve the existing teaching method and develop new teaching tools.

**Conclusion:** Vertical Integration of medical disciplines helps medical students to understand a clinical problem in the light of basic sciences. The modules beginning with the biochemistry of iron metabolism help them to understand higher concepts of Haemoglobin dissociation curve dealt with in Anaesthesia. An elaborate module helps to translate an understanding of social consequences of Anaemia in pregnancy. A well trained medical student can help to reduce maternal mortality due to anaemia in pregnancy.

**Index Terms-** Vertical Integration, Teaching tool, Anaemia in pregnancy, Medical Student, maternal mortality, Medical Curriculum.

## I. INTRODUCTION

Vertical Integration is a new teaching method(1). The basic sciences of Anatomy, Biochemistry, Physiology are taught together with pathology of the disease. Pharmacology of the drugs used to treat the disease is discussed. Surgical and Anesthetic considerations are explained. Finally the disease burden in society and community implications are also high

lighted. Thus major social problems like anaemia can be discussed elaborately leading to reduced maternal deaths.

There have been considerable advances in Teaching (2). Institutes However, maternal deaths as a direct and indirect result of anaemia in pregnancy remained to be high. Routine Teaching methods have to be modified for those community needs that need immediate attention.

This study was designed to study the teaching methods and develop a strategy best suited for teaching anaemia in pregnancy in our institute.

## II. LEARNING PHASES

The learning in a medical profession can be classified as:

- 1) **Preclinical Learning:** In the basic science departments of anatomy, physiology and biochemistry the normal Human body structure, function and biochemical balances are discussed. Having understood the normal mechanisms a medical student is taught about the etio-pathology, signs, symptoms, complications and sequelae of the various ailments affecting mankind. The microbiological basis of disease is discussed. The administration, digestion, metabolism and excretion of each therapeutic drug is explained.
- 2) **Clinical Learning:** Finally a medical student is given clinical cases where the patient with disease is interrogated for symptoms and examined for various signs. A list of investigations to be ordered need to be prepared. A disease process or a list of alternative disease processes has to be detected. The treatment has to be outlined and patient prognosticated.

A medical student is in a quandary of application of basic principals to therapeutic needs of his clinical cases. The amount of knowledge is enormous while the case basics and treatment options relatively less.

## III. VERTICAL INTEGRATION OF BASIC SCIENCES WITH CLINICAL CASES OF ANAEMIA IN PREGNANCY

### *Preparation of learning module*

Induction and Orientation programme was conducted. A team of experts from the Departments of Biochemistry, Physiology, Pathology, Transfusion Medicine, Pharmacology, community Medicine, General Medicine, Obstetrics and Anaesthesia was briefed on the teaching principle of vertical integration. Each discipline provided the clinically relevant

points to reduce maternal anaemia .The final module comprised of

1. Iron and its Metabolism : Dietary absorption, storage, transport and utilisation of iron .
2. Physiology of Iron metabolism : Dietary sources of iron and laboratory investigations of physiological anaemia of pregnancy
3. Investigations done to differentiate physiological from pathological anaemia and type the anaemia
4. Disseminated Intravascular Coagulation following abruption of placenta
5. Management of mild ,moderate and severe anaemia in each trimester of pregnancy
6. Management of severe anaemia in intrapartum and post partum periods
7. Congestive Heart Failure during pregnancy
8. Community Diagnosis of Anaemia and National Nutritional Anaemia Control Programme.

Students were given the learning module in PDF format in Web forum a fortnight before the actual clinical problems were given to them. The medical students were divided in groups to facilitate participatory group based activity. The final module was comprehended in batches of 6 students together in the presence of a teaching faculty.

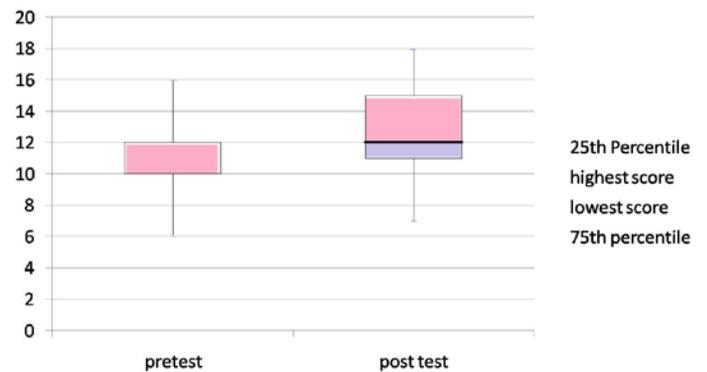
It was inferred that students were more interested and alert when the module was read as a group(3) .A teaching faculty was available to clear doubts in the module.



**Figure 1:Group Based participatory comprehension of Module on Anaemia in pregnancy**

#### *Pretest and post test*

A set of twenty multiple response multiple choice questions were used for pre plenary assessment. The same Questionnaire was assessed after the case based plenary session was over. The scores obtained were plotted using Box charts for pretest and posttest. The median, the 25<sup>th</sup> percentile, the 75<sup>th</sup> percentile and extreme values in pretest and post test group were plotted using Sigmaplot (.Figure 2 )



#### *Case Based Discussion*

Twelve case scenarios of anaemia in pregnancy were given for problem solving to the medical students .Students were divide in six groups Each group of nineteen students was given two cases for Problem Based Learning. The students presented the cases to a galaxy of experts from each department.



The cases given for problem solving provided the first and second triggers to facilitate problem solving

1. A case of severe anaemia at term
2. Parturient with severe anaemia
3. Congestive heart failure at term pregnancy
4. Abruptio placenta with multiple blood transfusions
5. Disseminated intra vascular coagulation
6. Anencephaly baby of a folic deficiency mother
7. Severe anaemia with food faddism
8. Severe anaemia for Caesarean section under general anaesthesia
9. Peurperal sepsis with severe anaemia
10. Intrapartum therapeutic forceps application in severe anaemia
11. A case of thalessemia with iron deficiency
12. Moderate Anaemia in Second trimester treated with parenteral Iron sucrose.

#### *Plenary Session*

The cases were also presented to professors of the disciplines integrated. The experts highlighted that the forceps applied in severe anaemia is therapeutic and not prophylactic as the mother is already in distress. Propped up position and Oxygen inhalation is mandatory during labour .Severe anaemia in any trimester requires blood transfusion .Parenteral Iron sucrose is a useful drug in moderate anemia .Active Management of Third stage of Labour can prevent post partum haemorrhage .Injectable antibiotics use can treat puerperal sepsis with anaemia.

#### *Mind Mapping*

The medical students of each group charted the concepts gained collectively .This was a participatory activity as the students of each group took one chart paper to outline their ideas. They signed their names below each chart . They were able to solve the clinical cases with the basic science preclinical knowledge with only a very little help from clinicians .It was also found as in that participation increased concept comprehension (4,5)

#### IV. CONCLUSION

Participatory learning activities keep students alert and interested. A thorough knowledge of basic sciences is essential for patient dealing .A firm foundation of clinical sciences is already established in the preclinical disciplines.

#### V. Competing interests

We do not have any commercial association that might pose a conflict of interest in connection with the manuscript. We certify that neither this manuscript nor one with substantially similar content under our authorship has been published or is being considered for publication elsewhere.

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