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Education Section

# Utilization of CHC (Complete Health Checkup) Type Charts to Improve the Students' Understanding of Clinical Pathology

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## ABSTRACT

**Background:** Second year undergraduate medical students lack an integrated approach towards the basic laboratory data. So, they find it difficult when analytical exercises are asked for in pathology practical examinations. A Complete Health Checkup (CHC) is one exercise where an individual undergoes a clinical examination, followed by various basic laboratory tests, along with other tests like ECG, X-ray and USG of the abdomen. A critical analysis of such charts would help in developing higher cognitive skills in the form of integration of all the data which is available, in order to arrive at a final diagnosis.

We hypothesized that facilitating the students to analyze a set of clinical pathology tests by using CHC charts as modules would enhance their integrated approach towards the laboratory data.

**Aim:** To evaluate the use of pre designed complete health charts which were designed to enhance the students' ability to apply and integrate their knowledge on the clinical pathology data.

**Materials and Methods:** Two batches of 44 students each (Group 1 and Group 2), who attended the clinical pathology postings, were included in the study (totally 88 students). Informed consents were obtained from all of them. In addition to their routine posting schedules, the students in Group 2 were exposed to fifteen CHC charts, one at a time, with the subsequent analysis of each chart by using an objective test and a discussion. At the end of their clinical pathology postings, an OSPE was conducted for all the students and the test scores were analyzed.

The statistical analysis was done using SPSS, version 15.

**Results:** Group 1 obtained a score which ranged from 48% to 78%, with a mean±SE (mean) of 62.0% ± 1.21 and Group 2 obtained a score which ranged from 65% to 94%, with a mean±SE (mean) of 86.2% ± 0.96. The Student's-t-test for the equality of means with a value of 15.59 (p=0.000), implied a statistical significance in the mean score, as was observed between the two groups.

**Conclusion:** Facilitating the students' learning by using CHC charts helps in improving the students' capacity to analyze and interpret the clinical pathology data and so, it can be utilized on a routine basis.

**Key Words:** Clinical pathology, Undergraduate medical student, CHC charts

## INTRODUCTION

Medical students often encounters difficulties during the application of clinical pathology data [1]. The Medical Council of India has mandated that an undergraduate medical student should not only be able to perform the tests, but that he/she also be able to understand the biochemical and the physiological disturbances that occur as a result of diseases [2].

The under graduate medical students in our college were posted in batches to study clinical pathology during their second year, for a period of about 20 days. During this period, these students were routinely exposed to the various practical exercises in haematology, urine analysis, stool examination and fluid cytology. Though the students developed the skill to perform the tests, they found it difficult during the exams, when the clinical relevance of the tests which were conducted was asked for. They lacked in the clinical application of those tests [3] and also in correlating them with other related diagnostic tests. This obviated the necessity to introduce integrated teaching -learning methods during the clinical pathology training sessions, to ensure the impartation of an adequate analytical knowledge to the learner [1]. A Complete Health Checkup is a health check programme where an individual undergoes a physical examination, followed by various basic laboratory blood and urine tests, along with ECG, X-ray and USG. A critical analysis of the various results which are obtained would help in developing higher cognitive skills in the form of integration and also, it would enhance the holistic approach towards the laboratory data. So, we hypothesized that exposing the students to such complete investigation charts could enhance their capacity to correlate the clinical details with the available lab data.

### Abbreviations

CHC=Complete Health Check up; USG=Ultra Sono Graphy; ECG=Electro Cardio Gram, OSPE= Objective Structured Practical Examination.

## MATERIALS AND METHODS

This study was approved by the Research and Ethical Committee of Sree Balaji Medical College and Hospital, Chrompet, Chennai, India. Eighty eight students (Two batches of 44 each, which were named as Group 1 and Group 2) who attended the clinical pathol-

ogy postings were included in the study. Group 1 had the routine schedule as every batch used to have and at the end of their clinical pathology postings, an evaluation was done by conducting an OSPE (Objective Structured Practical Examination) with 20 stations. Group 2 also had the routine schedule. In addition to that, they were provided with a copy of the Complete Health Chart of a simulated case (modules) at the end of the session every day. They were given a brief introduction about those charts and the details about the homework which had to be done every day with the chart. A list of reference books that were available in the college library was also provided.

**Each chart had the following details:**

Patient details

Relevant clinical details

Complete blood counts which included smear studies

A GTT report or the fasting and post prandial blood sugar tests with HbA1c

Thyroid function tests

Renal function tests

Liver function tests

Lipid profile

Complete urine examination.

Urine Micro albumin

Stool examination

Reports of ECG, X-ray of the chest and USG of the abdomen.

The Mantoux test results and the CSF analysis reports were included for the relevant cases. The charts were formulated in such a way that all the parameters had to be critically analyzed before arriving at a clinical diagnosis. The students were asked to critically analyze the chart during the after college hours and to write their observations in a note book. The next day, the students were asked to answer an objective question paper on that chart.

The questions on the following areas were included: knowledge, reasoning, diagnostics and therapeutics. This was followed by a discussion which was held by the teaching faculty for about 20 minutes. The students in Group 2 were asked to attend the sessions 30 minutes earlier every day, so that their routine schedules were not affected. Fifteen such CHC charts were discussed. A post CP assessment was done for Group 2 by conducting an OSPE with 20 stations.

For both the Groups 1 and 2, 50% of the OSPE stations were procedure stations for the performance of skills (skills stations); 50% were analysis stations where the cognitive exposure to the data analysis and the interpretation of the data were tested. Each station carried a total of five marks with five questions each. The examination was conducted for a total time of 120 minutes (2 hours) for total marks of 100.

**The OSPE scores of the students of the Groups 1 and 2 were graded as follows:**

**Grade I:** ≥75%,

**Grade II:** 60-74%;

**Grade III:** 50-59%;

**Grade IV:** <50%.

The results of Group 1 were compared with those of Group 2. The scores which were obtained by the students were analyzed by using SPSS, version 15.0. The descriptive statistics included percentiles, the arithmetic mean and the standard error of the mean. The inferential statistics of the Student's t test and the Chi square test for the qualitative data (different categories of achievement) with alpha=0.05, and p <0.05 were considered for statistical significance.

## RESULTS

56% students in Group 1 and 52% students in Group 2 were boys. All of them were undergraduate medical students who were in their second year, who were attending the clinical pathology postings. There were hundred percent attendances in both the groups throughout the schedule.

[Table/Fig-1] shows the list of the CHC charts that were used for the Group 2 students during their clinical pathology postings.

Frequency histograms were prepared for the scores which were obtained by both the groups and it showed a Gaussian distribution.

[Table/Fig-2] presents the descriptive statistics of the scores which were obtained by the two groups of students. 44 students who belong to Group 1 obtained a score which ranged from 48% to 78%, with a mean±SE (mean) of 62.0% ± 1.21 and the Group 2 students obtained a score which ranged from 65% to 94%, with a mean±SE (mean) of 86.2% ± 0.96. The Student's-t-test for the equality of means with a value of 15.59 (P=0.000), implied a statis-

| No. | Charts | Numbers |
|---|---|---|
| 1 | Normal | 1 |
| 2 | Obstructive Jaundice due to gall stones | 1 |
| 3 | Hemolytic Jaundice | 1 |
| 4 | Diagnosis of diabetes mellitus based on Blood glucose report | 1 |
| 5 | Diabetes mellitus with dyslipidemia with cellulitis lower leg | 1 |
| 6 | Diabetes mellitus with early nephropathy | 1 |
| 7 | Pyogenic meningitis | 1 |
| 8 | Post streptococcal glomerulo nephritis | 1 |
| 9 | Anemia-microcytic hypochromic with ankylostoma in stools | 1 |
| 10 | Anemia with congestive cardiac failure | 1 |
| 11 | Essential Hypertension | 1 |
| 12 | Acute pyelonephritis | 1 |
| 13 | Diabetes mellitus with dyslipidemia with acute myocardial infarction | 1 |
| 14 | Hypothyroidism | 1 |
| 15 | Tuberculous meningitis | 1 |

**[Table/Fig-1]:** CHC charts used during the clinical pathology postings for Group 2

| Student Group | N | Range of Scores Obtained | Median | Mean | SE(Mean) | Student –t -test |
|---|---|---|---|---|---|---|
| Group 1 | 44 | 48 to 78 | 61.5 | 62.0 | 1.21 | 15.59 (p=0.000)* |
| Group 2 | 44 | 65 to 94 | 88.0 | 86.2 | 0.96 | |

**[Table/Fig-2]:** Descriptive Statistics for the Scores obtained in OSPE by both the groups *- Statistically significant

| Grades | Group 1(%) | Group 2 (%) | Student –t-test |
|---|---|---|---|
| Grade I (≥75%,) | 31 | 47 | p=0.01* |
| Grade II (60-74%) | 31 | 22 | |
| Grade III (50-59%) | 11 | 13 | |
| Grade IV (<50%) | 27 | 18 | |

**[Table/Fig-3]:** Percentage of Group 1 and Group 2 students in various grades *- Statistically significant

tical significance in the mean score which was observed between the two groups.

The assessment scores were further categorized as grades I, II,III and IV according to the following achievement scale: Grade I: ≥75%, Grade II: 60-74%; Grade III: 50-59%; and Grade IV: <50%. We observed that in Group I, 31% were in Grade I; 31% were in Grade II, 11% were in Grade III and that 27% were in Grade IV, whereas in Group II, 47% were in Grade I, 22% were in Grade II, 13% were in Grade III and 18% were in Grade IV [Table/Fig-3]. The Student's t test was used, which showed a p value of 0.01. It implied that statistically significant differences were observed between the two groups.

## DISCUSSION

Problem based learning is increasingly being adopted in the undergraduate medical curriculum to enable the medical students to develop critical reasoning and for the application of knowledge in an integrated, systematic manner [4]. Teaching laboratory medicine as a part of pathology is a challenging task, because it requires an inter disciplinary approach [5]. The utilization of case presentations to increase the relevant basic science learning at the undergraduate level, has been tried in a few studies [6]. A study introduced "special study modules" on laboratory medicine in the undergraduate curriculum to enhance the practical laboratory education [7]. We opted to utilize tailor-made CHC charts to enhance the analytical approach towards clinical pathology among undergraduates. These charts were prepared in such a way that all the common clinical entities were included [Table/Fig-1].We opted for OSPEs over conventional practical exams at the end of the postings. Few studies have indicated the use of OSPEs over conventional examinations for avoiding an examiner bias and also to have a good discrimination index [8].

From [Table/Fig-2], it is evident that the range, median and the mean of the scores of Group 2 were significantly higher as compared to those of Group 1. The mean score of Group 1 was 62% as compared to 86.2% of Group 2. This indicated that the performance of the students in Group 2 was better as compared to that of the students of Group 1.When it was analyzed grade wise [Table/Fig-3], it was seen that 31% of Group 1 had got scores of more than 75%, whereas 47% of the Group 2 students had got such scores. When the percentage of the scores on "analysis" alone was taken into account, (i.e., scores of the analysis stations alone), 61% students of Group 2 and 52% students of Group 1 were seen to have got more than 75% marks. This showed that the CHC charts had played a significant role in enhancing the analytical approach of the students towards the clinical and the lab data.

## CONCLUSIONS

CHC charts aid in improving the students' capacity to critically analyze and interpret the clinical pathology data and so, they can be utilized on a routine basis during the clinical pathology training sessions. This would help also help the students in ordering relevant and suitable tests during their clinical practice.

**Future recommendations:** A prospective study with more number of students and involving various specialities which include Biochemistry, Microbiology and General Medicine, may throw more light on the utility value of the CHC charts in enhancing the students' analytical capabilities.

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