

Favorable Student Attitudes Towards Pharmacology in a Medical College in Western Nepal

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ABSTRACT

Traditional pharmacology teaching in medical schools does not adequately prepare the student for rational practice. Recently a number of modifications have been introduced in pharmacology teaching and learning. At the Manipal College of Medical Sciences, Pokhara, Nepal pharmacology is taught in an integrated manner with the other basic science subjects during the first four semesters of the undergraduate medical course. The present study was carried on second and third semester students during the month of March 2004 to obtain information on student attitude towards pharmacology, feedback on the assessment process, suggestions to improve pharmacology teaching and learning, basic demographic information about the respondents and to note the association, if any, of the student attitudes with demographic variables. Student attitude was assessed by noting their degree of agreement with 15 statements using a modified five-point Likert-type scale. The statements were grouped into those dealing with student attitude towards the subject and those concerned with improvements in pharmacology teaching and learning. The mean total, subject and improvement scores were calculated. Differences in the mean scores among different subgroups of respondents were analyzed ($p < 0.05$). One hundred and thirty-one students participated in the study and successfully completed the questionnaire; 83 were male. The overall student attitude towards pharmacology was positive. Differences in the mean scores were seen among the different subgroups. Differences were also noted in the mean scores of individual statements among different subgroups of respondents. Deficiencies were noted in the system of assessment, which was felt to mainly test factual knowledge. System based assessment using clinical problems, greater number of hospital visits and more problem-stimulated learning sessions were suggested. Improvements in the teaching-learning process and the system of assessment are required to make pharmacology learning more interesting and effective. The sessions on rational drug use should be continued and strengthened.

INTRODUCTION

Pharmacology is a crucial discipline for medical students who are going to be future doctors. It is important that medical students appreciate pharmacological principles and are able to apply them in the practice of medicine.¹ Traditional pharmacology teaching in medical schools is discipline based and teacher-centered with a heavy emphasis on acquiring factual knowledge about drugs² and does not train the student adequately for therapeutics.³

In the last two decades a number of educational programs have been developed to improve the teaching and learning of pharmacology and therapeutics.^{4,5} The World Health Organization (WHO) Action Programme on Essential Drugs has developed a manual for undergraduate medical students

on the principles of rational prescribing.⁶ Students are taught about a standard pharmacotherapeutic approach to common disorders resulting in a set of first-choice drugs, called personal or P-drugs. They are also taught how to personalize the set of P-drugs to specific patients.⁷

Students should develop 'transferable skills', which are important, not only in undergraduate medical education but also for continued learning throughout their medical career.⁸ The student should be able to solve therapeutic problems, prescribe appropriate drugs for disease conditions and communicate meaningfully with the patients.

Problem-oriented teaching can help students appreciate the relevance of the acquired information for appropriate prescribing.² Problem-based learning (PBL) has been

gaining ground in medical education.⁹ Some medical schools have completely switched over to PBL, whereas others use PBL in conjunction with lecture-based learning (LBL).¹⁰

At the Manipal College of Medical Sciences (MCOMS), Pokhara, Nepal from August 2003, we started to admit 75 students each semester (months of January and August) for the undergraduate medical course (MBBS). Before that we used to admit a batch of 100 students once a year. The students are taught Pharmacology in an integrated manner with other basic science subjects (Anatomy, Physiology, Biochemistry, Microbiology, Pathology and Community Medicine) during the first four semesters of study. The students are mainly from Nepal, India and Sri Lanka with a few non-resident Indians (NRIs) from other countries. The Nepalese students are selected on the basis of an entrance examination while others are selected on the basis of their high school (twelfth standard) marks and their performance before an interview board constituted by the college.

Pharmacology teaching takes place through didactic lectures and problem-stimulated learning (PSL) sessions. Each semester has three or four lectures per week and students are divided into batches of 18 or 19 for the PSL sessions. Each PSL batch is further subdivided into two groups of nine or ten students each. The students solve problems using the concepts taught in the class and the information resources available in the college library. Students are taught about Essential drugs, the P-drug concept and P-drug selection for specific patients. The revised curriculum of Kathmandu University, to which the college is, affiliated places strong emphasis on self-directed learning.¹¹ The curriculum emphasizes rational prescribing using the WHO Guide to Good Prescribing as the reference standard. Drug use indicators study, assessment of drug promotional materials and communication skills training using simulated patients are taught to encourage rational prescribing.

The students are assessed in all the seven basic science subjects every 15 days. There are separate sets of questions in each subject to be answered in a time period of 30 minutes. There are exams in each subject at the end of each semester and University exams at the end of the second and fourth semester. In the practical examinations, students are assessed on communication skills, clinical problem solving, prescription writing, analysis of promotional materials and drug use indicators.

Studies on the attitudes of medical students towards the crucial subject of pharmacology and therapeutics are lacking in Western Nepal. Such studies are important to obtain student feedback on teaching and learning and to make appropriate changes in the curricula. The present study was carried out to obtain:

- a) student attitude toward the teaching and learning of pharmacology at MCOMS
- b) student feedback on the assessment process in pharmacology
- c) suggestions to improve the teaching and learning of pharmacology and

- d) basic information about the student respondents and note any association of student attitude with demographic and other variables.

MATERIALS AND METHODS

The study was carried out among the second and third semester medical students at MCOMS, Pokhara, Nepal during the month of March 2004. The third semester students were admitted in January 2003 while the second semester students were admitted in August 2003. One hundred third semester and seventy-five second semester students were invited to participate in the study. Eighty-five (85%) third and 46 (61.3%) second semester students successfully completed the study and their responses were taken for analysis.

The students were asked to complete a questionnaire, which consisted of three parts. The first part collected demographic and other relevant information about the student respondents. The sex and nationality of the respondents were noted. Information on whether they had completed a Bachelor's course of study was noted. The profession of the parents and medium of instruction at school was recorded. In South Asia because of the British colonial rule and other factors, there are two media of instruction at school. English medium schools teach different school subjects in English while the vernacular medium schools teach them in local languages. In vernacular medium schools, English is taught as a second or third language. Information was collected on whether mathematics was one of the subjects of study at school (eleventh and twelfth standard levels). Their attitude towards mathematics and chemistry at school was recorded. Information was collected on whether the respondent was a self-financing or a government-selected student. The questionnaire used in the study is shown in the Appendix. The questionnaire was pre-tested in ten respondents and their data was not taken up for further analysis.

The second part of the questionnaire consisted of 15 statements. The respondents had to indicate their degree of agreement with the individual statements using a modified Likert-type scale. The students were asked to score each individual statement using the following key: 1- strongly disagrees with the statement, 2- disagrees, 3- neutral, 4- agrees and 5- strongly agrees with the statement. The students were instructed to use whole numbers only. The statements were grouped together under two main headings: subject and improvement. Statements 1, 2, 3, 5, 9, 10, 12, 13 and 14 dealt with the student attitude towards the subject of pharmacology while statements 4, 6, 7, 8, 11 and 15 measured student agreement with suggestions to improve pharmacology teaching and learning. The mean score for the two subheadings and mean total score for all the statements were calculated for each individual respondent. The overall mean subject, improvement and total scores were calculated from the individual mean subject, improvement and total scores.

Table 1. Mean subject, improvement and total scores according to the sex of the respondents

Sex	Subject score (mean ± SD)	Improvement score (mean ± SD)	Total score (mean ± SD)
Male respondents (n=83)	3.53 ± 0.44	4.09 ± 0.46	3.82 ± 0.29
Female respondents (n=48)	3.46 ± 0.38	3.95 ± 0.45	3.7 ± 0.33
P value	0.329	0.108	0.098

The mean subject, improvement and total scores were calculated for male and female respondents, respondents of different nationalities and graduate and non-graduate respondents. It was also calculated for respondents with doctor fathers and with fathers from other professions, for English and vernacular medium students and for students who did and did not study mathematics at the twelfth standard level. The students were grouped into those whose mothers were housewives and those who were professional working women and those who liked mathematics at school, were neutral to the subject or hated it. The attitude towards chemistry at school was similarly classified.

The mean subject, improvement and total scores were compared among the different subgroups of respondents. The mean scores of the individual statements were compared among the different subgroups of the respondents. Student's t-test was used for dichotomous variables and analysis of variance (ANOVA) for the others. Tukey's Honestly Significant Difference (HSD) test was used as the post-hoc test. A p value <0.05 was taken as statistically significant. The software Statistical Package for Social Sciences (SPSS for windows version 9) was used to perform the statistical analysis.

The third part of the questionnaire enquired about the opinions of the students regarding the teaching and learning of pharmacology. They were asked to enumerate the two most significant strengths and weaknesses of the department with regard to teaching and assessment. They were also asked to give two suggestions to improve the teaching and learning of pharmacology. These were analyzed and the most frequently made suggestions were noted down to obtain an idea about emerging trends.

RESULTS

One hundred and thirty-one students participated in the study. Eighty-three (63.3%) were male. Only seven students (5.3%) were graduates. The fathers of 48 students (36.6%) were doctors. The mothers of the majority of students [108

students (82.4%)] were housewives. One hundred and twelve students (85.5%) were educated in English medium schools. One hundred respondents (76.3%) were self-financing while 31 were government-selected. Eighty-five students (64.9%) had studied mathematics at the twelfth standard level.

The mean total score for the 131 respondents was 3.77. The mean subject score was 3.49 while the mean improvement score was 4.02. The mean subject score was significantly higher among students who liked chemistry in school compared to those who were neutral towards (Tukey's HSD, p=0.049) or hated (Tukey's HSD, p=0.029) the subject. The mean subject score was significantly higher among the second semester students compared to the third semester (Students t-test, p=0.013). The mean subject, improvement and total score according to the sex of the respondents is shown in Table 1. The scores were higher among the male respondents but the result was not statistically significant.

The mean total score was significantly higher among the Nepalese respondents compared to the Indians (Tukey's HSD, p=0.028) and the Sri Lankans (Tukey's HSD, p=0.039). The mean total score was also higher among respondents who liked mathematics at school compared to those who were neutral towards the subject (Tukey's HSD, p=0.02). It was also higher among those who liked chemistry at school compared to those who hated the subject (Tukey's HSD, p=0.001).

The mean scores of the individual statements are shown in Table 2. Students agreed that pharmacology had created a

Table 2. Mean scores of individual statements.

Statement*	Mean Score
Favorite subject	3.41
Knowledge base for rational choice of drugs	4.36
Interesting and stimulating lectures	3.4
Closer clinical integration	4.66
Developing problem-solving skills	3.98
Focus on health problems of South Asia	3.4
Practical sessions on rationality of prescriptions	4.1
Modules during clinical years	4.08
Fair assessment process	3.76
Transparent assessment process	3.52
MCQs in assessment	3.62
Assessment tests factual learning	3.23
Capacity for self-directed learning	3.68
Post-graduation subject	2.38
More emphasis on OSPEs & PBLs	4.07

For a full description of the individual statements kindly refer to the questionnaire in the appendix

Table 3. Mean scores of the individual statements according to the nationality of the respondents

Statement	Mean \pm SD score			
	Nepalese (n=48)	Indian (n=74)	Sri Lankan (n=9)	P value
Favorite subject	3.58 \pm 0.83	3.3 \pm 0.85	3.22 \pm 0.67	0.149
Knowledge base for rational choice of drugs	4.33 \pm 0.86	4.32 \pm 0.88	4.22 \pm 0.67	0.937
Interesting and stimulating lectures	3.33 \pm 1.04	3.3 \pm 0.92	3.55 \pm 0.88	0.748
Closer clinical integration	4.75 \pm 0.52	4.65 \pm 0.58	4.55 \pm 0.88	0.524
Developing problem-solving skills	4.02 \pm 0.86	3.85 \pm 0.8	3.89 \pm 0.6	0.532
Focus on health problems of South Asia	4.56 \pm 0.82	2.96 \pm 0.91	3.11 \pm 0.78	0.042
Practical sessions on rationality of prescriptions	4.39 \pm 0.57	3.97 \pm 0.66	3.78 \pm 0.44	0.048
Modules during clinical years	4.14 \pm 0.65	4 \pm 0.69	3.89 \pm 0.78	0.4
Fair assessment process	3.77 \pm 0.97	3.69 \pm 0.84	3.78 \pm 0.97	0.873
Transparent assessment process	3.58 \pm 0.87	3.44 \pm 0.91	3.67 \pm 0.71	0.582
MCQs in assessment	3.94 \pm 1.16	3.73 \pm 1.16	3.22 \pm 1.2	0.218
Assessment tests factual learning	3.5 \pm 1.05	3.3 \pm 0.95	3 \pm 0.71	0.295
Capacity for self-directed learning	3.7 \pm 0.72	3.65 \pm 0.8	3.67 \pm 0.71	0.932
Post-graduation subject	2.58 \pm 0.85	2.2 \pm 0.96	2.4 \pm 1.05	0.058
More emphasis on OSPEs & PBLs	4.19 \pm 0.74	4 \pm 0.86	4.05 \pm 0.87	0.179

For a full description of the individual statements kindly refer to the questionnaire in the appendix

knowledge base that would help them in choosing drugs rationally in their future practice. Practical sessions on rational drug use and modules on pharmacology during the clinical years of training were also welcomed. OSPE and PSL sessions should be emphasized more than didactic lectures.

The male students were more in agreement with the statement 'Pharmacology is my favorite subject in the basic sciences' compared to female students (Students t-test, $p=0.016$). The male students were more in favor of the statement 'There should be more emphasis on objective structured practical examinations (OSPE) and PSL rather than on didactic lectures' compared to the female students (Students t-test, $p=0.018$). Students whose fathers were not doctors more strongly agreed with the statement 'I will consider pharmacology as one of my subjects for post graduation' compared to those whose fathers were doctors (Students t-test, $p=0.045$). The self-financing students agreed less strongly with statement number 1 compared to the government-selected students (students t-test, $p=0.032$).

The mean scores of the individual statements according to the nationality of the respondents are shown in Table 3. The Nepalese students agreed to a greater extent with the statement 'I would like the subject to focus more strongly on the health problems of south Asia with special emphasis on Nepal' compared to the Indian students (Tukey's HSD, $p=0.042$) The Nepalese students were more in favor of introduction of practical sessions on rational use of drugs

compared to the Indian (Tukey's HSD, $p=0.001$) and the Sri Lankan students (Tukey's HSD, $p=0.016$). The mean scores of the individual statements according to the medium of instruction at school are shown in Table 4. The English medium students more strongly agreed with the statement 'The subject has created a knowledge base which will help me in choosing drugs rationally in my future practice' compared to vernacular medium students (Students t-test, $p=0.018$).

From the main themes, which emerged from the suggestions given by the students, the strengths of the department were PSL, competent teachers, helpful attitude and accessibility of teachers. The student-teacher interaction was good and teachers facilitated the development of concepts. The weaknesses noted were sometimes lectures were boring and the pace of teaching was fast.

The strengths of assessment were fairness, rapid receipt of results and transparency. The weaknesses were strict assessment, lack of multiple choice questions (MCQs) and individual variations in assessment. The suggestions to improve teaching were greater number of hospital visits and PSL sessions and more interactive lectures with greater use of audiovisual aids. Greater number of OSPE spots during the practical examination was also suggested.

Specific identification code was not given to the different student respondents. The anonymity of the respondents was maintained and the results were fed into the SPSS package

Table 4. Mean scores of the individual statements according to the medium of instruction at school

Statement	Mean \pm SD score		
	English medium students (n=112)	Vernacular medium students (n=19)	P value
Favorite subject	3.42 \pm 0.87	3.26 \pm 0.65	0.087
Knowledge base for rational choice of drugs	4.39 \pm 0.81	3.89 \pm 0.99	0.018
Interesting and stimulating lectures	3.37 \pm 0.94	3.1 \pm 1	0.26
Closer clinical integration	4.67 \pm 0.61	4.74 \pm 0.45	0.645
Developing problem-solving skills	3.91 \pm 0.82	3.95 \pm 0.78	0.857
Focus on health problems of South Asia	3.54 \pm 1.16	3.63 \pm 1.16	0.763
Practical sessions on rationality of prescriptions	4.13 \pm 0.65	4 \pm 0.67	0.410
Modules during clinical years	4.04 \pm 0.7	4.05 \pm 0.52	0.964
Fair assessment process	3.72 \pm 0.89	3.74 \pm 0.93	0.951
Transparent assessment process	3.48 \pm 0.9	3.68 \pm 0.75	0.347
MCQs in assessment	3.75 \pm 1.16	3.89 \pm 1.24	0.619
Assessment tests factual learning	3.37 \pm 0.95	3.28 \pm 1.18	0.724
Capacity for self-directed learning	3.71 \pm 0.77	3.42 \pm 0.69	0.124
Post-graduation subject	2.39 \pm 0.93	2.47 \pm 1	0.731
More emphasis on OSPEs & PBLs	4.07 \pm 0.83	3.94 \pm 0.8	0.543

For a full description of the individual statements kindly refer to the questionnaire in the appendix

by two of us (PM & AS) who were not actively involved in teaching the particular batches of students. The association between the current performance in academics and the scores of the student respondents could not be matched. However, the marks obtained in the different examinations in pharmacology was obtained from the department office and it was found that the Nepalese students overall, had done significantly better than the Indian (Tukey's HSD, $p=0.027$) and the Sri Lankan students (Tukey's HSD, 0.009). The third semester students performed better than the second semester and boys performed better than girls but the results were not statistically significant.

DISCUSSION

Pharmacology at MCOMS is taught during the first four semesters of the MBBS course. The subject is horizontally integrated with the other basic science subjects but vertical integration with the clinical subjects is weak.

Recently we have introduced a system of hospital visits, where students visit patients suffering from diseases of a particular organ system discussed during the previous week in the theory class. The students communicate with the patients, take a history and obtain details of the drugs used during treatment. The management of the condition is then discussed by a teacher of the pharmacology department with a clinical background (with a basic MBBS degree and a MD degree in pharmacology and therapeutics).

As suggested by the revised curriculum of Kathmandu University¹¹ we have introduced teaching sessions on drug use indicators, essential drug concept, rational use of drugs,

analysis of drug promotional materials and P-drug selection. These sessions are activity based and students solve the problems in groups of nine or ten.

Students were of the opinion that there should be more emphasis on PSL and OSPE. Like students from other Asian medical schools, our students had a positive opinion towards PBL/PSL.¹² Research with students in problem-based programmes has shown greater satisfaction with the learning environment.¹³

Pharmacology is not a particularly monetarily rewarding career choice in South Asia and this maybe one of the reasons for the lower rate of agreement with the statement 'I will consider Pharmacology as one of the subjects for post graduation' among students whose parents were doctors.

All the Nepalese students were selected through an entrance examination and had performed better in examinations compared to the students of other nationalities. The association between academic performance and the scores was not explored in the present study. The mean total score was higher among respondents who liked chemistry and mathematics at school. The ability of abstract thinking and conceptualization is shared to a certain extent by the disciplines of mathematics and pharmacology and many basic mathematical principles are involved in the study of pharmacokinetics and pharmacodynamics. This was however not explored in the present study.

Problem-stimulated learning in small groups and competent, friendly, helpful and accessible teachers were the strengths of the department. A previous study had shown that students

identified tutor characteristics, a non-threatening atmosphere, clinical relevance and encouragement of independent thinking and problem solving as the most important characteristics of effective small groups.¹⁴ More hospital visits and greater integration with the clinical disciplines was suggested.

The Southern Illinois University School of Medicine teaches pharmacology within a multidisciplinary organ system-based curriculum.¹⁵ Patient cases and joint colloquia involving faculty of different disciplines, including clinicians was employed. At a medical college in Eastern Nepal, the first two years of preclinical study is integrated, partially problem based with an emphasis on early clinical and community exposure.¹⁶ Organ systems with various themes were used to focus the student's learning and each department demonstrated how their subject contributed to the understanding of the theme. Our system of teaching and learning is still largely discipline based and the PSL sessions are conducted only by the department of Pharmacology. Large numbers of students (more than 300 across the four semesters of study), proportionately less number of faculty and physical separation of the basic and clinical science campuses are problems to be overcome before a similar program can be implemented in our institution.

The assessment process is summative and based on short-answer type questions. It mainly tests the ability of students to memorize and reproduce factual information. Often, preparation for the assessment test takes precedence over searching and collating information for the clinical problems presented during the PSL sessions. A similar problem was observed in a Brazilian medical school.¹⁷ Medical schools worldwide are seeking to involve students in curriculum evaluation. Soliciting student feedback regarding the assessment process has been shown to be valuable.¹⁸ It had been previously shown that students want more feedback on their performance in assessments to guide future learning and this was corroborated in the present study.¹⁹

The practical sessions on assessing rationality of prescriptions and evaluation of drug promotional material were appreciated by the students. We aim to continue and strengthen these sessions in the future. The majority of students were of the opinion that the pharmacology teachers have inculcated in them a capacity for self-directed learning.

The students were in favor of modules on pharmacology and therapeutics during the clinical years of their training. A survey of Italian doctors had considered the pharmacology teaching they received to be mainly theoretical and they were of the opinion that more time and attention should be devoted to issues more closely related to clinical practice.²⁰ Clinical pharmacology courses have been introduced during the clinical years of training in medical schools.^{21, 22} However, the lack of adequate number of faculty may be one of the problems in implementing a clinical pharmacology module in our institution.

Our study had many limitations. Only 131 of the total of 175 students (74.8%) participated in the study. A few student respondents did not complete the questionnaire satisfactorily so their responses could not be included in the analysis. The small number of students involved makes it difficult to extrapolate the results from the cohort and subgroup analysis. A few students might have been uncomfortable about frankly expressing their opinions and criticizing their teachers and may not have completed the questionnaire. Suggestions to improve the teaching and learning of pharmacology were collected on the questionnaire and were restricted to two in number. Focus group discussion to explore and further clarify the emerging themes was not carried out. We did not include a question about the student opinion regarding their grades or class standing in Pharmacology. Specific codes were not given to the different student respondents. The anonymity of the respondents was maintained and we could not explore an association between the student opinions and current performance in academics and related courses. The influence of grades on the opinions expressed in the survey was not explored. This can be explored in future studies. We could not find studies assessing student attitudes to pharmacology in the literature and so could not compare our findings to other studies. Similar studies in other medical colleges in Nepal will provide a larger sample size and will be helpful in making recommendations for modifying the process of pharmacology teaching and learning.

CONCLUSIONS

The students overall, had a positive opinion regarding the discipline of pharmacology with a mean total score of 3.77. The mean subject score was 3.49 while the improvement score was 4.02. The teaching and learning of pharmacology can be improved and a closer integration with the clinical disciplines is required. PSL should be strengthened and 'real' cases from the hospital should be used during the sessions. The sessions on rational drug use and assessment of drug promotional material were appreciated and should be continued and strengthened. The assessment process should be reviewed. MCQs should be included along with the traditional short-answer type questions and problem-based exercise evaluation may be considered.

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Appendix

Student attitude towards Pharmacology

Sex: M/ F Nationality: _____ Graduation: Yes/ No

If yes, then main subject: **Profession of parents:** Father: _____

Profession of parents: Mother: _____

Medium of instruction at school: English/ Vernacular

Was mathematics one of your subjects at school (10+2 level)? Yes/ No

Your attitude towards mathematics at school: Liked it Neutral Hated it

Your attitude towards chemistry at school: Liked it Neutral Hated it

Govt. selected /self-financing

For the following statements score using the following key: **1- strongly disagrees with the statement, 2- disagree, 3-neutral, 4-agree, 5-strongly agree**

1. Pharmacology is my favorite subject in the basic sciences.
2. The subject has created a knowledge base which will help me in choosing drugs rationally in my future practice.
3. I find the Pharmacology lectures interesting and stimulating.
4. I would like Pharmacology to be more closely integrated with the clinical sciences and would like real cases from the hospital to be used during PSL.
5. The subject has helped me to develop my problem-solving and logical reasoning skills.
6. I would like the subject to focus more strongly on the health problems of South Asia with special emphasis on Nepal.
7. I would like practical sessions on assessing rationality of prescriptions and evaluation of drug advertisements.
8. I would welcome modules on Pharmacology and therapeutics during the clinical years of my training.
9. The assessment system in Pharmacology is fair.
10. The assessment process is transparent.
11. I would like MCQs to be included in the assessment.
12. The assessment concentrates on ability to acquire facts rather than on the development of problem-solving skills.
13. The Pharmacology teachers have inculcated in me a capacity for self-directed learning.
14. I will consider Pharmacology as one of my subjects for post graduation.
15. There should be more emphasis on objective structured practical examination (OSPE) and PSL rather than on didactic lectures.

List what in your opinion are the TWO most important strengths and weaknesses of the department with regard to Teaching and Assessment

Teaching:

Strengths: 1) _____
 2) _____

Weaknesses: 1) _____
 2) _____

Assessment:

Strengths: 1) _____
 2) _____

Weaknesses: 1) _____
 2) _____

Mention TWO important suggestions to improve the teaching and learning of Pharmacology at MCOMS:

1) _____
2) _____