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"EFFECTIVENESS OF ELECTIVE POSTING IN MICROBIOLOGY FOR UNDERGRADUATE MEDICAL STUDENTS: A STUDY AMONG THIRD PART-I MBBS LEARNERS"

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Abstract:
Introduction: In the competency-based medical education curriculum, an elective is a learning opportunity designed to give students the chance to investigate, find, and experience areas or streams of interest in the field. Successful program implementation requires ongoing program evaluation and required adjustments based on input, results, and obstacles encountered. Materials and Methods: This is cross sectional study conducted from 28.01.2025 to 25.02.2025 at Zydus medical college and Hospital located in Gujarat Dahod among 40 undergraduate students from the MBBS 2021 batch third part first who chosen electives topics for different section in department of Microbiology. Result :15 days duration elective program of 40 third part first MBBS students conducted in various section of Department of Microbiology. Majority students attained the elective and said the faculty members were very helpful and responsive. Good improvement was recorded after post-test, the time duration was appropriate, and it provided an opportunity to show creativity and for teamwork. Most students rated the overall experience of electives as strongly agree and agree. Majority of the students attained elective posting to fill knowledge gap.

Key words: Elective module, medical student, perception, CBME , SOPs,

1 INTRODUCTION:

The new competency based MBBS program introduced by National Medical Commission after the changes in Graduate Medical Education Regulations 2019 for acquiring skills and aims to produce a competent Indian medical graduate.[1-3] The entire CBME deals with Each subject's specific abilities, time allotment, duration, and other details are discussed in detail and in an organized manner.[4] Apart from change in medical curriculum , Electives, which have been an integral part of the international medical curriculum was introduced by National Medical Commission having two parts i.e. instrumental and communicative learning which allow them to have diversified and specific learning experiences in the area of interest beyond fixed curricular boundaries.[5 -6] The instrumental learning deals with specific clinical abilities in the student's chosen field while communicative learning

concentrates on developing interpersonal skills with patients and assisting students in understanding assertive communication techniques relevant to the chosen subject.[4] The aim of elective posting is to give the student the chance to immerse themselves in a field of study, career stream, or profession.[1]In order to accomplish the goal, the institute gives students conditions that facilitate better learning. The present study suggested to make the elective posting innovative as well as interesting that can help student to choose pre and para clinical subject in post graduate, as Presently, the students are more inclined towards clinical subjects. The objective of the study is to evaluate the effectiveness of elective posting in Microbiology among Third Part-I MBBS students in enhancing learning outcomes, research exposure, and student satisfaction.

2 Materials and Methods:

This is cross sectional study conducted from 28.01.2025 to 12.02.2025 at Zydus medical college and Hospital located in Gujarat Dahod among 40 undergraduate students from the MBBS 2021 batch third part first who chosen electives topics for different section in department of Microbiology. Student who do not meet attendance criteria of 75 % excluded from the study. The 15 days of elective posting were planned for lectures, small group discussions, self-directed learning sessions and final submission of log book maintained during the elective posting.

Designing of elective posting:

All MBBS 2021 batch third part first students were divided in block 1 and block 2. block 1 included pre-selected preclinical or paraclinical subjects while block 2 included clinical department, including specialties, super specialty. The primary purpose of block 1 was to provide the learner with research experience in basic sciences or laboratory sciences or in clinical sciences and the purpose of block 2 was to provide the learner an explorative experience with guided patient care in a specialty of choice. The student who chosen electives topics for different section in department of Microbiology were included in this study. The elective module and topic distribution for elective posting in Department of Microbiology for block 1 students given in Table-1 and table-2 respectively.

Table-1: Elective module Department of Microbiology for block 1

Prerequisites for this elective	Necessary immunizations and universal precaution to be taken
Learning resources for the students	Departmental SOPs , departmental handbook and handouts
List of activities of the student's participation	1. Work daily with a supervisor to observe, assist and define the pre-examination process 2. Work daily with a supervisor for the collection of samples. 3. Work daily with a supervisor for processing of samples 4. Work daily with a supervisor In analytical processes 5. Observe standard safety precaution 6. Work daily with a supervisor In post analytical processes 7. Documentation and record maintenance
Portfolio entries required	1. Demonstration of worked up cases 2. Documentation of presentation 3. Log book
Assessment	Formative: • Attendance • Day to day participation in departmental activity • Performance of assigned tasks • Presentation of the worked ep cases in the Department

Table-2: Topic distribution for elective posting in Department of Microbiology			
s.no	Section	Topic	Learning objectives
1	Mycology	Diagnostic Mycology	1. To confirm the suspicion of infection 2. Collection of samples 3. Acceptance and rejection criteria for received samples 4. isolation and identification of different groups of fungi in the laboratory 5. perform biochemical tests used in the identification of fungi 6. evaluate the results of the biochemical tests. 7. Judge which test are appropriate for some fungi, but not others 8. Antifungal susceptibility test 9. Interpret results of antifungal susceptibility testing 10. Formulate how you will organize and address identifying unknown fungi based on observations of the patterns in your results.
2	Bacteriology	Antimicrobial Susceptibility testing and Antimicrobial Resistance and rational use of Antimicrobials	1. To perform the lawn culture on Muller Hinton Agar 2. To perform the Antimicrobial Susceptibility testing by Kirby Bauer disc diffusion method 3. To interpret the result of antimicrobial susceptibility testing 4. To learn how to develop antimicrobial resistance in bacteria
3	Bacteriology	Diagnostic bacteriology	1. To confirm the suspicion of infection 2. Collection of samples 3. Acceptance and rejection criteria for received samples 4. isolation and identification of different groups of bacteria in the laboratory 5. perform biochemical tests used in the identification of bacteria 6. evaluate the results of the biochemical tests. 7. Judge which test are appropriate for some bacteria, but not others 8. Antibiotic susceptibility test 9. Interpret results of Antibiotic susceptibility testing 10. Formulate how you will organize and address identifying unknown bacteria based on observations of the patterns in your results.
4	Molecular laboratory	Microbiology importance of molecular diagnostic methods in the identification of causative agents, calculation of viral load by RTPCR (SARS-Covid-2, HBV & HCV]	1. To learn about methods and types of samples to be collected 2. Sample storage and transportation 3. Maintaining the integrity of samples and monitoring the temperature of collected samples during transport. 4. To observe the process of test requisition form (TRF] 5. Observe and assist in the pre-analytical Processing - sample ID, patient ID, temperature maintenance etc. 6. Observe and assist in sample processing. 7. To learn observe and assist in the extraction of viral RNA. 8. To observe and learn the preparation of master mix and templet addition. 9. Loading of RTPCR machine 10. Calculation of viral load.
5	Microbiology Hospital infection control	Hospital infection control	1. To demonstrate the various causative agents of infectious disease and their role in health and disease 2. To demonstrate various methods used in their detection / gram stain /ZN stain / stool microscopy /culture /serology 3. Describe the epidemiological basis of common infectious disease

			4. To observe standard safety precautions 5. Demonstrate the different methods of sterilization and disinfection 6. Choose the most appropriate method of sterilization and disinfection to be used in specific situations in the laboratory, clinical and surgical practice 7. To assist in the monitoring of air and surface surveillance of the critical area in the hospital.
6	Parasitology	Diagnostic parasitology	1. To know and learn about the samples collected for parasitic infections. 2. To discuss the different types of parasites causing human parasitic infections 3. To learn about various concentration methods of stool 4. To learn the preparation of thick and thin blood smears and stain them with Leishman or Giemsa stain 5. To prepare saline preparation and iodine preparation of stool 6. Identify various form of blood parasites 7. Identify various cysts and eggs and larvae of various parasites.
7	Serology	Screening of viral infections	1. Identify the major viral illnesses that affect humans 2. Collection of samples for screening of viral diseases 3. To learn the principles of various serological tests used for viral screening 4. Perform various rapid diagnostic serological tests for diagnosis of HIV, HAV, HBV, HCV, HEV, dengue and chikunguniya 5. NACO HIV surveillance guidelines 6. Documentation and record maintenance
8	Microbiology Hospital infection control	Biomedical waste management	1. Define health care associated infection and enumerate the types 2. Discuss the factors that contribute to the development of HAI and the methods of prevention 3. Describe he basics of infection control 4. To assist in the monitoring of air and surface surveillance of the critical area in the hospital 5. To observe and assist in the segregation of BMW according to BMW guidelines 6. To assist in the monitoring of transport and storage o BMW 7. Documentation and record maintenance.

3 Result: 15 days duration elective program of 40 third part first MBBS students conducted in various section in Department of Microbiology. Among the 40 ,5 students posted in each section. All students successfully completed elective program with minimum attendance rate of 75 % reflecting strong participation., One student was absent in molecular section for one day. (Fig-1)
The majority of the 40 students (90%) agreed that the learning materials were sufficient, although a tiny minority (10%) said they needed more lucid materials. 95% of students reported finishing their log books, showing solid academic record-keeping; only 5% were still working on it. Most notably, 97.5% of students said the faculty was helpful and sensitive to their learning requirements, demonstrating the overall efficacy of the instruction and assistance. However, a minority (2.5%) thought the faculty could be more responsive. (Table 3).

Eight modules totalling forty questions were evaluated. With the highest score in hospital infection control (3/5) and the lowest in mycology, molecular diagnostics, and parasitology (0/5 each), the overall pre-test score was 10/40 (25%), showing poor baseline knowledge. The post-test score increased to 35/40 (87.5%) after the training, and all modules (4–5/5), performance remained consistently strong. The 25-point improvement was statistically significant ($p = 0.0023$), indicating

that the educational intervention was successful in improving knowledge in all domains, particularly in areas where the participant had previously shown difficulty. (Table 4)

According to the feedback analysis, most students had a favourable opinion of the elective posting. Regarding the posting's duration, all students overwhelmingly felt that it was appropriate, and no negative feedback was noted. 37 pupils (22 strongly agree, 15 agree) acknowledged the opportunities for teamwork, while only three disagreed. 39 students (32 strongly agree, 7 agree) confirmed that the electives aided in research learning, highlighting exposure to research experience as a strength. There was only one person who disagreed.

The preference for electives outside the city and institution, on the other hand, was a topic of disagreement; 27 respondents objected or strongly disagreed, compared to 13 who supported external posts. In respect to improving clinical knowledge, 30 students indicated an improvement in their clinical knowledge (21 strongly agree, 9 agree) while 10 respondents (6 disagree and 4 strongly disagree) disagreed with that. Feedback on faculty support was generally favourable; 39 respondents said that faculty members were helpful, while only one said that they weren't. Responses to the elective posting's time were divided; 25 respondents agreed (13 strongly agreed and 13 agreed) with the idea that it was too early, while 15 (8 disagree and 7 strongly disagreed) respondents thought it was too early. (Table 5).

Most students 15 (37.5%) and 10 (25%) chosen electives posting to fill knowledge gaps and best friend selected the topic respectively while help in choosing of carrier stream later, self-interest, parental profession, and attendance requirements played smaller roles 3 (7.5%), 6(15%), 4(10%) and 2 (5%) respectively. (Table 6)

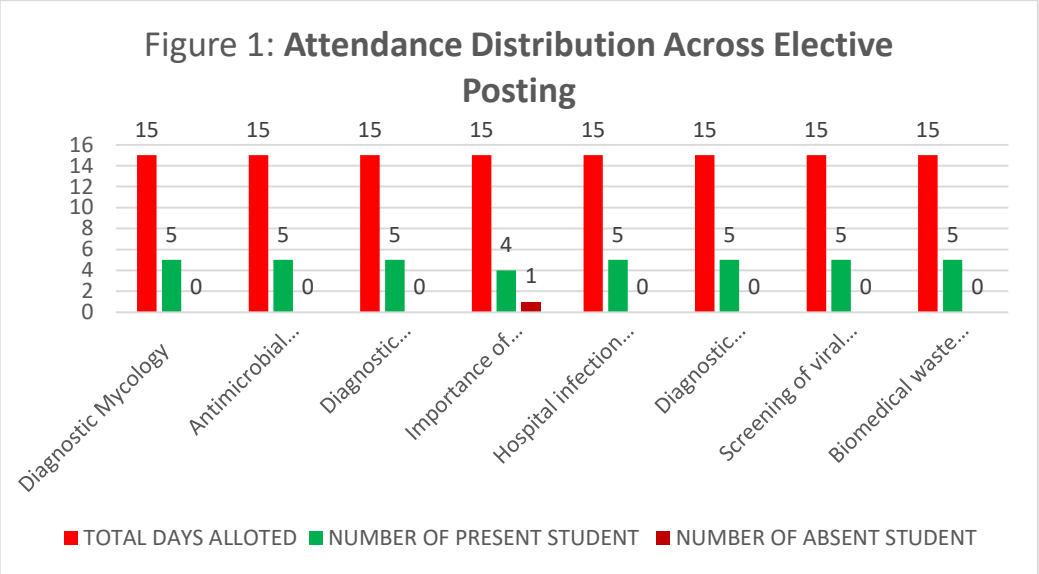

Table:3 Evaluation of Elective Posting		
	Yes % (n)	**No % (n)**
1. Attended with 75% attendance	**100% (40)**	**0% (0)**
2. List of learning resources provided	**90% (36)**	**10 % (4)**
3. Log book completed	**95% (38)**	**2**
4. Faculty members helpful and responsive to your learning needs?	**97.5% (39)**	**2.5% (1)**

Table:4 Pre-test and post-test performance of students across various modules with statistically significant improvement										
Test	Diagnostic Mycology	Antimicrobial stewardship	Diagnostic bacteriology	Importance of Molecular diagnostic	Hospital infection control	Diagnostic parasitology	Screening of viral infections	Biomedical waste management	Total	P value
Total question asked	5	5	5	5	5	5	5	5	40	0.002343
Pre-test score	0	2	1	0	3	0	2	2	10 (25%)	
Post-test score	4	4	4	4	5	4	5	5	35 (87.5%)	

Table:5 Feedback of Students Regarding Elective Posting					
Feedback	**Strongly Agree, % (n)**	**Agree, % (n)**	**Disagree, % (n)**	**Strongly Disagree, % (n)**	**Total**
5. Time duration appropriate	**100% (40)**	**0**	**0**	**0**	
6. Opportunity for team work	**55% (22)**	**37.5% (15)**	**7.5% (3)**	**0**	
7. Provide research experience	**80% (32)**	**17.4% (7)**	**2.5% (1)**	**0**	
8. Prefer electives out of institution outside city	**20% (8)**	**12.5% (5)**	**30% (12)**	**37.5% (15)**	
9. Improving clinical knowledge	**52.5 % (21)**	**22.5% (9)**	**15% (6)**	**10% (4)**	
10. Faculty member helpful	**47.5% (19)**	**50% (20)**	**2.5% (1)**	**0**	
11. Too early of elective posting	**32.5 % (13)**	**30% (12)**	**20% (8)**	**17.5 % (7)**	**40**

Table:6 Purpose of students for elective posting	
Purpose	**Number of students (N =40)**
1. To fill the knowledge gap	15 (37.5%)
2. Self-interest choice	6 (15%)
3. To complete attendance	2 (5%)
4. Parent's profession	4 (10%)
5. Help in choosing of carrier stream later	3 (7.5%)
6. Best friend selected the topic	10 (25%)

4 Discussion:

As recommended by the Indian National Medical Commission (NMC) (Medical Council of India, 2020), our medical college introduced an elective module for 2021 batch MBBS students.

Current study showed that maximum students were satisfied by the learnings but the students of Oman et al were only moderately satisfied. [(7)] This difference could be because of different pattern of electives. The present study showed maximum students were completed logbook and agreed pertaining to cooperation of Faculty members reflecting good academic record-keeping and interest in elective posting. In a study done by Patil s et al from Maharashtra, India recorded the same result. [(8)]

Regarding the Pre-test and post-test performance of students in current study knowledge of student posted in various section were significantly improved after post test as compare to pre-test with P value 0.002343 that is similar to study done by Thomas NE et al from South India in 2024 showed significant improvement of knowledge after post-test as compare to pre- test with P value <0.001. [(9)]

In present study regarding feedback, students mentioned that duration of time for student was appropriate, 75 % and 97.5 % students agreed that electives gave them an opportunity to gain clinical knowledge and develop research skills. Also, they mentioned the helpful nature of faculty members and interaction with them as a strength of the program. Past studies reported similar findings. [(10)] regarding the negative feedback, 7.5%, 2.5%, 67.5%,25%,2.5% and 37.5% of was disagree with Opportunity for team work, provide research experience, prefer electives out of institution outside

city, improving clinical knowledge, Too early of elective posting respectively. Similar findings were reported in a similar study done by Karjigi s et al from Karnataka, India. .[11]
Purpose of students for elective posting was very optimistic regarding the elective's module, 37% and 55% mentioned they are interested in elective because of and Help in choosing of carrier stream later respectively.

5 Conclusions: The undergraduate medical curriculum includes electives as a significant component. Our institute's implementation of the elective module was generally successful, and students enjoyed their time there. In order to give students a greater choice, it should be further promoted and additional subjects added to electives. It is crucial that, if feasible, students have direct patient experience during electives.

6 Limitations of the study: The present study conducted on small number of students, did not study the perception of faculty members involved in the program and demographic data of participants are the limitations of the study.

7 Author Contributions: Corresponding author contributed to Study design, data collection, statistical analysis, preparation of manuscript followed by 2nd, 3rd ,4th and 5th authors contributed to data collection.

8 Conflicts of Interest: No conflicts of interest.

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