Rabies Literacy Amongst Medical Undergraduate Students in a Public Teaching Hospital in East Delhi

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ABSTRACT

Background: With the launch of Competency Based Medical Education (CBME) Curriculum in 2019, we need to find out the extent to which medical undergraduates are being trained regarding the management of rabies. The aim of this study was to assess rabies literacy in medical undergraduate students admitted under the CBME curriculum in a public teaching hospital in East Delhi.

Methods: A cross-sectional study was conducted among the medical students of the pre-final year (admission year 2019) and second-year (admission year 2020) pursuing Bachelor of Medicine and Bachelor of Surgery (MBBS) course. The students were approached in their respective teaching sessions in an online survey using a pre-validated questionnaire wherein their responses were scored on a scale of 0 to 10.

Results: A total of 147 responses were analysed. The mean (±SD) total rabies literacy score obtained by students was 4.62 (±1.45) out of a maximum possible score of 10. Proportion of students who responded correctly to questions related to basic knowledge of rabies was higher as compared to questions assessing clinical knowledge.

Conclusion: Rabies literacy amongst medical undergraduates was poor. Students performed poorly on clinical decision-making questions and updated guidelines for rabies management. We need to focus on making the future doctors competent in animal bite management for rabies prevention by applying the CBME framework.

Keywords: Competency-based, Literacy, Medical education, Rabies.

INTRODUCTION

Rabies is a viral zoonosis and a 100% fatal disease.[1] It is estimated to cause 59,000 human deaths annually with about 95% cases being reported from Africa and Asia. Rabies is endemic in India and accounts for around one-third of global burden of rabies related deaths.[2] The Government of India has launched 'National Action Plan for Dog Mediated Rabies Elimination by 2030' which is based on "One Health Approach".[3]

Rabies is preventable if the animal bite patient receives post-exposure prophylaxis (PEP) as per the recommended guidelines. But certain studies show that the general practitioners and even the medical students have poor knowledge and skills related to management of animal bite cases with respect to rabies prevention.[4-7] With the launch of the Competency Based Medical Education (CBME) Curriculum for medical undergraduates in 2019 in India by the National Medical Commission (NMC),[8] we need to find out the extent to which the medical students are learning about the management of certain health issues such as rabies which is endemic in our country. We conducted this study to assess the rabies literacy among the medical undergraduates being trained under the CBME curriculum launched by the NMC.

PATIENTS AND METHODS

A cross-sectional study was conducted over a period of three months (August 2022 to October 2022) among the undergraduate students pursuing Bachelor of Medicine and Bachelor of Surgery (MBBS) at the University College of Medical Sciences, Delhi. We enrolled students of two cohorts, i.e., 2019 and 2020 admission years, *viz*, pre-final year (third-year) and second-year MBBS batches respectively. These were the first two batches to receive MBBS training under the new CBME curriculum.

The topic of rabies is taught in the departments of microbiology and community medicine. Around two lectures in a didactic mode are conducted for a large group of students in both the departments. In addition to this, in the department of community medicine, a single visit to the rabies clinic is conducted. All the students of these two admission cohorts attending their teaching sessions in the

department of community medicine were approached at the end of their teaching sessions where this feedback survey was undertaken and informed consent was obtained to use the data for study purpose.

An online google form consisting of an interviewer-developed pre-tested and pre-validated questionnaire was shared in the WhatsApp groups of the two MBBS admission cohorts at the end of the large group teaching session. These sessions were not on rabies and the students were not aware they would be tested at the end of the class. The questionnaire was developed using "National Guidelines for Rabies Prophylaxis, 2019" and "Current Guidelines on Prevention of Rabies, Consortium Against Rabies".[1,9] The domains regarding the basic and clinical knowledge, management of an animal bite, PEP, special situations like PEP in immunocompromised patients and advancement in rabies vaccination were included to make the assessment comprehensive. Two questions consisted of pictures of multiple transdermal bites on the leg and face respectively and the students were asked to categorise the wound as per the NCDC guidelines.[9] Each correct response was given a score of 1. However, in one question there were two correct responses and each sub-response was given a score of 0.5 in order to retain the overall score of 1. No negative marking was done for incorrect responses. The total score ranged from 0 to 10. A score of less than 4; 4 to 6 and more than 6 were considered as poor; average and good performance, respectively. Incomplete responses were excluded from the analysis.

Statistical analysis: The collected data was entered in Microsoft Excel and analyzed using Student's t-test and Mann-Whitney U test with the SPSS 20.0 statistical software. Continuous variables such as total rabies literacy score, were checked for normal distribution by Kolmogorov-Smirnov test and Shapiro-Wilk test. If normally distributed, continuous variables were presented as mean (± standard deviation, SD); and if non-normally distributed, then presented as median (interquartile range, IQR).

RESULTS

Out of a total of 169 medical students in each of the pre-final and second-year MBBS batches, we were able to approach 102 (60.4%) and 62 (36.7%) students in their respective teaching sessions. Of these, 16 students (9.8%) did not give consent and one student submitted an incomplete form. Therefore, a total of 147 responses were analysed.

The median (IQR) age of the students was 21 years (20,22) and three-fourth of them (75.5%, 111/147) were males. More (60.5%, 89/147) students belonged to the pre-final year MBBS batch. Most (93.2%, 137/147) of the students reported having attended atleast one teaching session on the topic of Rabies. Among these, majority (60.6%) reported attending rabies related session in both microbiology and community medicine departments; whereas 28.5% attended it only in the microbiology department and 10.9% attended it only in the community medicine department. The overall mean (±SD) total rabies literacy score obtained by the medical students was 4.62 (±1.45) out of a maximum possible score of 10. The mean (±SD) scores obtained by students of the second-year and pre-final year MBBS batches are 4.27 (±1.51) and 4.85 (±1.37) respectively (P=0.02). The median (IQR) scores obtained by students who had attended a teaching session on the topic of Rabies was found to be 4.5 (3.5,5.5) and it was 4.0 (3.0,4.5) among those who had not attended any rabies related teaching session (P=0.07). There was no significant difference between the mean scores obtained by students who had attended a rabies related teaching session only in the department of microbiology [4.36 (1.53)], only in community medicine [4.43 (1.59)] and those in both the departments [4.89 (1.36)] (P=0.13). ***Table I*** shows the item-wise distribution of correct responses to rabies literacy questionnaire administered to the medical students of the two MBBS admission cohorts.

DISCUSSION

The average performance of medical students regarding rabies literacy was found to be poor. The proportion of students who responded correctly to questions related to basic knowledge of rabies (e.g., primary system affected in rabies, immediate wound management of a dog bite, etc.) were higher as compared to those who responded correctly to clinical knowledge related questions of rabies (e.g., PEP in an immunocompromised person, preparation of anaphylaxis kit for PEP, updated Thai Red Cross schedule and dose of rabies monoclonal antibodies). We also found that very few students were familiar with the correct dose of rabies monoclonal antibodies (rabies mAbs). This may be because rabies mAbs being a recent development and therefore the incorporation of the same in the teaching-learning resource materials will take some time. The pre-final year students scored higher than the second-year students in rabies literacy score but despite that the rabies literacy score levels were poor (<50% score) than the expectations in both the cohorts of students. Also, the rabies literacy scores obtained by students who had ever attended a rabies related teaching session was not significantly different from those who had never attended any such session.

We found that most of the students were aware

TABLE I: Item-wise Distribution of Correct Responses to Rabies Literacy Questionnaire Among Second Year and Pre-final Year Medical Undergraduate Students (*n*=147)

Question	*Correct response [n (%)]*		
	2019 Batch (n=89)	*2020 Batch) (n=58)*	*Total (n=147)*
Questions related to Basic Knowledge of Rabies			
Rabies is most commonly seen in the age group of a.) 1-5 years b.) 11-19 years c.) Below 15 years d.) 15-45 years	36 (40.4)	27 (46.5)	63 (42.9)
The primary system affected in rabies is a.) Nervous system b.) Cardiovascular system c.) Musculo-skeletal system d.) All of the above	79 (88.8)	42 (72.4)	121 (82.3)
Immediate wound management of a dog bite includes* a.) Washing the wound with water and soap for 15 minutes b.) Washing the wound with water for 15 minutes c.) Application of Povidone-Iodine tincture d.) Suturing of the wound	73 (82.0)	50 (86.2)	123 (83.7)
Rabies is rarely transmitted by which animal a.) Mongoose b.) Bat c.) Cattle (Cows/ buffaloes/ camels) d.) Rodents and squirrels	14 (15.7)	07 (1.2)	21 (14.3)
Questions related to Clinical Knowledge of Rabies			
A female was diagnosed with breast cancer one year back for which she was undergoing chemotherapy. A cat scratched her on the face while she was on the way to the hospital. Patient had received pre-exposure prophylaxis against rabies six months back. The next management line would include: a.) Washing the wound, administration of ERIG and anti-rabies vaccination b.) Washing the wound, administration of HRIG and anti-rabies vaccination c.) Washing the wound and anti-rabies vaccination d.) Washing the wound would suffice	26 (29.2)	32 (55.2)	58 (39.5)
Categorise the type of wound, Fig.1 a.) Category 1 b.) Category 2 c.) Category 3	48 (53.9)	15 (25.9)	63 (42.9)
Anaphylaxis kit should be kept prepared while inoculation of a.) ERIG b.) HRIG c.) Rabies monoclonal antibodies	38 (42.7)	28 (48.3)	66 (44.9)

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Question	*Correct response [n (%)]*		
	2019 Batch (n=89)	*2020 Batch) (n=58)*	*Total (n=147)*
d.) All of the above			
Categorise the type of wound, Fig. 2	82 (92.1)	40 (69.0)	122 (83)
a.) Category 1 b.) Category 2 c.) Category 3			
Updated Thai Red Cross schedule is	48 (53.9)	18 (31.0)	66 (44.9)
a.) 0.1 mL ID injection in deltoid region at 0,3,7 and 28 days at 2 sites b.) 0.1 mL ID injection in gluteal region at 0,3,7 and 28 days at 2 sites c.) 0.5 mL IM injection in deltoid muscle at 0,3,7, 14 and 28 days at 1 site d.) 0.1 mL ID injection in deltoid region at 0,3,7 and 28 days at 1 site			
Dose of rabies monoclonal antibodies is	14 (15.7)	06 (10.3)	20 (13.6)
a.) 20 IU/ kg body weight b.) 40 IU/kg body weight c.) 3.33 IU/kg body weight d.) 0.1 IU/kg body weight			

Fig. 1

Fig. 2

*Values expressed as n (%). *Multiple responses allowed. If a student selected even a single correct response, we included her/him in the proportion of students giving the correct response. ERIG Equine rabies immunoglobulin, HRIG Human rabies immunoglobulin, ID intradermal, IM intramuscular.*

regarding the primary system affected by rabies and had knowledge regarding the immediate wound management after a dog bite which was assessed by a case scenario-based question. Similar findings were reported by studies conducted previously in which majority of medical students were aware about immediate washing of the wound with soap and water and application of antiseptic.[4,5] However, Bhalla, *et al* reported a lower proportion of general practitioners who were aware regarding the immediate wound management.[6] Similarly,

merely 29% medical students had correct knowledge regarding administration of Rabies Immunoglobulin (RIG) in another study from India.[4] Various studies have reported that most of the medical students and doctors did not have correct knowledge regarding anti-rabies vaccine schedule.[4-7]

Some of the limitations of the study include the fact that ours is a single centre study, and therefore the findings of the study cannot be generalised. COVID-19 pandemic disrupted the training of both the MBBS admission cohorts included in the study, and the findings may have been influenced by the modifications in the teaching-learning methods during the pandemic. We did not assess skills by direct observation as our data collection was using an online questionnaire. However, we tried to assess their clinical skills by giving case scenario-based questions which included patient history and images of dog bite wounds to categorise the wound for rabies management. The response from the second-year MBBS batch was lower than expected and we did not attempt to contact the students a second time as it would have led to a contamination of feedback response.

The second-year and the pre-final year medical undergraduate students were found to have a poor level of rabies literacy. The students performed poorly on the clinical decision-making questions and the updated guidelines for rabies management. Rabies being an important public health problem in India, there must be a focused effort on making the future doctors competent in animal bite management and its prevention, by applying the competency-based framework. It seems that there is a need to revisit the specific learning objectives, its teaching-learning methodology and assessment so as to ensure the expected outcomes. NMC now recommends Early Clinical Exposure (ECE) for medical education which facilitates in providing a clinical context and relevance to basic sciences learning. ECE can be used in the teaching learning methodology of rabies as well.[10] Although a visit to the rabies clinic is conducted for the medical students, more attention needs to be given to case discussions and methods of approaching an animal bite case, rather than just demonstrating the technique of anti-rabies vaccination and rabies immunoglobulin at the rabies clinic. Case-based learning and modular training on management of an animal bite and PEP against rabies can be introduced in CBME.

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