Impact of Educational Intervention on The Knowledge of Epidemiology, Prevention and Control of Rabies Among Paramedical Students, Taxilla

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ABSTRACT

Objective: To assess the knowledge of epidemiology, transmission, prevention and control of rabies and to find the effect of an educational intervention in paramedical students of HITEC-IMS, Taxilla.

Study Design: Quasi-experimental study.

Place and Duration of Study: HITEC-IMS, Taxilla, from Mar to Sep 2019.

Methodology: Study was carried out among paramedical students enrolled in 2 years diploma course in HITEC-IMS, Taxilla. Students were included by non-probability consecutive sampling.

Results: Out of the total of 89 participants, the fatality of rabies was identified by 63 (70.8%) respondents in pre-test and by 84 (94.4%) respondents in post-test (p<0.001). Less than half of the participants knew about bats as a reservoir of rabies (22, 24.7%) in pre-test that raised to 59 participants (66.3%) in post-test (p<0.001). The proper sequence of protocol for post-exposure prophylaxis (PEP) in un-vaccinated persons was identified by 42 (47.2%) respondents with an improvement of 27% in post-test (p<0.001). Proper order of rabies post-exposure prophylaxis (PEP) vaccine schedule in humans were identified by 16 (18.0%) respondents with an improvement of 6% in post-test (p=0.031).

Conclusion: Knowledge of reservoir, mode of transmission, prevention and control of rabies after educational intervention showed a significant increase in the students.

Keywords: Epidemiology, Lyssavirus, One health, Post exposure prophylaxis, Rabies.

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INTRODUCTION

Rabies is a zoonotic viral disease caused by the family rhabdovirus of genus Lyssavirus.[1] Rabies is a neglected tropical disease and is considered one of the fatal preventable communicable diseases around the globe.[1] High burden of rabies is reported in developing countries including Pakistan.[2] Rabies affect all mammals (bats, wolves, jackals, mongoose, skunks, cats, and foxes) and is transmitted to animals and humans through close contact with saliva from infected animals by bites, scratches, licks on broken skin or mucous membranes etc.[2,3] On entry in humans, the virus can cause devastating consequences such as encephalitis and death without timely post-exposure prophylaxis.[1,3] Moreover, Rabies cost immense loss of life with 61,000 deaths per year worldwide and is ranked 11th most deadly infectious disease.[4] Thirty thousand deaths due to rabies are reported in Subcontinent alone, followed by Africa. In India and Bangladesh, the incidence of human deaths related to rabies is around 30 and 14 cases per million annually. A high incidence of mortality from rabies is reported in Asia (58%) and South Asia (45%).[5] In Pakistan, fifty thousand cases of dog bites and 6000 deaths occur annually, highlighting the importance of preventing this disease.[4] Rabies is 100% preventable with timely administration of post-exposure prophylaxis to the human victims and can be controlled through mass vaccination of domestic dogs, which is quite cost effective.[6,7] Dogs are responsible for the 95% cases of rabies transmission in humans compared to several other carnivorous animals.[8] Oral transmission of the rabies virus has only been recorded experimentally.[9] No transmission cases through consumption of cooked meat or dairy products have been reported.

Pakistan faces challenges to answer the WHO call to eliminate dog-mediated human rabies by 2030 as rabies has complex transmission dynamics. Prevention and correct management are of utmost concern for health care workers and the general population. Awareness helps to prevent this deadly infection requiring prompt care and management.[3,10] A public sensitization campaign is needed in Pakistan to promote appropriate rabies prevention (washing bite wounds and PEP) and control (dog vaccination) measures. The

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purpose of the study was to assess the various aspects of this fatal communicable disease.

METHODOLOGY

This was a quasi-experimental study conducted at Paramedical School HITEC-IMS, Taxila, after taking ethical consent from Institutional Ethical Review Committee (ERC/19/04). The study was carried out from March to September 2019. Students were included by non-probability consecutive sampling.

Inclusion Criteria: Paramedical students enrolled in 2 years diploma course were included in the study.

Exclusion Criteria: Non-consenting students were excluded.

The sample size was calculated using the Rao sample size calculator with a 5% margin of error and 95% confidence level. The sample size came out to be 88.

Ninety-nine (99) students from the first and second year agreed to participate in the study after written consent and were included the pre-intervention education session. Only 89 students were available for the post-intervention education session.

A research questionnaire was designed after an extensive literature search by adopting the questions used in previous studies by Singh *et al*, and Auplish *et al*.[11,12] Then questionnaire was pilot tested on 23 paramedical students. In addition to certain baseline information, the questionnaire measured the knowledge through binary assessment against all the variables such as epidemiological aspects, mode of transmission, clinical signs of rabies in animals, pre-exposure prophylaxis (PrEP) and post-exposure prophylaxis (PEP), including vaccines/immunoglo-bulins, control of rabies transmission in canines and one health concept (the link between the health of people, animals, and humans).[13,14]

Pre-testing assessment was performed by using the questionnaire before educational intervention. The duration of educational intervention was one and a half hours. The intervention was delivered in two phases: lecture with audio-visual aid for one hour on topics covering rabies epidemiology, clinical features, prophylaxis, vaccination and control of transmission in canines and the importance of "one health concept" followed by a,[15] min short film on the re-emphasis of same aspects.[15] Fifteen minutes were given for a question-answer session and discussion among the students. Later, after three and a half months, the same questionnaire was used to collect post-test data.

Statistical Package for Social Sciences (SPSS) version 27. Frequency and percentages were recorded for categorical variables. Mean and SD were calculated for continuous variables. Association was determined by using McNemar's paired difference of proportions test. The *p*-value of ≤0.05 was considered statistically significant.

RESULTS

A total of 89 completed questionnaires from both the pre and post-intervention sessions were included in the study. Out of the 89 students, 56 (62.9%) were females with a mean age of 21.5 ± 2.73 years. The minimum age recorded was 19 and the maximum age was 27 years. The socio-demographic characteristics were shown in Table-I. All the participants were aware of rabies and its human transmission. Participants were asked about the fatality of rabies, and it was identified as by 63 (70.8%) respondents in pre-test and 84 (94.4%) in post-test ($p< 0.001$).

Table-I: Socio-demographic characteristics of study population (n=89).

Parameters	n (%)
Mean Age	21.5 ± 2.73 years
16-19 years	31(34.8%)
20-23 years	38 (42.7%)
24-27 years	20 (22.5%)
Gender	
Male	33 (37.1%)
Female	56 (62.9%)
Year of Study	
First year	61 (68.5%)
Second year	28 (31.5%)

Respondents were asked to identify the reservoir of rabies in animals. Dogs were identified by 83 (93.3%) participants in pre-test as compared to 87 (97.8%) in post-test (p=0.125). Bats as a reservoir were rightly identified by 22 (24.7%) respondents in pre-test and 59 (66.3%) in post-test (p≤0.001) as shown in Table-II.

Table-II showed the comparison of correctly chosen options regarding transmission routes of rabies virus in humans. The correct options of transmission of the rabies virus through rabid animals (saliva, licks, scratches, bite) were identified by 34 (38.2%) students in pre-test and 79 (88.8%) in post-test students (p<0.001).

Seventy-seven (77%) of the participants were aware of the importance of proper wound management of animal bites. Participants were asked to identify the correct rabies post-exposure prophylaxis (PEP) vaccine schedule for an unvaccinated person and the

proper anatomic site of rabies vaccine administration in humans (Table-III).

Table-II: Pre and post-test comparison of right options regarding reservoir and transmission routes of rabies virus (n=89).

Parameters	Correctly Identified Responses (n%). Pre-Test	Correctly Identified Responses (n%). Post Test	*p*-value*
Reservoir of Rabies			
Dogs*	83 (93.3%)	88 (99%)	0.125
Cats*	31 (34.8%)	78 (87.6%)	<0.001
Bats*	22 (24.7%)	59 (66.3%	
Squirrels**	35 (39.3%)	40 (44.9%)	0.063
Pigeons**	38 (41.8%)	44 (48.4%)	0.031
Transmission routes of rabies virus			
Through rabid animal (saliva, licks, scratches*	34 (38.2%)	79 (88.8%)	<0.001
Virus entry through normal (intact) skin or through inhaled air**	49 (55.1%)	77 (86	<0.001

**Rightly Identified Correct Options, **Incorrect Options, Correctly Identifie.*

Table-III: Post-exposure prophylaxis (pep) protocol as precautionary measures and for potential rabies exposure (n=89).

Variables	Correctly identified responses (n%), Pre-test	Correctly identified responses (n%) Post test	*p*-value*
Time required time to wash the wound with soap-water*	59 (66.3%)	79 (88.8%)	<0.001
Suturing the wound**	36 (40.4%)	43 (48.3%)	
Proper sequence of Protocol for Post-exposure prophylaxis (PEP) in unvaccinated person***	42 (47.2%)	69 (77.5%)	
Proper order of Rabies post-exposure prophylaxis (PEP) Vaccine schedule in humans*****	16 (18.0%)	22 (24.7%)	0.031
Proper anatomic site of Rabies vaccine administration in humans*****	33 (37.1%)	79 (88.1%)	<0.001

Wash with running water and soap for a minimum of 15 mins, **Suturing the animal bite wound is not recommended, ***Clean/ wash wound, administer human rabies immune globulin (HRIG) start rabies PEP vaccine series (Rabies Vaccine Vero Cell), ****Day 0,3,7, 14 and 285,***Deltoid area. *P-values calculated using McNemar's paired difference of proportions test.*

Immunization of stray dog population to control rabies in canines was the only correct option chosen by 34 (38.2%) students and 75 (84.3%) students in pre and post-test (p<0.001). Most of the participants 84 (94%) in the pre-test knew about the one health concept, which increased to 88 (99%) in the post-test.

DISCUSSION

Our study revealed that knowledge, regarding epidemiology and post-exposure prophylaxis was enhanced after the educational intervention. A study recently conducted in Pakistan reported that the majority of the people were aware of the rabies with 38.7% not knowing the signs and symptoms, only 2.9% were aware of the main source of spreading rabies.[13] The study conducted in Meda Welabu district, Bale zone, Ethiopia, by Desa *et al*, reported that most of the participants (88%) have heard of rabies and 52.5% knew dogs as the reservoir of rabies.[14] Similarly, a study done in Sri Lanka reported 99% of the general population knowing about rabies, whereas in our study, 93.3% of paramedical students knew about dogs being the reservoir in pre-test with an improvement of 99% in post-test.[15]

A recent analysis conducted in Brazil reported that between 2008 and 2016, patients were bitten mainly by domestic dogs and cats (with an annual incidence per state: 258 dog bites/100,000 persons and 41 cat bites/100,000/year).[16]

The educational intervention appeared highly successful in improving knowledge of our study participants, especially in improving the knowledge of post -exposure precautions.[17] In another study 67% participants knew the proper method of first aid, i.e., immediate washing of the wound with soap under running water. Prior to the educational sessions, only 57.3% students were aware of the ineffective role of traditional medicine in the prevention and treatment of rabies.[18]

In our study, there was 40% increase in the knowledge of students regarding post-exposure precautionary steps after the training. Whereas, in a similar study done by Auplish *et al*, there was a 40% increase in the knowledge of study participants regarding rabies post-exposure prophylaxis (PEP) vaccine schedule after the educational session.[12]

This study was aimed to assess the knowledge of epidemiology, prevention and control of rabies among health professionals to strengthen rabies control and elimination strategies. The results of this study could be used to implement rabies-training programs in Pakistan and other high exposure areas to improve rabies control and management. The results will serve as indicators to strengthen existing policies and actions and provide a baseline for future evaluation of Pakistan's national rabies elimination program by 2030.

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LIMITATIONS OF STUDY

This study included only paramedical students, thus not representing the whole healthcare workforce.

CONCLUSION

Knowledge of reservoir, mode of transmission, prevention and control of rabies after educational intervention showed a significant increase in the students.

Conflict of Interest: None.

Authors' Contribution

HS: Conception and study design conduction of educational session both pre and post test, data acquisition, statistical analysis interpretati on of results write up of manuscript, SM: Conception drafting manuscript, interpretation of results approval of final version to be published, TNJ: Interpretation of results critical review and proof reading, UH: Interpretation of results critical review and proof reading, MS: Data entry critical review and conclusion, RG: Statiscal analysis and interpretation of results.

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