



EVALUATING THE IMPACT OF A STRUCTURED HEALTH EDUCATION INTERVENTION ON KNOWLEDGE OF RABIES PROPHYLAXIS AMONG SCHOOL CHILDREN

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ABSTRACT

Background: Rabies is a preventable yet fatal zoonotic disease, with children being particularly vulnerable due to increased exposure and limited awareness regarding post-exposure measures. Gaps in knowledge especially related to wound care and timely prophylaxis, continues to pose challenges in effective prevention. The present study has been conducted with an aim to assess the baseline knowledge of high school students regarding prophylaxis against rabies and to evaluate the effectiveness of a structured health education intervention. **Methods:** A pre-post interventional study was conducted among 150 high school students. A pre-tested, structured questionnaire comprising 20 items across multiple domains of rabies prophylaxis was administered before and after a structured health education session. Knowledge was scored, and pre- and post-test mean scores were compared using paired Student's t-test. **Results:** We found a significant improvement in knowledge in all areas after the health education session. Clearly, the awareness about rabies being transmitted from animals improved from 60.7% to 81.3%, knowledge about animal bites was dangerous improved from 50.7% to 76.0% and recognition of need for prophylaxis improved from 63.3% to 78.7%. Similarly, our analysis showed that the awareness of pre exposure prophylaxis increased from 69.3% to 85.3% and the knowledge of rabies being a serious illness from 72.7% to 87.3%. Further, the knowledge with respect to vaccination like the number of doses required increased from 74.7% to 90.7%, availability from 76.0% to 86.7% and knowledge of safety of vaccines also increased from 85.3% to 95.3%. Overall, the average knowledge score improved from 11.34±2.93 prior to the intervention to 17.02±3.17 afterwards ($p<0.001$). **Conclusion:** Health education resulted in a significant improvement in knowledge regarding rabies prophylaxis among students, even a brief, structured intervention was effective in enhancing both awareness and practical understanding, highlighting the value of school-based educational programs.

Keywords: Rabies, Health Education, Post-Exposure Prophylaxis, School Children, Knowledge, Prevention.

INTRODUCTION

Rabies is a significant public health concern, which continues to contribute substantially to preventable mortality particularly in developing countries like India.¹ Rabies is an acute but progressive and almost invariably fatal viral zoonosis, which is caused by the Rabies virus, transmitted primarily through bites/scratches from infected animals mostly by establishing contact with saliva via bites, scratches, or contamination of wounds and mucous membranes.²

While several carnivorous animals are natural hosts for the virus, dogs are the main source of human infection, with > 3.3 billion people at risk worldwide.³

Despite the accessibility of highly effective post-exposure prophylaxis (PEP), rabies is continuously posing a challenge due to multiple factors which include; gaps in awareness, delayed healthcare intervention and inadequate wound management practices. In the epidemiology of rabies, children are particularly vulnerable because a significant proportion of animal bite cases including dog bites occur in school aged children, especially among those between 5 to 14 years of age, owing to their increased outdoor activity, inquisitive behavior and limited understanding of animal related risks.⁴ Apart from this, children are less likely to report minor exposures, which eventually results in delayed or missed initiation of prophylaxis in this subset of population. These factors collectively increase their susceptibility to this deadly disease and highlight the importance of targeted preventive strategies in this prone population. It is worth to note that effective rabies prevention not only relies on the availability of vaccines and immunoglobulins but also on sufficient knowledge regarding immediate wound



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care management, timely vaccination and most importantly adherence to recommended prophylactic schedules, however, several studies have reported that awareness regarding rabies transmission, first aid measures and prophylaxis remains suboptimal among school children.^{5,6} The reason for these misconceptions being reliance on traditional remedies, negligence of minor wounds continues to persist, thereby compromising timely and appropriate management.⁷ In this context, health education emerges as a critical intervention for improving awareness and promoting appropriate health-seeking behavior. It has been reported that school based educational programs provides an accessible and structured platform to impart essential information regarding rabies prevention and control by enhancing knowledge levels, correct misconceptions and by improving approach towards prophylactic measures among adolescents. With this in mind, the present study was conducted with an aim to assess the effectiveness of health education on knowledge regarding prophylaxis against rabies among high school children is essential. Such evaluations not only help in understanding the impact of educational interventions but also guide the development of targeted public health strategies aimed at reducing the burden of rabies through improved awareness and early preventive action.

MATERIAL AND METHODS

The present study was conducted over a period of one year with effect from July 2024 to June 2025. Prior to initiation, the school authorities were approached and the objectives of the study were explained to them and written permission was obtained. This study was conducted in a government school situated in an urban poor locality within the field practice area of the Department of Community Medicine, GMC Rajouri, India.

We randomly included a total of 150 students of both sexes, with ages ranging from 14 to 17 years, who were present on the day of the awareness activity. Participants completed a pre-tested, structured, self-administered questionnaire at baseline written in the English language. The tool consisted of 20 knowledge based items, covering essential aspects of rabies transmission, prevention and post-exposure prophylaxis. For analytical clarity; these questions were grouped into nine domains of public health relevance, including transmission by animals, severity of the disease, need for prophylaxis, wound care practices, awareness of pre-exposure prophylaxis, vaccine-related knowledge and finally use of rabies immunoglobulin. Each correct response was assigned a score of one, while as incorrect responses were scored zero, which yields a maximum possible score of 20. Mean pre-test scores were calculated and the proportion of correct responses for individual items and domains was determined. We then imparted a structured health education intervention, which included a 45 min educational video on rabies prophylaxis developed by the Rabies in Asia Foundation, followed by an additional 45 minute interactive session in which concepts were thoroughly explained to them and ultimately student queries were addressed with full enthusiasm. A post test using the same questionnaire was administered three months later to assess retained knowledge, we compared pre and post intervention mean scores to evaluate the effectiveness of the educational program. Data were analyzed using SPSS version 22.0. Qualitative data was expressed in terms of counts and corresponding frequencies while as quantitative data was presented in terms of mean and standard deviation. We applied Student's paired t-test to determine the statistical significance of differences between pre- and post-test scores.

RESULTS

Table 1: Socio-Demographic Characteristics of the Study Subjects

Parameter		Number	Percentage
Age (Years)	14 Years	35	23.3
	15 Years	63	42.0
	16 Years	41	27.3
	17 Years	11	7.3
Gender	Male	79	52.7
	Female	71	47.3
Socio economic status	Upper class	0	0.0
	Upper middle	13	8.7
	Lower middle	25	16.7
	Upper lower	61	40.7
	Lower	51	34.0

Mean±SD (Range)=15.2±2.83 (14-17 Years)

In the present study, we found that majority of the students were clustered in the mid-adolescent age group, with 15-year-olds forming the largest proportion (42.0%), followed by 16-year-olds

(27.3%) and (23.3%) were 14-year-olds. A smaller fraction of participants were aged 17 years (7.3%), and the mean age was 15.2±2.83 years which suggests that the sample was argely representative

of early to mid high-school grades wherein classroom attendance tends to be more consistent. Apart from this, the gender distribution was balanced, with a slight male predominance (52.7% vs. 47.3%). In terms of socioeconomic status, a clear trend toward the lower strata was observed with none of the participants belonged to the upper class, and only a small proportion fell into the upper middle class (8.7%) as shown in table 1. The

majority were distributed across the upper lower (40.7%) and lower (34.0%) categories, with an additional 16.7% in the lower middle class, this pattern is consistent with the study setting, which was located in an urban poor locality and it quietly underscores the relevance of such interventions in populations where both exposure risk and gaps in awareness are likely to coexist.

Table 2: Knowledge Regarding Prophylaxis against Rabies among Study Subjects before Health Education

Variable	Number	Percentage
Animals transmitting rabies	91	60.7
Danger of animal bite wounds	76	50.7
Need for prophylaxis against rabies	95	63.3
Importance of wound washing	81	54.0
Pre-exposure prophylaxis availability	104	69.3
Importance of disease	109	72.7
Number of vaccine doses	112	74.7
Availability of rabies vaccine	114	76.0
Safety of rabies vaccine	128	85.3

On assessing knowledge regarding prophylaxis against rabies among study subjects before health education, we found that 60.7% of the students were able to correctly report that animals are responsible for transmitting rabies. However; awareness regarding the dangers of animal bite wounds was comparatively lower, with only (50.7%) recognizing the seriousness of such exposures. Moreover, knowledge related to the need for prophylaxis was reported among 63.3% of participants, indicating that a fair proportion understood that rabies is preventable if managed timely and appropriately, however, when it came to practical first-aid

measures, like; wound washing, awareness dropped slightly to 54.0%, pointing toward a gap in immediate post-exposure practices. On the other hand, knowledge regarding the availability of pre-exposure prophylaxis was noted in 69.3% of students, while as 72.7% recognized the importance of rabies as a serious disease. Interestingly, understanding of vaccination related aspects appeared stronger, with 74.7% aware of the number of vaccine doses, 76.0% aware of vaccine availability and a high percentage of (85.3%) recognizing the safety of the rabies vaccine.

Table 3: Knowledge Regarding Prophylaxis against Rabies among Study Subjects after Health Education

Variable	Number	Percentage
Animals transmitting rabies	122	81.3
Danger of animal bites	114	76.0
Need for prophylaxis	118	78.7
Importance of wound washing	124	82.7
Pre-exposure prophylaxis availability	128	85.3
Importance of disease	131	87.3
Number of vaccine doses	136	90.7
Availability of vaccine	130	86.7
Safety of vaccine	143	95.3

On assessing knowledge regarding prophylaxis against rabies among study subjects after health education, we found that 81.3% of the students were able to correctly report that animals are responsible for transmitting rabies. Interestingly, awareness regarding the dangers of animal bite wounds showed a improvement, with 76.0% of students recognizing the seriousness of such exposures. The knowledge related to the need for prophylaxis was observed among 78.7% of participants, suggesting a better understanding that rabies is preventable when timely

and appropriate measures are taken. With regard to first-aid measures, awareness regarding wound washing raised to 82.7%, reflecting a considerable shift toward correct immediate post-exposure practices. Knowledge regarding the availability of pre-exposure prophylaxis was noted in 85.3% of students while as 87.3% recognized the importance of rabies as a serious and potentially fatal disease. Much importantly, understanding of vaccination-related aspects appeared particularly strong following the intervention, with 90.7% of students

got aware of the number of vaccine doses, 86.7% became aware of vaccine availability and a very high proportion (95.3%) recognized the safety of the rabies vaccine. These findings suggest a consistent

improvement across all domains after the health education session, with especially marked gains in areas related to practical management and vaccination.

Table 4: Improvement in Knowledge Score among the Study Subjects after Health Education

Knowledge Score	N	Mean	SD	95% CI For Mean	t-value	P-value
Pre-test	150	11.34	2.93	10.87-11.81	16.115	<0.001*
Post-test	150	17.02	3.17	16.51-17.53		

*Statistically Significant Difference (P-value<0.05)

Evidently, the mean pre-test score was 11.34 (SD ± 2.93), however, following the intervention, the mean post-test score increased to 17.02 (SD ± 3.17), this rise in mean score suggests a substantial gain in knowledge after the educational session. The difference between pre- and post-test scores was found to be statistically highly significant, with a t-value of 16.115 and a p-value of <0.001.

DISCUSSION

The baseline findings of the present study reflect a pattern that, rather interestingly, has been observed quite consistently across different settings. When 60.7% of students correctly identified animals as the source of rabies transmission, it aligns reasonably well with school-based studies from India, where awareness of dog bite as a cause is often moderate to high, though not universal. For instance, Angeline GG et al., reported that while a very high proportion (97.6%) recognized dogs as a source, knowledge about other reservoirs was limited, indicating that students often hold a somewhat narrow understanding of transmission.⁹ At the same time, the relatively low awareness regarding the dangers of animal bite wounds (50.7%) in the present study finds support in an urban study, wherein, Sivagurunathan C et al., reported that only about 63.5% of their participants recognized rabies as a fatal disease, and even fewer demonstrated appropriate concern toward bite exposures.¹⁰ This suggests that although the concept of rabies exists in consciousness, its perceived severity is often underestimated, especially when exposures appear minor. The finding that 63.3% of students were aware of the need for prophylaxis is comparable to earlier interventional work by Sancheti and Mangulikar, where around 74% of students knew about anti-rabies vaccination prior to educational intervention.¹¹ Hardanahalli et al. emphasized that this first and perhaps most critical step of post-exposure prophylaxis is often inadequately understood. In their study understanding regarding need for prophylaxis against rabies was (66.9%), which is compatible with our study.¹² The slight variation may reflect differences in study setting or prior exposure to awareness campaigns, but overall, both studies point toward a moderate baseline understanding rather than a uniformly adequate one.

What stands out more clearly, perhaps, is the gap in knowledge regarding immediate first-aid measures. In the present study, only 54.0% of participants were aware of proper wound washing, which is similar to 56.04% reported by Vinay M et al., similarly Kapoor P et al., reported that only 56% of individuals knew about washing the wound with soap and water, while community-based data documented by Sivagurunathan C showed that correct first-aid knowledge could be as low as 37%.^{10,13,14} This recurring deficiency across studies suggests that practical, actionable knowledge tends to lag behind general awareness, possibly due to persistent traditional practices or inadequate emphasis in health messaging. On the other hand, the relatively better awareness observed in domains such as pre-exposure prophylaxis (69.3%) and recognition of rabies as a serious disease (72.7%) appears consistent with findings of multicentric study by Ramesh Masthi NR et al., where 72.0% of participants recognized rabies as a fatal disease, which closely parallels the 72.7% observed in the present study.¹⁵ We observed that students had higher knowledge regarding vaccination-related aspects, particularly vaccine safety (85.3%) and availability (76.0%), which is consistent with the study of Angeline GG et al., where around 72% of students were aware of vaccination as a preventive measure, though knowledge about its availability was considerably lower.⁹ Such differences might reflect increasing public health messaging around immunization programs, which tend to emphasize vaccines more visibly than other aspects like wound care or immunoglobulin use.

After the health education, we assessed the knowledge regarding prophylaxis against rabies among study subjects and found a marked improvement across all domains and these findings align well with trends reported in other interventional studies. Evidently, awareness regarding animals transmitting rabies increased to 81.3% in the present study, which is comparable to findings by Sancheti and Mangulikar, where approximately 85.7% of students identified dog bite as a cause of rabies after intervention.¹¹ Similarly, recognition of the dangers of animal bites (76.0%) and the need for prophylaxis (78.7%) in the present study reflects an improved risk perception, which is consistent with observations from Surendran J et al.,

where awareness of disease severity and need for post-exposure prophylaxis ranged around 68.7%–88.6% after exposure or education.¹⁰

The improvement in knowledge regarding wound washing (82.7%) is particularly noteworthy, this is substantially higher when compared to baseline levels reported by Surendran J et al., where awareness of correct wound washing ranged from 37.3% to 56%, indicating that educational interventions can significantly bridge this critical gap.¹⁰ Similarly, knowledge regarding pre-exposure prophylaxis availability improved to 85.3% after imparting health education, which is in consonance with the study of Manoharan A et al., where awareness regarding prophylaxis-related components has been reported in the range of 42.4% to 70.8% prior to intervention, with improvement reaching close to 90–97% only after targeted education.¹⁷ Furthermore, recognition of rabies as a serious disease improved to 87.3% post intervention in our study, which aligns with the study of Shukla V et al., where awareness regarding fatality and seriousness increased substantially, for instance from 9–12% at baseline to over 90% post-intervention, suggesting that educational input consistently elevates perception of disease severity.¹⁸ In the present study, the awareness regarding the knowledge of the number of vaccine doses and vaccine availability increased drastically to 90.7% and 86.7% post intervention respectively. This is also comparable to findings by Sancheti et al., where awareness of anti-rabies vaccination increased from 74.28% to around 85% following health education.¹¹ Similarly, Shukla V et al., et al reported that knowledge of the number of vaccine doses increased from 27.7% at baseline to 77.7% after health education provided to them, which is consistent with our study.¹⁸

Evidently, the present study demonstrated a substantial improvement in knowledge scores following the educational intervention, with the mean score rising from 11.34 (± 2.93) to 17.02 (± 3.17), and this difference being highly significant ($p < 0.001$). Our findings are fairly consistent with multiple studies; Hardanahalli et al., reported a comparable improvement, where the mean knowledge score increased from 12.02 at baseline to 16.94 following health education, closely paralleling the magnitude of gain observed in the present study.¹² Similarly, among medical students in Chennai, Manoharan A et al., reported the mean score increased from 14.9 (± 3.7) to 22.7 (± 3.23) after intervention, again demonstrating a statistically significant improvement across all domains, which is in consonance with our results.¹⁷ The relative increase in that study is slightly higher, which may be attributable to differences in baseline educational status, yet the overall trend remains consistent. In another study Lungten L et al., reported the mean knowledge score improved from 19.98 (± 2.72) to

26.96 (± 2.24) corresponding to an increase in correct responses from 68.9% to 92.9% ($p < 0.001$).⁵ Although expressed differently, the proportional gain mirrors the significant rise seen in the present study. Clearly, the improvement observed in the present study is not an isolated finding but rather aligns closely with a broader body of evidence. Across diverse populations and study designs, educational interventions consistently result in statistically significant increases in knowledge scores, often with p -values < 0.001 . The magnitude of improvement may vary but the direction and significance remains remarkably uniform, reinforcing the effectiveness of structured health education in enhancing rabies-related knowledge.

CONCLUSION

The results of the present study demonstrated that while baseline knowledge regarding rabies prophylaxis was present, it remained inconsistent, particularly in critical areas such as wound management and immediate post-exposure practices. However; after the health education intervention, a clear and uniform improvement was evident across all domains, including both conceptual understanding and practical measures. Furthermore, the overall significant improvement in knowledge scores post intervention clearly highlights the effectiveness of the intervention, which indicates that even a relatively short, focused educational effort can lead to significant improvement in awareness and preventive practices.

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