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Knowledge of Seizures, Epilepsy, and Seizure First Aid among Teachers and Students at Various Educational Levels

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ABSTRACT

Epilepsy remains poorly understood in low-resource settings, with critical gaps in seizure first aid knowledge. This study assessed awareness among Pakistani students and teachers. **Objectives:** To assess knowledge of epilepsy and seizure first aid among students and teachers of all educational levels in Pakistan. **Methods:** This cross-sectional survey using a non-validated Google questionnaire in English and Urdu was shared on various social media platforms by convenience sampling (N=330). Data was analyzed using SPSS version 26.0. **Results:** A total of 330 responses were included for final analysis. Of which, students were the most numerous (178, 53.9%). Higher proportion of females (219, 66.4%). The majority of both students (164, 49.7%) and teachers (114, 34.5%) had heard of epilepsy or seizures. 42.7% (141) of students and 32.1% (106) of teachers identified epilepsy as a brain disorder. A small percentage of both students (49, 14.8%) and teachers (28, 8.5%) knew how to respond to a seizure. **Conclusions:** Although limited by a non-validated tool and descriptive analysis, this study revealed major gaps in seizure first-aid knowledge among students and teachers. The findings support the need for structured seizure first-aid training programs for students and teachers, and emphasize the impact of this training upon students' well-being and mental health.

INTRODUCTION

Epilepsy is a non-communicable disease of the brain and affects 50 million people worldwide, according to the WHO. The incidence and prevalence of epilepsy are higher in low and middle-income countries, and three-quarters of people living with epilepsy do not receive the appropriate treatment. The most recent study estimated the prevalence of epilepsy in Pakistan to be 9.99 per 1000. Epilepsy has historically been believed to be a demon or spiritual influence, or a psychological disorder, instead of a brain disorder. Stigma related to epilepsy hinders people living with epilepsy from seeking early treatment and compromises the quality of life in terms of both physical and cognitive well-being. This stigma can also lead to social isolation, rejection by peers, challenges in finding a partner, and reduced opportunities for education and employment [1, 2]. Frequent unrecognized seizures cause hippocampal or entorhinal neuronal loss, which is associated with declining cognitive processing skills and deterioration in memory [3]. Teachers and peers are often the first responders to seizures. Teachers must understand, recognize, and be knowledgeable about seizure responses, as their attitudes can significantly

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affect and impact children's physical and mental health. Knowledge about epilepsy has improved in recent years with the rise of health awareness campaigns, programs, and social media. However, knowledge about seizure first aid remains a significant challenge [4]. This study aimed to determine the level of expertise about seizures, epilepsy, and seizure first aid among students and teachers to identify the knowledge gaps. We plan to implement awareness campaigns, provide resources, and offer certification programs in seizure first aid to address these gaps. This study aims to assess knowledge of epilepsy and seizure first aid among students and teachers of all educational levels in Pakistan.

METHODS

This cross-sectional study using a non-validated Google questionnaire in English and Urdu was conducted via various social media platforms by convenience sampling (N=330). The Institutional Review Board of King Edward Medical University approved the study (Ref. No. 119/RC/KEMU). The study duration was six months, covering January 2024 to June 2024. The study targeted high school, college, and university students, as well as teachers across all educational levels. The study excluded students and teachers from healthcare to avoid confounding bias and skewing of the results of the study. Consent was obtained in the predesigned Google questionnaire. Researchers designed a questionnaire, based on Adal *et al.* (2024), and modified it [5]. A Google questionnaire in English and Urdu was translated and approved by the institutional board. An invitation to participate in the survey was sent to participants on various social media platforms (Facebook, WhatsApp groups, and distributed in schools and colleges through peers). Currently, no questionnaire has been validated for assessing the knowledge of seizures and first aid among students and teachers; therefore, we developed one. The participants included students over the age of 15 years and teachers between the ages of 20 and 60, selected through a convenience sampling technique. Based on expected epilepsy awareness (50%) as the exact prevalence is unknown, margin of error (5%), and 95% CI, the target was 384 participants; 330 achieved (85.9% response rate). The questionnaire was divided into further sections; the first section consisted of six questions, including demographic data, such as age, gender, designation, education, teaching experience for teachers, and city. The age was calculated in age groups and divided into five groups (<20, 21-30, 30-40, 41-50, and 51-60). The second section included general questions regarding knowledge of epilepsy and seizures, such as if they are familiar with the term epilepsy or seizure, where they have heard it, have they ever witnessed a seizure if yes where, what they think what is epilepsy and seizure, are the seizures and epilepsy are synonymous, medical emergency, contagious or can cause death, if all seizures are the same or different, and the third section included questions related to seizure first-aid, such as do you know how to respond to a seizure, how will you respond, should teachers and students be taught seizure first-aid, and are they interested in learning seizure aid? Most of the questions were closed-ended with 'yes, 'No,' 'I don't know,' and 'Maybe 'responses, and multiple response questions for obtaining consistent and correct responses to avoid misinterpretation of the true awareness. All data were entered and analyzed using SPSS version 26.0. Categorical variables, including age groups, gender, teaching experience, and responses related to epilepsy, seizures, and seizure first-aid, were summarized as frequency and percentage. For key variables, prevalence estimates with 95% confidence intervals (CIs) were calculated using the exact/binomial method. Comparisons between students and teachers were performed using Chi-square tests, and Fisher's exact test was applied when expected cell counts were less than 5. A $p<0.05$ was considered statistically significant.

RESULTS

Among 386 responses, a total of 330 responses were included for final data analysis. Among the respondents, the predominant group was students 178 (53.9%), and 152 (46.1%) were teachers (Figure 1).

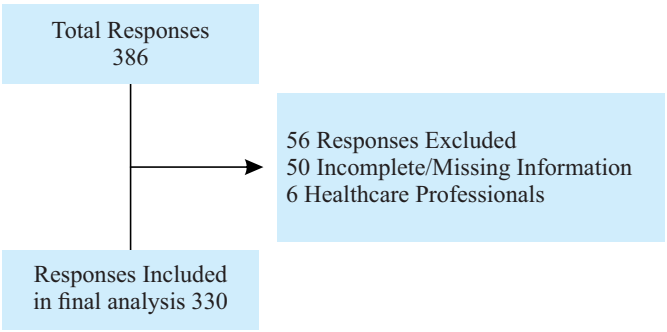

Figure 1: Distribution of Teaching Experience Among Participating Teachers (N=152)

The majority (142, 43%) of respondents were students aged less than 20, with one (0.3%) in the 31-40 age group. Teachers were more evenly distributed across various age ranges, with a notable concentration in the 31-40 age bracket (22.1%). Gender distribution showed a higher proportion of females (103, 31.2%) among students and teachers (116, 35.2%), contributing to 66.4% (219) of females across both groups. In terms of geographic distribution, the majority of students were from Lahore (144, 43.6%). Most were high school students (104, 31.5%) or bachelor's degree holders (66, 20%), while teachers predominantly held master's degrees (113, 34.2%) (Table 1).

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Table 1: Demographic Characteristics of Participants (N=330)

Variables	Students (N= 178), n (%)	Teachers (N= 152), n (%)	Total (N= 330), n (%)
Age (years)			
<20	142 (43.0%)	0	142 (43.0%)
21–30	35 (10.6%)	26 (7.9%)	61 (18.5%)
31–40	1 (0.3%)	73 (22.1%)	74 (22.4%)
41–50	0	45 (13.6%)	45 (13.6%)
51–60	0	8 (2.4%)	8 (2.4%)
Gender			
Female	103 (31.2%)	116 (35.2%)	219 (66.4%)
Male	71 (21.5%)	36 (10.9%)	107 (32.4%)
Not given / Prefer not to say	4 (1.2%)	0	4 (1.2%)
City			
Lahore	144 (43.6%)	28 (8.5%)	172 (52.1%)
Islamabad	14 (4.2%)	0	14 (4.2%)
Sialkot	0	50 (15.2%)	50 (15.2%)
Okara	0	48 (14.5%)	48 (14.5%)
Multan	2 (0.6%)	9 (2.7%)	11 (3.3%)
DG Khan	4 (1.2%)	1 (0.3%)	5 (1.5%)
Faisalabad	4 (1.2%)	1 (0.3%)	5 (1.5%)
Others	10 (3.0%)	15 (4.5%)	25 (7.6%)
Education			
Middle School	1 (0.3%)	2 (0.6%)	3 (0.9%)
High School	104 (31.5%)	6 (1.8%)	110 (33.3%)
Bachelor's Degree	66 (20.0%)	25 (7.6%)	91 (27.6%)
Master's Degree	7 (2.1%)	113 (34.2%)	120 (36.4%)
Doctorate / PhD	0	6 (1.8%)	6 (1.8%)

While teachers who had teaching experience between 5-10 years (39, 11.8%) and 11-20 years (30, 9.1 %) were aware of epilepsy, compared to teachers who had more than twenty years of teaching experience (15, 4.5%). Of the teachers with teaching experience of 5-10 years, the majority were in the age group between 31-40 years. Though statistical significance could not be assessed due to limited stratified data (Table 2).

Table 2: Teaching Experience of Participants (N=152 Teachers)

Experience in Years	n (%)
<5	38 (11.5%)
5-10	50 (15.2%)
11-20	41 (12.4%)
<20	21 (6.4%)
Not given	2 (0.6%)

Among students, the most common sources of information about epilepsy were given from school/college/university (16.7%), whereas teachers most frequently cited other sources (16.4%), and school/college/university (11.8%). Students reported witnessing seizures in real life (17.6%), followed by TV/cinema (5.8%), while teachers predominantly observed seizures in real life (28.2%). The majority of students (42.7%) and teachers (32.1%) correctly identified epilepsy as a brain disorder, though smaller proportions attributed it to psychological or spiritual causes or considered it "not a disease," and 12.4% overall reported "I don't know." Regarding seizure characteristics, students commonly described seizures as whole-body shaking (29.1%), whereas teachers most frequently selected "all of the above" (50%), reflecting broader recognition of seizure manifestations. Awareness of seizure first-aid, the most commonly chosen correct action was staying with the patient (students 13.9%, teachers 16.1%) (Table 3).

Table 3: Source of Knowledge and Seizure Characteristics

Items	Students (N= 178), n (%)	Teachers (N= 152), n (%)	Total (N= 330), n (%)
Where have you heard about it?			
Social media	47 (14.2%)	32 (9.7%)	79 (23.9%)
Family/friends/relatives	48 (14.5%)	39 (11.8%)	87 (26.4%)
School/college/university	55 (16.7%)	27 (8.2%)	82 (24.8%)
Other	28 (8.5%)	54 (16.4%)	82 (24.8%)
Where have you witnessed a seizure?			
Social media	14 (4.2%)	14 (4.2%)	28 (8.5%)
TV/cinema	19 (5.8%)	5 (1.5%)	24 (7.3%)
Real life	58 (17.6%)	39 (11.8%)	97 (29.4%)
N/A	87 (26.4%)	93 (28.2%)	180 (54.5%)
Others	0	1 (0.3%)	1 (0.3%)
What do you think epilepsy is?			
Brain disorder	141 (42.7%)	106 (32.1%)	247 (74.8%)
Psychological disorder	15 (4.5%)	21 (6.4%)	36 (10.9%)
Spiritual cause	1 (0.3%)	0	1 (0.3%)
Not a disease	4 (1.2%)	1 (0.3%)	5 (1.5%)
I don't know	17 (5.2%)	24 (7.3%)	41 (12.4%)
What is a seizure?			
Whole body shaking	96 (29.1%)	69 (20.9%)	165 (50.0%)
Loss of consciousness	5 (1.5%)	10 (3.0%)	15 (4.5%)
Loss of awareness	1 (0.3%)	4 (1.2%)	5 (1.5%)
Loss of bladder control	0	0	0
Tongue bite	1 (0.3%)	6 (1.8%)	7 (2.1%)
Fall	1 (0.3%)	3 (0.9%)	4 (1.2%)
Pelvic thrusting	0	1 (0.3%)	1 (0.3%)
Body stiffening	5 (1.5%)	5 (1.5%)	10 (3.0%)
Head shaking	1 (0.3%)	4 (1.2%)	5 (1.5%)
All of the above	51 (15.5%)	24 (7.3%)	75 (22.7%)
I don't know	17 (5.2%)	26 (7.9%)	43 (13.0%)

Awareness of Epilepsy and Seizures

Among students, 92.1% (95% CI: 87.2–95.6) reported they have heard of epilepsy, compared with 75.0% (95% CI: 67.3–81.7) of teachers. (p-value = 0.0001). Overall, 50.6% of students (95% CI: 43.0–58.1) and 38.2% of teachers (95% CI: 30.4–46.4) reported ever witnessing a seizure (p = 0.031). Regarding whether seizures and epilepsy are synonyms, 35.4% of students (95% CI: 28.1–43.1) and 46.7% of teachers (95% CI: 38.9–54.6) answered "Yes." Regarding the contagiousness of seizures, 44.2% of students (95% CI: 37.0–51.6) and 38.8% of teachers (95% CI: 31.3–46.7)

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correctly responded "No". A total of 19.7% of students (95% CI: 14.0–26.7) and 25.7% of teachers (95% CI: 18.9–33.9) believed that seizures are not a medical emergency. When asked if seizures can cause death, 21.8% of students (95% CI: 16.0–28.6) and 27.6% of teachers (95% CI: 20.6–35.5) answered "Yes." Only 7.3% of students (95% CI: 4.3–11.4) and 10.6% of teachers (95% CI: 6.2–16.8) believed that all seizures present similarly (Table 4).

Table 4: Awareness and Misconceptions About Epilepsy and Seizures Among Students and Teachers

Items	Students (N=178)	Teachers (N=152)	Chi-Square / Fisher's Exact
Have heard of epilepsy (Yes)	92.1% (95% CI: 87.2–95.6)	75.0% (95% CI: 67.3–81.7)	p=0.0001
Ever witnessed a seizure (Yes)	50.6% (95% CI: 43.0–58.1)	38.2% (95% CI: 30.4–46.4)	p=0.031
Seizures and epilepsy are synonyms (Yes)	35.4% (95% CI: 28.1–43.1)	46.7% (95% CI: 38.9–54.6)	p=0.052
Are seizures contagious (Yes)	9.7% (95% CI: 6.6–13.6)	7.3% (95% CI: 4.8–11.0)	p=0.45
Are seizures contagious (No)	44.2% (95% CI: 37.0–51.6)	38.8% (95% CI: 31.3–46.7)	–
Seizures are not a medical emergency (Yes)	19.7% (95% CI: 14.0–26.7)	25.7% (95% CI: 18.9–33.9)	p=0.24
Is epilepsy contagious? (Yes)	3.9% (95% CI: 2.1–7.0)	4.5% (95% CI: 2.5–7.4)	Fisher's exact, p=0.81
Can seizures cause death? (Yes)	21.8% (95% CI: 16.0–28.6)	27.6% (95% CI: 20.6–35.5)	Chi-square, p=0.26
Can seizures cause death? (No)	8.2% (95% CI: 5.0–13.0)	15.5% (95% CI: 10.3–22.3)	p=0.04
All seizures present similarly (Yes)	7.3% (95% CI: 4.3–11.4)	10.6% (95% CI: 6.2–16.8)	Fisher's exact, p=0.38

Knowledge of seizure first-aid was scarce among respondents. Among students, 27.5% (95% CI: 21.1–34.7) reported knowing how to respond correctly during a seizure, compared with 18.4% of teachers (95% CI: 12.6–25.5). Despite this, the majority supported educational training: 97.8% of students (95% CI: 94.3–99.4) and 94.1% of teachers (95% CI: 89.1–97.3) agreed that seizure first-aid should be taught in schools and colleges. Similarly, 81.5% of students (95% CI: 75.0–86.9) and 78.9% of teachers (95% CI: 71.6–85.1) expressed interest in learning seizure first-aid. The most common response chosen appropriately was to stay with the patients (students 46, 13.9%, teachers 53, 16.1%) (Table 5).

Table 5: Seizure First-aid Knowledge and Training

Items	Students N=178, n (%)	Teachers N=152, n (%)	Chi-Square / Fisher's Exact p-value
Know how to respond to a seizure (Yes)	49 (27.5%, 95% CI: 21.1–34.7)	28 (18.4%, 95% CI: 12.6–25.5)	0.085
Support teaching First-aid (Yes)	174 (97.8%, 95% CI: 94.3–99.4)	143 (94.1%, 95% CI: 89.1–97.3)	0.12 (Fisher's Exact)
Interested in learning First Aid (Yes)	145 (81.5%, 95% CI: 75.0–86.9)	120 (78.9%, 95% CI: 71.6–85.1)	0.58
How will you respond?			
Restrain the patient	24 (13.5%)	20 (13.2%)	–
Guide the patient away from danger	46 (25.8%)	53 (34.9%)	–
Stay with the patient	61 (34.3%)	45 (29.6%)	–
Give them food and water	7 (3.9%)	4 (2.6%)	–
Turn on the side and support the head	25 (14.0%)	21 (13.8%)	–
I don't know	15 (8.4%)	9 (5.9%)	–

DISCUSSIONS

It was also the first cross-sectional survey to establish the knowledge of epilepsy, seizures, and first aid among teachers at the different levels of education, high school, college, and university students. The majority of the students and teachers were aware of epilepsy (84.2%), and they knew it to be a disorder of the brain (74.8%). Nevertheless, the percentage of the respondents in the two groups who were aware of various forms of seizure (18%) and response to seizure (23.3%) was very low. Students with high school level were more conversant with epilepsy than the students with other levels of education, which aligns with other research works [4]. Regarding first aid response, only 16% of the students knew the proper responses, which was also true in Saudi Arabia (1.6%) [6]. In terms of the nature of seizure, 29.1% of them reported shaking the whole body as a symptom of a seizure, whereas 15.5% viewed all the listed symptoms as symptoms of a seizure. All in all, students were more aware of epilepsy compared to teachers, as seen in higher prevalence, no overlapping confidence interval, and a p-value below 0.0001. In the context of the awareness of the teachers, a number of studies have given more emphasis on training teachers on the acquisition of the recognition of the presence of seizures and the delivery of first aid [7]. Only 11.1% of teachers in Ethiopia were trained [7]; in Jeddah, Saudi Arabia, only one third were trained [8]; other studies reported training 9.2%, 8% and about a tenth of teachers trained [9-11]. In one study in Karachi, it was reported that 15.5 percent of the teachers had been trained on first aid [12]. Consistent with these results, we found that the

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majority of teachers were conversant with seizures and epilepsy, but there was still a large disparity in the knowledge of first aid for seizures (8.5%). Some teachers believed that epilepsy is contagious, similar to earlier research of 14.5% [12-14], although other researchers reported higher percentages (32.4-41.9) [15]. Awareness of epilepsy among teachers also depended on the years of teaching experience, whereby those with 5-20 years' experience were more aware, which could also be because of the epilepsy awareness provided by the media in recent years, in agreement with previous research [10,15-17]. Nonetheless, statistical significance was not provided as a result of scanty stratified data. This research paper has some limitations. First, the questionnaire employed was non-validated, which may have been a source of measurement bias and a restrictive aspect of reliability. Even though the study was based on previous literature, validated instruments or formal validation should be used in future research. Second, respondents had poor knowledge of seizure first-aid response, and few studies regarding the same have been conducted recently [18-20]. Third, the analysis was descriptive, mainly frequencies and percentages, with no advanced statistical evaluation to explore the associations and predictors. Lastly, convenience sampling in a non-representative manner of the population restricts generalization.

CONCLUSIONS

The study highlights critical gaps in seizure first-aid knowledge and provides an important foundation for larger, validated, and more analytically robust studies in the future. This study also stresses the importance of public education and training of teachers in recognizing the importance of seizure first aid response and how unrecognized seizures can significantly impact the physical and cognitive health of children. [18,19,20] The prompt recognition and prompt initiation of treatment can reduce the morbidity and mortality associated with epilepsy.

Authors Contribution

Conceptualization: ZS
Methodology: ZS, NK, JS, AH, SL, SB
Formal analysis: JS, SL, SB, HM
Writing review and editing: ZS, NK, JS, AH, SL, SB, HM

All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

All the authors declare no conflict of interest.

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