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Original Research Article

A Cross-Sectional Study on Knowledge and Practice of First Aid and Its Determinants among School Teachers in Karur District

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Abstract

Background: First aid is a vital life-saving skill, particularly in schools where children are vulnerable to injuries and medical emergencies. Teachers, as the immediate responders, play a crucial role in ensuring timely assistance and child safety.

Aims: This study aimed to assess the knowledge and practice of first aid among school teachers in Karur district, Tamil Nadu and to identify factors influencing their performance.

Methodology: An institution-based cross-sectional study was conducted among 440 school teachers selected through multistage random sampling. Data were collected using a validated, semi-structured questionnaire and analyzed with SPSS version 21.0 using appropriate descriptive and inferential statistics.

Results: The mean age of participants was 37.5±8.9 years and 85.5% were female. Overall, 57.3% reported prior first aid training. Good knowledge was observed in 54.5% of teachers, with higher knowledge regarding breathing difficulty (84.5%) and animal bites (71.1%), but lower for severe bleeding (15.5%) and epilepsy (28%). Multivariable logistic regression analysis showed that, after adjusting for potential confounders, only training status was significantly associated with knowledge (aOR 1.95, 95% CI 1.29–2.94). Good practice was reported by only 19.3% of teachers; postgraduate education and non-science subject specialization were independent predictors of good practice.

Conclusions: More than half of the teachers had good knowledge, but correct practice was notably poor, showing a knowledge-practice gap. Regular, structured and hands-on training programs, supported by adequate resources in schools, are essential to enhance preparedness in managing emergencies.

Keywords: First aid training, School teachers, Emergency response, Knowledge, Practice.

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Introduction

First aid is the immediate assistance provided to an ill or injured person until professional help arrives, aiming to preserve life and prevent complications. [1] School-aged children spend about 30% of their time in schools, making teachers vital responders. [2] In India, unintentional injuries rank as the second leading cause of death among children aged 5–14 years. [3] Adequate first aid knowledge and practice among teachers are essential for timely and effective emergency response. Given this background, the present study was undertaken to assess the knowledge and practices of first aid among school teachers, and to identify the factors influencing their performance.

Objectives:

1. To study the level of knowledge and practice of first aid among school teachers in Karur district, Tamil Nadu.
2. To assess the general characteristics determining the performance of first aid.

Materials and Methods

The present institution-based cross-sectional study was conducted in schools across Karur district, Tamil Nadu, from December 2022 to November 2023, to assess the knowledge and practice of first aid among school teachers in providing first aid. Karur district consists of eight administrative blocks, of which the Karur block was selected by simple random sampling through the lottery method.

The block comprises 15 clusters that include both government and private schools. From each cluster, one government and one private school were randomly selected, and a list of teachers from these schools was prepared. Teachers with a minimum of six months of work experience and who provided

informed consent were included, while those who declined consent were excluded. Based on the findings of Hosapatna et al., [4] which reported that 30.2% of teachers had adequate knowledge of first aid, the sample size was calculated at a 95% confidence level with 15% relative precision and a 10% allowance for non-response, resulting in 434 participants. In total, 220 teachers each from government and private schools were randomly selected, giving a final sample of 440 participants.

Data were collected using a self-administered, semi-structured questionnaire that was pre-tested in a pilot study with 44 teachers (10% of the main sample) to assess feasibility and refine the items. The tool included sections on demographic details, knowledge of first aid (11 questions assessing management of conditions such as severe bleeding, fainting, epistaxis, respiratory distress, bites, fractures, chemical burns, choking, neck and back injuries, seizures, and near drowning, with a score of ≥6 out of 11 considered good knowledge) and practice of first aid (11 items evaluating correct practices in real-life situations, where appropriate responses across applicable scenarios indicated good practice).

Ethical approval was obtained from the Institutional Ethics Committee of Madras Medical College, and permissions were obtained from the Director, Institute of Community Medicine, the Dean, Madras Medical College, and the Chief Educational Officer of Karur District. Written informed consent was obtained in English or Tamil and participation was voluntary with the option to withdraw at any time. Data collection was conducted through self-administered questionnaires with clarification provided as needed without altering the meaning of questions. Data were entered in Microsoft Excel and analyzed using SPSS version 21. Descriptive statistics were presented as frequencies and percentages, while associations between knowledge, practice and general characteristics were tested using Chi-square and Fisher's exact tests. Logistic regression was performed to identify independent factors associated with knowledge and practice after adjusting for confounders, with statistical significance set at $p<0.05$.

Results

A total of 440 school teachers participated, with a mean age of 37.5±8.9 years. Females constituted 85.5% of participants. The general characteristics of the study participants are depicted in Table 1.

Table 1: General characteristics of study participants

Factors	Category	Frequency (n=440)	Percentage (%)
Age (in years)	21-30	93	21.1
	31-40	185	42
	41-50	**124**	**28.2**
	51-60	38	8.6
Gender	Male	64	14.5
	Female	**376**	**85.5**
Education	Undergraduate	106	24
	Postgraduate	**334**	**76**
Marital status	Unmarried	59	13.4
	Married	**381**	**86.6**
No. of years of Service	≤10	**243**	**55.2**
	>10	197	44.8
Grade of teaching	Elementary	**136**	**31**
	Middle	106	24
	High	97	22
	Higher secondary	101	23
Training status	Yes	**252**	**57.3**
	No	188	42.7

Most teachers taught Language (n=187), followed by science (n=91) and mathematics (n=82), with fewer in social science (n=41), computer science (n=33), or teaching all subjects (n=29). A small proportion handled physical education, commerce/economics, accountancy, art/craft, or miscellaneous subjects (n≤9 each).

Knowledge of first aid among school teachers: The distribution of school teacher's knowledge regarding first aid measures for common injuries is shown in Table 2.

Table 2: Distribution of School Teachers according to their Knowledge regarding First Aid measures for Common Injuries (n=440)

Knowledge regarding First aid measures for Common Injuries	Frequency (n) of correct responses	Percentage (%)
Severe bleeding	68	15.5
Fainting child	103	23.4
Nose bleed/Epistaxis	204	46.4
Difficulty in breathing	372	84.5
Human/Animal bite	313	71.1
Suspected fracture	194	44.1
Chemical burns	269	61.1
Choking	209	47.5
Neck and back injury	335	76.1
Epilepsy	123	28
Near drowning	327	74.3

Out of 440 participants, 240 (54.5%) had good knowledge regarding first aid measures (score > 6), while 200 (45.5%) had poor knowledge (≤ 6). On univariate analysis, training status, years of service and marital status were found to be significantly associated with the level of knowledge ($p < 0.05$). However, in multivariable logistic regression analysis, only training status remained a significant independent predictor of good knowledge (aOR= 1.95, 95% CI: 1.29–2.94). (Table 3).

Table 3: Association between general characteristics of school teachers and knowledge of first aid

Factors	Category	Knowledge of first aid n (%)		p value	OR (95% CI)	aOR (95% CI)
		Good	Poor			
Age	≤40	136 (51.3)	129 (48.7)	0.095	0.72 (0.49-1.06)	-
	>40	104 (59.4)	71 (40.6)			
Gender	Male	31 (48.4)	33 (51.6)	0.288	0.75 (0.44-1.28)	-
	Female	209 (55.6)	167 (44.4)			
Education	Postgraduate	187 (55.7)	149 (44.3)	0.401	1.21 (0.78-1.88)	-
	Undergraduate	53 (51)	51 (49)			
Marital Status	Married	215 (56.4)	166 (43.6)	**0.044***	**1.76 (1.01-3.07)**	1.43 (0.77-2.65)
	Unmarried[#]	25 (42.4)	34 (57.6)			
No. of years of Service	>10	118 (59.9)	79 (40.1)	**0.042***	**1.48 (1.01-2.17)**	0.76 (0.47-1.22)
	≤10[#]	122 (50.2)	121 (49.8)			
Grade of teaching	Middle school and below	135 (55.8)	107 (44.2)	0.564	1.12 (0.77-1.63)	-
	Above middle school	105 (53)	93 (47)			
Type of school	Government	115 (52.3)	105 (47.7)	0.338	0.83 (0.57-1.21)	-
	Private	125 (56.8)	95 (43.2)			
Training status	Yes	154 (61.1)	98 (38.9)	**0.001***	**1.86 (1.27-2.73)**	**1.95 (1.29-2.94)**
	No[#]	86 (45.7)	102 (54.3)			
Subject specialization	Science and PET teachers	61 (61)	39 (39)	0.140	1.41 (0.89-2.22)	-
	Other subject teachers	179 (52.6)	161 (47.4)			

***Statistical significance at p<0.05, # Reference category**

Adjusted variables: Age, Gender, Education, Marital status, Service years, Grade of teaching, Type of school, Training status and Subject specialization

Note: After adjustment, only training status was a significant predictor of first aid knowledge. Marital status and service years were not statistically significant in the adjusted model, and other characteristics did not show significant associations.

Practice of first aid among school teachers: The practice of first aid among teachers for various common injuries showed differences in both the frequency of opportunities and the effectiveness of responses. (Table 4)

Table 4: Distribution of school teachers according to practice of first aid measures for Common injuries

Practice of First Aid for Common Injuries among teachers	Frequency (a) of opportunity (n=440)	Frequency of good practice (n=a)	Percentage (%)
Severe bleeding	263 (59.8)	152	57.8
Fainting child	266 (60.5)	127	47.7
Nose bleed/Epistaxis	213 (48.4)	43	20.2
Difficulty in breathing	221 (50.2)	176	79.6
Electrical burns	65 (14.8)	48	73.8
Suspected fracture	133 (30.2)	93	69.9
Chemical burns	79 (18)	21	26.6
Choking	60 (13.6)	33	55
Neck and back injury	75 (17)	29	38.7
Epilepsy	156 (35.5)	68	43.6
Near drowning	65 (14.8)	35	53.8

Out of 384 participants, 74 (19.3%) had good practice regarding first aid, while 310 (80.7%) had poor practice.

On univariate analysis, education level and subject specialization were found to be significantly associated with first aid practice ($p<0.05$). In the multivariable logistic regression analysis, after adjusting for potential confounders, teachers with postgraduate education were 2.62 times more likely to show good practice compared to those with undergraduate education (aOR= 2.62, 95% CI: 1.17–5.89).

Teachers teaching subjects other than Science or Physical Education were 55% more likely to show good practice compared to Science or PET teachers (aOR 0.45, 95% CI 0.22–0.93) (Table 5).

Table 5: Association between general characteristics of school teachers and practice of first aid (n=384)

Factors		Practice of first aid n (%)		p value	OR (95% CI)	aOR (95% CI)
		Good	Poor			
Age (in years)	≤40	52 (22.5)	179 (77.5)	0.048	1.73 (1.00-2.99)	-
	>40	22 (14.4)	131 (85.6)			
Gender	Male	14 (25.5)	41 (74.5)	0.209	1.53 (0.79-2.99)	-
	Female	60 (18.2)	269 (81.8)			
Education	Postgraduate	65 (21.8)	233 (78.2)	**0.019***	**2.39 (1.14-5.02)**	**2.62 (1.17-5.89)**
	Undergraduate#	9 (10.5)	77 (89.5)			
Marital Status	Married	64 (19)	272 (81)	0.769	0.89 (0.42-1.89)	-
	Unmarried	10 (20.8)	38 (79.2)			
No. of years of Service	>10	27 (15.4)	148 (84.6)	0.081	0.63 (0.38-1.06)	-
	≤10	47 (22.5)	162 (77.5)			
Grade of teaching	Middle school and below	36 (17.1)	175 (82.9)	0.225	0.73 (0.44-1.22)	-
	Above middle school	38 (22)	135 (78)			
Type of school	Government	33 (17.6)	154 (82.4)	0.432	0.82 (0.49-1.36)	-
	Private	41 (20.8)	156 (79.2)			
Training status	Yes	39 (16.8)	193 (83.2)	0.131	0.68 (0.41-1.13)	-
	No	35 (23)	117 (77)			
Subject specialization	Science and PET teachers	11 (11.7)	83 (88.3)	**0.032***	**0.48 (0.24-0.95)**	**0.45 (0.22-0.93)**
	Other subject teachers#	63 (21.7)	227 (78.3)			

***Statistical significance at p<0.05, # Reference category**

Adjusted with other variables: Age, Gender, Marital status, Service years, Grade of teaching, Type of school, Training status

Note: Age, gender, marital status, service years, grade of teaching, type of school and training status were not statistically significant in the adjusted logistic regression analysis.

Discussion

This institution based cross sectional study assessed the knowledge and practice of first aid among school teachers among school teachers in Karur district.

This study was conducted among 440 school teachers. Among the study participants, 21.1% were between 21-30 years of age, 42% were

between 31-40 years, 28.2% were between 41-50 years, and 8.6% were between 51-60 years. Female teachers constituted 85.5% of the sample, while male teachers accounted for 14.5%. A total of 76% of the teachers had completed postgraduate studies, and 24% had completed undergraduate studies. About 86.6% were married and 13.4% were unmarried. Teaching experience showed that 55.2% had been teaching for 10 years or less, and 44.8% had been teaching for more than 10 years. The grade distribution of teaching showed that 31% of the teachers were teaching elementary school students, 24% were teaching middle school students, 22% were teaching high school students, and 23% were teaching higher secondary students. Majority of the school teaches in this study were aged between 31-40 years (42%) similar to Alok Jindal et al. [5] in Mangalore, where 37.2% were in the same age group. This study also provides details about teaching experience, with 65.5% of teachers having less than 10 years of experience and 34.5% having more than 10 years. The categories of schools the teachers worked in included primary (43.8%), secondary (22.5%), and high school (34.7%). While the present study showed 76% had completed postgraduate studies, Sunil Kumar D et. al. [6] in Mysore showed only 49.2% with postgraduate qualifications.

The female predominance (85.5%) observed here was consistent with other studies. Feng Li et al. [7] in Shanghai, China reported 99.7% female participants while Shobha Masih et al. [8] conducted in Uttarakhand, found 94% female teachers.

School-based first aid training has been shown to improve health and safety knowledge significantly. Reveruzzi et al. [9]] showed that such training benefits adolescents by enhancing skills in injury management and cardiac arrest, with both teachers and students reporting positive outcomes. Interactive, scenario-based learning was found effective, supporting the integration of first aid into school curricula.

In the present study, 57.3% of teachers were trained in first aid, while 42.7% were not trained in first aid. This is higher compared to findings from other studies, such as Hadi A. Al-Qurain et al. [10] in Saudi Arabia, where 62.88% of teachers lacked first aid training, and Feng Li et al. [7] in China, where 69.2% had not received training. Monte Gagliardi et al. [11] in the United States also reported that one-third of teachers lacked specific first aid training while in Indonesia a study by Ristina Mirwanti et al. [12] reported only 24.24% had received training. Conversely, Alok Jindal et al. [5] in Mangalore found that 57 participants (n=100) had prior training in pre-hospital care which is similar to this study.

Teachers, being the first responders during school emergencies, must be provided with adequate knowledge and skills to provide pre-hospital care. Adequate training and resources are essential to safeguard students and reduce morbidity and mortality from emergencies. [5]

Knowledge of first aid: In this study, knowledge levels varied by condition. Teachers showed good awareness for breathing difficulty (84.5%) and animal or human bites (71.1%), while fewer recognized appropriate management for epilepsy (28%) and severe bleeding (15.5%). Regarding the management of nosebleeds, 46.4% of teachers showed correct knowledge, which was comparable to the findings of Alok Jindal et al. [5] (49.2%), but considerably higher than that reported by Sunil Kumar D et al. [13] in Mysore, where only 5.1% mentioned correct measures. Knowledge related to the management of choking was observed in 47.5% of participants, which was lower than the 71.2% reported by Alok Jindal et al. [5] in Mangalore.

Overall, 54.5% of teachers in this study had good knowledge (score ≥6), while 45.5% had poor knowledge. Significant predictors of higher knowledge included prior first aid training, greater teaching experience, and marital status. Binary logistic regression showed that trained teachers were nearly twice as likely to have adequate knowledge (aOR 1.946, 95% CI 1.29–2.94). This finding is in line with Feng Li et al. [7] who also reported higher knowledge among trained staff and with Nithin Joseph et al. [2] who showed that training was the only significant factor associated with knowledge after adjusting for confounders.

Unlike Nitin Joseph et al. [2], this study found no association between knowledge and subject specialization, age, gender or school type. This indicates that structured training is the most influential determinant of first aid knowledge.

Practice of first aid: In this study, for common incidents such as nose bleed/epistaxis and fainting child, although teachers often encountered these situations (48.4% and 60.5% respectively), their performance was relatively low (20.2% and 47.7% respectively). Incidents like choking and near drowning, which were less frequently encountered (13.6% and 14.8% respectively), showed moderate to good practice rates (55% and 53.8% respectively). Scenarios like chemical burns (18%) and neck and back injury (17%) showed relatively low rates of good practice (26.6% and 38.7% respectively). This suggests the need for better training and readiness for common incidents.

Comparatively, Nitin Joseph et al. [2] found wounds (36%) and syncopal attack (23%) were common emergencies. Sunil Kumar D et al. [13] reported higher practice rates for wound care

(80.8%), nosebleeds (32.5%) and fainting (10.6%). In burn cases, 36.8% applied cold water, higher than observed in this study.

There is a significant gap between knowledge (54.5%) and practice (19.3%) of first aid among teachers in this study. This gap can be attributed to the fact that theoretical knowledge often does not translate into practical skills without adequate hands-on practice. [18] Many training programs focus on theory rather than providing sufficient opportunities to practice skills in realistic scenarios. Shobha Masih et al. []8 in Uttarakhand concluded that the training program significantly improved participant's knowledge and practice scores related to the management of selected minor injuries. The findings highlight the importance of such training programs, as they can contribute to improving the overall health standards of children. Similarly, studies by Nitin Joseph et al. and Sunil Kumar D et al. confirmed variability in practices, stressing the need for standardized, practical training.

Child injuries are a growing global public health problem, becoming notably significant from the age of one. As children age, these incidents increasingly contribute to the overall mortality rates until they transition into adulthood. [5] According to a report from NIMHANS, accidental injuries account for about 7.2% of all deaths and have led to 6.3 million disability adjusted life years in children under 14 years old. [16] The United Nations Convention on the Rights of the Child (1989) establishes that all children are entitled to fundamental rights such as life, survival, and development. This includes access to the highest possible standard of health and to medical facilities for both treatment and recovery. India, as a signatory to this convention, is committed to upholding these rights. [17] This shows the importance of implementing effective preventive measures, strengthening first aid training for teachers and equipping schools with adequate facilities to ensure timely and life-saving care for children.

Strengths and Limitations: This study comprehensively assessed knowledge and practices of first aid, providing valuable insights for policy and training programs. However, as a cross-sectional study, causal relationships could not be established. Self-reported responses may also be subject to recall and social desirability bias.

Conclusion

The present study shows that although more than half of the school teachers reported receiving training in first aid, significant gaps persist in both knowledge and practice. Teachers constitute the first line of response to medical emergencies in school settings and inadequate preparedness may compromise timely and appropriate care. Strengthening structured and periodic first aid training, integrating first aid modules into teacher education curricula and ensuring the availability of essential first aid resources in schools are important steps. Such measures will not only enhance teacher's confidence and competence but also contribute to improved safety and health outcomes among school children.

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