

Original Research Article

Effectiveness of a video-assisted teaching programme on knowledge regarding first aid management among bus drivers: a quasi-experimental study

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ABSTRACT

Background: Bus drivers are frequently the first responders to road traffic accidents and passenger medical emergencies, yet many lack adequate first aid knowledge. A video-assisted teaching programme (VATP) offers a learner-friendly method of improving this knowledge among adult learners with varied educational backgrounds. To assess knowledge regarding first aid management among bus drivers before and after a VATP, and to determine the association between pre-test knowledge and selected socio-demographic variables.

Methods: A quasi-experimental one-group pre-test post-test design was used. Thirty-five bus drivers from a selected college in Dehradun, Uttarakhand, were enrolled through purposive sampling. Knowledge was measured using a 28-item structured, expert-validated questionnaire ($r=0.78$) administered before and after a video-based teaching intervention. Data were analysed using descriptive statistics, the paired t-test, and the chi-square test.

Results: Mean knowledge score rose from 13.00 (SD=5.72) pre-test to 19.97 (SD=4.96) post-test, a gain of 6.97 points ($t(34)=5.82$, $p<.001$; Cohen's $d = 0.98$). Adequate knowledge rose from 17.14% to 68.57%, while inadequate knowledge fell from 28.57% to 2.85%. No significant association was found between pre-test knowledge and socio-demographic variables (all $p>0.05$).

Conclusion: VATP produced a statistically significant and practically meaningful improvement in first aid knowledge among bus drivers, independent of socio-demographic background, and is a feasible, scalable strategy for strengthening prehospital emergency response capacity among transport-sector workers.

Keywords: Video-assisted teaching programme, First aid, Knowledge, Bus drivers, Quasi-experimental study, Road traffic accidents

INTRODUCTION

First aid is the immediate, temporary care given to an injured or acutely ill person before professional medical treatment becomes available, and timely intervention can materially reduce morbidity and mortality in emergency situations.¹⁻⁴ Bus drivers occupy a unique frontline position in public transportation systems: they are

frequently the first, and sometimes the only, person present when a passenger experiences fainting, bleeding, fracture, burns, or cardiac arrest, or when a road traffic accident occurs.^{5,6}

Road traffic injuries remain a major global public health problem. The World Health Organization estimates that approximately 1.19 million people die annually from road

traffic crashes worldwide, with the highest burden concentrated in low- and middle-income countries; road traffic injuries are also a leading cause of death among people aged 5–29 years.⁷⁻¹¹

In India, government data recorded over 4.6 lakh road accidents and more than 1.7 lakh fatalities in recent reporting years, underscoring the scale of the problem nationally.^{10,12,13} A substantial proportion of these deaths is attributable to delayed or absent first aid at the scene rather than to the severity of injury alone.¹⁴

Despite their pivotal position, evidence consistently shows that bus and commercial vehicle drivers possess limited first aid knowledge and skills, and structured training is not uniformly mandated.^{15,16} Conventional lecture-based instruction may be poorly suited to adult learners with heterogeneous educational backgrounds and limited available time.

The VATP is an alternative pedagogical strategy that uses audio-visual demonstration to improve attention, comprehension, retention, and practical application of knowledge, and has shown effectiveness in comparable populations, including mothers, school teachers, medical students, and other driver groups.¹⁵⁻²⁵

A clear gap remains, however, in the systematic evaluation of VATP specifically among bus drivers in the Dehradun region of Uttarakhand. The present study was therefore undertaken to assess the effectiveness of a VATP on knowledge regarding first aid management among bus drivers, using a pre-test/post-test design, and to examine whether pre-existing knowledge was associated with drivers' socio-demographic characteristics.

Objectives

To assess the level of knowledge regarding first aid management among bus drivers before and after a video-assisted teaching programme. To evaluate the effectiveness of the VATP by comparing pre-test and post-test knowledge scores; and to determine the association between pre-test knowledge scores and selected socio-demographic variables.

Hypotheses

H₁

There will be a statistically significant difference between pre-test and post-test knowledge scores regarding first aid management among bus drivers following the VATP.

H₂

There will be a statistically significant association between pre-test knowledge scores and selected socio-demographic variables.

METHODS

Study design and setting

A quantitative, quasi-experimental, one-group pre-test post-test design was adopted. The study was conducted in the seminar hall of a selected college affiliated with Dev Bhoomi Uttarakhand University, Dehradun, India, "from May 2025 to July 2025".

Participants and sampling

Thirty-five bus drivers (N=35) were enrolled using a purposive (non-probability) sampling technique. Inclusion criteria were: bus drivers affiliated with the selected college who were present at the time of data collection, conversant in Hindi, and holding a valid professional driving licence. Drivers who were absent during data collection, illiterate, or without a professional driving licence were excluded.

Research instrument

A structured questionnaire was developed following a review of the literature and expert consultation. It comprised two sections: Section A recorded nine socio-demographic variables (age, gender, residence, educational qualification, driving experience, type of bus driven, prior first aid training, time since training, and accident history); Section B contained a 28-item, single-best-answer, multiple-choice knowledge test covering first aid principles, first aid equipment, management of specific injuries (haemorrhage, fracture, burns, seizure, shock, cardiac events), and appropriate do's and don'ts during an emergency. Each correct response scored one point (maximum score = 28); knowledge was categorised as inadequate ($\leq 33\%$), moderately adequate (34–66%), or adequate ($\geq 67\%$) of the maximum score.

Validity and reliability

Content validity was established by a panel of five nursing experts, whose feedback informed minor revisions to the tool. Reliability was assessed using the split-half method with the Karl Pearson correlation formula, yielding a coefficient of 0.78, indicating acceptable internal consistency. A pilot study among five bus drivers meeting the inclusion criteria (conducted separately from the main sample) confirmed the feasibility of the protocol, with a statistically significant pre-post difference (paired $t=4.63$).

Data collection procedure

Following institutional ethical approval and administrative permission, informed consent was obtained from all participants. A pre-test was administered using the structured knowledge questionnaire, after which the video-assisted teaching programme on first aid management was delivered to all

participants. A post-test, using the identical instrument, was administered after an interval of several days to assess knowledge retention and gain.

Ethical considerations

The study protocol was approved by the research ethics committee of Dev Bhoomi Uttarakhand University. Written informed consent was obtained from each participant after explaining the purpose, procedures, and voluntary nature of participation; confidentiality of participant identity and data was assured throughout, and participants retained the right to withdraw at any stage without penalty.

Statistical analysis

Descriptive statistics (frequency, percentage, mean, standard deviation) were used to summarise demographic characteristics and knowledge scores. The paired-samples t-test was used to compare pre-test and post-test knowledge scores, with Cohen's d calculated as a measure of effect size. The chi-square test was used to examine the association between pre-test knowledge level and socio-demographic variables. A p value of <0.05 was considered statistically significant.

RESULTS

Socio-demographic characteristics

Table 1 presents the socio-demographic profile of the 35 bus drivers. The largest age group was 30–40 years (42.85%), and all participants (100%) were male. The majority resided in rural areas (80.00%) and had attained only primary-level education (48.54%); 37.14% had 5–10 years of driving experience, and 97.14% drove school buses. Sixty percent of drivers had never received prior

first aid training, and 62.85% had never personally encountered a road accident.

Pre-test and post-test knowledge levels

Table 2 shows the shift in categorical knowledge level following the VATP. Before the intervention, only 17.14% of drivers demonstrated adequate knowledge, while 28.57% were classified as having inadequate knowledge. After the intervention, 68.57% demonstrated adequate knowledge and only 2.85% remained in the inadequate category, indicating a marked upward shift in the knowledge distribution.

Effectiveness of the video-assisted teaching programme

The mean knowledge score increased from 13.00 (SD=5.72) at pre-test to 19.97 (SD=4.96) at post-test, a mean gain of 6.97 points. The paired-samples t-test confirmed that this improvement was statistically highly significant, $t(34) = 5.82$, $p < 0.001$ (Table 3). Cohen's d was 0.98, representing a large effect size by conventional benchmarks. Hypothesis H₁ was therefore accepted.

Association between pre-test knowledge and socio-demographic variables

Chi-square analysis (Table 4) revealed no statistically significant association between pre-test knowledge level and any of the socio-demographic variables examined, including age, residence, educational qualification, driving experience, prior first aid training, time since training, or accident exposure history (all $p > 0.05$). Associations for gender and type of bus could not be computed owing to near-complete homogeneity of these variables in the sample (100% male; 97.14% school-bus drivers). Hypothesis H₂ was therefore not supported by the data.

Table 1: Frequency and percentage distribution of bus drivers according to socio-demographic variables (n=35).

S. no.	Socio-demographic variables	Category	Frequency (N)	(%)
1	Age (in years)	20–30	8	22.85
		30–40	15	42.85
		40–50	9	25.71
		50–60	3	8.54
2	Gender	Male	35	100.0
		Female	0	0.00
3	Residence	Urban	7	20.00
		Rural	28	80.00
4	Educational qualification	Uneducated	5	14.28
		Primary	17	48.54
		Secondary (Matric)	13	37.14
		Graduate	0	0.00
5	Driving experience (years)	< 5	10	28.57
		5–10	13	37.14
		11–15	6	17.14
		> 15	6	17.14
6	Type of bus	School bus	34	97.14

Continued.

S. no.	Socio-demographic variables	Category	Frequency (N)	(%)
		Public bus	1	2.85
		Private bus	0	0.00
		Tourist bus	0	0.00
7	Previously trained in first aid	Yes	14	40.00
		No	21	60.00
8	Time since training (if trained)	< 1 year	4	28.57
		1–3 years	7	50.00
		> 3 years	3	21.42
9	History of encountering an accident	Yes	13	37.14
		No	22	62.85

Table 2: Percentage distribution of bus drivers according to pre-test and post-test knowledge level (n=35).

Levels of knowledge	Pre-test n (%)	Post-test n (%)
Inadequate ($\leq 33\%$)	10 (28.57)	1 (2.85)
Moderately adequate (34–66%)	19 (54.28)	10 (28.57)
Adequate ($\geq 67\%$)	6 (17.14)	24 (68.57)
Total	35 (100)	35 (100)

Table 3: Comparison of mean pre-test and post-test knowledge scores (paired t-test).

Tests	N	Mean	SD	Mean Difference	t-value (df)	P value
Pre-test	35	13.00	5.72	6.97	t (34)=5.82	<0.001
Post-test	35	19.97	4.96			

Table 4: Association between pre-test knowledge score and selected socio-demographic variables (chi-square test).

Demographic variables	χ^2 value (df)	p-value	Inference
Age (in years)	4.92 (6)	0.55	NS
Gender	Not computable ^a	—	—
Residence	0.45 (2)	0.80	NS
Educational qualification	3.91 (4)	0.42	NS
Driving experience	1.92 (6)	0.93	NS
Type of bus	Not computable ^a	—	—
Previously trained in first aid	1.18 (2)	0.55	NS
Time since training	7.44 (4)	0.11	NS
History of accident exposure	2.11 (2)	0.35	NS

NS=not significant ($p>0.05$); ^anot computable owing to a near-constant variable in this sample.

DISCUSSION

This study demonstrates that a structured, video-assisted teaching programme produced a substantial and statistically significant improvement in first aid knowledge among bus drivers, with a large effect size (Cohen's $d=0.98$). This finding is consistent with prior VATP research in comparable populations: Kumar et al reported a pre-test to post-test increase from 12.4 ± 3.2 to 20.9 ± 2.7 among bus drivers in Karnataka, and Hariprasad et al and Devi et al reported an improvement from a mean of 10.6 to 24.3 among Tamil Nadu state transport drivers.^{16,22} Similar improvements have been documented among mothers of young children, school teachers, and caregivers of people with epilepsy, supporting the generalisability of video-based instruction as an effective health-education strategy across diverse adult learner

groups, an approach well supported in the broader nursing-education literature.^{17,19,20,26} A notable finding of the present study was the absence of any statistically significant association between pre-test knowledge and socio-demographic characteristics such as age, education, or driving experience. This suggests that baseline knowledge deficits regarding first aid were broadly distributed across the sample rather than concentrated in a particular subgroup, and is consistent with a study among commercial drivers in south-west Nigeria by Olumide et al which similarly found inadequate baseline first aid knowledge and skills prior to training, irrespective of demographic profile. This pattern strengthens the argument that first aid training should be implemented as a universal requirement for all commercial drivers rather than being targeted selectively by demographic risk factors.²⁷ The pronounced shift from inadequate/moderate to adequate knowledge (68.57% adequate post-test,

versus 17.14% pre-test) also reinforces existing evidence that audio-visual instruction is particularly well suited to adult learners such as bus drivers, who may have limited formal education, constrained time for training, and benefit from the concrete, procedural demonstration that video media affords, compared with text-based or lecture formats.

Strengths

Strengths of this study include the use of a validated, reliability-tested instrument and the inclusion of both descriptive and inferential analysis addressing all stated objectives.

Limitations

Limitations include the single-group pre-test post-test design without a control or comparison group, which limits causal inference and cannot rule out the effect of test familiarity (testing effect); the modest, single-site sample of 35 male drivers, which limits generalisability, particularly given the complete absence of female drivers in this sample; and the relatively short post-test interval, which does not permit conclusions regarding long-term knowledge retention.

CONCLUSION

The video-assisted teaching programme was effective in significantly improving knowledge regarding first aid management among bus drivers, independent of their socio-demographic background. Given the frequent and unpredictable role bus drivers play as first responders to passenger emergencies and road traffic accidents, structured, video-based first aid education represents a feasible, low-cost, and scalable intervention that transport authorities, educational institutions, and community health programmes could adopt to strengthen prehospital emergency response capacity.

Implications for nursing practice

For nursing education, these findings support incorporating structured first aid and emergency-preparedness content, delivered through audio-visual media, into community and occupational health curricula, and encourage nursing students to engage in health education outreach with non-medical community groups.

For nursing administration, the findings support institutional policies mandating periodic first aid retraining for occupational groups such as bus drivers, supported by adequate audio-visual teaching resources. For nursing research, this study provides a baseline for larger, controlled trials comparing VATP with other teaching modalities and extending this work to other high-contact occupational groups, such as taxi and auto-rickshaw drivers, factory workers, and security personnel.

Recommendations and future research

Future studies should consider a larger, multi-site sample with a control group to strengthen causal inference; comparative designs evaluating VATP against other teaching methods (for example, live demonstration or simulation-based training); assessment of long-term knowledge retention through delayed follow-up testing; and inclusion of female drivers and other transport-sector occupational groups to improve generalisability.

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