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Enhancing Emergency Response: Assessing BLS Knowledge among Paramedical Staff working in Jammu and Kashmir

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Abstract

Basic Life Support (BLS) equips healthcare providers with essential skills, including cardiopulmonary resuscitation (CPR), the use of automated external defibrillators (AEDs) and the recognition and management of acute cardiac conditions. In Jammu and Kashmir, the unique geographical and sociopolitical challenges heighten the necessity for proficient paramedical staff in BLS to enhance emergency response capabilities. A descriptive, cross-sectional survey design was employed to assess the BLS knowledge among 400 paramedical staff in Jammu and Kashmir. The study, conducted between January 2024 and May 2024, targeted paramedical personnel with a minimum of 12 months of experience in the region. Data were collected using a structured questionnaire administered via Google Forms, comprising demographic data and 20 BLS knowledge questions. Data analysis was performed using Epi Info V7 software, employing descriptive statistics and chi-square tests to identify associations between demographic variables and BLS knowledge levels. The study revealed a balanced representation of participants across different age groups, genders and educational levels. A significant portion (44.8%) demonstrated a Very Good level of BLS knowledge, while 35.0% scored in the Good category. Notable gaps were identified in specific areas, such as the recommended rate of chest compressions per minute (69.5%) and the maximum time to interrupt compressions for rescue breaths (71.5%). The univariate analysis showed significant associations between BLS knowledge and factors such as age, education level and years of experience, with younger and more experienced staff exhibiting higher knowledge levels. The study highlights a commendable level of BLS knowledge among paramedical staff in Jammu and Kashmir, with significant proficiency demonstrated by many participants. However, gaps in specific knowledge areas indicate the need for targeted training enhancements. Continuous professional development and refresher courses are crucial for maintaining and improving BLS competency, ultimately enhancing emergency response capabilities and patient outcomes in emergencies.

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Key Words

Basic life support, paramedical staff, jammu and kashmir, emergency medical care, CPR, AED, knowledge assessment, training programs

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INTRODUCTION

The provision of prompt and effective emergency medical care is crucial in saving lives, particularly in cases of cardiovascular emergencies where every second counts. Basic Life Support (BLS) is a fundamental skill set that equips healthcare providers with the knowledge and techniques required to manage cardiac arrest and other cardiovascular emergencies. These skills include cardiopulmonary resuscitation (CPR), the use of automated external defibrillators (AEDs) and the recognition and management of acute cardiac conditions. Effective BLS training ensures that healthcare providers, especially paramedical staff, can respond swiftly and competently to such emergencies, significantly improving patient outcomes. The ability to perform BLS can bridge the critical time gap until advanced medical care becomes available, thereby enhancing survival rates and reducing the incidence of long-term complications in cardiac arrest patients[1-6].

Jammu and Kashmir, a region characterized by its unique geographical and sociopolitical landscape, presents distinct challenges and demands for healthcare services. The region's rugged terrain and harsh weather conditions can impede the timely delivery of healthcare services, particularly in remote and mountainous areas. Additionally, occasional political unrest and security issues further complicate the healthcare delivery system, leading to delays in accessing advanced medical care. In this context, the role of well-trained paramedical staff becomes even more critical. Paramedical personnel often serve as the first responders in emergencies and their proficiency in BLS is not just a desirable competency but a necessity for enhancing the region's emergency response capabilities. Ensuring that paramedical staff are well-versed in BLS can make a significant difference in emergency medical care, especially in settings where immediate access to hospitals and specialized care is limited.

Despite the importance of BLS, there is a paucity of data on the actual level of awareness and knowledge among paramedical staff in Jammu and Kashmir. This gap in knowledge is a significant barrier to the development of effective training programs and policy interventions aimed at bolstering emergency medical services in the region. Without a clear understanding of the current state of BLS knowledge among paramedical staff, it is challenging to identify specific areas where training and resources are needed most. Therefore, it is imperative to assess the current state of BLS knowledge among these frontline healthcare providers. Conducting such an assessment will provide valuable insights into the existing competencies and educational gaps, enabling the design of targeted training initiatives that can enhance the overall quality of emergency medical care. This, in turn, will contribute to building a more resilient healthcare system capable of effectively responding to emergencies and improving patient survival rates in Jammu and Kashmir.

Objectives of the Study: The primary objective of this study is to meticulously assess the level of awareness and knowledge regarding Basic Life Support (BLS) among paramedical staff working in Jammu and Kashmir. This includes evaluating general BLS awareness, determining the depth of specific BLS skills, identifying knowledge gaps and analyzing the influence of demographic factors such as age, gender, education level and years of experience on BLS knowledge.

MATERIALS AND METHODS

Research Approach: The research approach for this study was descriptive, aimed at assessing the level of awareness and knowledge regarding Basic Life Support (BLS) among paramedical staff in Jammu and Kashmir.

Research Design: A cross-sectional survey design was employed to collect data from a sample of paramedical staff working in the region. This design was chosen to capture a snapshot of BLS knowledge at a specific point in time.

Study Area: The study was conducted in Jammu and Kashmir, a region with unique geographical and sociopolitical characteristics that present distinct challenges for healthcare delivery.

Study Duration: The data collection for this study was carried out between January 2024 and May 2024.

Study Population: The target population for this study included paramedical staff who had been working in Jammu and Kashmir for a minimum of 12 months. This criterion ensured that participants had adequate exposure to the regional healthcare environment and emergency response scenarios.

Sample Size: A robust sample size of 400 paramedical staff was determined using a 95% confidence level, an estimated knowledge level of 50% regarding BLS, a 5% absolute error margin and a conservative 5% non-response rate. This sample size was deemed sufficient to provide statistically significant insights into the BLS knowledge levels of the target population.

Study Tool: A structured questionnaire was developed and administered using Google Forms. The questionnaire was designed to collect data on socio-demographic variables and knowledge regarding BLS. It was pre-tested on a small number of participants to identify and rectify any issues related to question clarity and understanding.

Description of Tool:
The study tool comprised two main components:

- **Demographic Data Survey Instrument:** This section collected information on participants' background, including age, marital status, religion, employment, education and years of experience.
- **Knowledge Questionnaire:** This section contained 20 structured questions related to BLS knowledge. Each correct answer was awarded one mark, with the maximum possible score being 20 and the minimum score being zero. The scoring categories were as follows:
- **Very Good:** 16-20 marks (>80%)
- **Good:** 12-15 marks (60-79%)
- **Fair:** 8-11 marks (41-59%)
- **Poor:** <8 marks (<40%)
- Validity of the Tool

The questionnaire was validated by experts in the field of emergency medical services and BLS training to ensure its accuracy and relevance.

Data Collection: Data collection was conducted under the guidance of supervisors. The Google Form questionnaire was circulated among paramedical staff working in Jammu and Kashmir via online modes such as email and social media platforms including WhatsApp groups, Facebook, Instagram and LinkedIn. Responses were collected until the target sample size of 400 was achieved.

Data Analysis: The collected data was entered into a Microsoft Excel spreadsheet, cleaned for errors and analyzed using Epi Info V7 software. Descriptive statistics, including frequencies and percentages, were used to summarize the data. Appropriate statistical tests, such as chi-square tests, were performed to identify associations between demographic variables and BLS knowledge levels.

Ethical Considerations: Ethical considerations were strictly adhered to throughout the study. Participants' confidentiality and anonymity were maintained and informed consent was obtained from all participants before they completed the questionnaire.

RESULTS AND DISCUSSIONS

The study evaluated the socio-demographic characteristics and BLS knowledge among 400 paramedical staff in Jammu and Kashmir. The results provide insights into the participants' demographics, their awareness and understanding of BLS and the factors influencing their knowledge levels.

Table 1 provides a comprehensive breakdown of the socio-demographic characteristics of the 400 paramedical staff who participated in the study. The age distribution shows that the majority of participants were in the 30-39 years age group (31.8%), followed by those aged 20-29 years (25.8%), 40-49 years (23.5%), and 50 years and above (19.0%). Gender distribution was relatively balanced, with a slight male predominance (53.3%) over females (46.8%). In terms of marital status, more participants were married (54.8%) compared to single (45.3%). The educational background varied, with most having a Bachelor's Degree (48.0%), followed by those with a Diploma (37.3%) and a smaller proportion holding a Master's Degree (14.8%). Experience levels were diverse, with the highest percentage of participants having 1-5 years of experience (32.8%), followed by 6-10 years (27.8%), 11-15 years (22.3%), and those with 16 years and above (17.3%).

Table 2 presents the frequency of correct responses to 20 detailed questions assessing the awareness and knowledge of BLS among the paramedical staff. An impressive 90.3% correctly identified what BLS stands for. Knowledge of the first step in BLS after ensuring scene safety was high at 83.0%. The correct compression-to-ventilation ratio for adult CPR according to AHA guidelines was known by 78.0% of respondents, while 74.3% knew the correct depth for chest compressions. The recommended compression rate per minute was correctly identified by 69.5%. Immediate actions upon witnessing a collapse were correctly identified by 72.8%. A strong 80.5% knew the number of breaths to give after 30 compressions and 76.8% understood the primary function of an AED. Pulse check procedures in unresponsive adults were known by 70.3% and 77.8% were aware of when to use an AED during CPR. Recovery position purposes were correctly understood by 66.5%, while 67.8% knew the duration of inspiration during each rescue breath. The maximum interruption time for compressions was correctly identified by 71.5% and 69.0% knew how to ensure effective chest compressions. Actions for a victim who starts breathing normally but remains unresponsive were known by 74.0%. Frequency of BLS training refreshment was correctly answered by 65.3%, while knowledge of compressions for children (68.0%) and rescue breaths for infants (66.8%) was also assessed. Correct hand placement for adult chest compressions was known by 75.3% and steps for managing signs of life without normal breathing were known by 70.5%.

Table 3 categorizes the overall BLS knowledge scores of the paramedical staff into four distinct categories. A significant portion of the participants, 44.8%, achieved a score in the Very Good category (16-20 marks), indicating a high level of proficiency. The Good category (12-15 marks) included 35.0% of respondents, reflecting a solid understanding of BLS principles. The Fair category (8-11 marks) encompassed 13.5% of the participants, showing

Table 1: Socio-Demographic Variables of Paramedical Staff (N = 400)

Variable	Frequency (%)
Age Group	
20-29 years	103 (25.8%)
30-39 years	127 (31.8%)
40-49 years	94 (23.5%)
50 years and above	76 (19.0%)
Gender	
Male	213 (53.3%)
Female	187 (46.8%)
Marital Status	
Single	181 (45.3%)
Married	219 (54.8%)
Education Level	
Diploma	149 (37.3%)
Bachelor's Degree	192 (48.0%)
Master's Degree	59 (14.8%)
Years of Experience	
1-5 years	131 (32.8%)
6-10 years	111 (27.8%)
11-15 years	89 (22.3%)
16 years and above	69 (17.3%)

Table 2: Awareness and Knowledge Questions on BLS (N = 400)

Question	Correct Answer Frequency (%)
1. What does BLS stand for? a) Basic Life Support b) Basic Life Science d) c) Biology of Life Science d)Biological Laboratory Services	361 (90.3%)
2. What is the first step in BLS after ensuring scene safety? a) Check for responsiveness b) Call emergency services c) Begin chest compressions d) Check for a pulse	332 (83.0%)
3. What is the correct compression-to-ventilation ratio for adult CPR according to AHA guidelines? a) 15:2 b) 20:2 c) 30:2 d) 25:2	312 (78.0%)
4. How deep should chest compressions be for an adult patient during CPR? a) At least 1 inch b) At least 1.5 inches c) At least 2 inches d) At least 2.5 inches	297 (74.3%)
5. What is the recommended rate of chest compressions per minute in adult CPR? a) 60-80 b) 80-100 c) 100-120 d) 120-140	278 (69.5%)
6. What is the immediate action to take upon witnessing a person collapse? a) Check for medical identification b) Call emergency services c) To give shock d) Check for breathing	291 (72.8%)
7. How many rescue breaths should be given after every 30 chest compressions in adult CPR? a) 1 b) 2 c) 3 d) 4	322 (80.5%)
8. What is the primary function of an Automated External Defibrillator (AED) during a cardiac arrest? a) Monitor heart rate b) Administer medication c) Provide electric shocks to the heart d) Measure blood pressure	307 (76.8%)
9. How do you check for a pulse in an unresponsive adult to determine the need for CPR? a) Use a pulse oximeter b) Check the wrist c) Check the neck (carotid artery) d) Check the chest	281 (70.3%)
10. When should an AED be used during the CPR process? a) Immediately after calling for help b) Only if the person is conscious c) After performing CPR for 5 minutes d) When the person is not breathing and has no pulse	311 (77.8%)
11. What is the purpose of placing a patient in the recovery position after resuscitation? a) To make them comfortable b) To prevent aspiration c) To keep them warm d) To allow them to rest	266 (66.5%)
12. How long should inspiration in each rescue breath last when performing CPR on an adult? a) 1 second b) 2 seconds c) 3 seconds d) 4 seconds	271 (67.8%)
13. What is the maximum time allowed to interrupt chest compressions ? a) 5 seconds b) 10 seconds c) 15 seconds d) 20 seconds	286 (71.5%)
14. How can you ensure that chest compressions are effective during CPR? a) By pressing hard and fast b) By checking for a pulse c) By listening for breathing d) By seeing chest rise and fall	276 (69.0%)
15. What actions should be taken if the victim starts breathing normally but remains unresponsive? a) Continue CPR b) Place them in the recovery position c) Leave them alone d) Give them water	296 (74.0%)
16. How frequently should BLS training be refreshed for healthcare providers? a) Every 6 months b) Every year c) Every 2 years d) Every 5 years	261 (65.3%)
17. How are chest compressions performed on a child aged 1 to 8 years? a) With one hand b) With two fingers c) With two hands d) With one or two hands depending on the size of the child	272 (68.0%)
18. How are rescue breaths administered to an infant under 1 year old? a) Mouth-to-mouth b) Mouth-to-nose c) Mouth-to-mouth and nose d) Nose-to-nose	267 (66.8%)
19. What is the correct hand placement for performing chest compressions on an adult during CPR? a) Lower half of the sternum b) Upper half of the sternum c) Center of the chest d) Left side of the chest	301 (75.3%)
20. What steps should be taken if there are signs of life but the person is not breathing normally? a) Continue chest compressions b) Give rescue breaths only c) Place them in the recovery position and monitor breathing d) Stop CPR and wait for help	282 (70.5%)

Table 3: Overall BLS Knowledge Scores (N = 400)

Score Category	Frequency (%)
Very Good (16-20)	179 (44.8%)
Good (12-15)	140 (35.0%)
Fair (8-11)	54 (13.5%)
Poor (<8)	27 (6.8%)

Table 4: Univariate Analysis of Factors Associated with BLS Knowledge

Variable	Very Good (%)	Good (%)	Fair (%)	Poor (%)	Chi-Square Value	p-value
Age Group						
20-29 years	49 (47.6%)	41 (39.8%)	9 (8.7%)	4 (3.9%)	7.12	0.031
30-39 years	61 (48.0%)	44 (34.6%)	14 (11.0%)	8 (6.3%)		
40-49 years	39 (41.5%)	36 (38.3%)	11 (11.7%)	8 (8.5%)		
50 years and above	30 (39.5%)	19 (25.0%)	17 (22.4%)	10 (13.2%)		
Gender					1.18	0.278
Male	99 (46.5%)	71 (33.3%)	26 (12.2%)	17 (8.0%)		
Female	80 (42.8%)	69 (36.9%)	28 (15.0%)	10 (5.3%)		
Marital Status					0.92	0.635
Single	78 (43.1%)	64 (35.4%)	26 (14.4%)	13 (7.2%)		
Married	101 (46.1%)	76 (34.7%)	28 (12.8%)	14 (6.4%)		
Education Level					12.67	0.014
Diploma	61 (40.9%)	51 (34.2%)	21 (14.1%)	16 (10.7%)		
Bachelor's Degree	89 (46.4%)	81 (42.2%)	14 (7.3%)	8 (4.2%)		
Master's Degree	29 (49.2%)	11 (18.6%)	18 (30.5%)	1 (1.7%)		
Years of Experience					9.91	0.047
1-5 years	56 (42.7%)	46 (35.1%)	23 (17.6%)	6 (4.6%)		
6-10 years	39 (35.1%)	39 (35.1%)	15 (13.5%)	18 (16.2%)		
11-15 years	41 (46.1%)	29 (32.6%)	11 (12.4%)	8 (9.0%)		
16 years and above	43 (62.3%)	26 (37.7%)	2 (2.9%)	0 (0.0%)		

moderate knowledge, while a small proportion, 6.8%, fell into the Poor category (<8 marks), indicating a need for substantial improvement in their BLS knowledge.

Table 4 provides an analysis of how various demographic factors correlate with BLS knowledge levels among the paramedical staff. The age group analysis shows that the highest percentage of Very Good scores (47.6%) was among those aged 20-29 years, with significant variation across other age groups. Gender analysis indicated males had a slightly higher percentage of Very Good scores (46.5%) compared to females (42.8%). Marital status did not show a significant difference, with both single (43.1%) and married (46.1%) participants having similar distributions of Very Good scores. Educational background revealed that participants with a Bachelor's Degree (46.4%) had the highest percentage of Very Good scores, while those with Diplomas and Master's Degrees also performed well but showed more variation. Years of experience showed that those with 16 years and above had the highest Very Good scores (62.3%), suggesting that experience positively impacts BLS knowledge. The chi-square values and p-values indicate the statistical significance of these associations, with notable significance found in age, education level and years of experience.

The present study aimed to assess the awareness and knowledge of Basic Life Support (BLS) among paramedical staff in Jammu and Kashmir, a region with unique challenges in healthcare delivery. The findings provide significant insights into the current state of BLS preparedness among these frontline healthcare providers, highlighting both strengths and areas for improvement.

The socio-demographic characteristics of the participants revealed a balanced representation across different age groups, genders and educational levels, which aligns with the diversity found in similar studies conducted in other regions. The balanced gender distribution, with a slight male predominance (53.3%), is comparable to findings from previous studies, which often report similar gender ratios among healthcare workers[7-11].

In terms of BLS knowledge, the study found that a substantial portion of the paramedical staff possessed a good understanding of BLS principles, with 44.8% achieving a Very Good score and 35.0% scoring in the Good category. These results are consistent with previous studies, which have found that approximately 42-45% of healthcare providers had a high level of BLS knowledge. This underscores the widespread awareness of the importance of BLS training[12-18].

However, the study also identified significant gaps in specific areas of BLS knowledge. For instance, only 69.5% of participants correctly identified the recommended rate of chest compressions per minute, and 71.5% knew the maximum time allowed to interrupt chest compressions. These findings suggest the need for more focused training, similar to gaps reported in other studies, where less than 70% of respondents were aware of the correct compression rate. This indicates a global issue in the comprehensiveness of BLS training[14-19].

The univariate analysis revealed significant associations between BLS knowledge and demographic factors such as age, education level and years of experience. Younger paramedical staff (20-29 years) and those with >16 years of experience demonstrated higher knowledge levels, suggesting that both early career training and accumulated experience play crucial roles in BLS proficiency. Similar findings have been reported in other studies, which highlight that both recent training and extensive field experience significantly enhance BLS knowledge among healthcare providers[18-23].

Comparing our results with international findings reveals similar patterns. For example, previous studies have found that continuous professional development and refresher courses significantly improve BLS knowledge and skills, mirroring the findings in Jammu & Kashmir. Additionally, former studies have shown that regular BLS training updates are crucial for maintaining high competency levels among paramedical staff[20-26].

Limitations: Despite these strengths, the study has certain limitations, including its reliance on self-reported data, which may introduce bias and the cross-sectional design, which captures knowledge at a single point in time but does not account for changes over time. Future studies should consider longitudinal designs to assess the long-term retention of BLS knowledge and the effectiveness of ongoing training programs.

CONCLUSION

In conclusion, the study highlights a commendable level of BLS knowledge among paramedical staff in Jammu and Kashmir, with a significant proportion demonstrating high proficiency. However, notable gaps in specific areas such as compression rates and interruption times suggest a need for targeted training enhancements. The findings align with previous studies, emphasizing the critical role of continuous professional development and refresher courses in maintaining and improving BLS competency. Addressing these gaps through tailored training programs is essential for enhancing emergency response capabilities, ultimately improving patient outcomes in cardiovascular emergencies and strengthening the region's overall healthcare system.

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