BLS Knowledge: A comparison between clinical and basic medical professionals

Conocimiento del BLS: Una comparación entre los profesionales de la medicina clínica y los de la medicina básica

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ABSTRACT

Introduction Cardiopulmonary resuscitation (CPR) is performed on sudden cardiac arrest patients. There is significant morbidity and mortality due to SCA and choking. This high incidence raises a question regarding knowledge of BLS in health care professionals. Therefore, we will be assessing knowledge of BLS among clinical and basic medical health care professionals. **Methodology** A cross-sectional study was conducted on the Medical professionals of Jinnah Sindh Medical University (JSMU) and Jinnah Postgraduate Medical Centre (JPMC) to assess their knowledge of BLS, within a period of 10 months. Data was collected from 94 participants using a pretested questionnaire through convenient sampling technique. Adequate knowledge was assessed and compared between medical professionals of JSMU and JPMC. P-value was taken significant if it were <0.05 after applying chi-square test. **Result** The mean age of participants was 33.0 ± 8.66 years. 48% candidates were related to Academics Faculty whereas 52% were Clinical Faculty. Overall 60 (63.8%) responders had "Adequate Knowledge". Out of those, 23 (38.3%) were from JSMU and 37 (61.6%) were from JPMC. There was a significant difference of knowledge of BLS among the institutes (p -value= 0.003). There was also significant difference of adequate knowledge of participants of JSMU who have had previous BLS training and those who haven't (p value =0.05). **Conclusion** BLS knowledge of medical professionals should be frequently revised and updated because they should be competent enough to handle any emergency situation, be it in a hospital or outside of it. Furthermore, this updated knowledge will have a positive effect on their students.

Keywords: Basic life support, knowledge, medical professional, basic and clinical faculty, CPR.

RESUMEN

Introducción La reanimación cardiopulmonar (RCP) se lleva a cabo en pacientes con parada cardíaca súbita. Existe una importante morbilidad y mortalidad debido a la parada cardíaca súbita y a la asfixia. Esta alta incidencia plantea una pregunta sobre el conocimiento de la RCP en los profesionales sanitarios. Por lo tanto, vamos a evaluar el conocimiento de la RCP entre los profesionales sanitarios de la medicina clínica y básica. **Metodología** Se llevó a cabo un estudio transversal entre los profesionales médicos de la Universidad Médica Jinnah Sindh (JSMU) y del Centro Médico de Postgrado Jinnah (JPMC) para evaluar sus conocimientos de SVB, en un periodo de 10 meses. Se recogieron datos de 94 participantes utilizando un cuestionario previamente probado mediante una técnica de muestreo conveniente. Se evaluaron los conocimientos adecuados y se compararon entre los profesionales médicos de la JSMU y del JPMC. El valor p se consideró significativo si era $<0,05$ tras aplicar la prueba de chi-cuadrado. **Resultados** La edad media de los participantes fue de $33,0 \pm 8,66$ años. El 48% de los candidatos estaban relacionados con la facultad académica, mientras que el 52% eran de la facultad clínica. En general, 60 (63,8%) encuestados tenían "conocimientos adecuados". De ellos, 23 (38,3%) procedían de la JSMU y 37 (61,6%) del JPMC. Hubo una diferencia significativa de conocimiento del BLS entre los institutos (valor $p=0,003$). También hubo una diferencia significativa entre los conocimientos adecuados de los participantes de la JSMU que habían recibido formación previa sobre SVB y los que no (valor $p=0,05$). **Conclusión** Los conocimientos de SVB de los profesionales médicos deben ser revisados y actualizados con frecuencia, ya que deben ser lo suficientemente competentes para manejar cualquier situación de emergencia, ya sea en un hospital o fuera de él. Además, estos conocimientos actualizados tendrán un efecto positivo en sus alumnos.

Palabras clave: Soporte vital básico, conocimientos, profesional médico, facultad básica y clínica, RCP

1 INTRODUCTION

According to American Heart Association (AHA), Cardiopulmonary resuscitation (CPR) is performed on patients with sudden cardiac arrest and Heimlich manoeuvre on patients with foreign body obstruction. CPR involves “chain of survival” i.e., early **recognition, resuscitation, defibrillation by automated external defibrillator** (AED). Sudden cardiac arrest (SCA), unlike heart attack, is cessation of heartbeat due to rapid, irregular electrical impulses in heart. In US, annually >66,000 deaths are due to SCA. The survival of the victim decreases by 7 to 10% per minute if immediate and effective CPR is not given and it increases by 2-3 times when given promptly and adequatelyⁱ. Choking due foreign body obstruction accounts for more than 500 emergency calls in San Diego County Emergency Departmentⁱⁱ.

Studies have been conducted to assess knowledge of Basic Life Support (BLS) in health care professionals as they are expected to deal with aforementioned crisis every now and then. One such study in Nepal declared that lack of adequate knowledge of BLS/CPR is found in medical and paramedical professionalsⁱⁱⁱ. Similar results were seen in a local study, conducted in Rawalpindi and Islamabad, in which only 40.09% of the participants, which included medical professionals and students, knew what CPR stood for and only 10% knew the first step of CPR^{iv}. This shows that ample studies have been conducted to assess knowledge of clinical medical professionals and paramedical staff.

To the best of our knowledge, however, no previous study has been conducted on non-clinical Academic medical professionals nationally. Furthermore, no comparison of knowledge of BLS among clinical and non-clinical medical professionals has been established. This gap needs to be filled as both medical fields are expected to have equal knowledge of BLS.

Therefore, as a preliminary step, this study is aimed to assess and compare the level of knowledge of BLS among clinical and non-clinical healthcare professionals of a basic and applied institute of Karachi, Pakistan. We also aim to compare the knowledge of our participants with the number of BLS sessions they have attended. This is to guide future planning and implementation of BLS course in medical universities and hospitals.

2 OBJECTIVE

1. To assess the knowledge of BLS among medical professionals
2. To compare knowledge of BLS between JSMU and JPMC
3. To compare knowledge of BLS between JSMU and JPMC with regards to BLS training
4. To compare knowledge of BLS between JSMU and JPMC with regards to past BLS practice on victim.

3 METHODOLOGY

Operational Definition for “Knowledge level/Adequate Knowledge”: If a participant scores more than or equal to 50% of the total score, i.e., 12 or more out of 23, his/her knowledge will be considered adequate.

Study Design & Setting: A cross-sectional study was conducted on the Medical professionals of Jinnah Sindh Medical University (JSMU) and Jinnah Postgraduate Medical Centre (JPMC) to assess their knowledge of BLS.

Duration of Study: The study was covered within a time duration of 10 months.

Sample Size and sampling technique: Using convenient sampling technique, we calculated our data using WHO software (with the following equation) for sample size determination, with confidence level of 95% and margin of error to be 5%. Our recommended sample size came out 100^v. However, data of 94 participants was collected.

$$n = \left(\frac{Z\alpha}{2} \right)^2 \frac{pq}{E^2}$$

Sample Selection:

- **Inclusion Criteria:** Amongst JSMU candidates, the main focus was upon the Teaching Faculty, whereas, within JPMC: Consultants, Registrars, Residents and Postgraduate trainees were included. The data was assembled from NeuroMedicine, Psychiatry, General Medicine, General Surgery, Orthopaedics, Dermatology, E.N.T, Ophthalmology, Chest and Pulmonology, Gynaecology and Obstetrics wards.
- **Exclusion Criteria:** Medical students and other staff members of each department were excluded in JSMU. In JPMC setting house offices, nursing staff and those practitioners working at the cardiology and Accident & Emergency Department were excluded.

Data Collection:

- **Study Variables:**

Dependant Variable: Knowledge of BLS

Independent Variable:

1. Socio-Demographic: Age, Institution and Faculty member.
 2. Exposure to BLS: Previous BLS training, number of BLS training received, BLS done on a victim, BLS taught to others.
- Data collection Tool and Method: A written consent was obtained, and name of the contenders were not included in the questionnaire. A 32-questions based self-structured questionnaire, on AHA guidelines for BLS 2010, was handed over to the participants. It was to be interviewed but only those participants who gave consent and were unable to fill the questionnaire themselves were interviewed, while the rest chose to fill it themselves.
 - Data Analysis Plan: We will enter data in Microsoft Excel 2013 and then transport it to Statistical Package for Social Sciences (SPSS) version 16.0 for analysis. We will calculate mean and standard deviation for continuous variables (age) and frequency and percentages for categorical variables (Institution, faculty member, previous BLS training, time since last BLS session, BLS training given, BLS attempted on any victim and overall correct answers for CPR and choking). We will also compare knowledge of BLS between JSMU and JPMC; between participants in each group with past BLS training & between participants in each group with past BLS practice on a victim using Chi-square test. P-value <0.05 will be considered statistically significant. If in any contingency table, an expected count falls less than 5, then Fisher-exact test will be applied.

Ethical Considerations: Ethical permission was granted by the Jinnah Sindh Medical University Ethical Review Committee.

4 RESULTS

Table 1 shows the socio-demographic statistics of the participants. The mean age of participants was 33.0 ± 8.66 years. 78 (83%) out of 94 participants were less and or equal to 40 years. Our data included

47 (50%) participants from JSMU and 47 (50%) from JPMC. Furthermore, out of 94, 45 (48%) candidates were related to Academics Faculty whereas, 49 (52%) of the total were working as Clinical Faculty.

Table 2 describes the previous BLS exposure of the participant. When asked for previous training of BLS, 83 (88.3%) of participants responded that they received BLS training. 11 (11.7%) of medical professionals responded that they have never attended any BLS session. Out of those who have previous BLS training, 73 (76.6%) candidates said they have received their training more than 1 year ago. When conferred about giving BLS training session 69 (73.4%) professionals said they have never given any BLS training to someone else. Also, when asked about BLS performed on any victim, 52 (55.3%) replied with affirmation.

As described in Figure 1, when tested upon Cardiopulmonary Resuscitation knowledge, the most correctly-answered question was: Recommended rate of compressions given to an adult, which is 100 compressions/minute. It was correctly answered by 86.2% of the participants. Second question was: name the artery most commonly used to check pulse, with 77.7% correct answers of Carotid artery. The question which was answered by the lowest percentage of participants was “The number of cycles of CPR after which pulse should be re-checked”. Only 14.9% correctly answered that pulse should be re-checked after 5 cycles of CPR. Second most poorly-answered question was: What will you do if you are unwilling to give mouth-to-mouth rescue breaths? Only 33% correctly identified that they should continue to give compressions only.

Figure 2 is regarding knowledge of choking. Fairly well-answered questions were: Most common situation leading to foreign body obstruction is while eating (answered by 75.5% candidates), manoeuvre performed on choking adult is Heimlich/ abdominal thrust, (answered by 75.5% candidates) and on a choking Infant is back slap (answered by 72.3% candidates). However, when asked about universal sign of choking, only 30.9% knew that it was clutching of the neck. Only 34% participants correctly recognised that they will inquire whether a victim is choking or not before performing Heimlich. Also, when asked about what the participant will do if they are alone and choking, only 36.2% knew that they will have to push their abdomen with edge of a table or back of a chair.

Participants were investigated with reference to their knowledge to manage emergency situations such as sudden cardiac arrest and choking. According to Figure 3, overall 60 (63.8%) responders had “Adequate Knowledge”. Out of those, 23 (38.3%) were from JSMU and 37 (61.6%) were from JPMC.

With regards to Figure 4, our results confirm that there is a significant difference of knowledge of BLS among the institutes (p -value= 0.003) with doctors of JPMC Centre (Clinical Institute) with 72.3% adequate knowledge than that of JSMU (Academic institute) 44.7 %.

Figure 5, shows that there was a significant difference of adequate knowledge, with p -value 0.05, between participants from JSMU who have had previous BLS training and those who haven't. Contrary

to which, insignificant difference (p-value 0.11) was found between adequate knowledge of JPMC professionals who've attended BLS training and those who have not.

According to Figure 6, BLS done on victim has not proved to cause any significant difference in the knowledge of BLS within JSMU and JPMC, with p-values 0.25 and 0.67 respectively. Thus, it is proved that the gap of knowledge is due to lack of BLS training within JSMU professionals.

5 DISCUSSION

Our results confirm that there is a difference of level of knowledge about BLS between the two institutes, with doctors of Jinnah Postgraduate Medical Centre (Clinical Institute) having better knowledge than that of Jinnah Sindh Medical University (Academic institute) with a p-value of 0.003. The result was similar to previous study done at Nepal³. This is an important finding of our research as both institutes comprise of qualified doctors with exceptional working experience, and hence are expected to have a good grasp on the knowledge of BLS. In fact, non- clinical practitioners are one of the most cited crowd for primary source regarding information on CPR at the time of emergency^{vi}. Secondly, Pakistan Medical & Dental Council (PMDC) also require doctors to renew their BLS knowledge every 5 years. This is not just to revise old knowledge, but also to update their skills in accordance to AHA. A study in Norway showed that out of 89% personnel, with previous BLS knowledge, only 11% had strived to keep their knowledge up-to date as required by their National guidelines^{vii}. Hence, doctors, whether practicing in clinics or teaching in medical university are required to be well-equipped with lifesaving skills.

In our study, the overall adequate knowledge came out to be 63.8%, which was close to the study done at Civil Hospital, Karachi^{viii}. Since our criteria for "adequate knowledge" was 50% correct answers, our result became inconsistent with study done in Nepal. Although 52% of their participants answered 50% of questions correctly, they did not take this as their criteria for adequate knowledge³.

Within JSMU, participants with previous BLS training had significant difference of BLS knowledge compared to professionals with no previous BLS training. This result is coherent with previous studies^{5, 8&ix}. As concluded in a research done in Turkey, candidates who acquire CPR skills through traditional and case-based learning prove to retain their knowledge far better than those who self-learn through videos^x. Thus, proper BLS training workshop should be provided to medical professionals teaching at medical universities. Difference in result was insignificant between both factions of BLS trained and untrained personnel in JPMC.

BLS done on a real victim was expected to show significant difference in level of knowledge of BLS, but no such result was seen in both institutes. Each institute was divided into "BLS done on Victim: Yes" and "BLS done on Victim: No". Answer 'yes' to BLS done on victim has not proved to cause any significant difference in the knowledge of BLS within JSMU and JPMC, with p-values 0.25 and 0.67

respectively. This result invalidates any claim that clinical professionals have better BLS knowledge due to their practice on real patients.

The sample selection of our study was done on convenient technique, thus, our result cannot be generalized to all other medical institutes. Moreover, it did not include data from private institutions and other government institutions to perhaps compare the knowledge of BLS of health professionals among them. Furthermore, since our study was on the theoretical knowledge of BLS and it did not include the practical knowledge of BLS steps should be taken to analyse that part as well. Lastly, our study only tested for knowledge of choking and CPR, not other components of BLS. Therefore, further studies should be conducted on federal and provincial level to recognise the lack of BLS knowledge among medical personnel and paramedics all over Pakistan.

6 CONCLUSION

BLS is a skill that every person of the medical field should be equipped with. Learning it frequently would help the medical personnel to act relevant and fast when he/she faces a situation requiring it. Medical teaching staff should be made aware of the relevance of BLS training and importance of effective and adequate bystander CPR for a victim's survival. Moreover, compulsory BLS course should be added to their training workshops because they are an important part of our society so they should be competent enough to handle any emergency situation, be it in a hospital or outside of it.

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Table1: Socio-Demographic characteristic of participants

Variable	Frequency (n)	Percentage (%)
<i>Age</i>	Mean (33.0 ± 8.66)	
≤ 40 yrs	78	83
> 40 yrs	16	17
<i>Institute</i>		
JSMU	47	50
JPMC	47	50
<i>Faculty Member</i>		
Academics Faculty	45	48
Clinical Faculty	49	52

Table 2: Previous BLS exposure of participants

Variable	Frequency(n)	Percentage (%)
<i>BLS training received</i>		
Yes	83	88.3
No	11	11.7
<i>Completion of Last BLS training</i>		
Less than or one year ago	10	10.6
More than one year ago	73	77.7
Never did it	1	11.7
<i>BLS training given</i>		
Yes	25	26.6
No	69	73.4
<i>BLS on Victim</i>		
Yes	52	55.3
No	42	44.7

Figure 1: Overall Correct answers to questions regarding CPR (in percentages)

Figure **Erro! Apenas o documento principal.:** Overall Correct answers to questions regarding Choking (in percentages)

Figure 3: Overall Adequate vs. Inadequate Knowledge (in percentages)

Figure 4: Comparison of Knowledge of BLS: JSMU vs. JPMC (in percentages)

Figure 5: Comparison of Knowledge of BLS with regards to BLS training (in percentages)

Figure 6: Comparison Knowledge of BLS with regards to BLS on victim (in percentages)