# Original Research

## The Validity of YouTube Videos on Pediatric BLS and CPR

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## Abstract

***Background:*** *There are few data regarding the validity of cardiopulmonary resuscitation (CPR) and basic life support (BLS) videos on YouTube in the medical literature, and those that do are only analyzing adult CPR videos. The present study aimed to determine the reliability and accuracy of pediatric CPR and BLS videos as to whether they are consistent with the 2010 CPR guidelines.* ***Materials and Methods:*** *YouTube was scanned in January 2015 using the key words "Pediatric CPR Pediatric BLS" without any filters. The raw data collected in the study included sources that uploaded the videos, the record time, the number of viewers in the study period, and inclusion of human or mannequins. Furthermore, the contents of the videos were evaluated as to whether they are consistent with the 2010 resuscitation guidelines. All videos were seen by two independent researchers (emergency physicians) and scored between 0 and 8.* ***Results:*** *In total, 1,200 videos were evaluated regarding the exclusion criteria, which yielded 232 eligible ones. Most of the videos were found to be uploaded by individuals with unspecified credentials (34.1%). Of the videos, 15.5% have content inconsistent with the 2010 guidelines. The median score of all the videos are not high enough (5 [interquartile range (IQR), 4–7]), and only one-third of the videos have optimal quality with scores of 7 or 8. The downloaded number of videos compatible with guidelines was significantly higher relative to the videos not compatible with the guidelines (15,389 [IQR, 881–31515] versus 477 [IQR, 108–3,797];* $p = 0.0001$*). The videos downloaded more than 10,000 times had a higher score than the others (median scores of 7 and 5, respectively;* $p = 0.0001$*).* ***Conclusions:*** *Moderate numbers of YouTube videos purporting to be about pediatric life support have optimal quality, and few of them are perfect. Furthermore, YouTube videos uploaded by news programs with an insufficient quality have the highest download rates.*

**Key words:** *pediatric, resuscitation, education, Internet, video*

## Introduction

The interval to launch cardiopulmonary resuscitation (CPR) in patients with sudden cardiac arrest is crucial for survival. At that rate bystander CPR is also significant to iniatiate a resuscitative effort.[1]

Although the most prevalant cause of adult cardiac arrest is ischemic cardiovascular diseases, this is not true of children. Respiratory failure and shock are usually typical causes of cardiopulmonary arrest among children, with overall survival rates of between 4% and 40% in cardiopulmonary arrests occurring out of the hospital.[2–4] Early CPR improves survival, and in pediatric patients the odds ratio is 13.4 in witnessed arrest and 3.2 in patients receiving bystander CPR. Early detection of an arrest patient following CPR is vital for a successful resuscitation.[3]

YouTube is a Web site that was founded in 2005 and has been used for sharing videos with other people. Although it is a very easy way of spreading knowledge via videos, it does not have a control mechanism for the scientific quality of the contents, which may result in disinformation.[5]

There are few data regarding the validity of CPR and basic life support (BL)S videos on YouTube in the medical literature, and those that do are only analyzing adult CPR videos.[5–7] The present study aimed to determine the reliability and accuracy of pediatric CPR and BLS videos as to whether they are consistent with the 2010 CPR guidelines.

## Materials and Methods

YouTube was scanned in January 2015 using the key words "Pediatric CPR and Pediatric BLS" without any filters. Six hundreds videos were derived from the first 30 pages (20 in each page). The videos were evaluated for each key word and whether they were relevant to the study. They were also categorized to the upload date, and the exclusion criteria were as follows:

- Videos published before and within 2010
- Videos relevant to pediatric CPR and BLS, without any demonstration or application
- Videos recorded in languages other than English
- Videos related to adult CPR
- Videos containing real-life cases with no training configuration
- Videos including an advertisement
- Funny videos
- Duplicated videos

The raw data collected in the study included sources that uploaded the videos, the record time, the number of viewers in the study period, and inclusion of humans or mannequins. Videos were categorized by source into five groups: private agencies, guideline bodies like the American Heart Association/European Resuscitation Council, healthcare professionals (physician, emergency medical technician, nurse, etc.), and news programs. Furthermore, the contents of the videos were evaluated as to whether they are consistent with the 2010 resuscitation guidelines.[8]

All videos were seen by two independent researchers (emergency physicians) and scored between 0 and 8. Conflicts between the two raters were reconciled by a third expert. Scoring criteria are given in accord with the 2010 CPR guidelines (*Table 1*).

### STATISTICAL ANALYSIS

All data obtained in the study were recorded in and analyzed using Statistical Package for Social Sciences for Windows software (version 17; SPSS, Inc., Chicago, IL). Numerical variables were given as median and interquartile range, whereas categorical variables were given as frequencies (*n*) and percentages. Three-group comparisons for numerical variables were performed by Kruskal–Wallis test, and the chi-squared test was used for categorical variables. Post hoc analysis was performed by Mann–Whitney U test with Bonferroni's correction. All the hypotheses were constructed as two tailed, and an alpha critical value of 0.05 was considered as significant.

**Table 1. Video Assessment Table for Independent Researchers**

| TASK | SCORE |
|---|---|
| Provide safety of rescuer and victim | 1 |
| Check responsiveness and breathing | 1 |
| Call ambulance | 1 |
| Check accurate hand positioning before initiating compressions | 1 |
| Is the depth of compressions adequate? | 1 |
| Is the rate of compressions right? | 1 |
| Open the airway and give 2 rescue breaths. | 1 |
| Is the ratio of compressions/ventilations right? | 1 |

## Results

In total, 1,200 videos were evaluated regarding the exclusion criteria, which yielded 232 eligible ones. One-third of them were duplicated (34.0%), and the causes are listed in *Table 2*.

*Table 3* demonstrates the characteristics of the 232 videos eligible for the study. The frequency of uploaded videos has increased within the last 2 years (2013, $n=72$; 2014, $n=95$). Demonstrations in 65 (34.1%) of the videos were performed by individuals with unspecified credentials. The remaining videos were as follows: healthcare professionals, 29.7%; guideline bodies, 24.6%; private agencies, 6.0%; and news programs, 5.6%. Most of the videos (87.9%) included applications on mannequins. Of the videos, 15.5.% included contents inconsistent with the 2010 CPR guidelines (*Table 3*). The inconsistent videos were mostly uploaded by individuals with unspecified credentials (91.7%, $n=33$).

Median duration of the videos was 198 (interquartile range [IQR], 99–341.5) s. The median score of the videos was 5 (IQR, 4–7). *Table 4* demonstrates scores of the videos and download/watching rates with respect to the source of the upload. The most downloaded videos were the ones uploaded by news programs or guideline bodies like the American Heart

**Table 2. Reasons of Exclusion of the Videos Left Out of the Analysis**

| REASON FOR EXCLUSION | *N* (%) |
|---|---|
| Duplicated videos | 329 (34.0) |
| Videos including an advertisement | 206 (21.3) |
| Videos related to adult CPR | 191 (19.7) |
| Videos relevant to pediatric CPR and BLS, without any demonstration or application | 103 (10.6) |
| Videos published before and within 2010 | 76 (7.8) |
| Non-English | 34 (3.5) |
| Videos including real-life events without an educational format | 14 (1.5) |
| Funny-recreational videos | 15 (1.6) |
| Total | 968 (100.0) |

BLS, basic life support; CPR, cardiopulmonary resuscitation.

**Table 3. Characteristics of the Videos Included in the Analysis**

| CHARACTERISTIC | *N* | % |
|---|---|---|
| Date (year) uploaded | | |
| 2011 | 34 | 14.7 |
| 2012 | 31 | 13.4 |
| 2013 | 72 | 31.0 |
| 2014 | 95 | 40.9 |
| Individual or institution uploaded the item | | |
| Private agency | 14 | 6.0 |
| Guideline body like AHA/ERC | 57 | 24.6 |
| Healthcare professional(s) (physician, emergency medical technician, nurse etc.) | 69 | 29.7 |
| Individual with unspecified credentials | 79 | 34.1 |
| News program | 13 | 5.6 |
| The demonstration/application was performed on... | | |
| Mannequin | 204 | 87.9 |
| Human | 20 | 8.6 |
| Both | 8 | 3.4 |
| Inconsistent content with 2010 resuscitation guidelines | | |
| No | 196 | 84.5 |
| Yes | 36 | 15.5 |
| Total scores received | | |
| 1 | 6 | 2.6 |
| 2 | 8 | 3.4 |
| 3 | 30 | 12.9 |
| 4 | 27 | 11.6 |
| 5 | 49 | 21.1 |
| 6 | 32 | 13.8 |
| 7 | 48 | 20.7 |
| 8 | 32 | 13.8 |
| Total number of videos | 232 | 100.0 |

AHA, American Heart Association; CPR, cardiopulmonary resuscitation; ERC, European Resuscitation Council.

Association/European Resuscitation Council. The sources of uploaded videos with the highest scores were the guideline bodies like the American Heart Association/European Resuscitation Council and private agencies (7 [IQR, 6–8] and 7 [IQR, 4–7], respectively). Although the download rates of the videos uploaded by the news programs were the highest, the median score of these videos was moderate (5 [IQR, 4–7]) (*Table 4*).

**Table 4. Distribution of Scores of the Videos and Download Rates with Respect to Source of Upload**

| INDIVIDUAL OR INSTITUTION UPLOADED THE ITEM (NUMBER OF GROUP)[a] | DOWNLOAD RATES | SCORE |
|---|---|---|
| Private agency (1) | 1,726 (301–52,372) | 7 (4–7) |
| Guideline body like AHA/ERC (2) | 12,241 (2,273–25,402) | 7 (6–8) |
| Individual with unspecified credentials (3) | 330 (41–2,608) | 4 (3–5) |
| Healthcare professionals (4) | 1,087 (86–14,902) | 6 (4.75–7) |
| News program (5) | 45,876 (246–51,544) | 5 (4–7) |
| *p* value | 0.000[b] | 0.000[c] |

Data are median (interquartile range).

[a]Sources of upload are numbered for groupwise comparisons.

[b]*Post hoc* analysis showed that Group 1 differs from Group 3, Group 2 differs from Groups 3 and 4, Group 3 differs from Groups 1, 2, and 5, Group 4 differs from Groups 2 and 5, and Group 5 differs from Groups 3 and 4.

[c]*Post hoc* analysis showed that Group 1 differs from Group 3, Group 2 differs from Groups 3, 4, and 5, Group 3 differs from Groups 1, 2, and 4, Group 4 differs from Groups 2 and 3, and Group 5 differs from Group 2.

AHA, American Heart Association; ERC, European Resuscitation Council.

Videos scored 7 and higher were considered to have optimal quality (reliable and compatible with the 2010 CPR guidelines), and this point was used as a cutoff value for statistical analyses. Of the videos, 34.5% ($n=80$) had optimal quality, and only 13.8% ($n=32$) had a score of 8. The downloaded number of videos compatible with the guidelines was significantly higher relative to the number of videos not compatible with the guidelines (15,389 [IQR, 881–31,515] versus 477 [IQR, 108–3,797]; $p=0.0001$). Those videos downloaded more than 10,000 times had a higher score than the others (median scores of 7 [$n=79$] and 5 [$n=153$], respectively) ($p=0.0001$).

The interclass correlation coefficient was 0.794 (95% confidence interval, 0.751–0.870), and the weighted kappa value was 0.727 (95% confidence interval, 0.658–0.801) between the two observers.

## Discussion

The present study showed that moderate numbers of YouTube videos purported to be about pediatric CPR have optimal quality and that only a few of them are perfect. Also, the upload rate of the videos has increased within the last 2 years.

The disadvantages of YouTube videos according to the present study are as follow:

- Most of the videos are uploaded by individuals with unspecified credentials (34.1%).
- Of the videos, 15.5% have wrong and inconsistent content with the 2010 CPR guidelines.
- The median score of all the videos is not high enough (5 [IQR, 4–7]).
- Only one-third of the videos have optimal quality with a score of 7 or 8.
- Although the download rates of the videos uploaded by news program are highest, their scores are only moderate.

The promising findings in the present study are as follows:

- Videos uploaded by guideline bodies and private agencies have the highest scores.
- The videos downloaded more than 10,000 times had a higher score than the others.

Yaylacı et al.[6] analyzed YouTube videos regarding adult CPR and BLS and reported that the videos are mostly uploaded by indiviuals with unspecified credentials. They also reported that those videos released by guideline bodies have the highest download rates and high quality scores. Furthermore, these authors showed that only 11.5% of the videos are compatible with the 2010 CPR guidelines, but in the present study this value is 34.5%. This difference is related to the definition of the compability that Yaylaci et al.[6] accepted a full score as compatible with the guidelines. This is also why in our study only 13.8% of videos have a full score of 8.

Tourinho et al.[9] showed that most of the videos uploaded after the release of the 2010 resuscitation guidelines have contents correlated to the 2005 guidelines. Another study that used search engines like YouTube, Google, and Yahoo reported only a few Web sites have a CPR content of high scientific quality.[10]

A similar study by Murugiah et al.[7] showed nearly half of the videos were uploaded by individuals with unspecified credentials. The present study also showed that one-third of the videos are uploaded by individuals with unspecified credentials. As a medical source, the most remarkable problem with the Internet is the unspecified upload origin. Also, as an open source of social media, it is nearly impossible to check the quality of these kinds of videos. After the established key words, 80% of the videos were excluded from the study, and this rate was 89% for the study by Yaylaci et al.[6] This points out that it is difficult to reach the right knowledge in open sourced digital platforms like YouTube.

However, the Internet sources might be useful tools for public training as they are easily available sources.[10,11] Public awareness and knowledge of pediatric CPR are less than those for adult CPR, and Internet sources should be used in order to improve this awareness. A short 1-min pediatric CPR video has been shown to be useful by the parents in a 2013 study.[12] So, high-quality training material on pediatric CPR may be useful for the training of lay persons.

### LIMITATIONS

There are several limitations to this study. For example, only the videos found within the first 30 pages of our YouTube search were included into the study for final analysis. Of these videos, 7.8% were released before the 2010 resuscitation guidelines. Furthermore, as YouTube is a dynamic tool, more videos might have been uploaded after the present study was performed.

## Conclusions

Moderate numbers of YouTube videos purporting to be about pediatric life support have optimal quality, and few of them are perfect. Furthermore, YouTube videos uploaded by news programs with an insufficient quality have the highest download rates.

## Disclosure Statement

No competing financial interests exist.

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