

## ORIGINAL RESEARCH

## Are YouTube videos accurate and reliable on basic life support and cardiopulmonary resuscitation?

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## Abstract

**Objective:** The objective of this study is to investigate reliability and accuracy of the information on YouTube videos related to CPR and BLS in accord with 2010 CPR guidelines.

**Methods:** YouTube was queried using four search terms ‘CPR’, ‘cardiopulmonary resuscitation’, ‘BLS’ and ‘basic life support’ between 2011 and 2013. Sources that uploaded the videos, the record time, the number of viewers in the study period, inclusion of human or manikins were recorded. The videos were rated if they displayed the correct order of resuscitative efforts in full accord with 2010 CPR guidelines or not.

**Results:** Two hundred and nine videos meeting the inclusion criteria after the search in YouTube with four search terms (‘CPR’, ‘cardiopulmonary resuscitation’, ‘BLS’ and ‘basic life support’) comprised the study sample subjected to the analysis. Median score of the videos is 5 (IQR: 3.5–6). Only 11.5% ( $n = 24$ ) of the videos were found to be compatible with 2010 CPR guidelines with regard to sequence of interventions. Videos uploaded by ‘Guideline bodies’ had significantly higher rates of download when compared with the videos up-

loaded by other sources. Sources of the videos and date of upload (year) were not shown to have any significant effect on the scores received ( $P = 0.615$  and  $0.513$ , respectively). The videos’ number of downloads did not differ according to the videos compatible with the guidelines ( $P = 0.832$ ). The videos downloaded more than 10 000 times had a higher score than the others ( $P = 0.001$ ).

**Conclusion:** The majority of YouTube video clips purporting to be about CPR are not relevant educational material. Of those that are focused on teaching CPR, only a small minority optimally meet the 2010 Resuscitation Guidelines.

**Key words:** *basic life support, Internet, resuscitation, YouTube.*

## Introduction

Early recognition and treatment of sudden cardiac arrest are known to improve survival for victims. Basic life support (BLS) involves a systematic approach to initial patient assessment, activation of emergency medical services, and the initiation of cardiopulmonary resuscitation (CPR).<sup>1,2</sup> Proper education is a prerequisite for CPR conducted by lay bystanders.

## Key findings

- Most of the YouTube videos regarding CPR were uploaded by credentials unspecified followed by guideline bodies which has higher rates of download compared to other sources.
- A small part of videos (11.5%) were completely compatible with 2010 CPR guidelines.
- The videos’ number of downloads did not differ according to the videos compatible with the guidelines, however videos downloaded more than 10 000 times had a higher score than the others.

CPR education propagated via the Internet may be useful to facilitate access to information related to CPR. Self-education through Internet resources is used extensively in the United States and is especially devised to teach bystander CPR.<sup>3</sup>

YouTube was first used in 2005 as an Internet application through which people upload, share and watch videos by means of a simple and integrated programme. It is extremely widespread and more than two-thirds of the Internet traffic comes from outside the United States. Because of easy and widespread accessibility, YouTube can be viewed as an important platform for sharing relevant healthcare information. On the other hand, one should not overlook the risk of dissemination of misleading information.<sup>4,5</sup>

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There are scarce data on reliable and accurate information on CPR and BLS conveyed by YouTube videos and limited number of videos are subjected to these investigations.<sup>3,5,6</sup> The objective of this study is to investigate reliability and accuracy of the information on YouTube videos related to CPR and BLS in accord with 2010 CPR guidelines.

## Methods

YouTube was queried using four search terms ‘CPR’, ‘cardiopulmonary resuscitation’, ‘BLS’ and ‘basic life support’ on 1 January 2014, limiting the search in the past 3 years (2011–2013). Search results were filtered according to dates of upload. The following were used as exclusion criteria:

- Videos irrelevant to CPR and BLS, out of the field of medicine.
- Videos relevant to CPR and BLS, without any demonstration or application.
- Videos recorded in languages other than English.
- Videos related to paediatric CPR
- Videos including real life events without an educational format.
- Videos including 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, inclusion of human or manikins. Videos were categorised by source into five groups: private agency, guideline bodies like AHA/Red Cross/ERC, individual identifying himself or herself as an emergency medical technician, certified CPR instructor or physician, individual with credentials unspecified and news programme.

All videos were seen by two independent researchers (emergency physicians) and scored between 0 and 7. The average of the two scoring was used for analysis for each scored variable. Scoring criteria were shown below in accord with 2010 CPR guidelines:

Task	Score
Provide scene safety	1
Check responsiveness and consciousness	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
Is the ratio of compressions/ ventilations right?	1

Researchers also rated the videos if they displayed the correct order of resuscitative efforts in full accord with 2010 CPR guidelines or not (e.g. ABC sequence vs. CAB).

## Statistical analysis

All data obtained in the study were recorded in and analysed using the Statistical Package for Social Sciences for Windows, Version 17 (SPSS Inc, Chicago, IL, USA). Numerical variables were given as median and interquartile ratio, while categorical variables were given as frequencies (n) and percentages. Three group comparisons for numeric variables were performed by Kruskal–Wallis test and chi-square for categorical variables. Post hoc analysis was performed by Mann–Whitney *U*-test with Bonferroni correction. All the hypotheses were constructed as two tailed, and an alpha

critical value of 0.05 was considered as significant.

## Results

A total of 1994 videos uploaded to Youtube within the study period were analysed for the purposes of the research. Of these, 1785 videos were left out using the exclusion criteria listed in Table 1. Finally, 209 videos meeting the inclusion criteria after the search in YouTube with four search terms (‘CPR’, ‘cardiopulmonary resuscitation’, ‘BLS’ and ‘basic life support’) comprised the study sample subjected to the analysis (Fig. 1).

Nearly two-thirds (64.6%) of the videos had been uploaded in 2013. Demonstrations in 65 (31.1%) of the videos were performed by individuals with credentials not specified. The remaining 52% of the videos were as follows: credentials specified = 23.4%, private agency = 9.1%, news programme = 7.2% and guideline bodies = 29.2%. Most of the videos (65.1%) included applications on manikins (Table 2).

Median duration of the videos was 165 (IQR: 105–309.5) seconds. Median scores of the videos is 5 (IQR: 3.5–6). Table 3 demonstrates scores of the videos and download/watching rates with respect to source of upload. Videos uploaded by ‘Guideline bodies’ had significantly higher rates of download when compared with the videos uploaded by other sources. Source of

TABLE 1. Reasons of exclusion of the videos left out of the analysis

Reason of exclusion	n	%
Videos irrelevant to CPR and BLS, out of the field of medicine	459	25.7
Videos relevant to CPR and BLS, without any demonstration or teaching	503	28.2
Videos recorded in languages other than English	195	10.9
Videos related to paediatric CPR	112	6.3
Videos including real life events without an educational format	44	2.5
Videos including advertisement	130	7.3
Funny videos	74	4.1
Duplicated videos	268	15.0
Total	1785	100.0

BLS, basic life support; CPR, cardiopulmonary resuscitation.

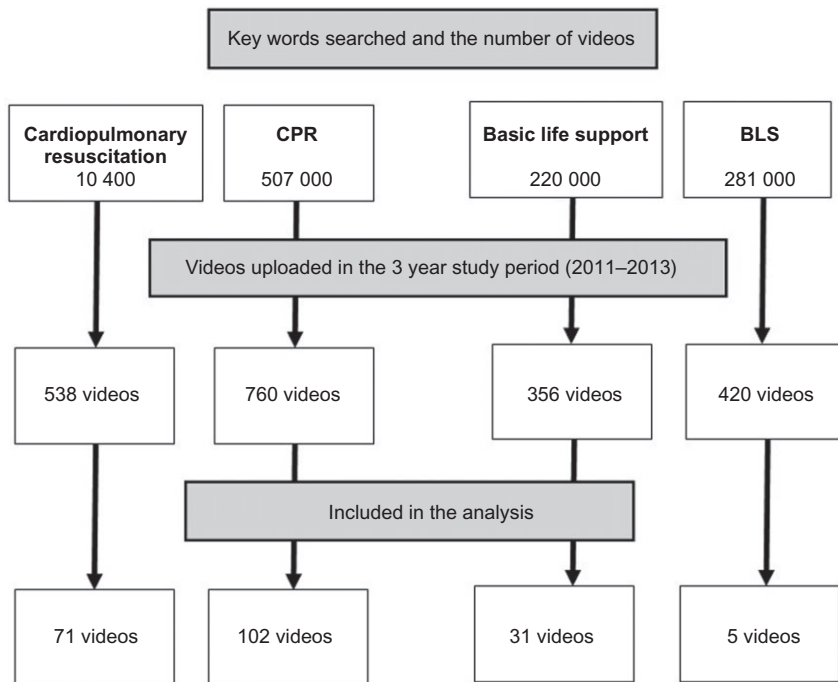


Figure 1. Video flow chart.

TABLE 2. Characteristics of the videos included in the analysis

	<i>n</i>	%
Date (year) uploaded		
2011	32	15.3
2012	42	20.1
2013	135	64.6
Individual or institution uploaded the item		
Private agency	19	9.1
Guideline bodies like AHA/Red Cross/ERC	61	29.2
Individual identifying him/herself as an emergency medical technician, certified CPR instructor or physician	49	23.4
Individual with credentials unspecified	65	31.1
News programme	15	7.2
The demonstration/application was performed on		
Manikin	136	65.1
Human	58	27.8
Both	15	7.2
AED use (mentioned AED in video?)		
Yes	71	34.0
No	138	66.0
Compatibility with 2010 CPR guidelines		
Yes	24	11.5
No	185	88.5
Total scores received		
Below 5	95	45.5
5 and higher	114	54.5
Total	209	100.0

AED, automatic external defibrillator; AHA, American Heart Resuscitation; CPR, cardiopulmonary resuscitation; ERC, European Resuscitation Council.

upload were not associated with scores of the items ( $P = 0.320$ ) (Table 3).

Only 11.5% ( $n = 24$ ) of the videos were found to be compatible with 2010 CPR guidelines with regard to sequence of interventions. Videos scored as 7 were considered to have optimal quality, (reliable and compatible with 2010 guidelines) and this point was used as a cut-off value for statistical analyses. Sources of the videos (10.5% vs 14.8% vs 10.8% vs 12.2.% vs 0.0%, respectively;  $P = 0.615$ ) and date of upload (year) (15.6% vs 7.1% vs 11.9%, respectively;  $P = 0.513$ ) were not shown to have any significant effect on the scores received. The videos' number of downloads did not differ according to the videos compatible with the guidelines (296 [IQR: 50–1921] vs 226 [IQR: 29–4567];  $P = 0.832$ ). The videos downloaded more than 10 000 times had a higher score than the others (median score of 6.00,  $n = 29$  and median score of 4.75,  $n = 180$ ; respectively) ( $P = 0.001$ ).

The interclass correlation coefficient was 0.825 (95% CI 0.776–0.864) and weighted kappa value was 0.708 (95% CI 0.639–0.777) between two observers.

## Discussion

The findings obtained in this study support the reliability of YouTube videos on teaching BLS and CPR and therefore can be useful in public education. It was observed that videos with a high rate of download had higher scores in terms of compatibility to contemporary guidelines.

There are scarce data on reliability and accuracy of the information on YouTube videos related to CPR and BLS procedures.<sup>5,6</sup> Murugiah *et al.* searched the literature data related to CPR and BLS key words but they limited the search with the first 10 pages yielded. They enrolled a total of 52 videos, and two independent researchers scored them. Similar to the present study, the majority were the group of 'the videos uploaded by individuals with unspecified credentials' (48%). Murugiah *et al.* reported that there was no significant difference in view count per day, 'accuracy of demonstration' or 'viewability'

**TABLE 3.** Distribution of scores of the videos and download rates with respect to source of upload

Individual or institution uploaded the item	Download rates Median (IQR)	Score Median (IQR)
Private agency	387 (78–1410)	4.5 (3–5)
Guideline bodies	1044 (89–10907)	5.0 (4–6)
Individual with credentials unspecified	73 (25–1849)	5.0 (3.9–6)
Credentials specified	122 (66–955)	5.0 (3.9–6)
News programme	373 (69–22571)	4.0 (3.3–5)
	<i>P</i> value = 0.012*	<i>P</i> value = 0.320

\*The post hoc analysis revealed that Guideline bodies are significantly different from others. IQR, interquartile ratio.

scores among videos based on source. Likewise, they pointed out that there was no relation between scores of the videos and rates of download.<sup>5</sup> Guideline bodies-sourced videos have higher rates of download but in contrast to findings in the previous studies, their scores are not significantly higher than others.

Although the present study recruited videos released in the 3-year period following publication of AHA 2010 guidelines, only 11.5% of the videos were compatible with these guidelines and most included outdated interventions such that ‘look-listen-feel’, ‘rescue breathing’ and ‘pulse check’. These findings were also comparable to the report published by Tourinho *et al.*<sup>6</sup> Tourinho *et al.* searched Portuguese language videos involved in CPR and BLS in YouTube (no restrictions with regard to the subject of production or the type of language used). They restricted the search with those released within the year following the publication of 2010 guideline. They found that 22% of the videos involving CPR and 30% of those related to BLS was compatible with 2005 guidelines. In addition, the percentage of those videos that included an emphasis on high quality chest compression in the videos was 11% for CPR-related videos and 6% in BLS-related ones. Therefore, they concluded that YouTube lacks of videos about CPR and BLS, which comply with the most recent AHA recommendations, and

this may negatively influence the population that uses it.<sup>6</sup>

The present findings also showed that only one third of YouTube videos comprising BLS procedures integrated automatic external defibrillator (AED) in the material. YouTube can help to show usage of AED effectively.

Although YouTube contains many videos involving CPR and BLS, a small percentage (10%) met the eligibility criteria for the purposes of the study. One fourth of the videos were totally irrelevant to CPR and BLS and/or out of the field of medicine. Similarly, Murugiah *et al.* also reported that they enrolled only 6,5% of the videos they searched.<sup>5</sup> In conclusion, it is not easy to find videotaped material in YouTube demonstrating properly performed CPR. Some simple applications can facilitate access to scientifically convenient material in YouTube and other Internet media. For example, each video can be labeled by a statement or symbol indicating the item can be used as an educational material and thus be encouraged with didactic purposes.

### Limitations

The process of scoring the videos are to some extent subjective, despite two independent physicians evaluated the material. Although eligibility of the videos were assessed by the researchers in a short time, it should not be overlooked that YouTube is not static

but instead, a continuously changing source of information depending on the time and date of researching. Thus it can be viewed as a limitation that this study presents only a snapshot of information available on YouTube.

### Conclusion

The majority of YouTube video clips purporting to be about CPR are not relevant educational material. Of those that are focused on teaching CPR, only a small minority optimally meets the 2010 Resuscitation Guidelines.

### Author contributions

Collected data: SY, MS, AY, HE; served as scientific advisors: OK, CE, OD; and statistical study: CE.

### Competing interests

None declared.

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