

# Automated External Defibrillator: Is Internet Education Reliable

## Otomatik Eksternal Defibrilatör: İnternet Eğitimi Güvenilir Mi?

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### Öz

Otomatik eksternal defibrilatörler (AED) yaygınlığı her geçen gün artan ve herkes tarafından rahatlıkla kullanılabilmesi amacıyla tasarlanmış hayat kurtarıcı cihazlardır. Bu çalışmada, "YouTube" içeriğinde bulunan AED'lerle ilgili videoları doğruluk ve klavuzlara uygunluk açısından değerlendirdik. YouTube'daki AED videoları, ILCOR 2015'in AED bölümü esas alınarak değerlendirildi. Videolar değerlendirilirken, videonun yükleyicisi, video süresi, görüntülenme sayısı ve AED'nin kimin üzerinde uygulandığı da kaydedildi. Her bir video 0-9 puan arasında bir skor uygulanarak değerlendirildi. Bu çalışmada 300 video değerlendirildi. Bunlardan 215'i dışlama kriterlerine göre çalışma dışı bırakıldı ve 85'i çalışmaya dahil edildi. Bu videolar değerlendirildiğinde, 36'sının eğitim amaçlı özel şirketler tarafından yüklendiği, ortalama görüntülenme sayısının 19836 (min.-max. 7 - 254318) olduğu ve ortalama sürenin 5.46 dakika (min.-max. 0.24 - 59.1) olduğu bulundu. En fazla video 2014'te yüklenmişti (17) ve 68 videoda demonstrasyon için bir manken kullanılmıştı. Sadece 3 video (%3.5) tam puan aldı. Videoları yükleyen kurum ve görüntüleme ile güvenilirlik arasında anlamlı ilişki olduğu görüldü ( $p \leq 0.05$ ). AED'nin uygulandığı kişi, video süresi ve yükleme zamanı ile güvenilirlik arasında bir korelasyon bulunmadı (sırasıyla  $p=0.218$ ,  $p=0.491$  ve  $p=0.324$ ). Biz çalışmamız sonucunda YouTube'da ki 'automatic external defibrillator' adı altında yayınlanan videoların sadece 3'ünün tam puan almış olduğunu, 23 videonun da ortalama puanın üzerinde puan aldığı için eğitim açısından çok da kullanışlı olmadığını gördük.

**Anahtar Kelimeler:** Kardiyak Arrest, Otomatik Eksternal Defibrilatör, YouTube Video

### Abstract

Automatic external defibrillators (AED) are life-saving devices whose prevalence is increasing day by day and are designed to be used easily by everyone. In this study, we evaluated the videos about AEDs on "YouTube" in terms of accuracy and compliance with the guidelines. AED videos on YouTube were evaluated based on the AED section of ILCOR 2015. While the videos were evaluated, the uploader, video duration, number of views, and who the AED was applied to were also recorded. Each video was evaluated by applying a score between 0-9 points. Three hundred videos were evaluated in this study. Of these, 215 were excluded from the study according to the exclusion criteria and 85 were included in the study. When these videos were evaluated, it was found that 36 of them were uploaded by private companies for educational purposes, the average number of views was 19836 (min. 7 – max. 254318) and the median duration was 5.46 seconds or minutes (min. 0.24 – max. 59.1). The highest number videos were uploaded in 2014 (17) and a mannequin was used for demonstration in 68 videos. Only 3 videos (3.5%) received full marks. It was observed that there was a significant relationship between the institution that uploaded the videos and the reliability of the views ( $p \leq 0.05$ ). No correlation was found between reliability and the person to whom AED was applied, video duration and loading time ( $p=0.218$ ,  $p=0.491$  and  $p=0.324$ , respectively). As a result of our study, we saw that only 3 out of 85 published under the name 'automatic external defibrillator' on YouTube received full scores, and 23 videos received scores above the average score, therefore, YouTube does not appear to be a reliable source of education for AED.

**Keywords:** Cardiac Arrest, Automatic External Defibrillator, YouTube Video

### Introduction

Cardiac arrest is defined as the state before death that will lead to death without necessary interventions. In adults, the primary cause of sudden cardiac arrest is shockable rhythms such as ventricular fibrillation (VF) and ventricular tachycardia (VT) in which adequate and speedy intervention is directly related to mortality. In the event of cardiac arrest, it has been reported that the mortality rate increases by 7% to 19% for every minute delay before initiating effective basic life support and resuscitation efforts. In shockable rhythms, the chance of survival decreases by 10-12%

per minute as the rhythm persists (1-4). Therefore, the time elapsed before using a defibrillator during basic life support is extremely critical.

Automatic external defibrillators (AED) are life-saving devices whose prevalence is increasing day by day and are designed to be used easily by everyone. Designed for use by both healthcare professionals and the general public, these devices are particularly valuable for reducing time loss and correcting the rhythm in shockable rhythms (1). Lessons on the use of AED are generally available at medical schools and courses are available to improve public awareness. As with many health related topics, both healthcare professionals and the general public turn to video sharing websites, such as YouTube, for information on education on AED (5). There are many studies evaluating the availability, reliability and educational potential of text or multimedia available on the Internet. These studies have generally found inadequate information online (6–10).

YouTube is a social sharing network where videos can be easily uploaded and shared. YouTube offers ease of use and has become a popular source

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of information, the downside being that videos with wrong information are also available and this information may also spread quickly (5,11–14).

In this study we evaluated videos about AED on YouTube, using the keyword “automatic external defibrillator”, in terms of accuracy and compliance with the guidelines.

## Material and Method

This study was conducted by searching on the YouTube website (<http://www.youtube.com>) using the keyword "automatic external defibrillator" between January 13th and 15th, 2016, and then evaluating the results obtained from English pages.

The results obtained from the search using the keyword "automatic external defibrillator" on the YouTube website (<http://www.youtube.com>) were evaluated for inclusion to this study by two Emergency Medicine consultants with AED training. All consultants reviewed ILCOR's AED section before evaluation of videos. The document details the following steps: how AED is to be opened, where pads should be placed, waiting time for rhythm analysis, warning of bystanders, pressing button for delivery of shock, immediate restart of chest compressions and reevaluation of rhythm (1). First of all, YouTube was searched using the keyword “automatic external defibrillator” and videos found in the search results were evaluated for relevance and sufficiency. Exclusion criteria for videos were:

1. Not related to AED
2. No demonstration, just narrative
3. Language other than English
4. Not educational
5. Advertisement or announcement (course etc.)
6. Repeat video

After selection of videos, the uploading institute/person was classified as official (such as AHA, ILCOR, university etc.), healthcare worker (physician, paramedic etc.), agencies (news etc.), firms (educational courses etc.) or unknown. The video duration, views and who AED was applied to (manikin, human or both) were also noted.

All videos were evaluated by two independent emergency medicine consultants. Any discrepancy in scores was resolved by consulting a faculty member of emergency medicine. Each video was evaluated by applying a score between 0-9 points (Table 1).

### Statistical analysis

Data were analyzed using the SPSS 20.0 for Windows software (SPSS Inc., Chicago, IL, USA). Normality of the quantitative data distribution was assessed using the Kolmogorov–Smirnov test. Parametric tests (independent-sample t-test and post hoc Tukey's test) were used for normally distributed data, and non-parametric tests (Mann–Whitney U-

test and the Kruskal–Wallis test) were applied to data not normally distributed. Continuous data are presented as means ± standard deviations or medians and ranges, as appropriate. All tests were two-tailed, and a p-value < 0.05 was considered to indicate significance.

**Table 1.** Parameters used for evaluated the conformity of videos

TASK	Score
A1. Does the video show how the defibrillator should be opened?	1
A2. Were all materials within explained and introduced?	1
A3. Were the AED pads placed in the correct area?	1
A4. Did the instructor wait for rhythm analysis?	1
A5. Were bystanders warned not to touch the patient?	1
A6. Was pressing of the shock button demonstrated?	1
A7. Were chest compressions resumed?	1
A8. Was rhythm analysis re-performed?	1
A9. Were pediatric pedals or pads shown?	1

Since this study was conducted by watching videos on YouTube, which is accessible to all people, and no patient data was used, and since ethical permission is not required in similar studies in the literature, ethics committee permission was not obtained.

## Results

YouTube search results for “automatic external defibrillator” were presented in pages with 15 results on each page. The first 20 pages were viewed and 300 videos were evaluated in this study. Two-hundred and fifteen videos were excluded according to the exclusion criteria. These videos were either non educational (n=62), advertisements (n=39), or did not include demonstration (n=35). Table 2 shows videos that were included for evaluation.

**Table 2.** Distribution of videos according to exclusion criteria.

Reason of exclusion	n	%
Not related to AED	9	3
Description but no demonstration	35	11.7
Not in English	13	4.3
Not educational	62	20.7
Primary for advertisement	39	13
Primary for entertainment	1	0.3
Non-medical video	24	8
Repeat video	32	10.7
Not excluded	85	28.3
<b>Total</b>	<b>300</b>	<b>100</b>

Videos were found to be uploaded by private companies (n=36), unknown (n=27) and official sources (n=22). The average number of views was 19836 (min 7 – max 254318) and the average

duration of videos was 5.46 (min.0.24 – max.59.1) minutes. The highest number videos were uploaded in 2014 (n=17) and least in 2008 (n=1). A mannequin was used for demonstration in 68 videos (Table 3). Video scores are shown in Table 3.

Only 3 (3.5%) videos received full score. Average video scores were 6.07±1.6. Score of 8 or more were accepted as above average and reliable. Only 23 videos (27.1%) were found to be reliable and It was observed that there was a significant relationship between the institution that uploaded the videos and the reliability of the views ( $p \leq 0.05$ ). No correlation was found between reliability, the person to whom AED was applied on, video duration and loading time. ( $p=0,218-0,491-0,324$  respectively).

The study has several limitations. Only one keyword was used and the addition of other keywords such as “AED”, “external defibrillator” or “automatic defibrillator” may have led to more

videos being analysed. Only English language videos were evaluated, other languages were ignored.

### Discussion

A search of YouTube website (<http://www.youtube.com>) using the keyword “automatic external defibrillator” revealed 508 results. The first 300 videos were evaluated in this study and 215 videos were excluded from the study according to the exclusion criteria. Videos were found to be uploaded by private companies (n=36), unknown (n=27) and official sources (n=22). As a result of our study, we saw that only 27% videos related to AED received above average score and that the remaining videos were not useful for educational purposes.

**Table 3.** Characteristics of the videos included in the analysis.

Date	n	%
2007	2	2.4
2008	1	1.2
2009	4	4.7
2010	9	10.6
2011	13	15.43
2012	15	17.6
2013	8	9.4
2014	17	20
2015	16	18.8
<b>Who uploaded</b>	<b>n</b>	<b>%</b>
Official institutions (such as AHA/ERC or University...)	6	7.1
Healthcare professional (physician, emergency medical technician, nurse etc.)	13	15.3
Individual with credentials unspecified	27	31.8
News program	3	3.5
Special courses	36	42.4
<b>Applied on whom?</b>	<b>n</b>	<b>%</b>
Human	16	18.8
Manikin	68	80
Both	1	1.2
<b>Score</b>	<b>n</b>	<b>%</b>
A1 correctly applied	46	54.1
A2 correctly applied	29	34.3
A3 correctly applied	84	98.8
A4 correctly applied	85	100
A5 correctly applied	82	96.5
A6 correctly applied	62	72.9
A7 correctly applied	76	89.4
A8 correctly applied	44	51.8
A9 correctly applied	9	10.6
<b>Total</b>	<b>85</b>	<b>100</b>

YouTube and similar social sharing networks are commonly used and allow for fast information exchange that is generally uncontrollable. Uncontrolled, widespread and fast spread of information is useful but may also lead to the spread of misinformation. Beydilli et al. evaluated YouTube videos of pediatric resuscitation (BLS and CPR) and found that only 232 of 1200 videos were related to BLS and CPR and that only 15% of these were reliable (5). Yaylacı et al evaluated the safety

and accuracy of YouTube videos on adult CPR and BLS and found that 1994 videos were uploaded, 1785 were excluded and 209 videos that were in accordance to 2010 guidelines were evaluated and very few found to be excellent with regard to educational value (11). Muraglia et al. evaluated YouTube videos of BLS and CPR and found no correlation between accuracy and the uploader and views, concluding that increased views do not mean high accuracy (13). In our study, only 28% of videos

were related to AED and only 27% of these videos were determined to be reliable. According to these two studies in the literature, although the percentage of reliable videos in our study is higher, considering that these videos are related to a highly critical issue such as the correct use of automatic external defibrillators during the performing of basic life support, we can also state based on the results of our study that the reliability of videos on this topic is low. Moreover, if all videos related to automatic external defibrillators had been examined in our study, the results might have been as low as those in these two studies

As with CPR in previous studies, AED is a topic that interests not only healthcare workers but the whole population. Therefore, both healthcare professionals and the general public may view or upload videos, with lack of validity and reliability of videos not sourced from healthcare professionals.

Guidelines published in 2015 include AED in basic life support measures and give details on: correctly opening the defibrillator, where to place pads, waiting time for rhythm analysis, should a shockable rhythm be detected the warning of bystanders followed by pressing of the shock button, immediate restart of chest compressions, reevaluation of rhythm by AED (1). When we evaluated AED videos, most scores were from the placement of pads, waiting for rhythm analysis and the warning of bystanders. The introduction and placement of pediatric pads was only seen in 10.6% of videos.

## Conclusion

Defibrillators are life saving devices. It is inevitable that healthcare professionals and the general public look to the internet for information, especially on such important topics. Marking of videos from official sources may be a method of showing the general public which videos are of necessary quality, leading to the spread of reliable information.

**Limitations:** This is the first study to evaluate online videos regarding the use of AED. The study has several limitations. Only one keyword was used and the addition of other keywords such as “AED”, “external defibrillator” or “automatic defibrillator” may have led to more videos being analyzed. Only English language videos were evaluated, other languages were ignored. We evaluated videos uploaded before the beginning of the study, so our results may change over time. The quality and characteristics of videos may change over time.

## Conflict of interest statement

The authors declare no conflict of interest.

**Ethics Committee Approval:** Since this study was conducted by watching videos on YouTube, which is accessible to all people, and no patient data was used, and since ethical permission is not required in similar studies in the literature, ethics committee permission was not obtained.

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