# Artikel 6

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**Submission date:** 31-Dec-2019 09:31PM (UTC+0700)
**Submission ID:** 1238867006
**File name:** 6._First_Aids.pdf (378.66K)
**Word count:** 2838
**Character count:** 15204

Journal of Taibah University Medical Sciences (2018) Ahead, 367–391

Taibah University

Journal of Taibah University Medical Sciences

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Student Article

# First Aid Guideline (FAG): A first aid education application for children aged 11–14 years in Indonesia

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Received 15 February 2018; revised 29 April 2018; accepted 2 May 2018; Available online 4 September 2018

**الملخص**

**أهداف البحث:** إن انتشار الإصابات بين الأطفال في سن ١١-١٤ سنة في إندونيسيا مرتفع. عادة ما تحدث هذه الإصابات بسبب عوامل مدرسية غير آمنة ونقص التعليم حول الإسعافات الأولية. لذا أصبح من الضروري تحسين دور الأطفال عن طريق إدخال تعليم الإسعافات الأولية باستخدام تطبيق الخطوط الإرشادية للإسعافات الأولية. الغرض من هذه الدراسة هو استخدام تطبيق على نظام الأندرويد لتعليم الإسعافات الأولية على المواقف الثانية للأطفال الإندونيسيين.

**طرق البحث:** تم استخدام التطبيق من خلال عدة مراحل. كانت المرحلة الأولى هي اختيار المواد التي سيتم تضمينها في التطبيق. كانت المرحلة الثانية هي صناعة التطبيق وكانت المرحلة الثالثة هي اختبار التطبيق. عمل الباحثون مع خبراء تقنية المعلومات في استخدام هذا التطبيق. وشمل اختبار جدوى التطبيق خبراء في مجالات الطوارئ والطب والجراحة وتقنية المعلومات. وقام الخبراء بتقييم التطبيق باستخدام استبانة حول وسائل الإعلام التعليمية. ثم تم تحليل النتائج عن طريق اختبار كابا لتقييم انطباع الخبراء.

**النتائج:** يحتوي التطبيق المستخدم على قوام ضد الطوارئ ومعالجة الاختناق والحروق والجروح والكسور. كما يوفر التطبيق المستخدم صورًا ومقاطع فيديو تعليمية، مما يسهل على المستخدمين تعلم الإسعافات الأولية. أظهرت نتائج التحليل الإحصائي وجود اختلاف كاف بين جميع الخبراء ١ و ٢ (المتوسط ٣,٥٥ ± ٠,٥٢٩ بانحراف معياري ± ٠,٥١٤ مع كابا = ٠,٥١٤ و p=٠,٠٣٥) والخبراء ١ و ٣ (المتوسط ٣,٥٥ ± ٠,٥٢٩ بانحراف معياري ± ٠,٥١٤ مع كابا = ٠,٥١٤ و p=٠,١٣٢) الخبراء ٢ و ٣ لديهم درجة جيدة من التشابه (المتوسط ٣,٥٠ ± ٠,٥٢٩ بانحراف معياري ± ٠,١٩٩ مع كابا = ٠,٥١٤ و p=٠,٠٣٥).

**الاستنتاجات:** إن تطبيق الخطوط الإرشادية للإسعافات الأولية هو اختراق جديد لتعليم الإسعافات الأولية للأطفال الذين تتراوح أعمارهم بين ١١-١٤ سنة ويمكن استخدام هذا التطبيق كوسيط لتعلم الإسعافات الأولية. هناك حاجة لمزيد من البحوث التي تشمل أعدادًا وسكانية أكبر.

**الكلمات المفتاحية:** الإسعاف؛ الإسعافات الأولية؛ تطبيقات الهواتف المحمولة؛ الخطوط الإرشادية للإسعافات الأولية

**Abstract**

**Objectives:** In Indonesia, the prevalence of injuries among children aged 5–14 years is high. Such injuries are generally caused by unsafe school-related factors and a lack of education about first aid. Thus, it is necessary to optimize the role of children by introducing first aid education using the First Aid Guideline (FAG) application. The purpose of this study was to develop a first aid education application for Indonesian children based on the Android operating system.

**Methods:** The application was developed in several stages. The initial stage was the selection of the content that would be included in the application. The second and third stages were the making and testing of the application, respectively. The researchers worked with information technology experts during the development of this application. The application feasibility test included experts in the fields of emergency and medical-surgical medicine as well as information technology. The experts assessed the application by completing a questionnaire on learning media. The results were then analysed by kappa tests to assess the experts' perceptions.

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Peer review under responsibility of Taibah University.

Production and hosting by Elsevier

 https://doi.org/10.1016/j.jtumed.2018.05.002

**Results:** The application contains emergency call menus, and information on the treatment of choking, burns, wounds, and bleeding. The application provides pictures and video tutorials, making it easier for users to learn about first aid. Statistical analysis showed a sufficient match between Experts 1 and 3 (mean 3.85 ± SD 0.369; kappa = 0.615; $p = 0.035$) and Experts 1 and 2 (mean 3.85 ± SD 0.369; kappa = 0.615; $p = 0.035$). Experts 2 and 3 showed good suitability (mean 3.80 ± SD 0.422; kappa = 0.615; $p = 0.035$).

**Conclusion:** FAG is a breakthrough application for first aid education for children aged 11–14 years. This application can be used as a medium for learning about first aid. However, further research in larger populations is required.

**Keywords:** First aid; First aid guideline; Injury; Mobile apps



## Introduction

The prevalence of injuries among children in Indonesia remains high at 9.7%, with various causes such as traffic accidents, falling, burning, and choking.[1] The factors influencing this prevalence include unsafe school practices and a lack of education on first aid and an understanding of the concepts of danger.[2] The optimization of health education can be implemented among children aged 11–20 years because children in this age group have developed peak physical, sensory, and psychomotor functions. Thus, they generally enjoy exploring new capabilities,[3] including technology with an attractive display in the form of an application on devices such as smartphones.[4] Therefore, smartphone-based first aid education is an attractive potential solution to reduce morbidity and mortality by decreasing suffering and preventing illnesses or further injuries. Generally, injuries among children are caused by factors from the children; at their age, their high energy levels may cause them to take actions without thinking logically.[5] Therefore, the attention and involvement of children, parents, and health workers in the use of new health education interventions on first aid are required for the prevention of injuries. Children aged 5–18 years are able to learn first aid techniques and those aged 11–18 years are typically willing to provide assistance.[6] Health education on first aid is used to increase their confidence in providing assistance. With the development of technology, health education can be delivered through smartphones.[4] Smartphones attract the attention of children because they can generate text messages and have cameras, music players, videos, games, email access, internet search engines, and so forth.[7]

Smartphone applications offer easy access to information.[8] Thus, these applications can be used for health education. The number of smartphone users in Indonesia reached 100 million in 2018, ranking fourth in the world after China, India, and the US.[9] Thus, technological advances should be applied in health education in order to reduce the effect of injuries. The purpose of this study was to develop the "First Aid Guideline (FAG)," an Android operating system-based application for educating on children aged 11–14 years on first aid for injuries.

## Materials and Methods

### *Study design*

This study used a quantitative approach to determine the perception equation between three experts and the audience so that the results of the application were feasible to be published. The content of the application could be seen on Table 1. The questionnaire used is shown in Table 2. This research was conducted at Junior High School 2 Jember (SMP 2 Jember) and Brawijaya University, Indonesia.

### *Sample characteristics*

The sample in this study included three experts. The first was an expert in emergency medicine. The second was expert in medical-surgical care and medication, and the last was an expert in information technology. The audience included 120 students at SMP 2 Jember aged 11–14 years.

### *Procedures*

The application was developed in two stages: creating and testing. Determining the content to be included in the application was the first step. An expert system was then created, which facilitated the construction of the FAG application. The expert system included information about first aid, including emergency calls, wounds, burns, choking, and bleeding. These contents were transformed into menus in the FAG application. The application was created by an information technology expert. The supporting applications included Microsoft PowerPoint (Microsoft Office) and Movie Maker (an application for editing, compiling, and combining video). This requires expert knowledge and creativity so that the contents could be delivered to the users, in this case, junior high school students.

After the application was completed, the second stage was expert testing of the application. Experts in emergency medicine, medical-surgical care, and information technology

**Table 1: Content included in the *First Aid Guideline* (FAG).**

| Content | Subcontent |
|---|---|
| Emergency call | Telephone number to the hospital in Jember, Indonesia |
| Choking | The concept of choking and initial response to choker |
| Skin wound | The concept of wounds, tools required, and initial response to wounds |
| Burn | The concept of burns and initial response to burns |
| Bleeding | The concept of bleeding and initial response to skin and nose bleeds |

**Table 2: Questionnaire on the value of the instructional media.**

| Assessment Item | Very Good | Good | Enough | Poor | Very Poor |
|---|---|---|---|---|---|
| | 4 | 3 | 2 | 1 | 0 |
| Ease of operation of the media | | | | | |
| The linkage of the image to the content | | | | | |
| Language is easy to understand | | | | | |
| Display compliance | | | | | |
| Accuracy of theme selection | | | | | |
| Quality display design | | | | | |
| Systematic presentation | | | | | |
| Clarity of the instruction manual | | | | | |
| Compatibility of the FAG contents to the operational standards of first aid procedures | | | | | |
| User feedback | | | | | |

assessed the application's operating system, content conformity, appearance, and language. Each expert received a questionnaire to assess the learning media, as shown in Table 2.

The feasibility of the application was also assessed using a questionnaire among 120 students at SMP 2 Jember. The questionnaire included information on the application's operating system, content conformity, appearance, and language.[7]

*Statistical analysis*

Kappa tests were performed using the SPSS16 software to evaluate the perception equation among experts, and the questionnaires completed by the students were also used to calculate percentages.

**Results**

In this study, the FAG application containing menus that provided information on emergency calls, chokes, cuts, burns, and bleeding was created, as shown in Figure 1. In addition, there is a "Chat FAG" menu that functions as a


**Figure 1:** Application menu.


**Figure 2:** Menu "Chat FAG".

container to consult regarding the first handling between the user and the owner of this application (see Figure 2). In addition, the kappa tests were used to evaluate the perception equation among experts, as shown in Table 3.

Based on the results of the data processed using SPSS, Table 3 shows that there was a sufficient match between Experts 1 and 3 (mean 3.85 ± SD 0.369; kappa = 0.615; p = 0.035) and Experts 1 and 2 (Mean 3.85 ± SD 0.369; kappa = 0.615; p = 0.035). Experts 2 and 3 had good suitability (Mean 3.80 ± SD 0.422; kappa = 0.615; p = 0.035). The feasibility test conducted among 120 students at Jember Junior High School 2 (SMP 2 Jember) revealed that 81.67% students found the application to be very feasible and 18.33% found it to be feasible.

## Discussion

A number of first aid applications are available. Most of the available applications are intended for first aid in general.

**Table 3: Kappa inter-expert test data analysis.**

| Expert | Mean | SD | Nilai Kappa | P nilai |
|---|---|---|---|---|
| Experts 1 and 2 | 3.85 | 0.369 | 0.615 | 0.035 |
| Experts 2 and 3 | 3.80 | 0.422 | 1.00 | 0.002 |
| Experts 1 and 3 | 3.85 | 0.369 | 0.615 | 0.035 |

However, the present study developed a novel application primarily intended to educate children on first aid for injuries of children and analysed the application using statistical analyses.

FAG provides first aid guidance. The main advantage of this application is the included contents, which are the result of consultation with various experts and a search of literature focused on children aged 11–14 years. The FAG application has unique features. For example, on entering the start menu, the user is advised to register and enter the contact information for their parent or the nearest person; the number is then integrated directly into the emergency call menu in the application. This application is in accordance with the idea proposed by Buck et al. (2015)[7] wherein emergency calls can be interpreted as calling a more mature person than a helper or a known person. Another feature of this application, i.e., the "Chat FAG" menu, allows users to consult directly with the application developer regarding health problems for health promotion and preventive efforts.

The optimal time for health education for children is when they are aged 11–20 years because they have peak physical, sensory, and psychomotor functions. Thus, they generally enjoy exploring new capabilities.[7] Mobile applications are attractive to users due to their various interactive features.[17] These applications provide a stimulus for active learning, unlike traditional methods that depend

on instructors or speakers. This method of learning uses technology; in this case, the learning video can be used to efficiently transfer knowledge to learners.[11]

Based on the results of the statistical analyses shown in Table 3, the kappa value between Experts 1 and 3 was 0.615 with a p value of 0.035. This indicated sufficient conformity (kappa value, 0.4–0.75) between Experts 1 and 3 with a p value of <0.05, implying that the suitability was significant. The above results are similar to the those for Experts 1 and 2. For Experts 2 and 3, the kappa value was 1.000 with a p value of 0.002, indicating good suitability (kappa value, >0.75) between Experts 2 and 3 with a p value of 0.002, implying a very significant suitability. Therefore, the three experts had significant suitability related to the FAG application.

The test results of the use of FAG indicate that the application can be used as learning media for first aid education among children aged 11–14 years. This study had some limitations; the emergency call menu did not include important phone numbers, especially those for health services such as first- and second-level health facilities in East Java. To our knowledge, the FAG is the first application to use the Android operating system to deliver first aid education.

## Conclusion

The FAG was developed as an application for first aid education among children aged 11–14-years. It can also be used to prevent injuries. Because technology has become an inseparable part of human life, healthcare providers must integrate it into services that they provide; this notion underpins the development of the FAG application. Further research involving a larger population of children aged 11–15 years is required.

## Conflict of interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Ethical approval

This study has passed the ethical test held at the Faculty of Medicine, Universitas Brawijaya (approval number 442/EC/KEPK-S2/12/2017).

## Authors' contribution

FE, HK and TS conceived and designed the study, conducted research, provided research materials, and collected and organized data. FE and TS analyzed and interpreted data. FE, HK and TS wrote the initial and final drafts of article. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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**How to cite this article:** Diaprasetia F, Kristianto H, Susanto T. First Aid Guideline (FAG): A first aid education application for children aged 11–14 years in Indonesia. J Taibah Univ Med Sc 2018;13(6):587–591.

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