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Simulation and education

Hospital employees improve basic life support skills and confidence with a personal resuscitation manikin and a 24-min video instruction☆

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ABSTRACT

Introduction: The use of a personal resuscitation manikin with video instruction is reportedly as effective as traditional instructor-led courses in teaching lay people basic life support (BLS). We applied this method to an entire hospital staff to determine its effect on their practical and self-judged BLS skills.
Methods: All 5382 employees at Stavanger University Hospital were asked to learn or refresh their BLS skills with the personal resuscitation manikin and video instruction. Prior to and nine months after training, all employees were asked to rate their BLS skills on a scale from one to five. Additionally, randomly chosen study subjects were tested for BLS skills pre-training and six months post-training during 2 min of resuscitation on a manikin.
Results: In total, 5118 employees took part in the BLS training program. The number of correct chest compressions increased significantly from 60 (5–102) to 119 (75–150) in the pre- vs. post-training periods, respectively, $P < 0.01$, but the number of correct MTM ventilations did not change. Self-reported BLS skills increased from 3.1 (±1.0) pre-training to 3.8 (±0.8) post-training, $P = 0.031$.
Conclusion: After distributing a personal resuscitation manikin with video instruction to an entire hospital staff, the median number of correctly performed chest compressions doubled and self-confidence in BLS skills improved significantly. This is a simple and less time-consuming method than instructor-led courses in preparing hospital employees in the basic handling of cardiac arrest.

1. Introduction

About one-third of all cardiac arrests occur in hospitals,[1] both in and out of critical care areas. As for out-of-hospital cardiac arrest, survival depends on a sequence of interventions—the chain of survival.[2] Cardiopulmonary resuscitation (CPR) is a central part of this, and the incidence of attempted CPR outside critical care areas has previously been reported to be 1.3 per 1000 admissions,[3] and personnel in these areas have less training and experience with the management of cardiac arrest.

Outside critical care areas the witnessing hospital employee should be able to recognise the arrest, call for help and perform basic life support (BLS).[4] Early BLS increases the chances of survival from ventricular fibrillation 2–3-fold.[5] Therefore, all health care professionals should be able to demonstrate competency in BLS skills,[6] and in a recent study hospital employees were generally motivated to learn BLS.[7]

Failure to perform good quality BLS according to current guidelines,[8–11] and poor skill retention is common among both healthcare professionals and lay people.[12] Traditionally in-hospital BLS training in our hospital consisted of time-consuming, expensive and unpractical 1-h courses with a maximum of 10 pupils per instructor. However, students have demonstrated better BLS skills after being taught by peer students than by professionals.[13] The use of video instruction[14,15] or voice advisory manikins[16] has been shown to be effective and feasible BLS training methods, and cognitive skills of BLS increase by using multimedia or case discussions.[17] Further, the rate of bystander CPR has been shown to increase in a population following television announcements.[18] Recently, personal resuscitation manikins with video instruction were reported to be as effective as traditional CPR courses in BLS training of lay people.[19–22] This training concept, however, has not been reported for hospital employees.

In 2006 the hospital Board of Directors at Stavanger University Hospital (SUH) initiated a campaign with the intention that all hospital employees should become proficient providers of BLS by

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Table 1
Questionnaire administered to all hospital employees before receiving their personal resuscitation manikin.

Question	Answer	Number of replies
What is your age?	43 (±11) years	3445
What is your gender?	Female: 87% Male: 13%	3298
How long ago did you have training in basic life support (BLS)?	15 (8–60) months Never: 296	3295
How well do you feel that you are trained in BLS (1–5, 1 = very bad and 5 = very good)?	3.1 (±1.0)	3412
Have you been in a situation where you needed skills in BLS, whether at work or not?	Yes, at work: 1121 (33%) Yes, outside work: 363 (11%) No: 2071 (60%)	3425

receiving a personal resuscitation manikin with video instruction. The aim of this study was to assess whether this BLS training concept could improve hospital employees' self-reported confidence and practical basic BLS skills.

2. Methods

2.1. Stavanger University Hospital (SUH)

SUH provides service to a population of 300,000 people. SUH has 905 beds (both somatic and psychiatric) and 5382 employees. In-hospital cardiac arrests (IHCAs) occurring outside critical care areas (Intensive Care Units, Coronary Care Units, Emergency Department and Operating Theatres) receive BLS by the attending employees and, following emergency activation, with advanced life support by a designated IHCA team. Prior to November 2006, BLS training was offered only to selected health care professionals and was unsystematically organised by instructors within individual departments.

2.2. BLS training with the MiniAnne concept

In November to December 2006, all SUH employees, regardless of prior training, were offered a personal resuscitation manikin (Laerdal MiniAnne, Stavanger, Norway) with a 24-min video instruction on DVD. The hospital employees were given three different training possibilities:

a. in a hospital meeting room available for everyone, the video was shown every hour during daytime, played by a coach, for nine days in a room with enough space for up to 50 employees to practice simultaneously on the floor. All employees were encouraged to participate;
b. those not willing to or not able to attend these sessions could practice with their own manikin and DVD in their actual working environment (with colleagues or on their own);
c. at home.

Besides these optional training possibilities, no further BLS instructions were provided. All training was voluntary.

2.3. Study design

The study consisted of two separate BLS skills assessments: self-reported confidence and practical skills. Both of these two independent BLS skills assessments were tested twice: before and after the campaign. All study subjects signed an informed consent document before participation. No further approval was required.

2.3.1. Self-reported BLS skills—questionnaire

Prior to receiving their personal manikin, we asked all employees to complete a questionnaire concerning their experience and self-judged skills in BLS (Table 1). Approximately nine months later another questionnaire was distributed to all hospital employees by internal mail (Table 2). Again, their self-judged BLS skills were assessed together with questions about their training experience.

2.3.2. Practical BLS skills—manikin study

To evaluate individual effects of the BLS training, 62 hospital employees from different departments were randomly chosen from a list of all hospital employees, but excluding personnel working at critical care areas.

Upon inclusion, the study subjects, without any preparation or knowledge of the study concept, were presented with a simulated cardiac arrest. They were told that they had just found an apparently unconscious 50-year-old woman on the ground. She was represented by a MiniAnne equipped with a counting device. This counting device measured the number of correct chest compressions (compression force >35 kg) and mouth-to-mouth (MTM) ventilations (chest rise) during the first 2 min after initiation of BLS, and the results were displayed on a small screen not visible for the study subjects. In addition, all actions taken by the study subjects were documented manually. After completing this test they were given a personal resuscitation manikin with video instruction and encouraged to use it actively.

Table 2
Questionnaire to all hospital employees nine months after receiving their personal resuscitation manikin.

Question	Answer	Number of replies
Where did you perform the BLS training with your MiniAnne manikin?	Hospital meeting room: 908 (65%) Own dept.: 366 (26%) At home: 73 (5%) Did not participate: 120 (9%)	1397
How long ago did you train with your MiniAnne manikin?	39 (26–48) weeks	1184
How well do you feel that you are trained in BLS (1–5, 1 = very bad and 5 = very good)?	3.8 (±0.8)	1333
How many persons, in addition to yourself, have trained on BLS with your MiniAnne manikin/self-instruction movie?	1 (0–3)	1165
Have you experienced any discomfort using the manikin?	Yes: 49 (4%) No: 1223 (96%)	1272