

Don't be afraid: Save a life with CPR.
Determinants of citizen's intention to participate in AED Alert.

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Abstract

Introduction: Ambulances do not always arrive on time, and AED enable civilians to start resuscitation in the meantime, increasing the victim's chances of survival with up to 50%. It is therefore of vital importance that there is a sufficient number of civilian aid workers. The aim of this research is to obtain insight in the factors influencing (not) signing up for an AED Alert, a tool that alerts civilians to come to the rescue.

Method: In this study, an online survey was used to gather data of 8522 respondents.

Results: Results indicated that respondents express less Fear for CPR when they have a higher level of Self-efficacy toward CPR, compared to those with a lower level of Self-efficacy toward CPR. Fear inhibits the signing up for AED Alert. This relation is, however, mediated by the Attitude toward CPR. AED Awareness has a positive influence on the attitude toward signing up for AED Alert. The relations between factors of the Theory of Planned Behaviour were found in bivariate correlations, however in a confirmative regression analysis only the attitude and the subjective norms were significant predictors of the intention to sign up for AED Alert.

Conclusion: Implications of the results are discussed.

Keywords

CPR, AED Alert, Fear, Self-Efficacy, Theory of Planned Behaviour

Introduction

Cardiopulmonary resuscitation (CPR) in combination with mouth to mouth resuscitation, and defibrillation administered within the first 6 minutes are crucial for the survival of a patient with a cardiac arrest. In the Netherlands 300 people suffer from cardiac arrest every week (Hartstichting, 2010). When bystanders apply an AED (Automatic External Defibrillator), the victim's survival rate increases to 50% (Hartslag Nu, n.d). Still every day 35 people in the Netherlands pass away outside a hospital due to cardiac arrest (Hartstichting, n.d). It is therefore very important that the number of people qualified to work with AEDs increases; the larger this number, the more victims of cardiac arrest can be saved. Through 'AED Alert' civilian aid workers are alerted via a text message with a specific mission (begin CPR on location 'X', or retrieve an AED). Citizen aid workers provide the location(s) where they are available, such as at home or at work. This research focuses on the question when people are willing to participate in AED Alert. And what are the possible objections and / or barriers that people experience when signing up for AED Alert? In this study we approach these questions primarily from the Theory of Planned Behaviour (TPB; Ajzen, 2005), with concepts such as attitude, subjective norm and self-efficacy.

Attitude towards reanimation: experience and fear

Theoretically the attitude toward signing up for AED Alert can be partly understood by people's positive attitudes towards reanimation and AED Alerts. Swor, Khan, Domeier, Honeycutt, Chu, and Compton (2006) reported that people are more likely to reanimate within 5 years after receiving a reanimation training. Kassin, Fein and Markus (2011) assume that role expectation is relevant. So people with a first aid certificate can feel responsible to help and are therefore probably more willing to sign up. It is assumed that the attitude towards resuscitating can also be explained by CPR-related fears. Even trained nurses report that they find resuscitation scary, overwhelming, frustrating and stressful (Pups, Weyker and Rodgers, 1997). There is only a small percentage of people who would

perform CPR on an adult without fear. For resuscitation of a child, this percentage is even lower (Savastono and Vanni, 2011). Research shows that people are afraid of being held responsible and have fear for contracting diseases (Cho, Sohn, Kang, Lee, Lim, Kim, Oh and Lim, 2010; Johnston, Clark, Dingle and FitzGerald, 2003; Jelinek, Gennat, Celenza, O'Brien, Jacobs and Lynch, 2001). In addition, they may feel not being able to properly resuscitate, which may be due to the public perception that CPR is difficult (Coons and Guy, 2009).

Various factors affect CPR-related fears. The age factor shows that in older people the degree of confidence in being able to resuscitate is lower, which may be explained by older people generally experience more physical symptoms, that can probably hinder a well performed resuscitation (Sipsma, Stubbs and Plorde, 2011). These researchers also suggest that people who have had CPR training were more willing to resuscitate after they have attended a CPR performance. The fears may change after a CPR training. The reason, often expressed prior to a CPR performance, is fear of a bad outcome. After CPR training the reasons changed to specific fears such as the fear of being sued by a poor outcome and fear of getting an infection (Hamasu, Morimoto, Kuramoto, Horiguchi, Iwami, Nishiyama, Takada and Hiraide, 2009).

Subjective norm

The subjective norm as defined by TPB is about the influence that people perceive from their social environment (Ajzen, 2005). The behaviour, for example to sign up for an AED Alert, is motivated by the potential social rewards or disapproval of performing or not performing the behaviour (White, Smith, Terry, Greenslade and McKimmie, 2009). The subjective norm is particularly suited to predict rather specific behaviours (De Oliveira and Pallister, 2013). This would imply that subjective norm may also influence the specific behaviour of signing up for AED Alerts. However, this is under the assumption that the decision to sign up is shared and discussed with one's social environment. The extent to which this occurs, however, is unknown, and the actual signing up is not directly observable behaviour. The impact of subjective norms on the decision to sign up for AED Alerts is therefore an

open question (De Oliveira and Pallister, 2013; Smith and McSweeney, 2007; Reno, Cialdini and Kallgren, 1993).

Not only the social network is important, also environmental factors play a role. One example is that the visible presence of AEDs may motivate people to take part in a first aid training (Kuramoto, Morimoto, Kubota, Maeda, Seki, Takada and Hiraide, 2008). Possibly, awareness of AED presence also affects the willingness to resuscitate and or willingness to sign up to an AED Alert.

Self-efficacy

When one has the feeling to be competent (self-efficacy), chances increase that one will help (Shotland and Heinold, 1985). It is therefore important that people have the confidence that they can resuscitate properly, because this will increase the intention to reanimate / to sign up for AED Alert. Schlessel, Rappa, Lesser, Pogge, Ennis and Mandel (1995) found that one month after CPR training self-efficacy has improved and the fear of CPR has declined in comparison with individuals who did not receive the training. Other studies also show that the increase of self-efficacy reduces the fear of CPR (Cho, Sohn, Kang et al., 2010; Sipsma, Stubbs and Plorde, 2011). People with the knowledge and skills to resuscitate cannot apply it properly without enough faith in their own abilities (Maibach, Schieber and Carroll, 1996). Low self-efficacy beliefs encourage people to visualize failures (negative thoughts), as opposed to people with high self-efficacy who are visualizing successful performances (positive thoughts). So people who followed a CPR course can visualise successful performances so they probably have more positive attitudes toward resuscitation. Observational learning will increase self-efficacy (Bandura, 1977). This effect is strongest when one has not previously carried out the behaviour, for example, at the beginning of a CPR training. Training is very important for one's own faith in CPR and willingness to resuscitate (Cho, Sohn, Kang et al., 2010). Sipsma, Stubbs and Plorde (2011) showed that people who have taken a CPR training over the past five years have increased confidence in their CPR performance. Schlessel, Rappa, Lesser et al. (1995) showed that CPR training for parents focusing on child CPR provides higher self-efficacy of CPR and a decrease in anxiety on

the implementation of a rescue. Self-efficacy for signing up for AED Alert is also important. The more people think they are unable to sign up to an AED Alert, the less likely it is that they will carry out this behaviour. This study examines whether self-efficacy regarding the sign up for AED Alert has predictive value on the intention to sign up.

All above predictions based on the reviewed literature are depicted in Figure 1.

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Methods

In this study, we will analyse three aspects of the above model (Figure 1) in more detail. The first analysis focusses on the role of self-efficacy for CPR in relation to fear. The second analysis focusses on the predictive value of fear and AED awareness on the attitude to sign up for the AED Alert. The third and last analysis focusses on the prediction of the intention to sign up for the Alert through predictors Self-efficacy, Attitude and Subjective norm.

The population of the study were Dutch speaking citizens that were approached by the social network of the researchers and through a link on the Website of Hartslag Nu (Hartslag nu, n.d.). A total of 9767 respondents started the questionnaire; after removal of incomplete cases resulted in 8522 cases remained for the analyses. Of these respondents 55.2% was male, and 44.8% women. 99.4% held a first aid / emergency response / CPR course certificate, and 97.5% has signed up for an AED Alert. The age of the respondents ranged from 13 to 92 years with a mean age of 33.81 years.

After giving informed consent respondents started with the actual questionnaire. In addition to general instructions, respondents who indicated not to have followed a first aid / emergency response / CPR course received the instruction to 'read the following statements and assume that you have the knowledge and ability to resuscitate' and 'assume that you fulfil the conditions to sign

in to AED Alert'. The intention and willingness questions could only be completed by respondents who did not already sign up to AED Alert. The subjective norm items for respondents who had already signed up were adjusted, for example, from "If I decide to sign up to AED Alert, then my family would approve of this" to "The decision to sign up with AED Alert was approved by my family".

The questionnaire started with questions about demographics, followed by awareness AEDs in the area, willingness to administer CPR ($\alpha = .79$), attitude towards CPR ($\alpha = .90$), intention to sign up (items based on Smith and McSweeney, 2007; $\alpha = .96$), subjective norm (items based on Oliveira and Pallister, 2013; $\alpha = .59$), self-efficacy to sign up ($\alpha = .93$) and fear (items based on Hamasu, Morimoto, Kuramoto et al., 2009; $\alpha = .93$). All items are completed on a 7-point Likert scale.

Results

The role of self-efficacy for resuscitation in relation to fear

Table 1 presents the bivariate correlations between the variables used in this study. It shows a significant correlation between Self-efficacy CPR and Fear ($r = -.86$). This strong negative relation is confirmed in subsequent regression analyses (see Table 2: for respondents CPR capable but not signed up for AED Alert $\beta = -.87$, $t(160) = -22.63$, $p < .01$; for respondents CPR capable and signed up for AED Alert $\beta = -.85$, $t(8151) = -146.51$, $p < .01$; for respondents CPR incapable $\beta = -.85$, $t(48) = -10.95$, $p < .01$.)

+++here Table 1+++

+++here Table 2+++

The relation between Fear and Attitude to sign up for AED Alert mediated by the Attitude toward CPR

Table 1 reports a moderate negative correlation between Fear and the Attitude toward signing up for AED Alert ($r < -.21^{**}$). Additional mediation analysis according to Baron and Kenny's approach (1986) indicates that this relation is mediated by the Attitude toward CPR for respondents that are not yet signed up for AED Alert (see Figure 2). In addition to the significant relation between Fear and the Attitude to sign up ($t(208) = -5.39, p < .01$) it was found that the relation between Fear and the mediator Attitude towards CPR was significant ($t(206) = -9.01, p < .01$). The mediator Attitude toward CPR is significantly positively related to the Attitude to sign up for AED Alert ($t(208) = 8.84, p = .02$). Finally in the mediation analysis, the relation between Fear CPR and Attitude to sign up is no longer significant ($t(205) = -1.10, p = .27$). The mediation is confirmed by the Sobel test ($Z = -5.54, p < .01$).

+++here Figure 2+++

AED Awareness and Attitude to sign up AED Alert

The bivariate correlation between AED Awareness and the Attitude to sign up for AED Alert is low, but positive and significant for respondents not signed up for AED Alert ($r < .16^{**}$). Additional regression analysis showed mixed results for this relationship depending on the selected group of respondents. The relation is not significant for respondents that are CPR capable, but not signed up for AED Alert. The relation is significant for respondents that are CPR incapable (Beta = .30, $t(1, 48) = 2.18, p < .05, R^2 = .09$).

Intention to sign up for AED Alert as predicted by the Self-efficacy to sign up for AED Alert, the Attitude to sign up for AED Alert, and Subjective norm

The correlation table (Table 1) indicates moderate to strong relations between the Intention to sign up for AED Alert, and the Self-efficacy to sign up for AED Alert ($r = .31^{**}$), the subjective norm ($r = .44^{**}$), and the Attitude to sign up for AED Alert ($r = .62^{**}$). In addition, regression analysis for respondents CPR capable but not signed up (see Table 3) confirmed the positive significant relations for Subjective norm (Beta = $.30^{**}$), and Attitude to sign up for AED Alert (Beta = $.54^{**}$). However, in the regression analysis Self-efficacy to sign up for AED Alert was found not to significantly predict the Intention to sign up for AED Alert.

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Discussion and conclusions

This study presents the following outcomes. Respondents express less Fear for CPR when they have a higher level of Self-efficacy toward CPR. Literature suggests that the level of self-efficacy toward can be increased by resuscitation training (Savastono and Vanni, 2011). Fear inhibits the signing up for AED Alert. This relation is, however, mediated by the attitude toward CPR. AED Awareness has a positive influence on the attitude toward signing up for AED Alerts. This is in agreement with previous findings (Reno, Cialdini and Kallgren, 1995). The visibility of AED in the environment is important to stimulate the attitude toward signing up for AED Alert.

In this study we applied the Theory of Planned Behaviour (Ajzen, 2005), which postulates that the attitude toward signing up for AED Alert, self-efficacy toward signing up for AED Alert and the subjective norm predict the intention to sign up for AED Alerts. It is assumed that the intention is the precursor of the actual behaviour. In this study we found that these assumed relations were found in bivariate correlations, however, in a confirmative regression analysis only the attitude and the subjective norms were significant predictors of the intention to sign up for AED Alert. The explained variance of this model is substantial ($R^2 = .43$).

The literature provides several studies on CPR and the fear for CPR that is experienced by many. This fear has a negative impact on the attitude toward CPR. However, this study indicates that the attitude toward CPR has a very strong relation on the attitude toward signing up for AED Alerts. So reducing fear for CPR and increasing a positive attitude toward CPR (e.g. by making AEDs more visible in the environment) will have a positive influence on the Attitude to sign up for AED Alert. Because this study also indicated that this attitude is also the most important predictor of the intention to sign up, it provides a strong message regarding the aim of the study: reducing fear and a positive attitude to resuscitation are important factors to increase the number of civilian aid workers.

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Figure 1. Hypothetical Model for the intention to sign up for an AED Alert

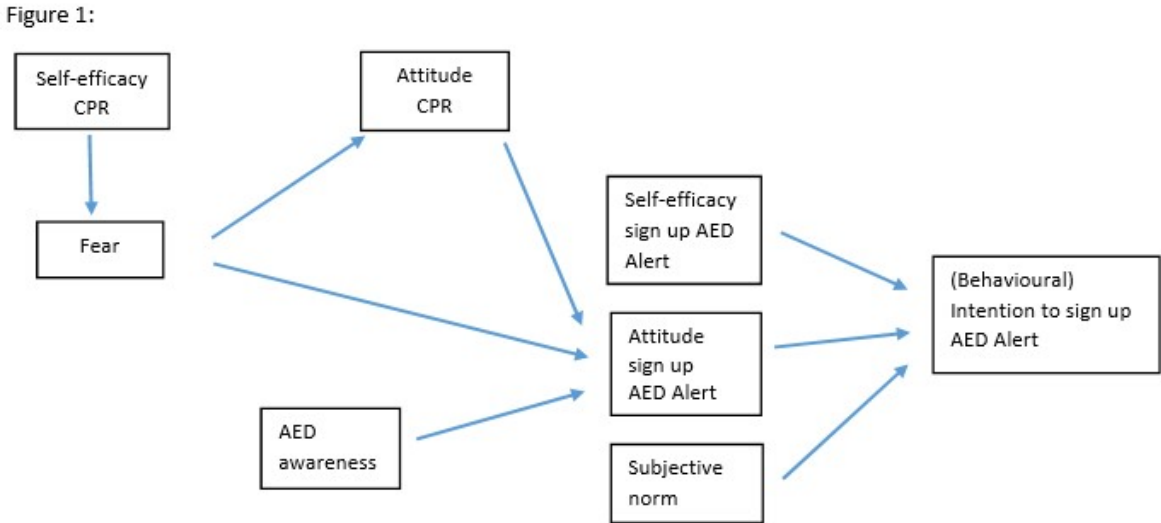
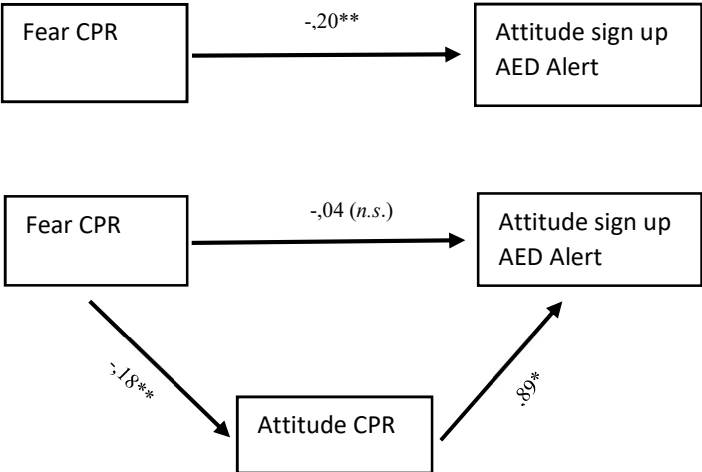


Figure 2. Mediation analysis with Attitude CPR as mediator on Fear (x) and Attitude Sign up AED Alert (y)



Note. Regression coefficients * $p < .05$; ** $p < .01$; n.s. = non-significant. Sobel $Z = -5.54, p < .01$.

Table 1. Means, Standard deviations, and bivariate correlations (N pairwise)

		M	SD	N	1	2	3	4	5	6	7
1	Attitude CPR	20.32	1.50	8427	-	-	-	-	-	-	-
2	Attitude sign up AED Alert	26.08	3.66	8291	.40**	-	-	-	-	-	-
3	Self-efficacy CPR	3.11	2.25	8436	.40**	.19**	-	-	-	-	-
4	Self-efficacy sign up AED Alert	23.06	5.97	203	.37**	.52**	.27**	-	-	-	-
5	Subjective norm	13.36	1.54	8434	.34**	.30**	.21**	.25**	-	-	-
6	Intention sign up AED Alert	27.02	14.50	201	.34**	.62**	.23**	.31**	.44**	-	-
7	Fear	14.18	7.86	8382	-.44**	-.21**	-.86**	-.28**	-.22**	-.25**	-
8	AED awareness	3.82	.74	8508	.19**	.16**	.22**	.24**	.14**	.16*	-.24**

Note. * $p < .05$. ** $p < .01$.

Table 2. Regression analysis with Fear as dependent and Self-efficacy CPR as independent, with 3 different selections of participants

Group of participants	B	SE	Bêta	t	p	R ²
CPR capable, not signed up for AED Alert	-2.73	.12	-.87	-22.63	.00**	.76
CPR capable, signed up for AED Alert	-3.03	.02	-.85	-146.51	.00**	.73
CPR incapable	-2.48	.23	-.85	-10.95	.00**	.72

Note. * $p < .05$. ** $p < .01$.

Table 3. Regression analysis with intention to sign up AED Alert as dependent variable, and attitude to sign up AED Alert, subjective norm and Self-efficacy sign up AED Alert as predictors

	β	t	p	R^2
Self-efficacy sign up AED Alert	-.03	-.42	n.s.	.43
Subjective norm	.30	4.69	.00**	.43
Attitude sign up AED Alert	.54	7.52	.00**	.43

Note. * $p < .05$. ** $p < .01$.