



RESEARCH ARTICLE

FACTORS THAT INFLUENCE BYSTANDER CPR: A NARRATIVE REVIEW

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ABSTRACT

Sudden out-of-hospital cardiac arrests are the most common cause of death worldwide. This mortality rate can be significantly reduced with the provision of bystander cardiopulmonary resuscitation. This narrative review uses a constructionist framework, and examines factors related to the provision of bystander cardiopulmonary resuscitation. Common factors include: resistance to perform the act due to various fears, lack of cardiopulmonary resuscitation education and training, legal implications around performing cardiopulmonary resuscitation, and socioeconomic variables whether or not cardiopulmonary resuscitation is initiated during out-of-hospital cardiac arrest. The authors developed a list of recommendations to enhance the provision of bystander cardiopulmonary resuscitation in out-of-hospital cardiac arrest with the ultimate aim to enhance overall survival rates during cardiac arrest. Education around the legal implications for providing bystander cardiopulmonary resuscitation needs to be widely disseminated. Support for cardiopulmonary resuscitation education and training should be provided to all individuals, including those with low socioeconomic statuses. Education should be provided around the efficacy of bystander cardiopulmonary resuscitation and the low to no risk for the bystander in relation to contracting infectious diseases.

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INTRODUCTION

Sudden cardiac arrest is seen as the most common cause of out-of-hospital deaths worldwide (Sudden Cardiac Arrest Foundation, 2017). These deaths are largely the result of a lack of intervention on the part of the individual who witnessed or happened upon the event (hereafter referred to as a 'bystander') (Bradley & Rea, 2011; Ross, Winter & Mossesso, 2000). Out-of-hospital cardiopulmonary resuscitation (CPR) is the single most important indicator for a positive patient outcome, yet the average rates for bystander CPR initiation are below 50% (Chen *et al.*, 2017). Immediate high-quality CPR for out-of-hospital cardiac arrest (OHCA) is known as the second step in the chain of survival as per the American Heart Association (American Heart Association, 2015). Successful resuscitation during OHCA is dependent on the amount of support bystanders are willing, or able, to provide. Bystander CPR doubles to triples survival rates of individuals who have undergone cardiac arrest, but reduces by seven to 10 percent

without intervention (Chen *et al.*, 2017; Hasselqvist-Ax *et al.*, 2015; Nehme, Andrew, Bernard, & Smith, 2015; Smith & Colquhoun, 2015 & Abdella *et al.*, 2008). The lack of education in how to initiate and maintain CPR is a barrier for people carrying out the life-saving act (Abdella *et al.*, 2008). Chances of survival from OHCA are greater if CPR is initiated at the scene of the event, however strategies need to be developed to increase participation, and proper execution, during this time (Ro *et al.*, 2015). Guidelines for CPR delivery have been public knowledge for decades, and participation in education and training of CPR is encouraged (Bhanji *et al.*, 2010). The ability to initiate and maintain CPR relies on various factors, including the level and amount of education and training, cultural factors, and legal implications (Ro *et al.*, 2015). The purpose of this narrative review is to examine factors related to the provision of bystander CPR, including: causes for resistance; education and knowledge; the role of legality, and the socioeconomic factors that influence whether or not CPR is initiated during OHCA. Each of these components were reviewed through a constructionist framework. Constructionism, as defined by Papert and Harel (1991), views learning as building knowledge structures in a context in which the learner is consciously engaged, and that

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concepts can be understood by constructing them. In reviewing the literature through such a constructionist lens, the authors were able to examine the most commonly researched factors related to the provision of bystander CPR and devise a list of recommendations for improving bystander CPR in the future.

Resistance to Initiating CPR- A Culture of Fear

Abystander's fear plays a substantial role in whether CPR is initiated outside of the hospital setting. Fear of legal liabilities and fear of doing something wrong are the most prevalent barriers to initiating CPR (Chen *et al.*, 2017). Through an online questionnaire, results from 2094 participants in China revealed that, while 75.8% of competent individuals would perform CPR to a family member or a stranger, significantly fewer bystanders would perform CPR on a stranger rather than a family member due to legal implications (Chen *et al.*, 2017). Another aspect related to fear of performing bystander CPR, is the fear of mouth-to-mouth ventilations, fear of the victim's response, or fear of contracting a contagious disease (Atkins, 2017; Sasson *et al.*, 2015). Contraction of HIV and hepatitis B remain a great concern during provision of CPR, however no case of HIV, hepatitis B or C, or Creutzfeld-Jakob disease has ever resulted from this cause (Vaillancourt, Steill & Wells, 2008). The American Heart Association currently approves the use of chest compression-only CPR, without mouth-to-mouth breathing, at a rate of 100 to 120 compressions per minute (American Heart Association, 2015). This provides an alternative method for bystanders not trained in CPR due to the ease of communicating these simple instructions through phone by a dispatcher. Individuals are still typically willing to perform compression-only CPR on a stranger, despite of CPR training (Cho *et al.*, 2010). The CPR-trained bystander participants interviewed in a study by Swor *et al.* (2006) revealed that their fears were around not being able to perform CPR correctly and fear that they would harm the patient. The most common reason in this population for not performing CPR, even though they were trained, was due to panic (Swor *et al.*, 2006). Through the literature, it is evident that reducing the bystander's fear around providing OHCA CPR is a necessity in order to improve the rates of bystander CPR.

CPR Education and Training

The number one barrier to an individual not receiving training for CPR was because he or she did not know where to find a training course, followed by the individual's lack of time and concern (Chen *et al.*, 2017). In their study, Chen *et al.* (2017) found that cost did not appear to play a role toward influencing the choice to become CPR certified or not, although not all literature supports this statement. While bystander CPR is more likely to be administered by individuals who have had some training, it is important to examine the kind of education and training that people are obtaining (Hasselqvist-Ax *et al.*, 2015 and Cho *et al.*, 2010). Several studies have shown that CPR is less likely to be performed by bystanders in low income communities, thus researchers have recommended training efforts for laypeople (including telephone CPR guidance) aiming specifically in those regions to increase the likelihood of CPR being performed in the case of OHCA (Chiang *et al.*, 2014; Mitchell, Stubbs, & Eisenberg, 2009 & Sasson *et al.*, 2011). Similarly, in their study in an African American community, Ross *et al.* (2000) found that white victims were more likely to receive CPR than their black counterparts, and recommended CPR education in targeted communities to

increase the skill-base in those areas. Such targeted education was also intended to increase the confidence of people in their CPR skills, so that they would be less fearful to initiate CPR in the case of an OHCA. The provision of CPR during OHCA was more common when the bystander had more than a high-school education and when the CPR training had been within five years (Swor *et al.*, 2006). In their systematic review, Vaillancourt *et al.* (2008) found that: shortened and simplified classes resulted in CPR skill acquisition; that both airway and breathing techniques should continue to be upheld as best-practice in CPR training; that CPR can be taught successfully in learning modules and videos (to meet needs of varying types of learners); that students should be taught about the low risk of disease transmission during CPR; and that regular recertification in CPR is necessary for individuals' skills to remain current. Previous strategies used to deliver CPR were: organization of mass CPR training events; CPR training of family members of patients suffering from heart diseases; promotional CPR videos; and CPR training of high school students (Vaillancourt *et al.*, 2008). Likewise, in their Maryland Fire and Rescue Services study, Bouland *et al.* (2015) also found that shortened CPR sessions (taught by non-uniformed instructors) resulted in more laypeople obtaining CPR training.

Legal Implications around Initiating CPR

As aforementioned, fear of legal liabilities, such as being sued, is one of the main factors causing bystanders to not participate in CPR outside of the hospital setting. Although protective laws, known as the "Good Samaritan Law" exists in many countries in Europe, as well as the United States, and Canada, there are no relevant laws in some countries, such as China, that will protect the CPR provider in the case of failed resuscitation (Chen *et al.*, 2017). Multiple studies discuss the bystander's fear of legal implications around performing CPR on a stranger leading to harm, thus contributing to the higher likelihood for someone to perform CPR on a family member rather than someone they do not know (Chen *et al.*, 2017; Coons & Guy, 2009; Johnston, Clark, Dingle & FitzGerald, 2003). Contrarily, the literature also discusses the bystander's fear around being sued because of the reluctance, or lack of performing CPR (Coons & Guy, 2009; Johnston *et al.*, 2003; Donohoe, Haefeli & Moore, 2006). Coons and Guy (2009) solidified the overall belief that bystanders feel they are risking personal and financial security when providing CPR to a stranger. The lack of knowledge around legal implications and bystander CPR denote the requirement for further education and clarification around the relations between regional OHCA and bystander CPR guidelines.

Socioeconomic Factors and the Initiation of Bystander CPR

Socioeconomic status (SES) and factors have been linked to the lack of by stander CPR throughout the literature. It is reported that "internationally bystander-CPR is performed in only about one third or fewer of cases of out of hospital arrest" and there have been numerous studies published that outline the correlation between income and race as variables for the lack of initiation of by stander CPR (Chew, Mohd Idzwan, Nik Hishamuddin, WanAasim & Kamaruddin, 2008, p 636; Mitchell *et al.*, 2009; Sasson *et al.*, 2012). According to a study by Fosbal *et al.* (2014), which looked at the incidence of bystander CPR and neighborhood characteristics, found that

black people with low income were less likely to perform bystander CPR than those persons in an affluent white neighborhood due to fear of contracting an infectious disease. It has also been noted that the lack of awareness of signs and symptoms associated with cardiac arrest is a predictor of whether or not the bystander will participate in the CPR. Other predictors are first-aid course training, as well as the cost associated with daycare and transportation while attending the CPR training (Ross *et al.*, 2000 & Sasson *et al.*, 2015). Sasson *et al.*, (2011) discussed contextual factors and the provision of bystander CPR. They found that bystander CPR was more apt to be provided in higher income neighborhoods, and that differences in neighborhoods of low SES and that of high SES were of the “same magnitude as witnessed and unwitnessed arrests” (Sasson *et al.*, p 677). The initiation and provision of bystander CPR in low SES areas might improve once there is ongoing awareness about the signs and symptoms of cardiac arrest, the low to no risk of contracting infectious diseases during CPR, and subsidized costs for basic CPR training. This may have implications for persons creating policies associated with education and training of persons for basic life support training, including CPR, and might lead to an improvement in the initiation of bystander CPR.

Conclusion

Bystander CPR plays a significant role in positive outcomes following cardiac arrest, increasing the 30-day survival rate from 4% for patients who did not receive CPR before EMS arrival, to 10.5% for those who received CPR prior to EMS arrival (Hasselqvist-Ax *et al.*, 2015). Based on this narrative review that used a constructionist framework, the authors developed a list of recommendations (Fig.1) to enhance the provision of bystander CPR in OHCA with the ultimate aim to enhance the overall survival rate of patients who arrest. There are common factors that emerge from the current published literature that contribute to the provision of bystander CPR, including a resistance to perform the act due to various fears, lack of CPR education and training, legal implications around performing CPR, and socioeconomic variables. Ultimately, more education to the public is imperative in enhancing knowledge around the efficacy of CPR, as well as the increasing knowledge that the provision of CPR during an OHCA is a low to no risk act for the bystander.

Figure 1. Recommendations

1. Offer affordable CPR training to everyone (focusing on low SES populations)
2. Target CPR training to family members of potential cardiac arrest victims
3. CPR classes should be simplified and shortened
4. Reassurance and education around CPR and the low-to-no risk of contracting infectious diseases
5. Encourage compression only CPR without mouth-to-mouth breathing when there is fear around contracting an infectious disease
6. Provide clearer information about the legal implications around bystander CPR for specific regions
7. Focus on reducing the stigma and fears around providing bystander CPR

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