**Public Unwillingness to Resuscitate Passersby: Knowledge, Attitudes, and Inhibitions**

Emily Hanassi, Esther Parai, Asnat Bashkin [נא להציב איותים מוסכמים של המחברות]

Department, University, City, Country

Provide full correspondence details here including e-mail for the corresponding author

**Public Unwillingness to Resuscitate Passersby: Knowledge, Attitudes, and Inhibitions**

Background: Cardiac arrest is the most common cause of death in the West. Its survival rates outside hospital depend largely on cardiopulmonary resuscitation (CPR) by those near the victim. Despite epidemiological data showing a major increase in the survival rate of people who have cardiac arrest and were resuscitated by bystanders, the percentages of public willingness to resuscitate are low. This study examines bystander knowledge of, attitudes toward, and inhibitions to willingness to perform CPR and detects variables that may be related to the low willingness rate.

Methods: The research population comprises 218 men and women aged 18–72 who answered a survey that included socio-demographic items, questions probing knowledge of CPR, statements describing attitudes, and statements describing inhibitions to bystander resuscitation.

Findings: The respondents are favorably disposed to emergency CPR. However, they displayed a low level of knowledge on 60 percent of the items. Also, respondents who are poorly informed expressed inhibitions with greater intensity and had more negative attitudes toward CPR. Inhibitions are a mediating variable in the connection between knowledge and attitude toward CPR (F (2, 216) = 83.28, *p*<0.01). The inhibitions that found expression most frequently are fear of injuring the person while resuscitating, fear of contagion in the course of CPR, and absence of a defibrillatornearby.

Conclusions: the respondents’ attitudes are associated mainly with inhibitions that mediate between knowledge and attitudes toward resuscitating casualties of cardiac arrest outside hospital. These inhibitions are consistent with those described in the research literature. Therefore, it is recommended to create intervention programs that emphasize strategies of giving support and tools that reinforce bystander knowledge of and access to proper CPR with reference to these inhibitions. Such programs should focus on broader deployment of defibrillators, use of assistance from emergency hotlines, training programs, and media campaigns.

[מילות מפתח?]

**Introduction**

Cardiac arrest is the most frequent cause of death in the West and is a large-scale problem in public health (1–3). According to various estimates, some 700,000 people in North America and Europe sustain cardiac arrest outside hospitals each year. Unfortunately, only 10% of them survive (4–6). Boosting the survival rate depends on successful cardiopulmonary resuscitation (CPR) by those at the scene of the victim’s collapse and/or rapid access to a defibrillator (7). After cardiac arrest, every minute that passes without CPR lowers the victim’s likelihood of survival and neurological and functional recovery. Accordingly, every delay in CPR may have dire consequences that can be prevented (8). A meta-analysis of seventy-nine studies, including 142,740 participants, found that victims of cardiac arrest who underwent CPR have four times the likelihood of survival than those who did not undergo CPR (9). Another study (10) that examined the effect of CPR away from hospitals in 2,142 cases of emergency cardiac arrest found that CPR by bystanders significantly improved victims’ prospects of survival—23% of victims survived to hospitalization and 12% were released from the hospital alive. By comparison, the corresponding rates among cardiac-arrest victims who did not undergo CPR by bystanders were 14% and 5%, respectively.

The expression “chain of survival” was coined to describe a series of events that, if performed together and on time, may greatly improve the chances of surviving cardiac arrest outside hospital. These events include (1) identifying the event that entails intervention, rapid access to the victim, and calling emergency services; (2) CPR by those nearest the victim, i.e., bystanders; (3) defibrillation; and (4) advanced care by a trained EMT (11). The three first links in the chain of survival—rapid access to the victim, early CPR, and early defibrillation—depend largely on public intervention in most cardiac-arrest events. Hence the immediate response of bystanders is critical in improving survival rates (9).

Despite epidemiological data showing a major improvement in the survival rate of cardiac-arrest victims who undergo bystander CPR, data pertaining to the rate of bystanders’ willingness to resuscitate are not encouraging. Despite the public’s generally positive view of CPR and evidence of its utility, even in countries that invest in public-education campaigns and encourage bystander CPR, the response rate in resuscitating cardiac-arrest victims is low (5). In the United States, for example, despite a public-education campaign that encouraged CPR willingness as well as widespread CPR training and the deployment of defibrillators, response is offered in only about one-fourth of all events (6, 9). By and large, there is evidence of positive attitudes among the public toward emergency CPR (12, 13). A study that looked into attitudes toward emergency CPR, with 2,400 participants, found that most held positive views on resuscitating close relatives and friends and 76% were favorably disposed to resuscitating strangers (12). Just the same, additional surveys in recent years indicate limited public confidence when it comes to performing CPR (14-15). Also found among the population are protracted scanty medical knowledge and even lack of awareness—a situation in need of urgent intervention (16).

Sasson et al.(6) examined the inhibitions that surfaced in four critical stages of CPR: (1) identifying an event that entails bystander CPR; (2) calling an emergency hotline by bystanders; (3) identifying the event by hotline staff and giving bystanders instructions; and (4) bystander CPR. It is found that lack of knowledge in performing CPR, unfamiliarity with the victim or the situation, and unwillingness to get involved are meaningful inhibitions to bystander detection of a cardiac-arrest event. In the second stage, the main inhibitions to calling an emergency hotline are inability to communicate with hotline staff, distrust of the authorities, language barrier, and physical limitations. In the third stage, inaccurate description of the event by bystanders, language barrier, and lack of knowledge in CPR create confusion and prevent hotline staff from properly identifying the event and giving bystanders accurate instructions. Finally, concern about mistakes in performing CPR, liability, a dangerous location (a road, for example), contagion, physical limitations, and language barriers were major inhibitions at the stage where CPR is actually performed (6). Similarly, a study that looked into the concepts of bystanders on emergency CPR found the estimation that 65% of those performing CPR will fail to carry out its stages (5).

Several additional surveys (9, 5, 17) revealed unwillingness among some bystanders to perform mouth-to-mouth resuscitation for reasons including fear of contagion and the belief that the technique is complex. Such complexity raises the probability that bystanders will not remember how to resuscitate or will be afraid of doing it incorrectly. The surveys also show that panic, the victim’s appearance, fear of failure and of liability, confusion on the bystander’s part, and failure to detect the cardiac arrest are the most common reasons for unwillingness to perform bystander CPR. Another reason for failure in CPR and the low response rate is nonparticipation in CPR courses. An in-depth study in China looked into this and identified three main reasons for nonparticipation in CPR courses: not knowing where the courses are given, lack of time, and disinterest in the topic (12).

Surveys that tested doctors’ knowledge of and attitudes toward CPR reveal a dismal state of willingness to resuscitate even among physicians. They show that anxiety about the patient’s death is a definitive factor in a doctor’s decision to perform CPR. Furthermore, some doctors do not remember the phone number of the emergency hotline in order to report an emergency and some do not even know how to use a defibrillator. Training in a CPR course and availability of defibrillators are found to be significant in forming more positive attitudes among doctors toward willingness to perform CPR (16, 18).

In addition to these findings, the legal aspect proves to be a consideration in willingness to resuscitate. National legislative initiatives such as “good Samaritan” and public defibrillator laws are found meaningful in enhancing bystanders’ willingness to resuscitate (11). However, unfamiliarity with the laws, their complexity, and their susceptibility to differing interpretations may prevent potential helpers from understanding the protections that these statutes provide and, accordingly, make them fearful of performing CPR. The limitations of laws that do not provide adequate protection of bystanders from lawsuits have been recognized by as the American College of Emergency Physicians (ACEP), which in a 2014 policy statement advocated the elimination of legal liability in order to encourage bystanders to save victims (9). It is important to make progress in this matter in order to remove the legal obstacle that deters bystanders from helping victims due to fear of being sued (19).

In view of previous research findings that show poor willingness of bystanders to perform emergency CPR and many inhibitions related to it, the purpose of this study is to examine knowledge, attitudes, and inhibitions among the public toward responding in CPR cases and to find variables that may be related. The results of the study may point the way to effective measures that will abet the public’s willingness to perform CPR.

**Methods**

The data were gathered by means of an anonymous online survey that elicited self-reportage about knowledge, attitudes, and inhibitions associated with CPR for someone in need of it. The survey was distributed to the public on social networks in January–April 2018. The research population comprised 218 participants over the age of 18 who were not members of medical staff and who answered the survey in full. The survey had four parts. Part 1 had seven items that elicited respondents’ socio-demographic data such as gender, age, marital status, religion, nationality, origin, place of residence, level of education, level of income, occupation, and extent of training in CPR. Part 2 comprised nine items that examined the respondent’s knowledge of CPR. Each question had one correct answer out of three possibilities (correct / incorrect / do not know). The Cronbach’s Alpha reliability of the knowledge questionnaire was found to be α=0.80. The “knowledge” variable was composed of the sum of correct answers, meaning that the higher the score, the more knowledgeable the respondent is. Part 3 of the survey had five statements describing respondents’ attitudes toward performing CPR. The respondents were asked to rank the level of their agreement with each statement. The levels of agreement were presented on a seven-level Likert scale (from 1=totally disagree to 7=definitely agree). The Cronbach’s Alpha reliability of the questionnaire was found to be α=0.72. The “attitudes” variable was composed by averaging the responses to the statements, so that the higher the score, the more positive the respondents felt about CPR. Part 4 of the survey comprised ten statements that describe inhibitions to performing emergency CPR. The respondent was asked to rank his or her agreement with each statement. The statements were arrayed on a seven-level Likert scale (from 1=totally disagree, 7=definitely agree). The Cronbach’s Alpha reliability of the questionnaire was found to be α=.73.

**Findings**

The research population comprised 218 participants over age eighteen—34% men and 66% women. Their average age was 37.3 years (SD=15.27) and more than half had academic education. The characteristics of the members of the sample are presented in Table 1.

[Table 1 about here]

As mentioned above, the survey included nine questions that tested the respondents’ knowledgeability about performing CPR for a person who needs it. Calculation of the average level of knowledge shows that the respondents correctly answered 3.77 knowledge questions on average (SD=1.89). The share of respondents who answered each knowledge question correctly appears in Table 2.

[Table 2 about here]

The table shows that most respondents know the hotline number. Also, about half of them know the optimum sequence of actions when doing CPR for a passerby. Furthermore, to test the level of knowledge, another open-ended question was presented, asking respondents to estimate how many people who undergo CPR survive without brain damage. More than half of the respondents (55%) stated that the likelihood of survival when CPR is done on a person in need of it exceeds 50%. When men and women were compared for differences in the level of knowledge, no significant difference was found.

To examine attitudes about performing CPR, the levels of agreement with five statements expressing an attitude toward performing CPR were averaged. Table 3 shows the respondents’ ranking on the five attitude statements after the categories were grouped. (Responses 1–3 signify disagreement with a statement, Response 4 denotes neutrality, and responses 5– 7 mean agreement with the statement.) To average the attitudes, the rankings of statements that express a negative attitude (2 and 4) were inverted.

[Table 3 about here]

When the average of the attitudes is calculated, positive attitudes toward doing CPR are found among the respondents (average 5.18, SD=1.33 on a seven-level Likert scale, 1 representing the most negative attitude and 7 expressing the most positive). The table shows that nearly half of the respondents (46.5%) say that if they see a person in need of help, they would probably try to perform CPR. Also, more than half of the respondents (52%) claim that in an emergency CPR situation, they would rather wait for an emergency medical team and not try to do it by themselves. Some 87% of the respondents agreed that if asked to do CPR by hotline staff, they would be willing to do so.

To examine inhibitions to performing CPR, the respondents were asked to rank the extent of their agreement with 10 statements that describe various inhibitions to bystander performance of CPR. (The levels of agreement were arrayed on a seven-level Likert scale, from 1=total disagreement to 7=definitely agree.) The responses were grouped into three categories, so that a score of 1 means no expression of an inhibition (composed of responses 1–3), a score of 2 signifies neutrality in respect to the inhibition (response 4), and a score of 3 indicates the presence of an inhibition (responses 5–7). The eight main inhibitions, reflected in the highest rates of respondents who mentioned them, are presented in Figure 1.

[Figure 1 about here]

Analysis of the findings shows that 33% of the respondents said that the appearance of the person in need of CPR may deter them from performing it and 32% said that, in their opinion, they could not detect cardiac arrest or some other situation entailing CPR. In addition, 40% expressed concern about being sued as a result of doing CPR. The inhibitions expressed at the highest rates were fear of injuring the person while performing CPR (57%), fear of contagion in the course of CPR (45%), and no defibrillator nearby (56%). The average inhibitions per respondent was 3.37 (SD=1.9). Nearly all respondents (96.3%) expressed at least one inhibition and more than half expressed at least three. Furthermore, 43.6% expressed four or more inhibitions to performing CPR on a passerby.

To examine gender differences in knowledge, attitudes, and inhibitions to bystander CPR, t-tests were performed on independent samples.

Significant gender differences were found in attitudes toward performing CPR (t=3.27, p<0.05) and in inhibitions (t=3.26, p<0.05). Attitudes toward CPR were more positive among men than among women (average 5.58 as against 4.9, respectively) and the level of inhibitions was lower among men than among women (averages 2.98 and 3.4, respectively). As stated, no significant gender differences were found in the level of knowledge of CPR.

To test relations among knowledge of CPR and attitudes toward and inhibitions to performing it on passersby, Pearson coefficients were calculated. This analysis revealed a weak positive relation between level of knowledge of CPR and attitudes toward performing it (*r*= 0.39, *p*<.01) and a relatively weak relation between knowledge of CPR and inhibitions in performing it (*r*= -0.36, *p*<.01). Nevertheless, a significant negative relation was found between inhibitions and attitudes toward performing CPR (*r*= -0.63, *p*<.01), so that when the attitudes are negative, inhibitions are expressed at a higher rate.

To test the hypothesis that bystanders’ inhibitions to performing CPR mediate a relation between level of knowledge about CPR and attitudes toward doing it for passersby, a hierarchical regression test was performed. First, the predictive variable—knowledgeability in CPR—was inserted, and then the mediating variable—inhibitions to performing CPR—was introduced. The data are shown in Table 4 below.

[Table 4 about here]

Analysis of the data shows that the regression model is statistically significant (F (2, 216) = 83.28, *p*<0.01). One may see that Step 1, the “knowledge” predictor, makes a unique and positive significant contribution, adding 16% to the explanation of variance in attitudes toward performing CPR. In Step 2, significant effect of the knowledge predictor weakens and the mediating variable, inhibitions to doing CPR, makes a unique and significant negative contribution to the model, adding 27% to the explanation of variance in attitudes toward performing CPR.

The conclusion to draw from these findings in is that the hypothesis of mediation is confirmed and that the variable of inhibitions to performing CPR mediates the relation between knowledge of the procedure and attitudes toward performing it.

Discussion

This study examined knowledge, attitudes, and inhibitions relating to bystander performance of CPR and presented the relations among them with reference to various relevant characteristics. Like previous studies, the data in this survey attest to a low level of knowledge (average correct responses to 3.77 of nine items) about resuscitating passersby (15, 16, 18). It is also found that despite evidence of weak response to performing emergency CPR, attitudes toward performing CPR were relatively favorable, much as found in previous studies (12–13). In addition, analysis of the survey data in this study indicates that respondents who are less knowledgeable about CPR had more negative attitudes toward the practice—a finding consistent with studies showing an inverse relation between knowledgeability about and attitudes toward performing emergency CPR (19–21).

The origin of the gap between attitudes and behavior, according to various studies, is the fact that when respondents are instructed to express an attitude that is only theoretical, the attitudes elicited are more positive and respondents tend to attribute to themselves desired attitudes that are more positive (22, 23). In this study, much as in other ones (12, 24), a significant gender difference is found in attitudes toward and inhibitions to performing CPR: men’s, attitudes are more positive and their inhibitions are weaker. To understand the nature of the relation between knowledge and attitudes, it was hypothesized in this study that inhibitions to performing CPR are a mediating factor in the relation between knowledge and attitudes. The analysis confirms this hypothesis, indicating that scanty knowledge about CPR may give rise to many inhibitions about performing it—which, in turn, will affect the public’s attitudes toward CPR for victims of cardiac arrest.

Various studies (9, 16, 18) indicate that knowledge of CPR and inhibitions to its implementation (e.g., no defibrillator nearby, inability to detect cardiac arrest, psychological factors, and fear of financial implications) are meaningful in forming attitudes toward offering a CPR response. The inhibitions that were found in this study resemble those reported by Sasson (6): no defibrillator available, fear of contagion, fear of injuring the person being resuscitated, fear of civil suit, detection of cardiac arrest, the appearance of the person in need of CPR, costs of taking the person to the hospital, and cost of the CPR course. Nevertheless, two inhibitions that were not strongly expressed in this study were physical disability and impaired belief in the ability to perform CPR, unlike other studies (5, 6, 9) that point to these inhibitions as significant reasons for the public’s reluctance to resuscitate. The reason that physical disability is not reflected in the current sample is that most members of the sample in this study were young, aged 18–35—a population group in which physical disability is not common. In addition, the inhibition of “belief in the ability to perform CPR” is less observed among the sample in the current study because most participants had taken a CPR course in the past and because a relatively large share of participants had done so in the past five years or two years (35% and 25%, respectively). Therefore, they were aware of their ability to perform CPR and save victims of cardiac arrest.

The current study shows that it suffices to focus on improving CPR knowledge and technical skills to improve the public’s attitudes toward administering emergency CPR. However, reference must also be made to the range of inhibitions that exist in society and the set of aspects that may neutralize them and enhance victims’ chances of survival. For this purpose, below are recommendations for the treatment of the inhibitions that were frequently found in the current study in order to enhance willingness to perform CPR:

1. ***Fear of harming someone while performing CPR and fear of civil suit***

According to Hansen et al. (5), prior knowledge that intervention cannot cause real damage is crucial for encouraging bystanders to perform CPR and improve victims’ chances of survival. If so, emphasize should be given in training activities that intervention is effective and important for survival and that the risk of causing harm as a result of CPR is minimal, even when bystanders are unsure of their skills to perform it (5). Similarly, information about laws and/or legal provisions that protect those doing resuscitation should be included in CPR courses and advertised prominently alongside the CPR regulations.

1. ***Fear of contagion***

To overcome reluctance among bystanders to restoring a victim’s breathing, more interest is being expressed in promoting resuscitation by chest compression only instead of the traditional practice, which includes chest compression and mouth-to-mouth—because when traditional resuscitation is compared with and that by massage only, no meaningful differences in victims’ survival have been found (25). The public should be advised that the risk of contagion is very low. Policymakers should ensure the availability of breathing masks and gloves wherever CPR stations are set up.

1. ***No defibrillator available***

In the current study, it was found that the most meaningful inhibition expressed by the respondents concerns inability to access a defibrillator. This finding underscores the importance of public access to this device in order to improve rate of the cardiac-arrest survival outside hospital. Defibrillators should be more widely deployed and appropriate signs and information to assure their accessibility should be provided. A large observational study showed that countrywide deployment of publicly accessible defibrillators increased willingness to perform CPR and helped to improve survival outcomes (9). In previous research it has also been found that volunteers familiar with defibrillators felt more self-confident and found the devices convenient to use when attempting CPR. Prior knowledge that the defibrillator would come with instructions in its use was mentioned as having a soothing effect on inhibitions and improved performance (e.g., adequate depth and consistency when performing chest compression) (19).

1. ***Identifying the victim in need of CPR and the cost of a CPR course***

In the current study, a rather small proportion of respondents had taken a CPR course privately. One of the reasons mentioned for not taking the course was its cost, which was also reflected as an inhibition on the inhibitions questionnaire. The use of online distance learning and teaching may lower the costs and broaden the reach of training programs (26). To promote CPR education, there is a need for new creative approaches that will reach a broader public that has no access to CPR training today, e.g., no-cost community and organizational programs to encourage CPR; development of self-learning CPR courses for schools, families, and the public at large; dedicated programs on public sites; and encouraging organizations to provide CPR training among public workers to offer a response for this segment of the public (9).

Media campaigns are another way to improve the public’s willingness to administer emergency CPR. In 2012, the British Heart Organization came out with an advertising campaign that was meant to enhance awareness and knowledge of manual CPR, and media propaganda marketing has been proposed as a mechanism with which to improve the public’s attitudes. In February 2013, a survey was conducted in Birmingham, UK, to estimate the possibility of a relation between exposure to the British advertising campaign and CPI knowledge, on the one hand, and the public’s willingness to make use of the practice, on the other. It was found that those who had been exposed to the campaign were more willing to perform CPR than they had been before (14). The data indicate that venues such as social media can be used to disseminate knowledge and enhance public awareness of how to identify and resuscitate victims of cardiac arrest.

In addition to the foregoing, it is recommended to make the public more aware that it can obtain focused CPR assistance from emergency hotlines, possibly enhancing public willingness to apply this practice when needed. CPR training cannot offer a solution in many cases of cardiac-arrest that occur in the presence of family or relatives who lack this training (26). In this state of affairs, after a medical emergency is detected, one of the first and most critical things that someone present should do is to call a hotline (9). The development of “telephone CPR instructions” via hotlines has been found effective in supporting CPR performance in real-time even when the rescuers have no prior training (26). Accordingly, the analysis of the attitudes questionnaire in the current study showed that the participants’ views on resuscitation were more positive when EMT intervention was involved than otherwise. Thus, the importance of giving hotline staff training and information in this matter deserves emphasis.

The current study has several limitations. The first is relatively small sample size; it is likely that a larger random sample would better reflect the attitudes, knowledge, and inhibitions to CPR among bystanders. In addition, those who chose to participate in the survey may have had an initial interest in CPR and therefore expressed positive positions. Furthermore, the questionnaire used was a self-reportage vehicle that addressed a theoretical situation. In reality and real time, inhibitions may find stronger expression and attitudes may be more negative when an act of resuscitation is actually needed and are less powerful when the participant is asked to express a theoretical view only. One may therefore raise the conjecture that the actual attitudes are more negative, and the inhibitions more powerful, than the participants reported.

Nevertheless, despite the limitations, this study provides a detailed and broad picture of inhibitions to bystander performance of cardiopulmonary resuscitation and illuminates the connection between these inhibitions and attitudes and knowledge. The study may serve as a landmark for the drafting of intervention programs that will raise the share of those participating in cases of cardiac arrest outside hospital and improve the public’s awareness of performing CPR. The findings reflect the need to develop a joint effort to create interventions that will prompt citizens, decision-makers, and policymakers alike to promote the matter and propel it to the top of the public agenda.

**References**

1. Sund B, Svensson L, Rosenqvist M, Hollenberg, J. Favourable cost-benefit in an early defibrillation programme using dual dispatch of ambulance and fire services in out-of-hospital cardiac arrest. [Electronic version.] *European Journal of Health Economics,* 13(6). 2012:811-818.‏
2. Division of Emergency Medical Services. 2015 Annual Report to the King County Council. Seattle, WA: Emergency Medical Services Division of the Public Health Department—Seattle and King County [September 8, 2015].‏
3. Capucci A, Aschieri D, Piepoli MF, Bardy GH, Iconomu E, Arvedi M. Tripling survival from sudden cardiac arrest via early defibrillation without traditional education in cardiopulmonary resuscitation. *Circulation,* 106(9). 2002:1065-1070.‏
4. Go AS, Mozaffarian D, Roger VL, Benjamin EJ, Berry JD, ... Franco S. Heart disease and stroke statistics—2014 update: a report from the American Heart Association. [Electronic version.] *Circulation,* 129(3). 2014:e28.
5. Hansen CM, Rosenkranz SM, Folke F, Zinckernagel L, Thomsen T, Torp‐Pedersen C, ... Rod MH. Lay bystanders’ perspectives on what facilitates cardiopulmonary resuscitation and use of automated external defibrillators in real cardiac arrests. *Journal of the American Heart Association,* 6(3). 2017: e004572.
6. Sasson C, Meischke H, Abella BS, Berg RA, Bobrow BJ, Chan, PS, ... Masoudi F. Increasing cardiopulmonary resuscitation provision in communities with low bystander cardiopulmonary resuscitation rates. *Circulation,* 127(12). 2013:1342-1350.
7. Bar-El, A, Netz, A, Peri, Z. [נא לוודא את איות שמות המחברים], Does your family physician know what to do when resuscitation is needed [in Hebrew] [Electronic version.] HaRefuah, 156(1). 2017:57–58.
8. Graham R, MCoy MA, Schultz AM, editors. Strategies to improve cardiac arrest survival: A time to act. (pp. 1-8). Washington, DC: National Academies Press, 2015.
9. Graham R, MCoy MA, Schultz AM, editors. Strategies to improve cardiac arrest survival: A time to act. (pp. 16-23). Washington, DC: National Academies Press, 2015.
10. Ritter G, Wolfe RA, Goldstein S, Landis JR, Vasu CM, Acheson A, ... Medendrop SV. The effect of bystander CPR on survival of out-of-hospital cardiac arrest victims. [Electronic version.] *American Heart Journal,* 110(5), 2015:932-937.
11. Lin, HY, Chiang WC, Hsieh MJ, Ko, PC, Sun, JT, Hung, SC. et al. National community chain-of-survival initiatives are associated with improved bystander cardiopulmonary resuscitation rates and survival for cardiac arrests in Taiwan. *Circulation,* 106(9), 2016: 1065-1070.‏
12. Chen M, Wang Y, Li X, Hou L, Wang Y, Liu J, Han F. Public knowledge and attitudes towards bystander cardiopulmonary resuscitation in China. [Electronic version.] BioMed Research International, 2017.
13. Jarrah S, Judeh M, AbuRuz ME. Evaluation of public awareness, knowledge and attitudes towards basic life support: A cross-sectional study. *BMC Emergency Medicine,* 18(1). 2018:37.‏
14. Bull S, Shadwell J, Stewart B, Stride B, Reilly L, Warburton J, Haroon S. Mass media marketing and willingness to undertake cardiopulmonary resuscitation: A cross-sectional survey of the general public in Birmingham, UK. [Electronic version.] *The Lancet*, 382. 2013:S27.‏
15. Bobrow BJ, Eisenberg MS, Panczyk M. The institute of medicine says time to act to improve cardiac arrest survival: Here’s how. [Electronic version.] *Annals of Emergency Medicine,* 67(4). 2016:492-495.‏
16. Einav S, Wacht O, Kaufman N, Alkalay E. Cardiopulmonary arrest in primary care clinics: More holes than cheese: A survey of the knowledge and attitudes of primary care physicians regarding resuscitation. [Electronic version.] *Israel Journal of Health Policy Research,* 6(1). 2017:22.
17. Swor R, Khan I, Domeier R, Honeycutt L, Chu K, Compton S. CPR training and CPR performance: Do CPR‐trained bystanders perform CPR?. [Electronic version.] *Academic Emergency Medicine,* 13(6). 2006:596-601.
18. Bobrow, BJ, Eisenberg MS, Panczyk M. The institute of medicine says time to act to improve cardiac arrest survival: Here’s how. [Electronic version.] *Annals of Emergency Medicine,* 67(4). 2016:492-495.‏
19. Vargas, JRN, Matiz-Camacho H, Osorio-Esquivel J. Evidence-based clinical practice manual: Cardiopulmonary-cerebral resuscitation. [Electronic version.] *Colombian Journal of Anesthesiology,* 43(1). 2015:9-19.‏‏
20. Kitamura T, Iwami T, Kawamura T, Nagao K, Tanaka H, Hiraide A. Nationwide public-access defibrillation in Japan. [Electronic version.] *New England Journal of Medicine,* 362(11). 2010:994-1004.
21. Lijovic M, Bernard S, Nehme Z, Walker T, Smith K, Victorian Ambulance Cardiac Arrest Registry Steering Committee. Public access defibrillation—Results from the Victorian Ambulance Cardiac Arrest Registry. [Electronic version.] *Resuscitation,* 85(12). 2014:1739-1744.‏
22. Wicker AW. Attitudes versus actions: The relationship of verbal and overt behavioral responses to attitude objects. [Electronic version.] *Journal of Social Issues,* 25(4). 1969:41-78.
23. Edwards AL. The social desirability variable in personality assessment and research. [Electronic version.] *Journal of Medical Education,* 33(8). 1958:610-611.
24. Piliavin IM, Rodin J. Piliavin JA. Good samaritanism: an underground phenomenon? [Electronic version.] *Journal of Personality and Social Psychology,* 13(4). 1969:289.
25. Riva G, Hollenberg J, Svensson L, Ringh M, Rubertsson S, Nordberg P. et al. Increase in bystander cardiopulmonary resuscitation in sweden during the last 15 years is mainly attributed to increased rates of “Chest Compression Only” CPR. [Electronic version.] *Circulation,* 134(1). 2016:A13201.
26. Abella BS, Aufderheide TP, Eigel B, Hickey RW, Longstreth WT et al. Reducing barriers for implementation of bystander-initiated cardiopulmonary resuscitation. [Electronic version.] *Circulation,* 117(5). 2008:704-709.‏