AN ABSTRACT OF THE THESIS OF

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Abstract approved:

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Automated External Defibrillators (AEDs) are portable medical devices that can be used by laypersons to treat two common types of cardiac arrest. Awareness surrounding the use of AEDs and willingness to use them in emergency situations is documented in few populations. This investigation aimed to address this gap by gauging the public's level of awareness of and willingness to use AEDs in Portland, Oregon, and by identifying predictors of awareness and willingness. Portlanders were surveyed at Multnomah County Library branch locations using anonymous surveys that included demographic questions and questions that tested respondents' awareness of and willingness to use AEDs. Portlanders were more familiar with the term "Automated External Defibrillator" than with the terms and symbols associated with this term. Men, persons over 50 years old and persons living with someone under 18 years old were more confident and willing to use AEDs, but these findings did not reach statistical significance. Statistically significant correlations were found between Portlanders' willingness to use AEDs and their reported confidence, as well as between their willingness to use AEDs on strangers and on known persons. This indicates that increasing the level of training and education Portlanders receive on AEDs may help improve Portlanders' willingness to use them in cardiac emergency situations.

Key Words: AED, Automated External Defibrillator, Cardiac Arrest, Defibrillation

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Portlanders' Cardiac Emergency Response Awareness

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I understand that my project will become part of the permanent collection of Oregon State University, University Honors College. My signature below authorizes release of my project to any reader upon request.

Allison Joan Schue, Author

Introduction:

Out of hospital cardiac arrest is a significant cause of death in the United States, with an estimated 424,000 cases assessed by Emergency Medical Services (EMS) personnel each year (1). For adults in the US suffering nontraumatic cardiac arrest with any type of first recorded rhythm, survival to hospital discharge following EMS treatment was approximately 10.7% in 2011 (1). For American children in this situation, the survival to hospital discharge in 2011 was approximately 5.4% (1). For those who experienced bystander-witnessed ventricular fibrillation, the survival rate to hospital discharge for adults was estimated to be 31.7% in the United States in 2011 (1). In the first year of the Oregon Sudden Unexpected Death Study, which analyzes cases of sudden cardiac death that occur in Multnomah County (the metropolitan area of Portland, Oregon, encompassing approximately 1,000,000 residents), the incidence of cardiac arrest in the population was estimated to be 53/100,000 people (2).

Automated External Defibrillators (AEDs) are electronic medical devices that can be used by laypersons to treat two common types of cardiac arrest, ventricular fibrillation (VF) and ventricular tachycardia (VT) (3). Of those who suffer cardiac arrest, it is estimated that 23% have VF or VT or a rhythm that is "shockable" by an AED (1). Unlike Cardiopulmonary Resuscitation (CPR) which aims to maintain oxygenation to the brain until definitive care can be administered to the affected individual, AEDs have the ability to deliver an appropriate dosage of electricity to the patient's heart, which may make it possible for the heart to resume a normal rhythm (3). To determine if shocks are appropriate in a given cardiac arrest emergency, AEDs analyze the electrical impulses in the heart of the patient after the pads have been attached appropriately to the chest, making them easy for laypersons to use (3). In order to maximize the possibility for a positive outcome, early defibrillation is essential, as it is estimated that the chance of survival during a cardiac arrest emergency decreases 7 to 10 percent with every minute that passes before defibrillation is performed (4). Given that there is always some amount of intervening time, usually several minutes, before trained emergency medical

responders arrive on the scene to deliver care, early defibrillation with an AED can greatly improve outcomes for cardiac arrest patients.

In addition to the benefits of early defibrillation with AEDs, it is also important to emphasize the fact that AEDs were intended for use by witnesses of cardiac arrest emergencies and were therefore designed to be easy for laypersons to use. In fact, it has been shown that children of elementary school age in Nijmegen, Netherlands are both capable and willing to use AEDs following basic training, with 80% of those surveyed reporting AEDs to be easy to use (5). This clearly shows that members of the general public should be fully capable of using an AED correctly in the event of a cardiac arrest emergency; however, the public's knowledge of and willingness to use AEDs has not been fully explored. Previous studies in this area have focused on the Japanese population (6), geographically unspecified patrons of a suburban shopping mall (7), and dental hygienists in Ohio (8). While all of these studies are provide valuable data on AED awareness and willingness to use, it is difficult to generalize the conclusions from these studies to the population of Portland, Oregon (the geographical focus of this study), as the populations surveyed in the studies cited differ significantly from Portland.

The purpose of this research was first to determine the overall level of AED awareness and willingness to use AEDs in the population of Portland, Oregon and then to determine whether certain demographic factors were predictive of confidence about and willingness to use AEDs. From this data, it was hoped that it would be possible to identify subgroups within the general Portland population that would benefit the most from further education and training in bystander response to cardiac arrest emergencies. I made the a priori hypotheses that younger people would be more willing to use AEDs due to their exposure to pop culture and newer technologies, that people living with people under 18 years old would be more willing to use AEDs, and that men would be more willing to use AEDs. These hypotheses stemmed from my personal experiences communicating with people about AED use following training in AED use and CPR.

Methods:

The Multnomah County Library branches that were selected as locations for surveying were as follows: Belmont, Hillsdale, Hollywood, Midland, Northwest Portland, Sellwood, St. Johns, and Woodstock. Surveying occurred on Fridays, Saturdays or Sundays between October 19th and November 16th, 2014. Meeting room reservations ranged from 2-3 hour blocks of time. Selection of the days, times and locations was based on the availability of public meeting rooms and their geographical locations, with the goal of surveying at the most diverse grouping of libraries possible during the times available in mind. The booking procedure for these rooms included the project director/student researcher filling out and submitting an application to the selected libraries according to librarian instructions. Following the booking of public meeting rooms, the procedure described subsequently was followed during all surveying times.

The researcher first propped opened the door to the public meeting room and affixed an IRB-approved sign advertising the study to potential study participants to the door to encourage library patrons to participate. The researcher also arranged the meeting rooms so that study participants had a table and chair at which to complete the survey. Due to lack of "walk-in" participants, the researcher briefly informed library patrons and asked if they were interested in participating, according to the rules set in place by librarians at each of the individual libraries. Since individual libraries differed in their policies regarding approaching patrons about their interest in participating in a research survey the locations at libraries where patrons were asked about their interest varied. At the Northwest Portland, Hillsdale, Hollywood, Belmont and Woodstock branches, participants were asked about their interest in participation in front of the library entrance and then, if interested, proceeded to take the survey within the reserved meeting room. At the Sellwood, St. Johns and Midland branches, library patrons were recruited as they passed the library meeting room and then, if interested, proceeded to take the survey within the meeting room. According to the IRB-approved procedure, clearly ineligible (e.g. children) and uninterested patrons were not asked to participate.

When participants decided to take the survey, they first encountered an informed consent screen on the online Qualtrics version of the survey or an informed consent sheet on the paper version of the survey. In order to continue with the survey, the participants were required to select the "Yes" option on the screen or first sheet, otherwise they were not allowed to continue. All surveys were completely anonymous, and as such, no signature was obtained from the study participants. Participants were asked to direct questions and concerns to the researcher who was present at the beginning of the survey. Following the selection of the "Yes" option on the consent document, participants proceeded to answer questions about demographic information and their awareness of and willingness to use AEDs (see Appendix for the complete survey). The survey took participants approximately five minutes to complete and participants were not compensated monetarily or in any other tangible way for their time.

In processing the data collected, demographic indicators were paired with AED awareness, confidence and willingness data in graphical and tabular representations to identify correlations between these data sets. Basic statistical tests, including independent t-tests, the Pearson chi-squares test and Pearson correlation coefficients, were also performed to determine the statistical significance of the results that were generated. Descriptive statistics for the entire study sample were calculated and presented in Table 1. Both demographic and AED awareness variables were treated as categorical or ordered categorical. Due to the fact that seven point Likert scales were used for reporting confidence and willingness to use AEDs, both were treated as both ordered categories and as continuous measures, since limitations associated with both of these approaches were identified.

AED awareness data was assessed based on accuracy of written answers and answers that were determined to be lacking key information or blatantly incorrect by the researchers were eliminated from the final positive response percentages. Confidence and willingness were analyzed based on age grouping and then by sex, with respondents placed into two groups based on their responses: over 50 years old and under 50 years old, or male and female, respectively. The mean confidence and willingness markers were then compared for each of these groups and the significance

of the results was determined using an independent samples t-test. Confidence and willingness to use AEDs based on whether someone lived with a minor was determined by grouping the survey population into two groups: those that reported living with persons under 18 years old and those that did not. The number of responses that had rated on confidence as "Somewhat Confident" or higher were then counted and their percentages of the total group were then determined. The same method was then applied to the responses regarding willingness to use AEDs, using a rating of "Somewhat Likely" or higher as the grouping parameter. Statistical significance was then determined using Pearson chi-squares tests.

To assess whether correlations existed between willingness to use AEDs and confidence, and willingness to use AEDs on strangers and willingness to use AEDs on known persons, the Pearson correlation coefficient was calculated for three data pairs. These pairs were: 1) willingness to use AEDs on strangers and confidence, 2) willingness to use AEDs on known persons and confidence, and 3) willingness to use AEDs on strangers and willingness to use AEDs on known persons. These comparisons were also graphed to show patterns that arose in the data visually and the significance of the results was determined using an independent results t-test.

Results:

All of the 42 surveys that were distributed were returned, and of these surveys, 25 (59.5%) were completed on a laptop using the Qualtrics online survey format. In the online survey format, the respondents were not able to revisit answers to previous questions and were not presented with questions on confidence and willingness if they indicated no awareness in the first section of the survey. In the paper format of the survey, respondents were instructed to complete the survey in its entirety, regardless of their responses to the questions regarding awareness. Of those surveyed, 42.9% considered themselves to be female and 54.7% were over 50 years old; only one respondent reported being in the 18-24 years age range. Additionally, 28.6% reported living with a person who was under 18 years old and 21.4% reported living with a person who was over 65 years old. A total of 21 different ZIP codes were reported and the frequencies of each are listed in Table 1.

Table 1. Baseline characteristics of the entire survey population

Variables	Positive Responses from Survey Population (*N* = 42)
Women	18 (42.9)
Living with someone over 65, %	9 (21.4)
Living with someone under 18, %	12 (28.6)
Over 50 years old, %	23 (54.8)
ZIP Code, counts	
92518	1 (2.4)
97086	1 (2.4)
97202	4 (9.5)
97203	4 (9.5)
97206	2 (4.8)
97207	1 (2.4)
97210	2 (4.8)
97211	1 (2.4)
97212	4 (9.5)
97213	1 (2.4)
97214	4 (9.5)
97215	1 (2.4)
97216	1 (2.4)
97218	1 (2.4)
97219	5 (11.9)
97220	2 (4.8)
97221	2 (4.8)
97222	2 (4.8)
97229	1 (2.4)
97230	1 (2.4)
97236	1 (2.4)

All variables are reported as frequencies in the total survey population, with percentages reported alongside in parentheses.

Of the total survey population (*N*=42), 59.5% responded that they recognized the public access AED sign provided on the survey. Of those who responded "Yes," 68.0% gave brief written descriptions of the sign's meaning. Based on screenings of these answers which looked for general accuracy in the descriptions provided by

respondents three responses were removed from this group, decreasing the positive recognition of the sign to 52.4%. Out of the total survey population, 54.8% indicated that they recognized the term "AED," but after analysis of the written answers that were provided, four responses were deemed inaccurate and discarded from the positive answer pool. This made the positive recognition of the term 45.2%. With regards to the survey population's recognition of the term "Automated External Defibrillator," 71.4% responded positively, and one respondent did not answer the question. After screening the written descriptions for accuracy, two were removed from the set, making the positive recognition of the term to 66.7%.

Of those who responded to the questions regarding confidence and willingness (*N*=29), those who were over 50 years old reported a greater confidence in their ability to use an AED in an emergency, with a mean of 3.88 +/- 1.86 (Table 2). They also reported that they would be more likely to use an AED on someone they know in an emergency, with a mean of 5.50 +/- 1.67 (Table 2). These results approached but did not achieve conventional criteria for statistical significance (p=0.17 and 0.15 respectively). Both age groups reported a similar likelihood to use an AED on a stranger in an emergency, with those over 50 years old having a mean of 4.67 +/- 2.09 and those under 50 having a mean of 4.64 +/- 2.09 (Table 2).

Table 2. Confidence and willingness to use AEDs based on age group

	Under 50 years old		Over 50 years old	
Variables	**Total Responses (*N*)**	**Mean Score**	**Total Responses (*N*)**	**Mean Score**
Confidence in ability to use an AED in an emergency	16	2.94 +/- 1.91	16	3.88 +/- 1.86
Likelihood that respondent would use an AED on a stranger	14	4.64 +/- 2.34	15	4.67 +/- 2.09
Likelihood that respondent would use an AED on someone s/he knows	15	4.40 +/- 2.38	16	5.50 +/- 1.67

Mean scores +/- standard deviation based on the following 1-7 scale: 1=Very Unconfident/ Very Unlikely, 2=Unconfident/Unlikely, 3= Somewhat Unconfident/Somewhat Unlikely, 4=Unsure, 5=Somewhat Confident/Somewhat Likely, 6=Confident/Likely, 7=Very Confident/Very Likely

Additionally, men reported that they were slightly more confident in their abilities to use AEDs and willing to use an AED than women, but the differences were small and did not meet conventional criteria for statistical significance (Table 3). Mean values for both men and women indicated a confidence level would fall close to "Somewhat Unconfident" on the given scale. Mean values for men for both "likelihood of use" questions showed that men reported their likelihood of AED use in emergencies to be close or equal to "Somewhat Likely" on the given scale. Mean values for women showed that they as a group fell closest to the "Unsure" category for likelihood of using an AED on a stranger, while they fell closest to the "Somewhat Likely" category for using an AED on someone that they knew.

Table 3. Confidence and willingness to use AEDs based on gender

Variables	Females		Males	
	Total Responses (*N*)	**Mean Score**	**Total Responses (*N*)**	**Mean Score**
Confidence in ability to use an AED in an emergency	13	3.31 +/- 1.75	19	3.47 +/- 2.07
Likelihood that respondent would use an AED on a stranger	13	4.31 +/- 2.25	16	4.94 +/- 2.14
Likelihood that respondent would use an AED on someone (s)he knows	13	4.92 +/- 2.02	18	5.00 +/- 2.20

Mean scores +/- standard deviation based on the following 1-7 scale: 1=Very Unconfident/ Very Unlikely, 2=Unconfident/Unlikely, 3= Somewhat Unconfident/Somewhat Unlikely, 4=Unsure, 5=Somewhat Confident/Somewhat Likely, 6=Confident/Likely, 7=Very Confident/Very Likely

Of those who responded that they were living with persons less than 18 years of age, likelihood of use of AEDs on strangers and on persons the respondents knew was reported to be between "Somewhat Likely" and "Very Likely" by 60.0% and 63.6% of respondents in each respective category (Table 4). Confidence in one's ability to use an AED was reported to be lower on a 1-7 scale, with the number or respondents from the group who reported a level of confidence that exceeded "Somewhat Confident" being 36.4% (Table 4). This pattern was mirrored in the responses from those who did not live with persons under 18, as 25.0% of these respondents reported to be "Somewhat Confident" or higher, while 31.0% and 41.9%

of this group reported that they would be at least "Somewhat Likely" to use an AED in an emergency on a stranger or someone they knew, respectively (Table 4). All three of these measures showed that a higher percentage of respondents who lived with persons under 18 scored at least "Somewhat Confident"/ "Somewhat Likely" on the scales than respondents who reported not living with persons under 18 (Table 4). However, this data did not meet conventional criteria for statistical significance when Pearson Chi-Squares testing was applied to the data sets ($p=0.45$, $p=0.63$ and $p=0.60$ for willingness to use AEDs on strangers, willingness to use AEDs on known persons and confidence, respectively).

Table 4. Confidence and willingness to use AEDs based on living with persons under 18 years old

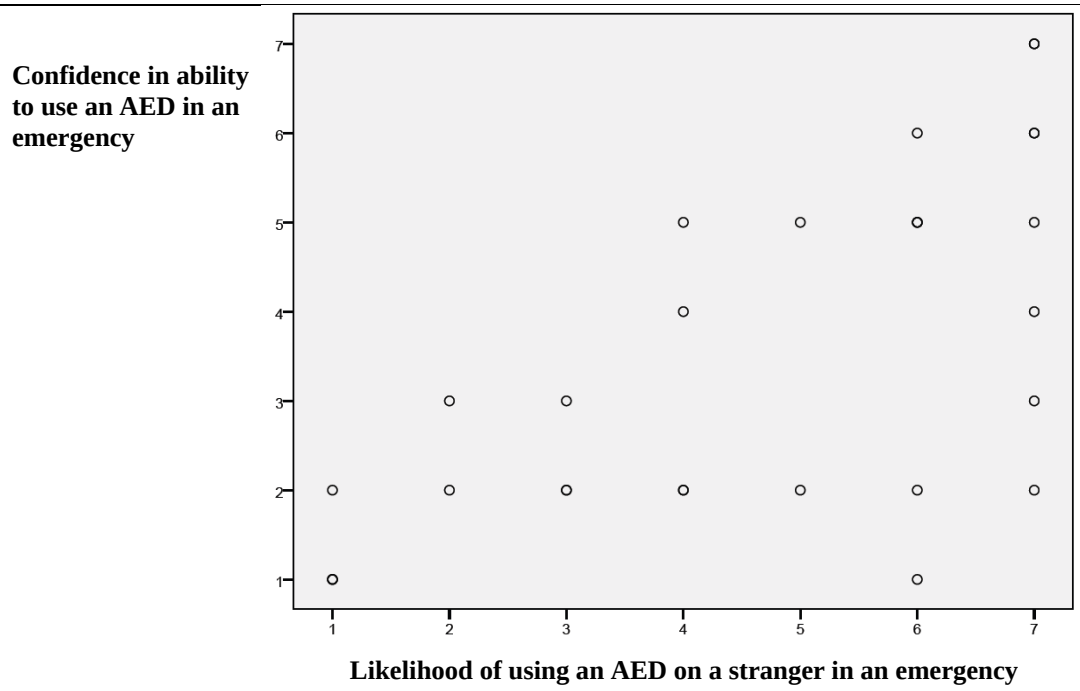
Variables	Living with persons under 18		Not living with a persons under 18	
	Total Responses (*N*)	**Scores greater than 4**	**Total Responses (*N*)**	**Scores greater than 4**
Confidence in ability to use an AED in an emergency	11	4 (36.4)	32	8 (25.0)
Likelihood that respondent would use an AED on a stranger	10	6 (60.0)	29	9 (31.0)
Likelihood that respondent would use an AED on someone (s)he knows	11	7 (63.6)	31	13 (41.9)

All variables are reported as frequencies within the group who reported living with persons under 18 years old ($N=12$), with percentages reported alongside in parentheses; scores reflect answers on the following 1-7 scale: 1=Very Unconfident/ Very Unlikely, 2=Unconfident/Unlikely, 3= Somewhat Unconfident/Somewhat Unlikely, 4=Unsure, 5=Somewhat Confident/Somewhat Likely, 6=Confident/Likely, 7=Very Confident/Very Likely

In the results collected from those who responded to the questions regarding confidence in ability and willingness to use AEDs in emergencies on strangers and known persons ($N=32$, $N=29$, and $N=31$, respectively), correlations were found between responses using the Pearson Correlation. Confidence in one's ability to use an AED was statistically significantly correlated with reported likelihood of use on strangers ($r=0.657$, $p<0.001$) and on known persons ($r=0.619$, $p<0.001$), as can be seen in Figures 1 and 2. Willingness to use an AED on a stranger was also correlated

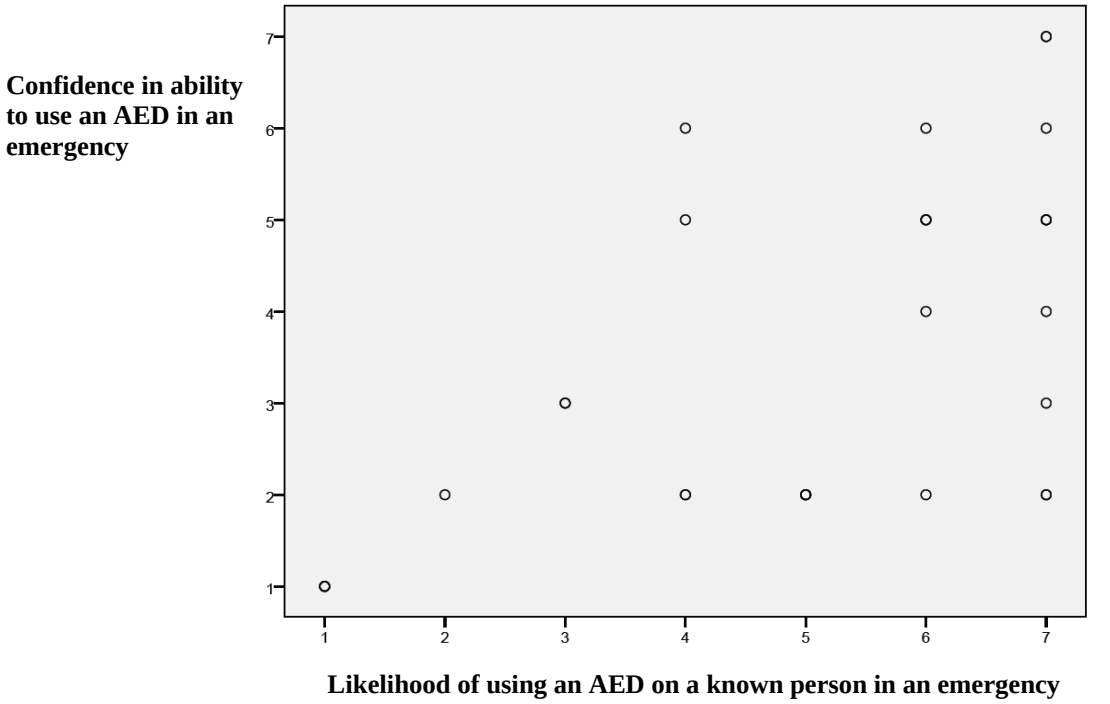
with one's willingness to use an AED on a person that he or she knew and this($r=0.811$, $p<0.001$), and this was also statistically significant (Figure 3).

Figure 1. Confidence and willingness to use an AED on a stranger



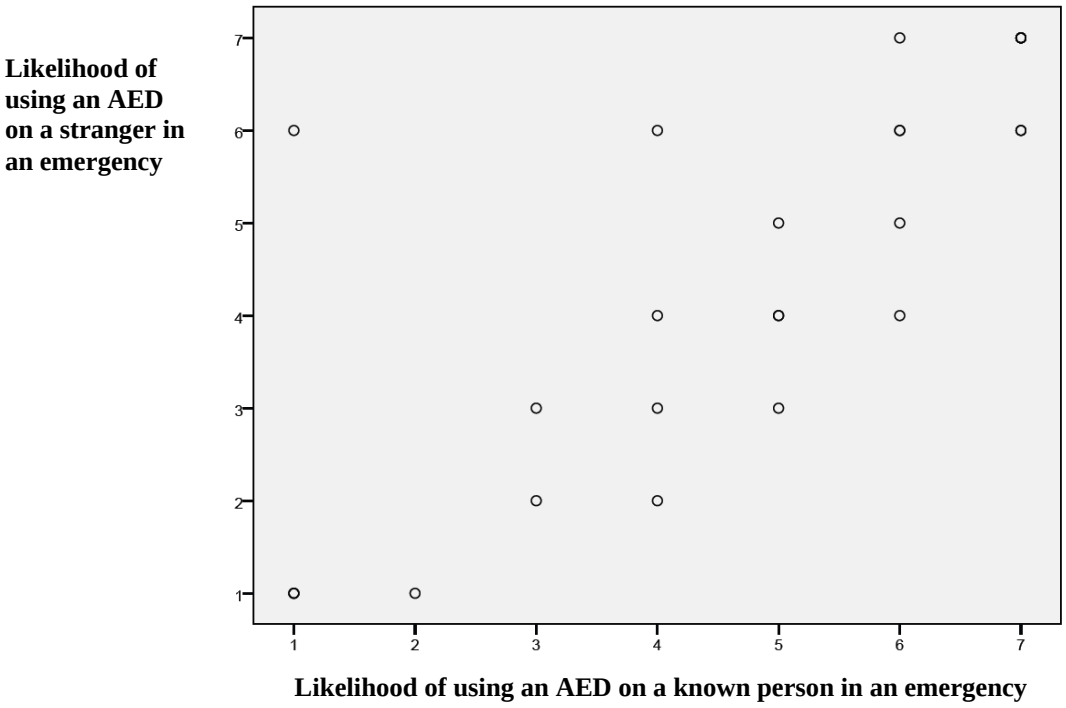
Axis scales reflect scores on the following 1-7 scale: 1=Very Unconfident/ Very Unlikely, 2=Unconfident/Unlikely, 3= Somewhat Unconfident/Somewhat Unlikely, 4=Unsure, 5=Somewhat Confident/Somewhat Likely, 6=Confident/Likely, 7=Very Confident/Very Likely; Pearson's Correlation Coefficient (r) = 0.657; $p<0.001$

Figure 2. Confidence and willingness to use an AED on a person known to the respondent



Axis scales reflect scores on the following 1-7 scale: 1=Very Unconfident/ Very Unlikely, 2=Unconfident/Unlikely, 3= Somewhat Unconfident/Somewhat Unlikely, 4=Unsure, 5=Somewhat Confident/Somewhat Likely, 6=Confident/Likely, 7=Very Confident/Very Likely; Pearson's Correlation Coefficient (r) = 0.619; $p<0.001$

Figure 3. Willingness to use an AED on a stranger and on a person known to the respondent



Axis scales reflect scores on the following 1-7 scale: 1= Very Unlikely, 2=/Unlikely, 3=Somewhat Unlikely, 4=Unsure, 5= Somewhat Likely, 6= Likely, 7=Very Likely; Pearson's Correlation Coefficient (r) = r=0.811; $p<0.001$

Discussion:

Based on the survey population, the population of Portland, Oregon is somewhat familiar with signage indicating the presence of an AED and with the term "AED," with the lowest number recognizing the acronym "AED" by itself. A larger proportion of the population surveyed was familiar with the term "Automated External Defibrillator," which indicates that the public may be less familiar with the acronyms and symbols used to denote AEDs than they are with the devices themselves.

Additionally, those who were over 50 years old were slightly more confident in their ability to use an AED in an emergency, indicating that there may be a connection between age and confidence. This could be due to an increased awareness of heart problems in general as members of the population age, as these members of

the population have had a longer amount of time to be exposed to information surrounding the treatment of heart problems than younger members of the population. Additionally, members of the "50 and older" age group felt more likely to use AEDs in emergency situations. This could be due to the fact that older individuals have a higher incidence of cardiac arrest, which could mean that this group could more easily visualize a situation where a cardiac emergency would occur and use of an AED would be necessary (2). Since both of these findings approached statistical significance ($p=0.17$ and $p=0.15$ for each, respectively) and the sample size for this study was relatively small, further surveying could potentially show whether these trends are actually significant or not.

However, while older individuals were more confident in their abilities to use AEDs, there was very little difference between the level of willingness to use AEDs on strangers in older people and younger people (Table 2). This indicates that there may be a general discomfort in the population, regardless of age, in giving first aid or medical attention to a stranger.

With regards to differences in willingness and confidence between the male and female sub-populations, no statistically significant differences were observed; however, men self-rated their confidence and willingness to be slightly higher than women in all areas (Table 3). The data showed that this difference between sexes was the greatest when a stranger was experiencing a cardiac emergency, with the mean score of men being 4.94 +/- 2.14, in comparison to the mean score of women being 4.31 +/- 2.25 (Table 3). While both of these values indicate that there is some ambivalence with regards to using an AED on a stranger, women's answers indicate that they would fall more consistently into the "Unsure" category, while men's answers indicate that they would more consistently fall into the category of "Somewhat Likely" to use an AED. This difference, if real, could be attributed to many factors, including the possibility that men have less discomfort in interacting with strangers, particularly in emergency situations. This would be consistent with previous findings that have shown that men are more inclined to directly respond to arterial bleeding emergencies than women (9). Another possibility for this is that men could have a greater tendency to imagine themselves responding to an

emergency situation than women, making them more likely to report a willingness to use an AED on anyone, regardless of their true willingness. A notable limitation of this survey method is the fact that it only was able to measure respondents' anticipated willingness to use an AED in an emergency, and cannot be compared to real responses to emergencies. This fact makes it difficult to conclude how predictive these measures are of true bystander response to cardiac emergency situations. Additionally, a larger sample size would be helpful in determining whether this difference is generalizable to the general population of men and women in Portland, Oregon, as the sample size of the population that answered questions on willingness and confidence was not large, which only allows large differences to be definitively deemed statistically significant (Table 3).

Living with persons less than 18 years of age was associated with an elevated level of confidence and willingness in the population, with over half of this group reporting their willingness to use AEDs on strangers or known persons as "Somewhat Willing" or higher, while less than half of those who did not live with persons under 18 reported this level of willingness. It is likely that adults who live with people under 18 are parents, guardians or immediate family members of these minors, which could make them feel a greater sense of responsibility for the wellbeing of others and could thereby also make them more willing to respond in emergency situations in general. Additionally, persons under 18 years old are very often enrolled in the K-12 education system; by January 1st, 2015 all K-12 schools in Oregon are required by state law to have an AED on their premises, which could make relatives and guardians of K-12 students more willing to use these devices than the general population due to prior exposure to these devices (10). It is also important to note that the entire population reported a greater willingness to use AEDs than their confidence level, indicating that Portlanders would be willing to step out of their emotional "comfort zone" to help victims of cardiac emergencies (Table 4). However, the sizes of the populations used for these analyses were small and these results did not reach statistical significance, indicating a need for further study of this subgroup in order to determine whether this greater willingness is generalizable to the entire population of Portlanders.

Among Portlanders, statistically significant correlations were found between confidence and willingness to use AEDs on strangers and known persons, as well as between their willingness to use AEDs on strangers and on known persons (Figures 1-3). Willingness to use an AED on a stranger and willingness to use an AED on a known person were more closely correlated than confidence and willingness to use an AED (Figures 1-3). These observations indicate that Portlanders who are confident in their abilities to use AEDs think that they would be more likely to respond to a cardiac arrest emergency with an AED. This is important because from these results it can be inferred that by taking actions that increase Portlanders' confidence in their ability to use AEDs, the likelihood that Portlanders would use AEDs in emergency situations would also increase. Given the potential lifesaving abilities of AEDs in cases of cardiac arrest, it would be beneficial for more laypersons to be willing to respond with an AED in these circumstances (1, 3, 4).

Limitations that were identified for this study included the small sample size that was able to be surveyed, which made it difficult to detect statistically significant associations. A contributing factor to this was the fact that the surveyor found it difficult to convince many library members to take the survey, given the IRB approved protocol that was in place. Additionally, since the survey was given to adults who expressed their willingness to take part in the study, an inherent response bias existed in the method.

The entire population of Portland, Oregon would likely benefit from additional awareness campaigns and education about the use, locations, terminology of and signage associated with AEDs. Women, younger people and adults that do not live with minors might particularly benefit from additional education, training and awareness campaign targeting, but further study of these populations would need to be conducted in order to determine whether specific attention is warranted. Some potential ways that these populations could be targeted include social media-targeting of awareness campaigns to these groups or mandatory AED/CPR training in university health curricula. Awareness of signage and symbols associated with AEDs, as well as the acronym "AED" itself, could be improved in the general

population through general billboard campaigns by the Multnomah County Health Department, as this may be a way to improve general awareness of these.

Conflicts of Interest:

None

Funding Sources:

None

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Appendix:

This research study is being conducted by public health researchers from the Oregon State University College of Public Health and Human Sciences, for the purpose of understanding Portlanders' awareness and knowledge in out-of-hospital cardiac arrest treatment. In order to participate in this study you must be currently 18 years or older. Your survey responses will be entirely anonymous; we will not collect any information that can identify you, and after completing this survey you will not be contacted by researchers from this study again. The survey should take no more than five minutes to complete and your responses will help the researchers improve emergency response training and infrastructure. You are participating in this research voluntarily, and you may decide to withdraw without penalty--that is, not complete the survey--at any time during the process. By checking "Yes", you are acknowledging that you have read, understand and meet the requirements stated, and that you would still like to participate in this research study by filling out this survey.

- ○ Yes
- ○ No

Do you consider yourself male or female?

- ○ Female
- ○ Male

Please provide your home ZIP code in the space provided below.

_____

Please select your age range.

- ○ 18-24 years
- ○ 24-35 years
- ○ 35-50 years
- ○ 50-65 years
- ○ Over 65 years

Do you live with a person that is under 18?

- ○ Yes
- ○ No

Do you live with someone that is over 65?

- ○ Yes
- ○ No

Please use the image below to answer the following question.

If you saw a sign like the one in the image, would you understand its general meaning?

- ○ Yes
- ○ No

If yes, please briefly describe the sign's meaning in your own words. (No more than 1-2 sentences).

_____

_____

_____

_____

Do you recognize the term "AED"?

- ○ Yes
- ○ No

If yes, please briefly explain what the term “AED” means in your own words.

_____

_____

_____

_____

Do you recognize the term "Automated External Defibrillator"?

- ○ Yes
- ○ No

If yes, please briefly explain what the term "Automated External Defibrillator" means in your own words.

_____

_____

_____

_____

Please imagine a place where you spend a lot of your time, other than your home. Do you know where the nearest AED is in that location and could you access it quickly in an emergency?

- ○ Yes
- ○ No

Have you ever been trained in using an AED?

- ○ Yes
- ○ No

If yes, please indicate how you were trained (check all that apply).

- ☐ Work related training
- ☐ American Red Cross
- ☐ American Heart Association
- ☐ Other: _____

In an emergency situation, how confident would you be in your ability to use an AED?

- ○ Very Unconfident
- ○ Unconfident
- ○ Somewhat Unconfident
- ○ Unsure
- ○ Somewhat Confident
- ○ Confident
- ○ Very Confident

In an emergency situation, how likely is it that you would use an AED on a stranger?

- ○ Very Unlikely
- ○ Unlikely
- ○ Somewhat Unlikely
- ○ Unsure
- ○ Somewhat Likely
- ○ Likely
- ○ Very Likely

In an emergency situation, how likely is it that you would use an AED on someone you know?

- ○ Very Unlikely
- ○ Unlikely
- ○ Somewhat Unlikely
- ○ Unsure
- ○ Somewhat Likely
- ○ Likely
- ○ Very Likely

The survey is now complete. Thank you for your participation!