Northumbria Research Link

1   **Abstract**

2

3   **Background**

4   Bystander cardiopulmonary resuscitation (BCPR) is undertaken in only 40% of out of hospital

5   cardiac arrests (OHCAs) in the UK. Lower rates of BCPR and public access defibrillator (PAD)

6   use have been correlated with lower socio-economic status (SES). The aim of this study was

7   to examine knowledge and attitudes towards BCPR and PAD's using a study specific

8   questionnaire, and to understand how these potentially interact with individual

9   characteristics and SES.

10

11   **Methods**

12   Cross-sectional study between July-December 2021 across areas of varying SES in North

13   England.

14

15   **Results**

16   Six hundred and one individuals completed the survey instrument (mean age=51.9 years,

17   52.2% female). Increased age was associated with being less willing to call 999 (p<0.001) and

18   follow call handler advice (p<0.001). Female respondents were less comfortable performing

19   BCPR than male respondents (p=0.006). Individuals from least deprived areas were less likely

20   to report comfort performing CPR, (p=0.016) and less likely to know what a PAD is for,

21   (p=0.025). Higher education level was associated with increased ability to recognise OHCA

22   (p=0.005) and understanding of what a PAD is for (p<0.001). Individuals with higher income

23   were more likely to state they would follow advice regarding BCPR (p=0.017) and report

24   comfort using a PAD (p=0.029).

25

26   **Conclusion**

27   Individual characteristics such as age and ethnicity, rather than SES, are indicators of

28   knowledge, willingness, and perceived competency to perform BCPR. Policy makers should

29   avoid using SES alone to target interventions. Future research should examine how cultural

30   identity and social cohesion intersect with these characteristics to influence willingness to

31   perform BCPR.
32
33
34
35
36
37
38
39
40
41
42
43
44

45   Key words: Cardio-pulmonary resuscitation, bystander help, defibrillator, deprivation

Background

Out of hospital cardiac arrest (OHCA) is a time-critical event. National Health Service (NHS) ambulance services treat approximately 30,000 OHCAs annually in the United Kingdom (UK)[1], but survival rates remain low, around 7-8% in the UK [2] and 10% in the United States (US).[3] Bystander cardiopulmonary resuscitation (BCPR), CPR provided by witnesses to an OHCA not part of an organised emergency response system,[4] is a critical link in the 'Chain of Survival. BCPR is known to improve the rate of return of spontaneous circulation (ROSC) and more than doubles the chance of survival.[5,6] For every 30 patients who receive BCPR, one additional life will be saved.[6]

The proportion of members of the public trained to deliver BCPR, or use a public access defibrillator (PAD), remains poor[7,8]; in the UK, BCPR is undertaken in only 40% of OHCAs.[9] In comparison, King County (Seattle, US)[10] and Norway[11], report BCPR rates of 67% and 73% respectively, and there are clear opportunities for improvements in the UK. Community characteristics in which individuals live and work influence the likelihood they will suffer an OHCA, receive BCPR and survive.[12] Neighbourhoods with lower rates of BCPR have been correlated with lower income, lower education level, and older or ethnically diverse populations.[13-15]

Across England significant variation exists in the proportion of patients receiving BCPR. North East and North Cumbria (NENC) is one of the most socially deprived regions in England, comprises large concentrations of high-risk neighbourhoods (high incidence of OHCA and low provision of BCPR), and is an outlier in BCPR rates compared to other English regions. [5, 16] A significant body of evidence exists supporting the effectiveness of BPCR, but initiatives aimed at improving the uptake of CPR training have yet to impact high-risk neighbourhoods.[17,18] Factors preventing individuals in these neighbourhoods delivering BCPR or using a PAD, and the influence of markers of socio-economic status (SES), are unclear. These are important considerations when designing interventions to improve the uptake of BCPR, or when targeting initiatives at high-risk populations and neighbourhoods. The aim of this study was to examine knowledge and attitudes towards BCPR and PAD's, and to understand how these potentially interact with individual characteristics and SES.

Methods

Study design

This cross-sectional survey was undertaken between July and December 2021.

Setting

The study was conducted in areas of varying SES across NENC, an area covered by two NHS ambulance services.

86   North East Ambulance Service NHS Foundation Trust (NEAS) covers North East England,

87   serving a population of 2.71 million people across urban and rural locations.[19] North Cumbria

88   is covered by North West Ambulance Service NHS Foundation Trust, serving a predominantly

89   rural population of 496,200.[20] NENC comprises the highest concentration of white British

90   people in England and Wales.[21]

91

92   **Data sources**

93   Postcode areas of interest were identified by the number of OHCA's attended by the

94   ambulance service, the rate of BCPR as reported in the OHCA outcomes registry[22] and the

95   areas deprivation level identified using the Indices of Multiple Deprivation (IMD) (2019).[23]

96   Each lower layer super output area (LSOA) in NENC was obtained. The IMD ranks every LSOA

97   by deprivation.

98

99   **Design and development of the survey instrument**

100   The survey instrument was based upon the Restart a Heart participant survey 2019[17] and

101   further developed to meet the specific study aims. The survey was paper-based and captured

102   participant demographics, general health, knowledge and experience of, and willingness and

103   competency to deliver, BCPR and use a PAD. The survey comprised a combination of

104   categorical questions and 10-point Likert scales (1=worst to 10=best), chosen to maximise

105   expression of feeling. [24] Questions were dichotomised into four domains: 1) experience of

106   CPR and PAD use, 2) knowledge of CPR and defibrillation, 3) willingness to perform CPR and

107   use a PAD, and 4) competency, confidence and comfort of performing CPR and using a PAD

108   (Supplementary file 1).

109

110   Categories of employment status were derived from the UK Household Longitudinal Study[25],

111   categories of household income from the Government Statistical Service[26] and occupation

112   classifications from the Office of National Statistics (manager, professional, clerical etc.).[27]

113   Patient/public involvement helped develop relevant questions and piloted the survey

114   instrument to ensure face validity, appropriateness and brevity. Feedback was incorporated

115   into the final version of the survey instrument.

116

117   **Data collection and participants**

118   Research paramedics wearing ambulance uniform targeted busy commercial areas such as

119   shopping centres and precincts, within LSOAs from least to most deprived. Consecutive

120   members of the public were approached regarding study participation. Potential participants

121   received a verbal explanation of the study and a participant information sheet comprising a

122   unique study identification number to facilitate withdrawal. Willing participants then

123   completed the paper-based survey. Eligible participants were aged ≥18 years with mental

124   capacity. Study participation was voluntary.

125

126

Statistical analysis

Participants with missing data were excluded from relevant analyses. Answers consisting of 'not applicable' or 'prefer not to say' were deemed to be missing data and 'unsure' answers were combined with 'no' where applicable to generate a dichotomous variable ('yes' or 'no or unsure'). Office of National Statistics Standard Occupational Classification[26] was used to group occupations into levels 1-4. The age variable met parametric assumptions whilst all other variables were considered to be non-parametric as they were either categorical or ordinal. We used an independent samples t-test when determining differences in dichotomous categorical data by age, with 95% confidence intervals. Spearman Rho correlations were used when examining associations between either ordinal independent variables or age, and the dependent ordinal variables. We used either Mann Whitney U with Monte Carlo Simulation or Kruskal-Wallis with Monte Carlo Simulation (Dunn's pairwise test used for post-hoc analysis) when examining ordinal independent variables and categorical dependent variables. Fisher's Exact Test with Monte Carlo Simulation was used when examining associations between categorical independent and dependent variables. Monte Carlo Simulations used a random seed and 99% confidence intervals. SPSS v26 was used for analyses with alpha level of 0.05. Statistical test results are reported following American Psychological Association 7th edition guidelines.[28]

Ethics

Health Research Authority approval was not required as participants were members of the public in non-healthcare settings (IRAS: 299065, 4th May 2021). The study received ethical approval from NEAS Research Ethics Committee on 1st July 2021 (NEAS/2021/299065). Willing participants provided verbal consent prior to completion of the survey instrument.

Results

A total of 603 individuals completed the survey instrument. Two participants later withdrew, resulting in 601 surveys for analysis. Results are reported in relation to participant characteristics and their relationship with the dependent variables, followed by SES characteristics and their relationship with the dependent variables. Dependent variables are reported in tables 1-4, each representing one of the four domains.

Participant characteristics

Age

600 (99.8%) participants reported their age, with a mean age of 51.9 years (range=18 to 95, standard deviation (SD)=17.7). Age had a significant negative correlation with all five questions relating to participants' willingness to help; increased age was associated with being less willing to call 999 (r(597)=-1.53, p<0.001), follow advice (r(597)=-0.167, p<0.001), help a family member (r(598)=-0.159, p<0.001), help someone familiar (r(598)=-0.183, p<0.001) and help a stranger (r(598)=-0.119, p<0.003).

167   Age was not significantly associated with any other aspect of the four domains: experience of
168   CPR, knowledge of CPR or competency, confidence and comfort of performing CPR (all
169   p>0.05).
170
171   *Gender*
172   Slightly more respondents (n=600, 99.8%) were female (52.2%). There was a significant
173   difference in being comfortable performing CPR (U=38835.5, p=0.006) with females (n=311,
174   median=5) reporting less comfort than males (n=287, median=7). Gender was not associated
175   with any aspect of experience or knowledge of CPR, or competency of performing CPR (all
176   p>0.05). There were no associations between gender and any other variable across the four
177   domains (all p>0.05).
178
179   *Ethnicity*
180   A total of 597 (99.3%) participants reported their ethnicity, with the majority reporting white
181   ethnicity (n=570, 95.5%). Ethnicity was significantly associated with knowledge of what CPR
182   is for (p<0.001); Asian/Asian British participants only constituted 2.3% of the overall valid
183   sample but constituted 12.2% of respondents who reported not knowing what CPR is for.
184   Ethnicity was also associated with knowledge of what a defibrillator is for (p<0.001), where
185   Asian/Asian British participants constituted 10.1% of respondents who reported not knowing
186   what a defibrillator is for. There were no associations between ethnicity and any other
187   variable across the four domains (all p>0.05).
188
189   *General health*
190   Participants (n=600, 99.8%) reported a median general health rating of 8 (range=1 (very poor
191   health) -10 (excellent health), IQR=3), with a statistically significant but very weak positive
192   correlation with participants' comfort using a defibrillator (r(598)=0.145, p<0.001). Those
193   with higher general health were slightly more likely to be comfortable using a defibrillator.
194   There were no associations between general health and any other variable across the four
195   domains (all p>0.05).
196
197   **Socio-economic status characteristics**
198   *Indices of Multiple Deprivation*
199   Of participants that provided their postcode (n=586, 97.5%), the median IMD score was 4
200   (n=586, range=1-10, IQR=5), with results slightly positively skewed with 134 (22.9%)
201   participants from postcodes representing most deprived areas (IMD score of 1), and 52 (8.9%)
202   participants from postcodes representing least deprived areas (IMD score of 10). IMD had a
203   statistically significant but very weak negative correlation with comfort performing CPR
204   (r(582)=-0.091, p=0.029), with those from least deprived areas being slightly less likely to be
205   comfortable performing CPR.
206   There was also a significant difference in IMD score between those who reported knowing
207   what a PAD is for (n=483, median=4) versus those who didn't (n=103, median=3; U=21349.5,

208   p=0.025), those from more deprived areas were more likely to report knowing what a PAD is
209   for. There were no associations between IMD and any other variable across the four domains
210   (all p>0.05).

212   *Highest education level*
213   Almost all participants (n=599, 99.7%) reported their highest education level, the most
214   common of which was GCSE/GCE (General Certificate of Secondary Education/General
215   Certificate of Education) (n=196, 32.6%). Highest education level (A level, undergraduate
216   degree, postgraduate degree) was associated with participants feeling able to tell if someone
217   was having a cardiac arrest (p=0.005), compared to those with a lower educational level
218   (none, GCSE). Highest education level was associated with knowing what a defibrillator is for
219   (p<0.001); of the respondents reporting this, 16.5% had no education, whereas 33.0% of
220   respondents who did not know or were unsure, had no education. A total of 348 (58.1%)
221   participants said they would like more information about BCPR, with a greater proportion of
222   those with A/AS level and postgraduate education reporting they would like more
223   information (p=0.020). There were no associations between highest education level and any
224   other variable across the four domains (all p>0.05).

226   *Employment status*
227   Nearly all participants (n=599, 99.7%) reported their employment status, with most being in
228   paid employment (n=240, 39.9%). There were no associations between employment status
229   and any variable across the four domains (all p>0.05).

231   *Occupation level*
232   Only 490 (81.5%) participants reported their occupation classification, the most common of
233   which was retired (n=165, 27.5%). Occupation level significantly affected reported willingness
234   to follow advice (H(5)=17.018, p=0.005). The post-hoc test identified strong evidence
235   (p=0.032, adjusted using Bonferroni correction) of a difference between those with level 2
236   occupations (mean rank=263) and those retired (mean rank=231); being retired was therefore
237   associated with being less likely to be willing to follow advice than those in level 2 occupations
238   (carer, clerical, plant and machine operatives, services and sales). There was no evidence of a
239   difference between the other pairs. There were also no associations between occupation
240   level and any other variable across the four domains (all p>0.05).

242   *Income*
243   Only 478 (79.5%) participants reported their income, with the largest number of participants
244   (n=112, 23.4%) reporting an income of between £20,800 to £31,199.
245   Median income was £31,200 to £41,599 (IQR=3). Income was positively but very weakly
246   significantly correlated with willingness to follow advice (r(475)=0.109, p=0.017), so
247   individuals with a higher income were more willing to follow advice.

248 Income was positively but very weakly significantly correlated with being comfortable using
249 a defibrillator (r(476)=0.097, p=0.034), meaning those with a higher income were more likely
250 to be comfortable using a defibrillator. There was a significant difference in income based on
251 whether people reported knowing what a defibrillator is (U=11217, p=0.001), with those
252 saying yes (n=406, median=£20,800 to £31,199) having a higher income than those saying no
253 or unsure (n=72, median=£10,400 to £20,799).
254
255 **Discussion**
256 This cross-sectional study aimed to examine knowledge and attitudes towards BCPR, and to
257 understand how these potentially interact with individual characteristics and SES. We found
258 individual characteristics and markers of SES were inconsistently associated with participants'
259 knowledge and attitudes towards BCPR, with weak associations where present. These
260 findings were unexpected given the previously identified association between BCPR rates and
261 social deprivation in the region[5,16], and evidence that individuals experiencing OHCA are less
262 likely to receive BCPR in deprived areas.[13-15] This gives rise to questions regarding the
263 reliability of participants subjective responses as to how they may act, versus how they *do* act
264 when faced with a real OHCA event. However, the findings support more recent evidence; a
265 review of BCPR in deprived communities identified that willingness to perform or learn BCPR
266 was not influenced by deprivation[29], rather a range of contextual and environmental factors
267 determined administration of BCPR.[30] Factors other than individual SES are likely to contribute
268 to lower levels of BCPR in deprived communities, such as cultural identity and social cohesion.
269 Social capital, of which social cohesion forms a part, is increasingly linked with health
270 outcomes including being related to improved cardiovascular mortality[31] and use of
271 preventative services.[32] This links to recent theoretical developments in the field of
272 healthcare inequalities which emphasise the importance of applying an intersectional lens by
273 looking beyond markers of SES as being solely representative of geographical 'place'.[33] It is
274 pertinent to explore whether social cohesion has an interaction with BCPR, and whether it
275 would explain the gap identified in this study.
276
277 Of individual and SES factors, only age was consistently associated with participants'
278 willingness to perform BCPR, where older participants were less willing to call 999, follow
279 advice, or help someone, irrespective of SES. This suggests older individuals are broadly
280 similar in attitude towards BCPR, regardless of SES, may have the same fears, and are subject
281 to the same barriers. Given most OHCA occur in the home and are witnessed by spouses[34],
282 an unwillingness to help family members is problematic, particularly as age is a risk factor for
283 OHCA. Previous research has identified older individuals have lower levels of knowledge and
284 self-confidence regarding BCPR,[35] although it is not possible to draw similar conclusions from
285 our study, as we found no difference in knowledge, capability or confidence of performing
286 BCPR based on participant age. Younger age was associated with comfort performing BCPR
287 and has been reported elsewhere.[36] With regard to comfort performing BCPR, women were
288 less comfortable than men.

289 Women being less likely to receive BCPR is well-documented[37], but our study shows women
290 are also less likely to be willing to deliver BCPR. There were no further gender disparities
291 regarding understanding of what BCPR is and the importance of delivering it. Ethnicity was
292 associated with poorer knowledge of BCPR. Whilst our study was limited with small numbers
293 of individuals from ethnic minorities, the findings support other studies which have identified
294 ethnic minorities encounter barriers accessing BCPR training, exacerbated by language
295 difficulties.[38] Participation in our study was generally reflective of regional ethnicity, but
296 focused studies within the region with ethnic minority study populations would help to better
297 explain these differences.

298

299 Regarding SES markers, participants from more deprived areas were more likely to be
300 comfortable performing CPR and were more likely to know what a defibrillator is for. This may
301 be because OHCA is more likely to occur in deprived areas. Our findings contrast a previous
302 study that reported those in deprived areas believe resuscitation should be carried out by
303 those trained and who have the necessary skills.[30] It is possible participants in deprived areas
304 from our study were more likely to have some personal, direct or indirect, experience of
305 OHCA. However, the lack of associations between other SES markers suggests there is some
306 form of community effect rather than individual characteristics that contribute to being
307 comfortable performing BCPR. There is also a perception that patients requiring BCPR may be
308 more likely to be under the influence of illicit drugs or alcohol in areas of higher deprivation
309 and this may influence level of comfort.[30] The association identified between higher
310 education and an increased willingness to learn CPR suggests a better understanding of the
311 consequences of not receiving BCPR, although this is not based upon having had delivered
312 BCPR, or having used a PAD, and is not dependent on SES.[39] Health literacy is a mechanism
313 that links education and health[40], yet there is a need for research to explicitly examine this
314 relationship in relation to OHCA and people's willingness to perform BCPR.

315

316 A study of 2084 UK adults established CPR training was most frequently delivered in the
317 workplace and had a positive effect on an individuals' self-reported willingness to act and use
318 a PAD.[41] In our study, 59.9% of participants were absent from work for various reasons
319 (retired, undertaking caring responsibilities, unemployed etc.) or were self-employed with
320 limited access to CPR training. This, coupled with the fact CPR skills are known to decay over
321 time[42], may explain some of our findings regarding willingness to act and use a PAD. Further
322 research is needed regarding targeting CPR training to those not in work or self-employed.

323

324

325 That participants with higher levels of self-reported general health were more likely to be
326 comfortable using a defibrillator could be explained by the physicality needed to acquire the
327 PAD from community points and bring it to the patient prior to use. However, this
328 interpretation may be placed in doubt as there was no such association identified between

329 general health and comfort performing CPR, which may have been expected, as chest
330 compressions require physical fitness in order to be performed effectively.[43]
331 There is almost certainly a much more complicated interaction between general health and
332 the physicality required for obtaining PADs or performing chest compressions, which we are
333 unable to explore in this study.
334
335 **Limitations**
336 This cross-sectional study has captured participants responses at one time point and may not
337 truly reflect whether an individual would act, or use a PAD, when faced with a real OHCA
338 event. A limited number of participants in our study reported ethnicity other than white
339 British, potentially reducing the generalisability of our findings. However, we believe this is
340 reflective of regional ethnicity and has not unduly influenced our results.   Some participants
341 did not provide responses to all questions, particularly regarding occupation and income, so
342 these data were missing from our analysis. Most participants did however respond regarding
343 key questions for each domain, so we do not believe this has influenced our findings or
344 conclusions. The study was conducted during the Coronavirus pandemic and may have
345 influenced participants attitudes towards BCPR and their responses.
346 We identified ceiling effects in many of the measures relating to knowledge of BCPR,
347 willingness to help and competence of performing BCPR, which meant we were unable to
348 develop multivariate models. This ceiling effect may have been influenced by social
349 desirability bias where survey data were collected by uniformed paramedics, which may have
350 influenced participants' responses to present their knowledge, willingness to help and
351 competence as being higher. Future research should consider including a test of participants'
352 knowledge of OHCA and BCPR. It may also be worthwhile testing whether different data
353 collectors with or without uniforms would result in different results.
354
355 **Conclusion**
356 Markers of SES and deprivation are a poor indicator of knowledge of, and willingness and
357 competency to perform, BCPR. Interventions to improve levels of BCPR should avoid using
358 SES or deprivation to identify target populations but focus on individual characteristic's such
359 as age and ethnicity. Future research should examine the role of these characteristics in
360 willingness to perform BCPR and how they intersect with cultural identity and social cohesion.
361 Qualitative research may provide further understanding of how these factors influence
362 behaviours of fragile societies.
363
364 **Declaration of interest**
365 None
366
367
368
369

References

1. Perkins GD, Brace-McDonnell SJ. The UK out of hospital cardiac arrest outcome (OHCAO) project. BMJ Open. 2015; 1;5(10):e008736.

2. Resuscitation Council (UK). Consensus Paper on Out-of-Hospital Cardiac Arrest in England. 2015. Available from https://www.resus.org.uk/sites/default/files/2020-05/OHCA_consensus_paper.pdf

3. Go AS, Mozaffarian D, Roger VL, et al. Heart disease and stroke statistics–2014 update: a report from the American Heart Association. Circulation. 2014;129(3):e28-e292.

4. Perkins GD, Jacobs IG, Nadkarni VM et al. Cardiac arrest and cardiopulmonary resuscitation outcome reports: update of the Utstein Resuscitation Registry Templates for Out of-Hospital Cardiac Arrest: a statement for healthcare professionals from a task force of the International Liaison Committee on Resuscitation (American Heart Association, European Resuscitation Council, Australian and New Zealand Council on Resuscitation, Heart and Stroke Foundation of Canada, InterAmerican Heart Foundation, Resuscitation Council of Southern Africa, Resuscitation Council of Asia); and the American Heart Association Emergency Cardiovascular Care Committee and the Council on Cardiopulmonary, Critical Care, Perioperative and Resuscitation [published correction appears in Circulation. 2015;132:e168–e169]. Circulation. 2015;132:1286–1300. doi: 10.1161/CIR.0000000000000144

5. Brown TP, Booth S, Hawkes CA, et al. Characteristics of neighbourhoods with high incidence of out-of-hospital cardiac arrest and low bystander cardiopulmonary resuscitation rates in England. *Eur Heart J Qual Care Clin Outcomes*. 2019; 1;5(1):51-62.

6. Sasson C, Rogers MAM, Dahl J, Kellermann AL. Predictors of survival from outof-hospital cardiac arrest: a systematic review and meta-analysis. Circulation 2010; 3:63–81.

7. Axelsson AB, Herlitz J, Homberg S, Thoren AB. A nationwide survey of CPR training in Sweden: foreign born and unemployed are not reached by training programmes. Resuscitation. 2006;70:90—7. 5.

8. Donohoe RT, Haefeli K, Moore F. Public perceptions and experiences of myocardial infarction, cardiac arrest and CPR in London. Resuscitation. 2006; 71:70

9. Hawkes C, Booth S, Ji C, Brace-McDonnell SJ, Whittington A, Mapstone J, et al. Epidemiology and outcomes from out of-hospital cardiac arrests in England. Resuscitation. 2017; 110:133–40.

10. Meinhardt D, Fischer M, Meischke. CPR community survey in King Country. 2021. https://kingcounty.gov/depts/health/emergency-medical-services/vulnerable-populations/~/media/depts/health/emergency-medical-services/documents/vulnerable-populations/CPR-community-survey.ashx - Accessed 12/10/2022

11. Lindner TW, Soreide E, Nilsen OB, Torunn MW, Lossius HM. Good outcome in every fourth resuscitation attempt is achievable—an Utstein template report from the Stavanger region. Resuscitation 2011;82: 1508–13.

12. Sasson C, Magid DJ, Chan P, Root ED, McNally BF, Kellermann AL, et al. Association of neighbourhood characteristics with bystander-initiated CPR. N Engl J Med 2012; 367:1607–15.

13. Vadeboncoeur TF, Richman PB, Darkoh M, Chikani V, Clark L, Bobrow BJ. Bystander cardiopulmonary resuscitation for out-of-hospital cardiac arrest in the Hispanic vs the non-Hispanic populations. Am J Emerg Med 2008; 26:655–60.

14. Root ED, Gonzales L, Persse DE, Hinchey PR, McNally B, Sasson C. A tale of two cities: the role of neighborhood socioeconomic status in spatial clustering of bystander CPR in Austin and Houston. Resuscitation. 2013; 84:752–59.

15. Fosbol EL, Dupre ME, Strauss B, Swanson DR, Myers B, McNally BF, et al. Association of neighbourhood characteristics with incidence of out-of-hospital cardiac arrest and rates of bystander-initiated CPR: implications for community-based education intervention. Resuscitation. 2014; 85:1512–17.

16. Moncur L, Ainsborough N, Ghose R, Kendal SP, Salvatori M, Wright J. Does the level of socioeconomic deprivation at the location of cardiac arrest in an English region influence the likelihood of receiving bystander-initiated cardiopulmonary resuscitation? *Emerg Med J* 2016; 1;33: 105-8.

17. Hawkes CA, Brown T, Noor U, Carlyon J, Davidson N, Soar J, et al. Characteristics of Restart a Heart 2019 event locations in the UK. Resuscitation Plus. 2021; 1;6:100132.

18. British Heart Foundation. Funding for defibrillators in England. 2016. Available from: https://www.bhf.org.uk/heart-health/how-to-save-a-life/defibrillators/funding-for-defibrillators-in-england.

19. North East Ambulance Service NHS Foundation Trust. Who we are and what we do. 2021. Available from https://www. neas.nhs.uk/about-us/who-we-are-and-what-we-do

20. North West Ambulance Service NHS Trust. Who we are. 2022. Available from: https://www.nwas.nhs.uk/about/who

21. UK Population by Ethnicity. Regional Ethnic Diversity. 2020. Available from: https://www.ethnicity-facts-figures.service.gov.uk/uk-population-by-ethnicity/national-and-regional-populations/regional-ethnic-diversity/latest

485   22. University of Warwick. Out of hospital cardiac arrest outcomes registry. 2018.
486   Available   from:
487   https://warwick.ac.uk/fac/sci/med/research/ctu/trials/ohcao/publications/epidemio
488   logyreports/ohcao_epidemiology_report_2018_published.pdf

489   23. English indices of deprivation. 2019. Available from
490   https://imd-by-postcode.opendatacommunities.org/imd/2019

491   24. Chyung SY, Roberts K, Swanson I, Hankinson A. Evidence-based survey design: The use
492   of a midpoint on the Likert scale. Perform Improve 2017; 56(10): 15-23.

493   25. Understanding society. The English Longitudinal Study. 2022. Available from:
494   https://www.understandingsociety.ac.uk/

495   26. Government statistical service. Harmonised Concepts and Questions for Social Data
496   Sources – Income. 2015. Available from: https://gss.civilservice.gov.uk/wp-
497   content/uploads/2016/03/S4-Income-June-16.pdf

498   27. Office of national statistics. Standard occupational classification. 2021. Available
499   from:
500   https://www.ons.gov.uk/methodology/classificationsandstandards/standardoccupat
501   ionalclassificationsoc

502   28. American Psychological Association. (2020). Publication manual of the American
503   Psychological Association 2020: the official guide to APA style (7th ed.). Washington,
504   DC: American Psychological Association.

505   29. Uny I, Angus K, Duncan E, Dobbie F. Barriers and facilitators to delivering bystander
506   cardiopulmonary resuscitation in deprived communities: a systematic review.
507   Perspect Public Health. 2022; 17579139211055497.

508   30. Dobbie F, Uny I, Eadie D, Duncan E, Stead M, Bauld L, et al. Barriers to bystander CPR
509   in deprived communities: Findings from a qualitative study. PLoS One. 2020;
510   10;15(6):e0233675.

511   31. Rodgers J, Valuev AV, Hswen Y, Subramanian SV. Social capital and physical health: An
512   updated review of the literature for 2007–2018. Soc Sci Med 2019; 1;236:112360.

513   32. Kim ES, Kawachi I. Perceived neighbourhood social cohesion and preventive
514   healthcare use. Am J Prev Med 2017; 53(2), e35-e40.

515   33. Bambra C. Placing intersectional inequalities in health. Health Place 2022;
516   1;75:102761.

517   34. Breckwoldt J, Schloesser S, Arntz HR. Perceptions of collapse and assessment of
518   cardiac arrest by bystanders of out-of-hospital cardiac arrest (OOHCA). Resuscitation
519   2009; 80:1108–13.

35. Brinkrolf P, Bohn A, Lukas R-P, Heyse M, Dierschke T, Van Aken HK, et al. Senior citizens as rescuers: Is reduced knowledge the reason for omitted lay-resuscitation-attempts? Results from a representative survey with 2004 interviews. PLoS One 2017; 12(6): e0178938.

36. Swor R, Khan I, Domeier R, Honeycutt L, Chu K, Compton S. CPR training and CPR performance: do CPR-trained bystanders perform CPR? Acad Emerg Med 2006; 13:596–601.

37. Becker TK, Gul SS, Cohen SA, Maciel CB, Baron-Lee J, Murphy TW, et al. Public perception towards bystander cardiopulmonary resuscitation. Emerg Med J 2019; 1;36(11):660-5.

38. Boulton AJ, Del Rios M, Perkins GD. Health inequities in out-of-hospital cardiac arrest. Curr Opin Crit Care. 2022; 1;28(3):229-36.

39. Birkun A, Kosova Y. Social attitude and willingness to attend cardiopulmonary resuscitation training and perform resuscitation in the Crimea. World J Emerg Med 2018; 9(4):237-48.

40. Van Der Heide I, Wang J, Droomers M, Spreeuwenberg P, Rademakers J, Uiters E. The relationship between health, education, and health literacy: results from the Dutch Adult Literacy and Life Skills Survey. J Health Commun. 2013; 4;18: 172-84.

41. Hawkes CA, Brown TP, Booth S, Fothergill RT, Siriwardena N, Zakaria S et al. Attitudes to cardiopulmonary resuscitation and defibrillator use: a survey of UK adults in 2017. J Am Heart Assoc. 2019; 2;8(7):e008267.

42. Su E, Schmidt TA, Mann NC, Zechnich AD. A randomized controlled trial to assess decay in acquired knowledge among paramedics completing a paediatric resuscitation course. Acad Emerg Med. 2000;7:779–786.

43. Ock SM, Kim YM, hye Chung J, Kim SH. Influence of physical fitness on the performance of 5-minute continuous chest compression. Eur J Emerg Med 2011; 1;18(5):251-6.

554 **Table 1: Experience of performing CPR and using a defibrillator**

Variable	Have you ever performed CPR?				Have you ever used a defibrillator?			
	N	Yes	No or unsure	p value (MD, 95% CI)	N	Yes	No or unsure	p value (MD, 95% CI)
Age, N (mean, SD)	600	64 (50.7, (16.1)	536 (52.1, 17.9)	0.550 (-1.4, -6.0 to 3.2)	599	11 (50.1, 18.9)	588 (52.0, 17.7)	0.721 (-1.9, -12.5 to 8.7)
Gender, N (%)	600	63 (10.5)	537 (89.5)	0.971	600	11 (1.8)	589 (98.2)	0.873
Female N (%)	313 (52.2)	33 (52.4)	280 (52.1)		313	6 (54.5)	307 (52.1)	
Male N (%)	287 (47.8)	30 (47.6)	257 (47.9)		287	5 (45.5)	282 (47.9)	
Ethnicity, N (%)	597	64 (10.6)	533 (89.4)	0.819	597	11 (1.8)	586 (98.2)	0.177
White, N (%)	570 (94.8)	64 (100)	506 (94.9)		570 (94.8)	10 (90.9)	560 (95.6)	
Mixed/Multiple, N (%)	4 (0.7)	0 (0)	4 (0.8)		4 (0.7)	1 (9.1)	3 (0.5)	
Asian / Asian British, N (%)	14 (2.3)	0 (0)	14 (2.6)		14 (2.3)	0 (0)	14 (2.4)	
Black, African, or Black British, N (%)	4 (0.7)	0 (0)	4 (0.8)		4 (0.7)	0 (0)	4 (0.7)	
Other, N (%)	5 (0.8)	0 (0)	5 (0.9)		5 (0.8)	0 (0)	5 (0.9)	
General health, N (MR)	600	64 (286.5)	536 (302.2)	0.491	600	11 (356.1)	589 (299.5)	0.282
Indices of Multiple Deprivation score, N (MR)	586	61 (260.8)	525 (297.3)	0.110	585	10 (260.0)	575 (293.6)	0.531
Highest education level, N (%)	599	64 (10.7)	535 (89.3)	0.630	599	11 (1.8)	588 (98.2)	0.715
None, N (%)	117 (19.5)	10 (15.6)	107 (20.0)		117 (19.5)	1 (9.1)	116 (19.7)	
GCSE / GCE, N (%)	196 (32.7)	18 (28.1)	178 (33.3)		196 (32.7)	3 (27.3)	193 (32.8)	
AS / A level, N (%)	134 (22.4)	17 (26.6)	117 (21.9)		134 (22.4)	3 (27.3)	131 (22.3)	
Undergraduate, N (%)	86 (14.4)	13 (15.1)	73 (13.6)		86 (14.4)	3 (27.3)	83 (14.1)	
Postgraduate, N (%)	40 (6.7)	4 (6.3)	36 (6.7)		40 (6.7)	1 (9.1)	39 (6.6)	
Other, N (%)	26 (4.3)	2 (3.1)	24 (4.5)		26 (4.3)	0 (0)	26 (4.4)	
Employment, N (%)	599	64 (10.7)	535 (89.3)	0.665	599	11 (1.8)	588 (98.2)	0.431
Self-employed, N (%)	61 (10.2)	7 (10.9)	54 (10.1)		61 (10.2)	0 (0)	61 (10.4)	
Paid employment, N (%)	240 (40.1)	28 (43.8)	212 (39.6)		240 (40.1)	5 (45.5)	235 (40.0)	
Unemployed, N (%)	42 (7.0)	3 (4.7)	39 (7.3)		42 (7.0)	1 (9.1)	41 (7.0)	
Retired, N (%)	166 (27.7)	13 (20.3)	153 (28.6)		166 (27.7)	3 (27.3)	163 (27.7)	
Maternity leave, N (%)	4 (0.7)	0 (0)	4 (0.7)		4 (0.7)	0 (0)	4 (0.7)	
Looking after family, N (%)	37 (6.2)	6 (9.4)	31 (5.8)		37 (6.2)	1 (9.1)	36 (6.1)	
Full-time student, N (%)	8 (1.3)	1 (1.6)	7 (1.3)		8 (1.3)	1 (9.1)	7 (1.2)	
Long term sick / disabled, N (%)	37 (6.2)	6 (9.4)	31 (5.8)		37 (6.2)	0 (0)	37 (6.3)	
Something else, N (%)	4 (0.7)	0 (0)	4 (0.7)		4 (0.7)	0 (0)	4 (0.7)	

Occupation, N (%)	490	50 (10.2)	440 (89.8)	0.059	490	9 (1.8)	481 (98.2)	0.566
Level 1, N (%)	63 (13.2)	10 (20.0)	53 (12.0)		63 (13.2)	2 (22.2)	61 (12.7)	
Level 2, N (%)	146 (30.5)	16 (32.0)	130 (29.5)		146 (30.5)	2 (22.2)	144 (29.9)	
Level 3, N (%)	57 (11.9)	2 (4.0)	55 (12.5)		57 (11.9)	0 (0)	57 (11.9)	
Level 4, N (%)	49 (10.3)	9 (18.0)	40 (9.1)		49 (10.3)	2 (22.2)	47 (9.8)	
Retired, N (%)	165 (34.5)	12 (24.0)	153 (34.8)		165 (34.5)	3 (33.3)	162 (33.7)	
Other, N (%)	10 (2.1)	1 (2.0)	9 (2.0)		10 (2.1)	0 (0)	10 (2.1)	
Income, N (MR)	478	53 (246)	425 (239)	0.724	478	10 (241)	468 (239)	0.973

555   * significant at $p < 0.05$

556   CI = confidence interval, CPR = cardiopulmonary resuscitation, MD = mean difference, MR = mean

557   rank, SD = standard deviation

558

559

Table 2: Knowledge of cardiac arrest, CPR and defibrillator

Variable	Do you know how to tell if someone is having a cardiac arrest?				Do you know what CPR is for?				Know what a defibrillator is for?				Would you like more information on CPR?			
	N	Yes	No or unsure	p value (MD, 95% CI)	N	Yes	No or unsure	p value (MD, 95% CI)	N	Yes	No or unsure	p value (MD, 95% CI)	N	Yes	No or unsure	p value (MD, 95% CI)
Age, N (mean, SD)	600	144 (50.2, 16.2)	456 (52.5, 18.2)	0.182 (-2.3, -5.6 to 1.1)	600	526 (51.9,17.4)	74 (52.6, 20.0)	0.740 (-0.7, -5.1 to 3.6)	600	491 (51.9, 17.3)	109 (52.3, 19.7)	0.818 (-0.4, -4.1 to 3.3)	600	348 (48.9,17.2)	252 (56.1, 17.7)	<0.001 (-7.2, -10.0 to -4.4)*
Gender, N (%)	600	143 (23.8)	457 (76.2)	0.443	600	526 (87.7)	74 (12.3)	0.063	600	491 (81.8)	109 (18.2)	0.751	600	348 (58.0)	252 (42.0)	0.246
Female, N (%)	313 (52.2)	79 (55.2)	234 (51.2)		313 (52.2)	244 (46.4)	43 (58.1)		313 (52.2)	258 (52.5)	55 (49.5)		313	189 (54.3)	124 (49.2)	
Male, N (%)	287 (47.8)	64 (44.8)	223 (48.8)		287 (47.8)	282 (53.6)	31 (41.9)		287 (47.8)	233 (47.5)	54 (50.5)		287	159 (45.7)	128 (50.8)	
Ethnicity, N (%)	597	144 (23.8)	457 (76.2)	0.520	597	523 (87.6)	74 (12.4)	<0.001*	597	488 (81.7)	109 (18.3)	<0.001*	597	345 (57.8)	252 (42.2)	0.135
White, N (%)	570 (95.5)	139 (97.9)	431 (94.7)		570 (95.5)	508 (97.1)	62 (83.8)		570 (95.5)	476 (97.5)	94 (86.2)		570 (95.5)	323 (93.6)	247 (98.0)	
Mixed/Multiple, N (%)	4 (0.7)	0 (0)	4 (0.9)		4 (0.7)	4 (0.8)	0 (0)		4 (0.7)	4 (0.8)	0 (0)		4 (0.7)	3 (0.9)	1 (0.4)	
Asian / Asian British, N (%)	14 (2.3)	1 (0.7)	13 (2.9)		14 (2.3)	5 (1.0)	9 (12.2)		14 (2.3)	3 (0.6)	11 (10.1)		14 (2.3)	12 (3.5)	2 (0.8)	
Black, African, or Black British, N (%)	4 (0.7)	1 (0.7)	3 (0.7)		4 (0.7)	3 (0.6)	1 (1.4)		4 (0.7)	2 (0.4)	2 (1.8)		4 (0.7)	3 (0.9)	1 (0.4)	
Other, N (%)	5 (0.8)	1 (0.7)	4 (0.9)		5 (0.8)	3 (0.6)	2 (2.7)		5 (0.8)	3 (0.6)	2 (1.8)		5 (0.8)	4 (1.2)	1 (0.4)	
General health, N (MR)	600	144 (310.3)	456 (297.4)	0.429	600	526 (301)	74 (298)	0.878	600	492 (300)	108 (303)	0.850	600	349 (307)	251 (292)	0.305
Indices of Multiple Deprivation score, N (MR)	586	140 (277)	446 (299)	0.176	586	517 (294)	69 (287)	0.717	586	483 (301)	103 (259)	0.025*	586	343 (295)	243 (291)	0.748
Highest education level, N (%)	599	143 (23.9)	456 (76.1)	0.005*	599	525 (87.6)	74 (12.4)	0.059	599	490 (81.8)	109 (18.2)	<0.001*	599	348 (58.1)	251 (41.9)	0.020*
None, N (%)	117 (19.5)	23 (19.7)	94 (20.6)		117 (19.5)	95 (18.1)	22 (29.7)		117 (19.5)	81 (16.5)	36 (33.0)		117 (19.5)	59 (17.0)	58 (23.1)	
GCSE / GCE, N (%)	196 (32.7)	36 (18.4)	160 (35.1)		196 (32.7)	168 (32.0)	28 (37.8)		196 (32.7)	167 (34.1)	29 (26.6)		196 (32.7)	110 (31.6)	86 (34.3)	

AS / A level, N (%)	134 (22.4)	41 (30.6)	93 (20.4)		134 (22.4)	123 (23.4)	11 (14.9)		134 (22.4)	118 (24.1)	16 (14.7)		134 (22.4)	89 (25.6)	45 (17.9)	
Undergraduate, N (%)	86 (14.4)	23 (26.7)	63 (13.8)		86 (14.4)	80 (15.2)	6 (8.1)		86 (14.4)	75 (15.3)	11 (10.1)		86 (14.4)	48 (13.8)	38 (15.1)	
Postgraduate, N (%)	40 (6.7)	17 (42.5)	23 (5.0)		40 (6.7)	37 (7.0)	3 (4.1)		40 (6.7)	35 (7.1)	5 (4.6)		40 (6.7)	30 (8.6)	10 (4.0)	
Other, N (%)	26 (4.3)	3 (11.5)	23 (5.0)		26 (4.3)	22 (4.2)	4 (5.4)		26 (4.3)	14 (2.9)	12 (11.0)		26 (4.3)	12 (3.4)	14 (5.6)	
Employment, N (%)	**599**	**143 (23.9)**	**456 (76.1)**	**0.534**	**599**	**525 (87.6)**	**74 (12.4)**	**0.242**	**599**	**490 (81.8)**	**109 (18.2)**	**0.215**	**599**	**348 (58.1)**	**251 (41.9)**	**0.136**
Self-employed, N (%)	61 (10.2)	19 (13.3)	42 (9.2)		61 (10.2)	48 (9.1)	13 (17.6)		61 (10.2)	48 (9.8)	13 (11.9)		61 (10.2)	34 (9.8)	27 (10.8)	
Paid employment, N (%)	240 (40.1)	57 (39.9)	183 (40.1)		240 (40.1)	215 (41.0)	25 (33.8)		240 (40.1)	206 (42.0)	34 (31.2)		240 (40.1)	148 (42.5)	92 (36.7)	
Unemployed, N (%)	42 (7.0)	11 (7.7)	31 (6.8)		42 (7.0)	36 (6.9)	6 (8.1)		42 (7.0)	33 (6.7)	9 (8.3)		42 (7.0)	27 (7.8)	15 (6.0)	
Retired, N (%)	166 (27.7)	33 (23.1)	133 (29.2)		166 (27.7)	148 (28.2)	18 (24.3)		166 (27.7)	137 (28.0)	29 (26.6)		166 (27.7)	84 (24.1)	82 (32.7)	
Maternity leave, N (%)	4 (0.7)	1 (0.7)	3 (0.7)		4 (0.7)	4 (0.8)	0 (0)		4 (0.7)	3 (0.6)	1 (0.9)		4 (0.7)	2 (0.6)	2 (0.8)	
Looking after family, N (%)	37 (6.2)	11 (7.7)	26 (5.7)		37 (6.2)	34 (6.5)	3 (4.1)		37 (6.2)	28 (5.7)	9 (8.3)		37 (6.2)	25 (7.2)	12 (4.8)	
Full-time student, N (%)	8 (1.3)	2 (1.4)	6 (1.3)		8 (1.3)	6 (1.1)	2 (2.7)		8 (1.3)	5 (1.0)	3 (2.8)		8 (1.3)	7 (2.0)	1 (0.4)	
Long term sick / disabled, N (%)	37 (6.2)	7 (4.9)	30 (6.6)		37 (6.2)	31 (5.9)	6 (8.1)		37 (6.2)	27 (5.5)	10 (9.2)		37 (6.2)	20 (5.7)	17 (6.8)	
Something else, N (%)	4 (0.7)	2 (1.4)	2 (0.4)		4 (0.7)	3 (0.6)	1 (1.4)		4 (0.7)	3 (0.6)	1 (0.9)		4 (0.7)	1 (0.3)	3 (1.2)	
Occupation, N (%)	**490**	**119 (24.3)**	**371 (75.7)**	**0.113**	**490**	**430 (87.8)**	**60 (12.2)**	**0.829**	**490**	**407**	**83**	**0.353**	**490**	**276 (56.3)**	**214 (43.7)**	**0.413**
Level 1, N (%)	63 (12.9)	16 (13.4)	47 (12.7)		63 (12.9)	55 (12.8)	8 (13.3)		63 (12.9)	51 (12.5)	12 (14.5)		63 (12.9)	38 (13.8)	25 (11.7)	
Level 2, N (%)	146 (29.8)	38 (31.9)	108 (29.1)		146 (29.8)	129 (30.0)	17 (28.3)		146 (29.8)	118 (29.0)	28 (33.7)		146 (29.8)	89 (32.2)	57 (26.6)	
Level 3, N (%)	57 (11.6)	11 (9.2)	46 (12.4)		57 (11.6)	48 (11.2)	9 (15.0)		57 (11.6)	47 (11.5)	10 (12.0)		57 (11.6)	33 (12.0)	24 (11.2)	
Level 4, N (%)	49 (10.0)	18 (15.1)	31 (8.4)		49 (10.0)	43 (10.0)	6 (10.0)		49 (10.0)	46 (11.3)	3 (3.6)		49 (10.0)	29 (10.5)	20 (9.3)	
Retired, N (%)	165 (33.7)	32 (26.9)	133 (35.8)		165 (33.7)	147 (34.2)	18 (30.0)		165 (33.7)	136 (33.4)	29 (34.9)		165 (33.7)	82 (29.7)	83 (38.8)	
Other, N (%)	10 (2.0)	4 (3.4)	6 (1.6)		10 (2.0)	8 (1.9)	2 (3.3)		10 (2.0)	9 (2.2)	1 (1.2)		10 (2.0)	5 (1.8)	5 (2.3)	

| Income, N (MR) | 478 | 122 (255) | 356 (234) | 0.164 | 478 | 428 (243) | 50 (208) | 0.093 | 478 | 406 (248) | 72 (191) | 0.001* | 478 | 284 (244) | 194 (234) | 0.446 |

* significant at p<0.05

CI = confidence interval, MD = mean difference, MR = mean rank, SD = standard deviation

Table 3: Willingness to seek help, follow advice and help someone experiencing OHCA

Variable	Willingness to call 999		Willingness to follow advice		Willingness to help family		Willingness to help someone familiar		Willingness to help a stranger	
	N	p value	N	p value	N	p value	N	p value	N	p value
Age, N (CC)	**599 (-1.53)**	**<0.001***	**599 (-0.167)**	**<0.001***	**600 (-0.159)**	**0.001***	**600 (-0.183)**	**<0.001***	**600 (-0.119)**	**0.003***
Gender, N	**599**	**0.178**	**599**	**0.238**	**600**	**0.146**	**600**	**0.888**	**600**	**0.664**
Female, N (MR)	*313 (304)*		*313 (305)*		*313 (306)*		*313 (300)*		*313 (298)*	
Male, N (MR)	*286 (296)*		*286 (294)*		*287 (295)*		*287 (301)*		*287 (303)*	
Ethnicity, N	**596**	**0.570**	**596**	**0.590**	**597**	**0.150**	**597**	**0.278**	**597**	**0.501**
White, N (MR)	*569 (299)*		*569 (298)*		*570 (299)*		*570 (299)*		*570 (301)*	
Mixed/Multiple, N (MR)	*4 (317)*		*4 (347)*		*4 (335)*		*4 (348)*		*4 (233)*	
Asian / Asian British, N (MR)	*14 (296)*		*14 (283)*		*14 (293)*		*14 (309)*		*14 (264)*	
Black, African, or Black British, N (MR)	*4 (244)*		*4 (347)*		*4 (186)*		*4 (199)*		*4 (229)*	
Other, N (MR)	*5 (317)*		*5 (347)*		*5 (335)*		*5 (348)*		*5 (320)*	
General health, N (CC)	**599 (0.004)**	**0.931**	**599 (-0.002)**	**0.958**	**600 (0.003)**	**0.951**	**600 (0.013)**	**0.757**	**600 (-0.015)**	**0.718**
Mean Indices of Multiple Deprivation score, N (CC)	**585 (-0.066)**	**0.109**	**585 (-0.027)**	**0.515**	**586 (-0.052)**	**0.212**	**586 (0.000)**	**0.998**	**586 (-0.021)**	**0.612**
Highest education level, N	**599**	**0.250**	**599**	**0.435**	**599**	**0.608**	**599**	**0.333**	**599**	**0.604**
None, N (MR)	*117 (287)*		*117 (285)*		*117 (290)*		*117 (282)*		*117 (286)*	
GCSE / GCE, N (MR)	*196 (304)*		*196 (307)*		*196 (299)*		*196 (302)*		*196 (304)*	
AS / A level, N (MR)	*134 (305)*		*134 (294)*		*134 (311)*		*134 (309)*		*134 (307)*	
Undergraduate, N (MR)	*86 (297)*		*86 (302)*		*86 (300)*		*86 (310)*		*86 (309)*	
Postgraduate, N (MR)	*40 (311)*		*40 (320)*		*40 (306)*		*40 (306)*		*40 (298)*	
Other, N (MR)	*26 (294)*		*26 (311)*		*26 (289)*		*26 (279)*		*26 (268)*	
Employment, N	**599**	**0.352**	**599**	**0.223**	**599**	**0.210**	**599**	**0.108**	**599**	**0.310**
Self-employed, N (MR)	*61 (303)*		*61 (310)*		*61 (311)*		*61 (316)*		*61 (305)*	
Paid employment, N (MR)	*240 (303)*		*240 (305)*		*240 (305)*		*240 (306)*		*240 (306)*	
Unemployed, N (MR)	*42 (297)*		*42 (284)*		*42 (286)*		*42 (294)*		*42 (298)*	
Retired, N (MR)	*166 (289)*		*166 (283)*		*166 (287)*		*166 (282)*		*166 (286)*	
Maternity leave, N (MR)	*4 (318)*		*4 (349)*		*4 (336)*		*4 (270)*		*4 (283)*	
Looking after family, N (MR)	*37 (318)*		*37 (308)*		*37 (328)*		*37 (341)*		*37 (340)*	
Full-time student, N (MR)	*8 (282)*		*8 (315)*		*8 (261)*		*8 (274)*		*8 (240)*	
Long term sick / disabled, N (MR)	*37 (310)*		*37 (333)*		*37 (295)*		*37 (289)*		*37 (285)*	
Something else, N (MR)	*4 (318)*		*4 (269)*		*4 (336)*		*4 (349)*		*4 (377)*	
Occupation, N	**489**	**0.068**	**489**	**0.005***	**490**	**0.064**	**490**	**0.095**	**490**	**0.182**

Level 1, N (MR)	63 (238)		63 (240)		63 (248)		63 (245)		63 (242)
Level 2, N (MR)	145 (256)		145 (263)		146 (256)		146 (252)		146 (255)
Level 3, N (MR)	57 (240)		57 (234)		57 (231)		57 (243)		57 (235)
Level 4, N (MR)	49(251)		49 (267)		49 (265)		49 (273)		49 (269)
Retired, N (MR)	165 (237)		165 (231)		165 (235)		165 (231)		165 (233)
Other, N (MR)	10 (261)		10 (189)		10 (249)		10 (261)		10 (283)
Income, N (CC)	**477 (0.030)**	**0.507**	**477 (0.109)**	**0.017***	**478 (0.037)**	**0.425**	**478 (0.073)**	**0.110**	**478 (0.040)**	**0.384**

* significant at $p < 0.05$

CC = correlation coefficient, MR = mean rank

Table 4: Competency, confidence and comfort of performing CPR or using a defibrillator

Variable	Capable of helping		Confident of helping		Comfortable performing CPR		Comfortable using a defibrillator	
	N	p value	N	p value	N	p value	N	p value
Age, N (CC)	**600 (-0.059)**	**0.147**	**597 (-0.059)**	**0.184**	**598 (-0.111)**	**0.006***	**600 (-0.007)**	**0.857**
Gender, N	**600**	**0.084**	**597**	**0.083**	**598**	**0.006***	**600**	**0.178**
Female, N (MR)	313 (289)		311 (287)		311 (281)		313 (291)	
Male, N (MR)	287 (313)		286 (312)		287 (320)		287 (310)	
Ethnicity, N	**597**	**0.341**	**594**	**0.461**	**595**	**0.434**	**597**	**0.136**
White, N (MR)	570 (302)		567 (299)		568 (299)		570 (301)	
Mixed/Multiple, N (MR)	4 (276)		4 (356)		4 (388)		4 (315)	
Asian / Asian British, N (MR)	14 (218)		14 (221)		14 (243)		14 (197)	
Black, African, or Black British, N (MR)	4 (314)		4 (340)		4 (347)		4 (218)	
Other, N (MR)	5 (218)		5 (288)		5 (227)		5 (374)	
General health, N (CC)	**600 (0.031)**	**0.449**	**597 (0.019)**	**0.648**	**598 (0.070)**	**0.086**	**600 (0.145)**	**<0.001***
Indices of Multiple Deprivation score, N (CC)	**586 (-0.066)**	**0.113**	**585 (-0.059)**	**0.156**	**584 (-0.091)**	**0.029***	**586 (0.030)**	**0.470**
Highest education level, N	**599**	**0.963**	**596**	**0.459**	**597**	**0.594**	**599**	**0.551**
None, N (MR)	117 (293)		116 (301)		117 (291)		117 (285)	
GCSE / GCE, N (MR)	196 (301)		194 (294)		196 (293)		196 (293)	
AS / A level, N (MR)	134 (302)		134 (320)		132 (317)		134 (308)	
Undergraduate, N (MR)	86 (311)		86 (296)		86 (312)		86 (327)	
Postgraduate, N (MR)	40 (284)		40 (260)		40 (288)		40 (305)	
Other, N (MR)	26 (309)		26 (280)		26 (264)		26 (286)	
Employment, N	**599**	**0.886**	**596**	**0.822**	**597**	**0.422**	**599**	**0.581**
Self-employed, N (MR)	61 (306)		61 (310)		60 (299)		61 (316)	
Paid employment, N (MR)	240 (307)		240 (302)		240 (316)		240 (303)	
Unemployed, N (MR)	42 (287)		41 (301)		42 (288)		42 (256)	
Retired, N (MR)	166 (294)		165 (295)		165 (278)		166 (296)	
Maternity leave, N (MR)	4 (386)		4 (317)		4 (312)		4 (314)	
Looking after family, N (MR)	37 (267)		36 (255)		37 (266)		37 (280)	
Full-time student, N (MR)	8 (298)		8 (262)		8 (311)		8 (283)	
Long term sick / disabled, N (MR)	37 (316)		37 (325)		37 (328)		37 (325)	

Something else, N (MR)	*4 (269)*		*4 (244)*		*4 (234)*		*4 (300)*	
Occupation, N	**490**	**0.508**	**487**	**0.705**	**488**	**0.090**	**490**	**0.150**
Level 1, N (MR)	*63 (261)*		*63 (260)*		*63 (283)*		*63 (267)*	
Level 2, N (MR)	*146 (246)*		*144 (243)*		*146 (246)*		*146 (229)*	
Level 3, N (MR)	*57 (228)*		*57 (228)*		*57 (232)*		*57 (240)*	
Level 4, N (MR)	*49 (273)*		*49 (263)*		*49 (267)*		*49 (287)*	
Retired, N (MR)	*165 (237)*		*164 (240)*		*164 (226)*		*165 (241)*	
Other, N (MR)	*10 (249)*		*10 (217)*		*9 (238)*		*10 (255)*	
Income, N (CC)	**478 (0.051)**	**0.269**	**476 (0.024)**	**0.603**	**476 (0.066)**	**0.149**	**478 (0.097)**	**0.034***

* significant at <0.05

CC = correlation coefficient, MR = mean rank