

Original Article

Title: Socio-economic status has a limited association with knowledge and attitudes towards Bystander Cardiopulmonary Resuscitation: A cross-sectional study in North England.

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Abstract

Background

Bystander cardiopulmonary resuscitation (BCPR) is a critical link in the 'Chain of Survival', yet in the UK, is undertaken in only 40% of out of hospital cardiac arrests (OHCA). Lower rates of BCPR have been correlated with lower socio-economic status (SES). This study aimed to explore how knowledge and attitudes about BCPR linked to SES across North East and North Cumbria in England.

Methods

Cross-sectional study between July-December 2021 surveying individuals from areas of varying SES.

Results

Six hundred and one individuals completed the survey instrument (mean age=51.9 years, range=18-95, standard deviation=17.7; 52.2% (n=313) female). Increased age was associated with being less willing to call 999 ($p<0.001$) and follow call handler advice ($p<0.001$). Female respondents were less comfortable performing BCPR than male respondents ($p=0.006$). Individuals from least deprived areas were less likely to report comfort performing CPR, ($p=0.016$) and less likely to know what a Public Access Defibrillator (PAD) is for, ($p=0.025$). Higher education level was associated with increased ability to recognise OHCA ($p=0.005$) and understanding of what a PAD is for ($p<0.001$). Individuals with higher income were more likely to follow advice regarding BCPR ($p=0.017$) and report comfort using a PAD ($p=0.029$).

Conclusion

SES is a poor indicator of knowledge, willingness, and perceived competency to perform BCPR. Policy makers should avoid using SES alone to target interventions and focus more on individual characteristics such as age and ethnicity. Future research should examine how cultural identity and social cohesion intersect with these characteristics to influence willingness to perform BCPR.

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 OHCA's annually in the United Kingdom (UK)¹, but survival rates remain low, around 7-8% in the UK² 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', 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 OHCA's.⁹ In comparison, King County (Seattle, US)¹⁰ and Norway¹¹, report BCPR rates of 70% and 79%¹² respectively, and there are clear opportunities for improvements in the UK. Community characteristics in which individuals live and work have an important influence on the likelihood they will suffer an OHCA, receive BCPR and survive.¹³ Neighbourhoods with lower rates of BCPR have been correlated with lower income, lower education level, and older or ethnically diverse populations.¹⁴⁻¹⁶

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 a large concentration 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, 17} A significant body of evidence exists supporting the effectiveness of BPCR, but initiatives aimed at improving the uptake of CPR training have yet to make an impact in high-risk neighbourhoods.^{18,19} A paucity of evidence exists explaining the factors preventing individuals in these neighbourhoods delivering BCPR, or how markers of socio-economic status (SES) may influence this. 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 explore knowledge and attitudes of individuals across NENC towards BCPR, including the association between people's individual characteristics and markers of SES.

Methods

Study design

A cross-sectional survey 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.

North East Ambulance Service NHS Foundation Trust (NEAS) covers North East England and serves a population of 2.71 million people across urban and rural locations.²⁰ North Cumbria is covered by North West Ambulance Service NHS Foundation Trust (NWAS) and serves a predominantly rural population of 496,200.²¹

Data sources

Postcode areas of interest were identified by the number of OHCA's attended by the ambulance service, the rate of BCPR as reported in the OHCA outcomes registry²² and the areas level of deprivation identified using the Indices of Multiple Deprivation (IMD) (2019).²³ Each lower layer super output area (LSOA) in NENC was obtained. The IMD ranks every LSOA by deprivation. The study targeted busy commercial areas within LSOAs from least to most deprived, to approach participants.

Design and development of the survey instrument

The survey instrument was based upon the Restart a Heart participant survey 2019¹⁸ and was further developed to meet the specific study aims. The survey captured participant demographics, general health, knowledge and experience of CPR and use of a PAD, willingness and competency to deliver BCPR and use a PAD, and how the Coronavirus pandemic has changed willingness to help. The survey comprised a combination of categorical questions and 10-point Likert scales, chosen to maximise expression of feeling.²⁴ Questions were separated into four relevant domains: 1) experience of CPR and PAD use, 2) knowledge of CPR and defibrillation, 3) willingness to perform CPR and use a PAD, and 4) competency, confidence and comfort of performing CPR and using a PAD (Supplementary file 1).

Categories of employment status derived from the UK Household Longitudinal Study²⁵; categories of household income from the Government Statistical Service²⁶ and occupation classifications from the Office of National Statistics.²⁸ Patient/public involvement helped develop relevant questions and piloted the survey instrument to ensure face validity, appropriateness and brevity. Feedback was incorporated into the final version of the survey instrument.

Data collection and participants

Research paramedics (RPs) wearing ambulance uniform targeted members of the public regarding study participation. Eligible participants were aged ≥ 18 years and had mental capacity. Potential participants received a verbal explanation of the study and a short participant information sheet with a unique study identification number; participation was voluntary.

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 Classification²⁷ 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. Pearson correlations were used when examining associations between either ordinal characteristic variables or age and the dependent ordinal variables, and 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 characteristic variables and categorical outcome variables. Fisher's Exact Test with Monte Carlo Simulation was used when examining associations between categorical characteristic and categorical outcome variables. All Monte Carlo Simulations used a random seed and 99% confidence intervals. SPSS version 26 was used for all analyses and the alpha level was set at 0.05.

Ethics

Health Research Authority approval was not required as participants were members of the public in non-healthcare settings, and were not patients (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 outcome variables, followed by SES characteristics and their relationship with the outcome variables. Outcome 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, 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 ($r(597)=-1.61$, $p<0.001$), follow advice ($r(597)=-0.158$, $p<0.001$), help a family member ($r(598)=-0.135$, $p<0.001$), help someone familiar ($r(598)=-0.160$, $p<0.001$) and help a stranger ($r(598)=-0.120$, $p<0.003$).

Age was not associated with any other aspect of the four domains: experience of CPR, knowledge of CPR or competency, confidence and comfort of performing CPR (all $p>0.05$).

Gender

Slightly more respondents ($n=600$, 99.8%) were female ($n=313$, 52.2%) than male ($n=287$, 47.8%). There was a significant difference in being comfortable performing CPR ($U=38835.5$, $p=0.006$) with females ($n=311$, median=5) reporting less comfort than males ($n=287$, median=7). Gender was not associated with any aspect of experience or knowledge of CPR, or competency of performing CPR (all $p>0.05$). There were no associations between gender and any other variable across the four domains (all $p>0.05$).

Ethnicity

A total of 597 (99.3%) participants reported their ethnicity, with the majority reporting white ethnicity ($n=570$, 95.5%). Ethnicity was significantly associated with knowledge of what CPR is for ($p<0.001$); Asian/Asian British participants only constituted 2.3% of the overall valid sample but constituted 12.2% of respondents who reported not knowing what CPR is for. Ethnicity was also associated with knowledge of what a defibrillator is for ($p<0.001$), where Asian/Asian British participants constituted 10.1% of respondents who reported not knowing what a defibrillator is for. There were no associations between ethnicity and any other variable across the four domains (all $p>0.05$).

General health

Participants ($n=600$, 99.8%) reported a median general health rating of 8 (range=1-10, IQR=3), with a statistically significant but very weak positive correlation with participants' comfort using a defibrillator ($r(598)=0.153$, $p<0.001$); those with higher general health were slightly more likely to be comfortable using a defibrillator. There were no associations between general health and any other variable across the four domains (all $p>0.05$).

Socio-economic status characteristics

Indices of Multiple Deprivation

Of participants that provided their postcode ($n=586$, 97.5%), the median IMD score was 4 ($n=586$, range=1-10, IQR=5), with results slightly positively skewed with 134 (22.9%) participants from postcodes representing most deprived areas (IMD score of 1), and 52 (8.9%) participants from postcodes representing least deprived areas (IMD score of 10). IMD had a statistically significant but very weak negative correlation with comfort performing CPR ($r(582)=-0.100$, $p=0.016$), with those from least deprived areas being slightly less likely to be comfortable performing CPR.

There was also a significant difference in IMD score between those who reported knowing what a PAD is for (n=483, median=4) versus those who didn't (n=103, median=3; U=21349.5, p=0.025), those from more deprived areas were more likely to report knowing what a PAD is for. There were no associations between IMD and any other variable across the four domains (all p>0.05).

Highest education level

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

Employment status

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

Occupation level

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

Income

Only 478 (79.5%) participants reported their income, with the largest number of participants (n=112, 23.4%) reporting an income of between £20,800 to £31,199. Median income was £31,200 to £41,599 (IQR=3). Income was positively but very weakly significantly correlated with willingness to follow advice (r(475)=0.126, p=0.017), so individuals with a higher income were more willing to follow advice.

Income was positively but very weakly significantly correlated with being comfortable using a defibrillator ($r(476)=0.100$, $p=0.029$), meaning those with a higher income were more likely to be comfortable using a defibrillator. There was a significant difference in income based on whether people reported knowing what a defibrillator is ($U=11217$, $p=0.001$), with those saying yes ($n=406$, median=£20,800 to £31,199) having a higher income than those saying no or unsure ($n=72$, median=£10,400 to £20,799).

Discussion

This cross-sectional study aimed to explore knowledge and attitudes towards BCPR, and to understand how knowledge and attitudes potentially interact with individual characteristics and SES. We found individual characteristics and markers of SES were inconsistently associated with participants' knowledge and attitudes towards BCPR, with weak associations where present. These findings were unexpected given the previously identified association between BCPR rates and social deprivation in the region^{5,17}, and evidence that individuals experiencing OHCA are less likely to receive BCPR in deprived areas.¹⁴⁻¹⁶ However, the findings support more recent evidence; a review of BCPR in deprived communities identified that willingness to perform or learn BCPR was not influenced by deprivation²⁸, rather a range of contextual and environmental factors determined administration of BCPR.²⁹ Factors other than individual SES are likely to contribute to lower levels of BCPR in deprived communities, such as cultural identity and social cohesion. Social capital, of which social cohesion forms a part, is increasingly linked with health outcomes including being related to improved cardiovascular mortality³⁰ and use of preventative services.³¹ This links to recent theoretical developments in the field of health and care inequalities which emphasise the importance of applying an intersectional lens by looking beyond markers of SES as being solely representative of geographical 'place'.³² It is pertinent to explore whether social cohesion has an interaction with BCPR, and whether it would explain the gap identified in this study.

Of individual and SES factors, only age was consistently associated with participants' willingness to perform BCPR, where older participants were less willing to call 999, follow advice, or help someone, irrespective of SES. This suggests older individuals are broadly similar in attitude towards BCPR, regardless of SES, may have the same fears, and are subject to the same barriers. Given most OHCA occur in the home and are witnessed by spouses,³³ an unwillingness to help family members is problematic, particularly as age is a risk factor for OHCA. Previous research has identified older individuals have lower levels of knowledge and self-confidence regarding BCPR,³⁴ although it is not possible to draw similar conclusions from our study, as we found no difference in knowledge, capability or confidence of performing BCPR based on participant age. Younger age was associated with comfort performing BCPR and has been reported elsewhere.³⁵ With regard to comfort performing BCPR, women were less comfortable than men.

Women being less likely to receive BCPR is well-documented,³⁶ but our study shows women are also less likely to be willing to deliver BCPR too. There were no further gender disparities regarding understanding of what BCPR is and the importance of delivering it. Ethnicity was associated with poorer knowledge of BCPR. Whilst our study was limited with small numbers of individuals from ethnic minorities, the findings support other studies which have identified ethnic minorities encounter barriers accessing BCPR training, exacerbated by language difficulties.³⁷ Participation in our study was generally reflective of regional ethnicity, but focused studies within the region with ethnic minority study populations would help to better explain these differences.

Regarding SES markers, participants from more deprived areas were more likely to be comfortable performing CPR and were more likely to know what a defibrillator is for. This may be because OHCA is more likely to occur in deprived areas. Our findings contrast a previous study that reported those in deprived areas believe resuscitation should be carried out by those trained and who have the necessary skills.²⁹ It is possible participants in deprived areas from our study were more likely to have some personal, direct or indirect, experience of OHCA. However, the lack of associations between other SES markers suggests there is some form of community effect rather than individual characteristics that contribute to being comfortable performing BCPR. There is also a perception that patients requiring BCPR may be more likely to be under the influence of illicit drugs or alcohol in areas of higher deprivation and this may influence level of comfort.²⁹ The association identified between higher education and an increased willingness to learn CPR suggests a better understanding of the consequences of not receiving BCPR, although this is not based upon having had delivered BCPR, or having used a PAD, and is not dependent on SES.³⁸ Health literacy is a mechanism that links education and health³⁹, yet there is a need for research to explicitly examine this relationship in relation to OHCA and people's willingness to perform BCPR.

That participants with higher levels of self-reported general health were more likely to be comfortable using a defibrillator could be explained by the physicality needed to acquire the PAD from community points and bring it to the patient prior to use. However, this interpretation may be placed in doubt as there was no such association identified between general health and comfort performing CPR, which may have been expected, as chest compressions require physical fitness in order to be performed effectively.⁴⁰ There is almost certainly a much more complicated interaction between general health and the physicality required for obtaining PADs or performing chest compressions, which we are unable to explore in this study.

Limitations

We identified ceiling effects in many of the measures relating to knowledge of BCPR, willingness to help and competence of performing BCPR. This may have been influenced by social desirability bias where survey data were collected by uniformed paramedics, which may have influenced participants' responses to present their knowledge, willingness to help and competence as being higher. Future research should consider including a test of participants' knowledge of OHCA and BCPR. It may also be worthwhile testing whether different data collectors with or without uniforms would result in different results.

Conclusion

Markers of SES and deprivation are a poor indicator of knowledge of, and willingness and competency to perform, BCPR. Interventions to improve levels of BCPR should avoid using SES or deprivation to identify target populations but focus on individual characteristic's such as age and ethnicity, though the latter requires further investigation. Future research should examine the role of these characteristics in willingness to perform BCPR and how they intersect with cultural identity and social cohesion.

Declaration of interest

None

Authorship contribution statement

KC, JS, SS and GM designed the study. AM provided data to facilitate LSOA identification for North East England and TD identified LSOA's in North Cumbria. KC, LB and EB collected study data. JS analysed study data. KC, JS and SS wrote the manuscript. GM, LB, TD, EB and AM provided critical review and comment on the manuscript.

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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. 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.
11. Nichol G, Thomas E, Callaway CW, Hedges J, Powell JL, Aufderheide TP, et al. Regional variation in out-of-hospital cardiac arrest incidence and outcome. *JAMA* 2008; 300:1423–31.

12. Kiguchi M, Okubo C, Nishiyama C, Maconochie I, Ong ME, Kern K, et al. Out-of-hospital cardiac arrest across the World: First report from the International Liaison Committee on Resuscitation (ILCOR). *Resuscitation*. 2020; 39-49.
13. 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.
14. 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.
15. 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.
16. 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.
17. 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.
18. 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.
19. 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>.
20. 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>
21. North West Ambulance Service NHS Trust. Who we are. 2022. Available from: <https://www.nwas.nhs.uk/about/who>
22. University of Warwick. Out of hospital cardiac arrest outcomes registry. 2018. Available from: https://warwick.ac.uk/fac/sci/med/research/ctu/trials/ohcao/publications/epidemiologyreports/ohcao_epidemiology_report_2018_published.pdf
23. English indices of deprivation. 2019. Available from <https://imd-by-postcode.opendatacommunities.org/imd/2019>

24. Chyung SY, Roberts K, Swanson I, Hankinson A. Evidence-based survey design: The use of a midpoint on the Likert scale. *Perform Improve* 2017; 56(10): 15-23.
25. Understanding society. The English Longitudinal Study. 2022. Available from: <https://www.understandingsociety.ac.uk/>
26. Government statistical service. Harmonised Concepts and Questions for Social Data Sources – Income. 2015. Available from: <https://gss.civilservice.gov.uk/wp-content/uploads/2016/03/S4-Income-June-16.pdf>
27. Office of national statistics. Standard occupational classification. 2021. Available from: <https://www.ons.gov.uk/methodology/classificationsandstandards/standardoccupationalclassification>
28. Uny I, Angus K, Duncan E, Dobbie F. Barriers and facilitators to delivering bystander cardiopulmonary resuscitation in deprived communities: a systematic review. *Perspect Public Health*. 2022; 17579139211055497.
29. Dobbie F, Uny I, Eadie D, Duncan E, Stead M, Bauld L, et al. Barriers to bystander CPR in deprived communities: Findings from a qualitative study. *PLoS One*. 2020; 15(6):e0233675.
30. Rodgers J, Valuev AV, Hswen Y, Subramanian SV. Social capital and physical health: An updated review of the literature for 2007–2018. *Soc Sci Med* 2019; 1;236:112360.
31. Kim ES, Kawachi I. Perceived neighbourhood social cohesion and preventive healthcare use. *Am J Prev Med* 2017; 53(2), e35-e40.
32. Bambra C. Placing intersectional inequalities in health. *Health Place* 2022; 1;75:102761.
33. Breckwoldt J, Schloesser S, Arntz HR. Perceptions of collapse and assessment of cardiac arrest by bystanders of out-of-hospital cardiac arrest (OOHCA). *Resuscitation* 2009; 80:1108–13.
34. 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.
35. 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.
36. 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.

37. 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.
38. 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.
39. 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.
40. 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.

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
<i>Level 1, N (%)</i>	63 (13.2)	10 (20.0)	53 (12.0)		63 (13.2)	2 (22.2)	61 (12.7)	
<i>Level 2, N (%)</i>	146 (30.5)	16 (32.0)	130 (29.5)		146 (30.5)	2 (22.2)	144 (29.9)	
<i>Level 3, N (%)</i>	57 (11.9)	2 (4.0)	55 (12.5)		57 (11.9)	0 (0)	57 (11.9)	
<i>Level 4, N (%)</i>	49 (10.3)	9 (18.0)	40 (9.1)		49 (10.3)	2 (22.2)	47 (9.8)	
<i>Retired, N (%)</i>	165 (34.5)	12 (24.0)	153 (34.8)		165 (34.5)	3 (33.3)	162 (33.7)	
<i>Other, N (%)</i>	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

* significant at p<0.05

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

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, 7.4)	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, 7.2)	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 (52.2)	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 (47.8)	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
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* 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 (-1.61)	<0.001*	599 (-0.158)	<0.001*	600 (-0.135)	0.001*	600 (-0.160)	<0.001*	600 (-0.120)	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 (0.024)	0.563	599 (-0.008)	0.851	600 (-0.030)	0.461	600 (-0.011)	0.791	600 (-0.032)	0.432
Mean Indices of Multiple Deprivation score, N (CC)	586 (-0.051)	0.214	585 (-0.011)	0.792	586 (-0.056)	0.173	586 (-0.010)	0.812	586 (-0.025)	0.547
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

<i>Level 1, N (MR)</i>	<i>63 (238)</i>		<i>63 (240)</i>		<i>63 (248)</i>		<i>63 (245)</i>		<i>63 (242)</i>
<i>Level 2, N (MR)</i>	<i>145 (256)</i>		<i>145 (263)</i>		<i>146 (256)</i>		<i>146 (252)</i>		<i>146 (255)</i>
<i>Level 3, N (MR)</i>	<i>57 (240)</i>		<i>57 (234)</i>		<i>57 (231)</i>		<i>57 (243)</i>		<i>57 (235)</i>
<i>Level 4, N (MR)</i>	<i>49 (251)</i>		<i>49 (267)</i>		<i>49 (265)</i>		<i>49 (273)</i>		<i>49 (269)</i>
<i>Retired, N (MR)</i>	<i>165 (237)</i>		<i>165 (231)</i>		<i>165 (235)</i>		<i>165 (231)</i>		<i>165 (233)</i>
<i>Other, N (MR)</i>	<i>10 (261)</i>		<i>10 (189)</i>		<i>10 (249)</i>		<i>10 (261)</i>		<i>10 (283)</i>
Income, N (CC)	477 (0.039)	0.397	477 (0.126)	0.006*	478 (0.037)	0.416	478 (0.069)	0.131	478 (0.037) 0.420

* 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)	601 (-0.058)	0.153	598 (-0.055)	0.184	599 (-0.097)	0.018*	601 (-0.001)	0.980
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 (0.035)	0.390	597 (0.005)	0.898	598 (0.067)	0.103	600 (0.153)	<0.001*
Indices of Multiple Deprivation score, N (CC)	586 (-0.068)	0.098	585 (-0.071)	0.088	584 (-0.100)	0.016*	586 (0.020)	0.630
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)	

<i>Something else, N (MR)</i>	<i>4 (269)</i>		<i>4 (244)</i>		<i>4 (234)</i>		<i>4 (300)</i>	
Occupation, N	490	0.508	487	0.705	488	0.090	490	0.150
<i>Level 1, N (MR)</i>	<i>63 (261)</i>		<i>63 (260)</i>		<i>63 (283)</i>		<i>63 (267)</i>	
<i>Level 2, N (MR)</i>	<i>146 (246)</i>		<i>144 (243)</i>		<i>146 (246)</i>		<i>146 (229)</i>	
<i>Level 3, N (MR)</i>	<i>57 (228)</i>		<i>57 (228)</i>		<i>57 (232)</i>		<i>57 (240)</i>	
<i>Level 4, N (MR)</i>	<i>49 (273)</i>		<i>49 (263)</i>		<i>49 (267)</i>		<i>49 (287)</i>	
<i>Retired, N (MR)</i>	<i>165 (237)</i>		<i>164 (240)</i>		<i>164 (226)</i>		<i>165 (241)</i>	
<i>Other, N (MR)</i>	<i>10 (249)</i>		<i>10 (217)</i>		<i>9 (238)</i>		<i>10 (255)</i>	
Income, N (CC)	478 (0.055)	0.232	476 (0.028)	0.536	476 (0.066)	0.150	478 (0.100)	0.029*

* significant at <0.05

CC = correlation coefficient, MR = mean ra

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