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Epidemiological trends of childhood maltreatment and domestic abuse recorded in 'The Health Improvement Network' database

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Abstract

Objectives: Describe the epidemiology of childhood maltreatment and domestic abuse (in women)

Design: Analysis of longitudinal records between 1st January 1995 to 31st December 2018

Setting: 'The Health Improvement Network' database

Participants: There were 11,831,850 eligible patients from 787 contributing practices. Childhood maltreatment and domestic abuse (in women only) were defined as the presence of a recorded confirmatory Read code.

Outcome measures: The incidence rate (IR) and prevalence of childhood maltreatment and domestic abuse between 1996-2017. When exploring childhood maltreatment, the IR and prevalence are described as a rate in a cohort of only those aged 0-18 years (per 100,000 child years (CY)/per 100,000 child population). Whereas in domestic abuse these measures are described only in a cohort of women aged 18 and over (per 100,000 adult years (AY)/per 100,000 adult population). An adjusted incidence rate ratio (aIRR) is given to examine the differences in IRs based on sex, ethnicity and deprivation.

Results: The IR (IR 60.1; 95% CI 54.3-66.0 per 100,000 CY) and prevalence (416.1; 95% CI 401.3-430.9 per 100,000 child population) of childhood maltreatment rose until 2017. The aIRR was greater in patients from the most deprived backgrounds (aIRR 5.14; 95% CI 34.57-5.77 compared to least deprived) and from an ethnic minority community (e.g. Black aIRR 1.25;1.04-1.49 compared to White). When examining domestic abuse in women, in 2017, the IR was 34.5 (31.4-37.7) per 100,000 AY and prevalence 368.7 (358.7-378.7) per 100,000 adult population. Similarly, the IR was highest in the lowest socio-economic class (aIRR 2.30; 2.71-3.30) and in ethnic minorities (South Asian aIRR 2.14;1.92-2.39 and Black aIRR 1.64;1.42-1.89).

Conclusion: Despite recent improvements in recording, there is still a substantial under-recording of maltreatment and abuse within UK primary care records. Approaches must be implemented to improve recording and detection of childhood maltreatment and domestic abuse within medical records.

Keywords: Domestic abuse, childhood maltreatment, epidemiology, primary care, incidence

Strengths and limitations of this study

- Childhood maltreatment and domestic abuse are global public health issues associated with substantial morbidity and mortality. Public sector bodies, such as those working in healthcare, are in a position to identify and support those who have experienced such traumatic experiences in order to prevent the development of subsequent negative consequences
- To our knowledge this is the first study to describe the incidence and prevalence of domestic abuse using UK primary care data and to update evidence regarding the occurrence of childhood maltreatment in the last two decades
- The study was able to examine patients by age, gender, deprivation and ethnicity. However, for ethnicity there was missing data.
- There is a substantial under-recording of Read codes relating to childhood maltreatment and domestic abuse within this dataset
- There are several explanations for the possible under-recording, these need to be further studied in detail.

INTRODUCTION

Childhood maltreatment (physical, sexual or emotional abuse and neglect against those under the age of 18 years)[1] and domestic abuse (controlling, coercive, threatening behaviour, violence or abuse between those who are, or have been, intimate partners or family members)[2] are global public health problems. Approximately one third of women and one third of children globally are estimated to have been survivors of domestic abuse and childhood maltreatment respectively.[3,4]

The negative downstream social, psychological and physical health effects of childhood maltreatment and domestic abuse bear a substantial societal cost.[5–10] Therefore, a public health approach is urgently needed to prevent both the occurrence of childhood maltreatment and domestic abuse as well as their secondary consequences. In order to support a public health approach, high quality data recording relating to these exposures plays an important role. Exploring the role of routinely collected data (which due its repeatable nature can be used for surveillance) is crucial in both the estimation of the societal burden of disease as well as the identification of risk and protective factors.[11]

Exposure to domestic abuse and childhood maltreatment remain taboo topics in many cultures, despite the adverse consequences in terms of health and wellbeing, with significant stigma around disclosure of traumatic events.[12,13] As a result, survivors of such traumatic experiences often find it difficult to attend and seek support from public sector authorities such as healthcare staff.[14,15] There are also challenges for healthcare staff to routinely enquire or ask about such experiences in their patients' lives.[16] The combination of barriers to disclosure and enquiry are likely to lead to a hidden burden of domestic abuse and childhood maltreatment not captured in administrative public sector data. However, since introductions of new guidelines in the UK (National Institute of Health and Care Excellence in 2016 and 2017), the hope has been that administrative recording will have improved.[17,18] This drive towards improved reporting is spurred on by UK media and governmental interest in these topics (Examples of high profile events leading to media and governmental interest includes: the death of Baby P, the Jimmy Savile inquiry, Operation Yewtree, the death of Daniel Pelka, the identification and referral to improve safety (IRIS) trial and the consideration of the domestic abuse bill), administrative recording will have improved.[19–23]

Current UK national estimates of domestic abuse are largely derived from self-reported surveys in conjunction with administrative data, where suitable, to overcome the challenge of estimating the hidden burden of abuse which may not be visible to public sector bodies. The crime survey for England and Wales (CSEW) provides useful self-reported information and used in conjunction with police records of the number of recorded domestic abuse incidents to define epidemiological estimates of domestic abuse. In women, the reported prevalence from the CSEW (for those aged 16-59 years old) was 7.9% in the financial year 2017/2018 while the crude estimate derived from police data for the year ending 2017 (not yet available for 2018 for those aged 16 and over) across England was 24.0/1,000 population (in men and women).[24,25]

Unfortunately, the use of alternative administrative records pertaining to information on domestic abuse are largely limited to recording processes such as hospital records. There is no specific international classification of disease code that are specific to domestic abuse: The closest matches are T74.1 (physical abuse, confirmed), Y07.0 (spouse or partner, perpetrator of maltreatment and neglect) and Z63.0 (and problems in a relationship with spouse or partner) which when specified in adults relate to physical abuse, maltreatment.[26] However, there are substantial limitations to utilising these codes to describe the epidemiology of domestic abuse, due to low numbers of such codes being recorded and also ambiguities in coding practice between hospital trusts.[26]

The state of epidemiological estimates when exploring childhood maltreatment suffers from similar challenges. A recent observational study utilised data from 1858-2016 that was derived from child mortality records, police recorded-homicides, crimes against children, child protection data, children in care and data taken from the National Society for the Prevention of Cruelty to Children (NSPCC) to study long term trends of child maltreatment. The study found a decreasing long-term trend in child maltreatment until the year 2000 but reported an increase thereafter.[27] However child mortality continued to decrease.[27] A recommendation of the report was to further research and establish whether child maltreatment is continuing to increase.[27] However, once again when taken from the CSEW, the estimated prevalence of experiencing childhood maltreatment was 18.9% (financial year end 2016).[28] The information relating to the incidence rate for those at risk of childhood maltreatment or domestic abuse is low. One approach to attempt to do so is to use records taken from general practice (GP). A previous study using GP recorded data between 1995 to 2010 explored the incidence rates and prevalence of childhood maltreatment related concerns (includes information relating to suspected and possible maltreatment) and identified an increase in incidence and prevalence of maltreatment related concerns between this time.[29]

Considering the limitations which exist in current approaches estimating the burden of childhood maltreatment and domestic abuse, there is a need to explore the incidence and prevalence of childhood maltreatment and domestic abuse within general practice records to 1) gain further insight into the epidemiology of these traumatic exposures 2) identify the strengths and limitations of using such records to monitor rates of childhood maltreatment and domestic abuse. Therefore, our aim was to investigate how the incidence and prevalence of childhood maltreatment and domestic abuse have changed between 1996-2017 using 'The Health Improvement Network' (THIN) primary care database.

METHODS

Study design and data source

Yearly cohort and cross-sectional studies were conducted between 1st January 1995 and 31st December 2018 to describe the yearly incidence rate (IR) and prevalence of childhood maltreatment and domestic abuse. A retrospective cohort study between 1st January 1995 and 31st December 2018 was conducted to describe the cumulative IR broken down by age group, gender (in childhood maltreatment), deprivation and ethnicity.

During the study period, the dataset consisted of medical records taken from 787 UK general practices and deemed to be representative of the UK population.[30] THIN records

information relating to demographics, disease progression and management.[31] Information relating to symptoms, examinations, and diagnoses are documented using a hierarchical clinical coding system called Read codes.[32]

Population, exposure and outcomes

General practices were eligible for inclusion 12 months following installation of electronic health records or from the practice's acceptable mortality recording date.[33,34] Inclusion of data after these points were measures of quality assurance for the dataset. During the study period from 1st January 1995 and 31st December 2018, there were 11,831,850 eligible patient records following this inclusion criteria.

The outcomes of interest (childhood maltreatment or domestic abuse) were both defined by presence of a relevant Read code relating to patient exposure. As the aim of this study was to examine incidence and prevalence, the code list used to define incidence and prevalence varied to account for codes that mention a history of the exposure (for the calculation of prevalence but not for incidence rate). The list of Read codes used in this study to describe childhood maltreatment/domestic abuse (varied by incidence and prevalence) are documented in the supplementary (supplementary read code lists) and selection of such codes are described in previous published work.[9,35–37] Domestic abuse exposure in this study was limited to only female patients as comparatively very low numbers of men had recorded incidents of domestic abuse during the study period. The annual incidence rate and prevalence of domestic abuse experienced by men between 2005-2017 is displayed on supplementary tables 1-2.

Dependent on the outcome of interest, there were further inclusion criteria on the study population which was eligible for inclusion. To calculate the IR and prevalence of childhood maltreatment, we only included patients under the age of 18 at cohort entry. We enforced a study criterion that patients would have to exit the study by their 18th birthday as they would no longer be contributing child-years (CY) at risk. During the study period the total population amounted to 3,045,456 children. In order to calculate the IR and prevalence of domestic abuse, a female adult cohort was selected who had an eligible cohort entry date from the age of 18 years onwards (4,982,781 eligible patients). The purpose being to allow us to calculate an IR of adult years (AY) at risk. Additionally, there is debate about whether children living in a household where there is domestic abuse overlaps with the definition of child maltreatment as a form of adverse childhood experience (ACEs).[38] Therefore, to avoid confusion in definition between childhood maltreatment and experiencing ACEs which include other markers of household adversity, we have restricted our domestic abuse population to only those over the age of 18 years.

Statistical analysis and follow up

For annual point prevalence, the numerator was the cumulative count of eligible individuals with any record of domestic abuse (occurred over 18 years) or childhood maltreatment (occurred under 18 years) identified at the 1st January each year from 1996 to 2017 who were then divided by the total eligible population on the same date (denominator). The prevalence is described per 100,000 population (in the domestic abuse cohort per 100,000

adult population and childhood maltreatment cohort per 100,000 child population) with their associated confidence intervals (CI).

A series of yearly cohort studies were performed to calculate the crude IR of domestic abuse and childhood maltreatment for each year from 1996 to 2017. The numerator was the new number of cases in that calendar year, divided by the total number of person-years at risk (denominator) for the given year. In each annual cohort study to determine IR, the period of follow up was defined as:

Entry date: The latest date of either study start date (1st of January each year), one year after electronic medical records were implemented, one year after the practice reached acceptable mortality recording date or when the patient met the age inclusion criteria if one was present (e.g. patients had to reach 18 years before they were eligible for entry into the domestic abuse study population).

Exit date: The earliest date of either study end date (31st of December each year), outcome date (new incident of childhood maltreatment or domestic abuse), death date, transfer date (when patient moved practice and were censored from the dataset), collection date (last date the practice contributed to the dataset) and the date when patient's age crosses the age inclusion criteria (e.g. patients will exit the cohort when they turn 18 for the IR calculation of childhood maltreatment).

Graphical representations of the incidence and prevalence was conducted from years where there were 5 or more incident cases of domestic abuse (2005) or childhood maltreatment (1997). The annual IR and prevalence are also stratified by sex (male or female) for childhood maltreatment.

Additionally, the cumulative IR for the whole time period from the 1st January 1995 to 31st December 2018 was stratified by age category of outcome incidence (defined using categories used by the Department of Education to allow for comparison),[39] Townsend deprivation quintile,[40] ethnicity and sex when using data for the whole time period from the 1st January 1995 to 31st December 2018.

To discern differences between ethnic groups and deprivation quintiles (in the child cohort) a multivariate (adjusting for each other, sex and age at cohort entry) Poisson regression offsetting for person years of follow-up was used to calculate an adjusted incidence rate ratio (aIRR). Where there were missing data in our covariates (Ethnicity and Townsend quintile), these were treated as a separate missing category and included in the final model. Significance was set at $p<0.05$.

Statistical analysis was conducted using STATA MP/4 v15.1 (Statacorp 2017). Wherever IR, IRR and prevalence are presented, associated 95% confidence intervals (CI) are given in conjunction.

Patient and public involvement

No patients were actively involved in setting the research question, outcome measures, study design, results interpretation of write up of the results. There are plans for the results

to be disseminated to the community affected by this research through childhood maltreatment and domestic abuse charities and social media channels.

Ethical Approval

Anonymised data were used throughout the study provided by the data provider to the University of Birmingham. Studies using The Health Improvement Network (THIN) database have had initial ethical approval from the NHS South-East Multicentre Research Ethics Committee, subject to prior independent scientific review. The Scientific Review Committee (IQVIA) approved the study protocol (SRC Reference Number: SRC18THIN034) prior to its undertaking.

RESULTS

During the study period there was a total of 4,603 incident episodes of childhood maltreatment cohort in a cohort of 3,045,456 children (aged under 18). In the adult female cohort (aged over 18), there were 5,598 incident recorded episodes of domestic abuse in the total female population of 4,982,781 patients. Table 1 outlines the characteristics of both cohorts at cohort entry as well as the patients who were incident cases of childhood maltreatment and domestic abuse.

Childhood maltreatment

The IR of childhood maltreatment increased from 22.5 per 100,000 CY (95% CI 11.8-33.2) in 1997 to 60.1 per 100,000 CY (95% CI 54.3-66.0) in 2017. The was a steadily increasing trend from 2007 to 2012 and a steep rise between the year 2012 (IR 30.0; 95% CI 26.8-33.3 per 100,000 CY) and 2013 (IR 52.3; 95% CI 47.9-56.7 per 100,000 CY), after which it remained relatively stable until 2017. Further details can be seen in figure 1a and supplementary table 3.

When broken down by sex, a similar temporal trend is noted between both males and females. However, the cumulative IR was higher in the female cohort (IR 27.2; 95% CI 26.1-18.6 per 100,000 CY) was greater when compared to the male cohort (IR 19.4; 95% CI 18.6-20.3 per 100,000 CY). The IR in females in 2017 was 66.2 (95% CI 57.4-75.1) per 100,000 CY compared to IR of 54.3 (95% CI 46.5-62.1) per 100,000 CY in males. Further details of the trends are seen on figure 1 b-c and supplementary tables 4-5.

The age range was broken down into the categories 0-1, 1-4, 5-9, 10-15 and 16-17 years. The group with the highest IR was the 0-1-year cohort (IR 52.7; 95% CI 47.9-58.0 per 100,000 CY) and whereas the 16-17 group (IR 21.2; 95% CI 19.0-23.5 per 100,000 CY) had the lowest IR (figure 1d and supplementary table 6). When examining by socio-economic deprivation quintile there was a linear relationship observed between IR and deprivation. More details are seen in figure 1e and supplementary table 7. Lastly, the IR was higher in the ethnic minority groups (Black (IR 45.1; 95% CI 37.4-52.9 per 100,000 CY), South Asian (IR 34.7; 95% CI 29.0-40.4 per 100,000 CY) and Other backgrounds (IR 48.1; 95% CI 37.3-58.9 per 100,000 CY)) when compared with those who had a White (IR 27.7; 95% CI 26.5-29.0 per 100,000 CY)) or mixed ethnicity (IR 21.8; 95% CI 13.4-30.2 per 100,000 CY). Further details are provided in figure 1e and supplementary table 8.

The prevalence of childhood maltreatment steadily increased from 176.3 (95% CI 132.8-219.8) per 100,000 child population in 1997 to 416.1 (95% CI 401.3-430.9) per 100,000 population in 2017. This can be seen in figure 2 and supplementary table 9.

In the multivariate analysis following adjustment for age at cohort entry, sex and deprivation quintile, the increased risk apparent in South Asians compared to White children was not evident (aIRR 1.06; 95% CI 0.89-1.26). However, the Black (aIRR 1.25; 95% CI 1.04-1.49) and other (aIRR 1.45; 95% CI 1.15-1.82) populations were at a greater risk. In the above analysis there was a gradient increase observed in the risk of childhood maltreatment with worsening deprivation. The most deprived quintile had a five-fold increased risk of childhood maltreatment (aIRR 5.14; 95% CI 4.57-5.77). Further details are seen in supplementary table 10.

Domestic abuse

The IR of domestic abuse increased from 0.3 per 100,000 AY (95% CI 0.0-0.6) in 2005 to 34.6 per 100,000 AY (95% CI 31.4.1-37.7) in 2017. The trend was increasing relatively steadily from 2006 to 2013 followed by a steep increase in 2014 (IR 35.8; 95% CI 33.2-38.5 per 100,000 AY). Further details can be seen in figure 3a and supplementary table 11.

The age range was broken down into the categories 18-24, 25-34, 35-44, 45-54, 55-64 and over 65 years. The groups with the highest IR were 18-24 (IR 33.0; 95% CI 31.2-34.9 per 100,000 AY) and 25-34-year cohorts (IR 33.7; 95% CI 32.2-35.3 per 100,000 AY), followed by a decline by age group. Further details are seen in figure 3b and supplementary table 12. When examining by deprivation quintile, again a linear trend was seen where there was a fourfold increased risk of new domestic abuse incidence in the most deprived quintile (IR 36.3; 95% CI 34.3-38.3 per 100,000 AY) compared to the least deprived (IR 8.9; 95% CI 8.2-9.6 per 100,000 AY). More information can be found in figure 3c and supplementary table 13. Lastly, similar to childhood maltreatment, a disparity was seen in relation to ethnic group, where Black (IR 55.0; 95% CI 47.7-62.6 per 100,000 AY), South Asian (IR 65.4; 95% CI 58.6-72.2 per 100,000 AY) and Other background (IR 73.6; 95% CI 57.4-89.7 per 100,000 AY)) had a higher incidence rate when compared with those who had a White (IR 21.5; 95% CI 20.7-22.3 per 100,000 AY)) or mixed ethnic (IR 36.8; 95% CI 29.4-44.2 per 100,000 AY) background. Figure 4 and supplementary table 14 contain additional detail.

The prevalence of domestic abuse increased in an almost linear manner from 16.0 (95% CI 14.0-17.9) per 100,000 adult population to 368.7 (95% CI 358.7-378.9) per 100,000 adult population in 2017. This can be seen in figure 4 and from supplementary table 15.

In the multivariate regression analysis, it was evident that ethnicity played a factor in the risk of domestic abuse. South Asians (aIRR 2.14; 95% CI 1.92-2.39), Black (aIRR 1.64; 95% CI 1.42-1.89) and Other (aIRR 2.19; 95% CI 1.75-2.73) populations were all at a greater risk than the White cohort. Similar to childhood maltreatment there was a gradient increase between worsening deprivation and the risk of domestic abuse. The most deprived quintile had an aIRR of 2.30; 95%CI 2.71-3.30. Further details contained within supplementary table 16.

DISCUSSION

Summary of key findings

The IR of both childhood maltreatment and domestic abuse increased until 2017 (60.1 (95% CI 54.3-66.0) per 100,000 CY and 34.6 (95% CI 31.4.1-37.7) per 100,000 AY respectively in 2017). Additionally, the prevalence of both childhood maltreatment and domestic abuse continued to increase in a linear fashion until 2017. Of interest there were similar patterns of risk in both groups. For both childhood maltreatment and domestic abuse, there was a substantially increased aIRR seen in those from a more deprived background when compared to the least deprived, and a greater incidence rate of new cases of both childhood maltreatment and domestic abuse in those from an ethnic minority background despite taking into account other co-variates. The IR was also highest in the 0-1-year group and in females for childhood maltreatment and the 18-24-year group for those experiencing domestic abuse. The most notable finding is the high level of under-recording of childhood maltreatment and domestic abuse in the dataset in comparison to those reported in self-reported surveys including the CSEW and NSPCC survey.

Comparison to current literature

As this was the first cohort to the authors' knowledge to explore the annual incidence and prevalence of domestic abuse (in women) using UK primary care records, it is difficult to compare the incidence rates directly with other studies. However for childhood maltreatment, one previous study (including data from 1995-2010) reported the IR of childhood maltreatment related concerns using THIN.[29] The maltreatment related concern codes included cases of suspected or probable maltreatment which would explain why their documented IR and prevalence are substantially higher than those reported in our study.[29] However, of note in that study they demonstrated an increased IR of childhood maltreatment related concerns in those in the under one group, those who are female and almost a five times increased risk in those from the most deprived group when compared to the lowest group, all of which are similar to our findings.[29]

Of particular note, a key finding of our study was the prevalence and IR were much lower than estimates derived from currently existing sources of childhood maltreatment and domestic abuse epidemiology. When examining UK police reports of domestic abuse, although for both genders, the prevalence in England was 24.0 per 1,000 population, much higher than in our study even though we only included a female denominator population.[24] When compared to the CSEW data which showed a prevalence of 7.9% in women, our figure seems even lower.[25] Similarly, although no combined child maltreatment figure exists for police reports, if we examine the estimated prevalence from the CSEW which suggested 18.9% of all adults have experienced some form of childhood maltreatment our figure of 4.2 per 1,000 population (2017) is substantially lower.[28] When compared to other administrative data such as children in need data, which contains the rate of children on Child protection plans, GP recorded prevalence still remains low, which has also been shown in previous literature on maltreatment related concerns.[29,41]

The low values of incidence and prevalence of childhood maltreatment and domestic abuse and other interesting findings resonate and build on known literature. There have been national policy reports highlighting inconsistencies in data collected relating domestic abuse

and childhood maltreatment to poverty and ethnicity.[42,43] However, we clearly demonstrate a linear relationship between IR and socio-economic deprivation following adjustment for ethnicity. When adjusting for deprivation, GP data still highlights the burden of maltreatment and abuse experienced in ethnic minorities (although South Asians were not at a higher risk of childhood maltreatment, and mixed raced individuals were not at a higher risk of either childhood maltreatment or domestic abuse). It has been previously highlighted that black and minority ethnic children are over-represented in child protection records within the UK, but this may be related to poverty (a form of which we have been able to adjust for in our study), isolation and willingness to seek help due to stigma in some communities.[44] In contrast to our findings, the prevalence reported for domestic abuse exposure CSEW was highest in those from a mixed race background, and lower in those from the South Asian, Black or Other community.[25]

There are clear messages that need to be taken from this study relating to the under-recording of domestic abuse and childhood maltreatment in GP records. Although approaches and intervention have been implemented and evaluated to record both of these traumatic experiences, more needs to be done.[23,45] Healthcare professionals should be aware of the morbidity burden caused by such exposures and also the referral tools at their disposal highlighted in recent national guidelines.[17,18] Attempts to overcome barriers in asking about domestic abuse and childhood maltreatment such as the use of short question proformas are options to be trialled more broadly.[46] Although recording of domestic abuse and childhood maltreatment do not yet fall under the incentivised payment system for GPs, it should be strongly encouraged to improve our recording and implementation of appropriate referral mechanisms.[47]

Strengths and limitations

Although our data are derived from a large population-based cohort, the results demonstrate substantial under-recording of childhood maltreatment and domestic abuse. Therefore, our results are likely to underestimate the burden of childhood maltreatment and domestic abuse by GPs. The increasing trends in IR and prevalence suggest that recording is improving and with the introduction of national guidelines and standards, this will continue to improve.[17,18] Before this dataset can be used for surveillance purposes or tracking of long term trends in childhood maltreatment or domestic abuse, there need to be further improvements in the rate or recording and reporting. Although this study was not designed to assess the impact of public policy or media attention at certain time points, it is also possible that spikes in IR seen in the dataset such as in 2012-2013 in the childhood maltreatment cohort may be related to high profile news events such as the exposure of Jimmy Savile which was shown to result in an increase of reports of childhood maltreatment to UK statutory bodies.[48]

In our IR subgroup analysis, we also have limitations in the recorded ethnicity of patients (highlighted in table 1). Ethnicity recording has historically been poor, although improving in primary care data, with missing rates of around 50%.[49] Therefore, future research should aim to explore the IR of these outcomes in other cohorts which have utilised similar UK census categories for ethnicity.

Conclusion

In conclusion, our study showed an in-depth exploration of the incidence rate and prevalence trends of childhood maltreatment and domestic abuse using UK primary care records. It is clear that there is a severe under-reporting of both of these important exposures which relate to substantial morbidity and mortality burdens. Therefore, approaches to improve recording of abuse and strategies to detect and prevent negative consequences of childhood maltreatment and domestic abuse should be implemented.

Figure legends:

Figure 1: The incidence rate of childhood maltreatment broken down by sex, age, deprivation and ethnicity

Figure 2: Prevalence of childhood maltreatment: 1997-2017

Figure 3: The incidence rate of domestic abuse broken down by age, deprivation and ethnicity

Figure 4: Prevalence of domestic abuse: 2005-2017

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Data statement
The original data can be requested from the study team. However, ethics approval may need to be sought by the data provider prior to release of data.

Author contributions
This study contributed to the PhD thesis for the main author JSC. JSC, JT, SB and KN were responsible for initial conception of the study. JSC was responsible for data extraction, analysis and first draft of the manuscript. The final manuscript was authorised by all the authors with JT providing expert knowledge on childhood maltreatment, whereas SB and KN provided methodological expertise.

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Declaration of Interests
All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work, no financial relationships with any organisations that might have an interest in the submitted work in the previous three years, no other relationships or activities that could appear to have influenced the submitted work.

References

1 HM Government. Working Together to Safeguard Children: A guide to inter-agency working to safeguard and promote the welfare of children. 2018https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/722305/Working_Together_to_Safeguard_Children_-_Guide.pdf (accessed 11 Jul2018).

2 HM Government. Guidance: Domestic violence and abuse. UK Gov. 2016.https://www.gov.uk/guidance/domestic-violence-and-abuse#domestic-violence-and-abuse-new-definition (accessed 19 Feb2018).

3 World Health Organization. Child maltreatment. 2017https://www.who.int/violence_injury_prevention/violence/child/Child_maltreatment_infographic_EN.pdf?ua=1 (accessed 16 Dec2019).

4 World Health Organization. Global and regional estimates of violence against women. 2014.https://www.who.int/reproductivehealth/publications/violence/9789241564625/en/ (accessed 16 Dec2019).

5 Bellis MA, Hughes K, Ford K, Ramos Rodriguez G, Sethi D, Passmore J. Life course health consequences and associated annual costs of adverse childhood experiences across Europe and North America: a systematic review and meta-analysis. *Lancet Public Heal* 2019; **0**. doi:10.1016/S2468-2667(19)30145-8.

6 Gilbert R, Widom CS, Browne K, Fergusson D, Webb E, Janson S. Burden and consequences of child maltreatment in high-income countries. *Lancet* 2009; **373**: 68–81.

7 Bacchus LJ, Ranganathan M, Watts C, Devries K. Recent intimate partner violence against women and health: a systematic review and meta-analysis of cohort studies. *BMJ Open* 2018; **8**: e019995.

8 Krug EG, Dahlberg LL, Mercy JA, Zwi AB, Lozano R. World report on violence and health. http://apps.who.int/iris/bitstream/handle/10665/42495/9241545615_eng.pdf;jsessionid=38974668595BA31895E557DC1CB1EFEC?sequence=1 (accessed 4 Jul2018).

9 Chandan JS, Thomas T, Gokhale KM, Bandyopadhyay S, Taylor J, Nirantharakumar K. The burden of mental ill health associated with childhood maltreatment in the UK, using The Health Improvement Network database: a population-based retrospective cohort study. *The lancet Psychiatry* 2019; **6**: 926–934.

10 Chandan JS, Thomas T, Bradbury-Jones C, Russell R, Bandyopadhyay S, Nirantharakumar K *et al.* Female survivors of intimate partner violence and risk of depression, anxiety and serious mental illness. *Br J Psychiatry* 2019; : 1–6.

11 World Health Organization. The public health approach. WHO. 2011.http://www.who.int/violenceprevention/approach/public_health/en/ (accessed 8 Nov2018).

12 Overstreet NM, Quinn DM. The Intimate Partner Violence Stigmatization Model and Barriers to Help-Seeking. *Basic Appl Soc Psych* 2013; **35**: 109–122.

13 Allnock D, Miller P. No one noticed no one heard report. 2013.https://pdfs.semanticscholar.org/7258/5fbe2269c865ac7c42aaf0e4bec5224a938b.pdf (accessed 29 Jul2019).

14 Smith CS. Coping Strategies of Female Victims of Child Abuse in Treatment for Substance Abuse Relapse: Their Advice to Other Women and Healthcare

Professionals. *J Addict Nurs* 2007; **18**: 75–80.
15 Robinson L, Spilsbury K. Systematic review of the perceptions and experiences of accessing health services by adult victims of domestic violence. *Health Soc Care Community* 2007; **16**: 16–30.
16 Taket A. Responding to domestic violence in primary care. *BMJ* 2012; **344**: e757.
17 NICE. Overview | Child abuse and neglect | Guidance | NICE. 2017.https://www.nice.org.uk/guidance/ng76 (accessed 16 Dec2019).
18 NICE. Overview | Domestic violence and abuse | Quality standards | NICE. 2016.https://www.nice.org.uk/guidance/qs116 (accessed 16 Dec2019).
19 Parish E. Who should we blame for the death of Baby P? *BMJ* 2014; **349**: g6643.
20 STAFFORDSHIRE & STOKE-ON-TRENT SAFEGUARDING CHILDREN BOARDS. LESSONS TO BE LEARNED BRIEFING NO. 16: IN RESPECT OF THE DEATH OF DANIEL PELKA. 2013https://www.staffordbc.gov.uk/sites/default/files/cme/DocMan1/PolicyAndImprovement/Serious--Case-Review---Daniel-Pelka.pdf (accessed 16 Dec2019).
21 Department for Education. Investigations relating to Jimmy Savile - GOV.UK. 2015https://www.gov.uk/government/publications/investigations-relating-to-jimmy-savile (accessed 16 Dec2019).
22 UK Parliament. Domestic Abuse Bill 2017-19. 2017.https://services.parliament.uk/bills/2017-19/domesticabuse.html (accessed 16 Dec2019).
23 Feder G, Davies RA, Baird K, Dunne D, Eldridge S, Griffiths C *et al.* Identification and Referral to Improve Safety (IRIS) of women experiencing domestic violence with a primary care training and support programme: a cluster randomised controlled trial. *Lancet* 2011; **378**: 1788–1795.
24 Public health England. Public Health Profiles domestic abuse. 2018.https://fingertips.phe.org.uk/search/Domestic Abuse#page/4/gid/1/pat/6/par/E12000004/ati/102/are/E06000015/iid/92863/age/164/sex/4 (accessed 16 Dec2019).
25 Office for national statistics. Domestic abuse in England and Wales: year ending March 2018. 2018.https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/bulletins/domesticabuseinenglandandwales/yearendingmarch2018#prevalence-of-domestic-abuse.
26 Olive P. Intimate partner violence and clinical coding: issues with the use of the International Classification of Disease (ICD-10) in England. *J Health Serv Res Policy* 2018; **23**: 212–221.
27 Degli Esposti M, Humphreys DK, Jenkins BM, Gasparrini A, Pooley S, Eisner M *et al.* Long-term trends in child maltreatment in England and Wales, 1858-2016: an observational, time-series analysis. *Lancet Public Heal* 2019; **4**: e148–e158.
28 Office for National Statistics. Abuse during childhood. 2016.https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/articles/abuseduringchildhood/findingsfromtheyearendingmarch2016crimesurveyforenglandandwales (accessed 16 Dec2019).
29 Woodman J, Freemantle N, Allister J, de Lusignan S, Gilbert R, Petersen I. Variation in recorded child maltreatment concerns in UK primary care records: a cohort study using The Health Improvement Network (THIN) database. *PLoS One* 2012; **7**: e49808.
30 Blak BT, Thompson M, Dattani H, Bourke A. Generalisability of The Health

Improvement Network (THIN) database: demographics, chronic disease prevalence and mortality rates. *Inform Prim Care* 2011; **19**: 251–5.

31 IQVIA. IQVIA Medical Research Data - Health Research Authority. 2018.https://www.hra.nhs.uk/planning-and-improving-research/application-summaries/research-summaries/the-health-improvement-network-thin-database/ (accessed 20 Aug2019).

32 Booth N. What are the Read Codes? *Health Libr Rev* 1994; **11**: 177–82.

33 Maguire A, Blak BT, Thompson M. The importance of defining periods of complete mortality reporting for research using automated data from primary care. *Pharmacoepidemiol Drug Saf* 2009; **18**: 76–83.

34 Horsfall L, Walters K, Petersen I. Identifying periods of acceptable computer usage in primary care research databases. *Pharmacoepidemiol Drug Saf* 2013; **22**: 64–69.

35 Chandan JS, Thomas T, Bradbury-Jones C, Russell R, Bandyopadhyay S, Nirantharakumar K *et al.* Female survivors of intimate partner violence and risk of depression, anxiety and serious mental illness. *Br J Psychiatry* 2019; : 1–6.

36 Chandan JS, Thomas T, Bradbury-Jones C, Taylor J, Bandyopadhyay S, Nirantharakumar K. Intimate partner violence and temporomandibular joint disorder. *J Dent* 2019; **82**: 98–100.

37 Chandan JS, Thomas T, Raza K, Bandyopadhyay S, Nirantharakumar K, Taylor J. Association between child maltreatment and central sensitivity syndromes: A systematic review protocol. BMJ Open. 2019; **9**: bmjopen-2018-025436.

38 Hughes K, Bellis MA, Hardcastle KA, Sethi D, Butchart A, Mikton C *et al.* The effect of multiple adverse childhood experiences on health: a systematic review and meta-analysis. *Lancet Public Heal* 2017; **2**: e356–e366.

39 Department for Education. Children looked after in England including adoption: 2018 to 2019 - GOV.UK. 2019.https://www.gov.uk/government/statistics/children-looked-after-in-england-including-adoption-2018-to-2019 (accessed 15 Dec2019).

40 Townsend P, Phillimore P, Beattie A. Health and deprivation: inequality and the North. 1988. *London Croom Helm Google Sch* 1988.

41 Public Health England. Public Health Profiles Children subject to a child protection plan with initial category of abuse: rate per 10,000 children aged under 18. 2019.https://fingertips.phe.org.uk/search/child protection#page/4/gid/1/pat/6/par/E12000004/ati/102/are/E06000015/iid/92853/age/173/sex/4 (accessed 16 Dec2019).

42 Eldin Fahmy, Emma Williamson CP. Evidence and policy review: Domestic violence and poverty. 2016 doi:https://research-information.bris.ac.uk/en/publications/evidence-and-policy-review(af69c4ab-ff0b-4392-9318-890dc0fcc359).html.

43 Bywaters P, Bunting L, Davidson G, Hanratty J. The relationship between poverty, child abuse and neglect: an evidence review. 2016; : 74.

44 Owen C, Statham J. Disproportionality in child welfare : the prevalence of black and minority ethnic children within the 'looked after' and 'children in need' populations and on child protection registers in England. 2009.https://www.semanticscholar.org/paper/Disproportionality-in-child-welfare-%3A-the-of-black-Owen-Statham/c3bec39040bc3816b2bce4cde6e51dc05321996b (accessed 16 Dec2019).

45 McGovern A, van Vlymen J, Liyanage H, Jones S, de Lusignan S, Woodman J *et al.* A

simple clinical coding strategy to improve recording of child maltreatment concerns: an audit study. *Br J Gen Pract* 2014; **64**: 389–90.

46 Gerbert B, Moe J, Caspers N, Salber P, Feldman M, Herzig K *et al.* Simplifying physicians' response to domestic violence. *West J Med* 2000; **172**: 329–31.

47 National Institute for Health and Care Excellence. Quality and Outcomes Framework Indicators - Standards & Indicators. 2016.https://www.nice.org.uk/Standards-and-Indicators/QOFIndicators (accessed 28 Jul2019).

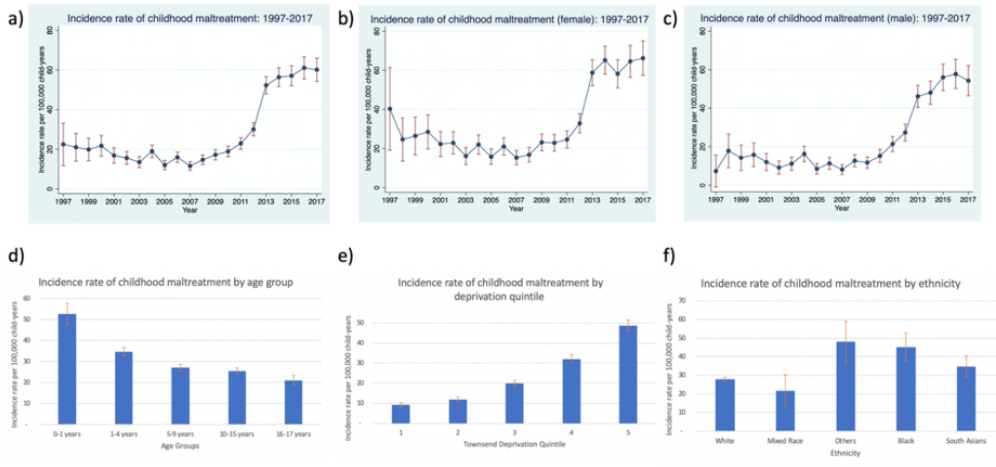
48 NSPCC. Giving victims a voice. 2013.https://www.nspcc.org.uk/globalassets/documents/research-reports/yewtree-report-giving-victims-voice-jimmy-savile.pdf (accessed 16 Dec2019).

49 Mathur R, Bhaskaran K, Chaturvedi N, Leon DA, vanStaa T, Grundy E *et al.* Completeness and usability of ethnicity data in UK-based primary care and hospital databases. *J Public Health (Oxf)* 2014; **36**: 684.

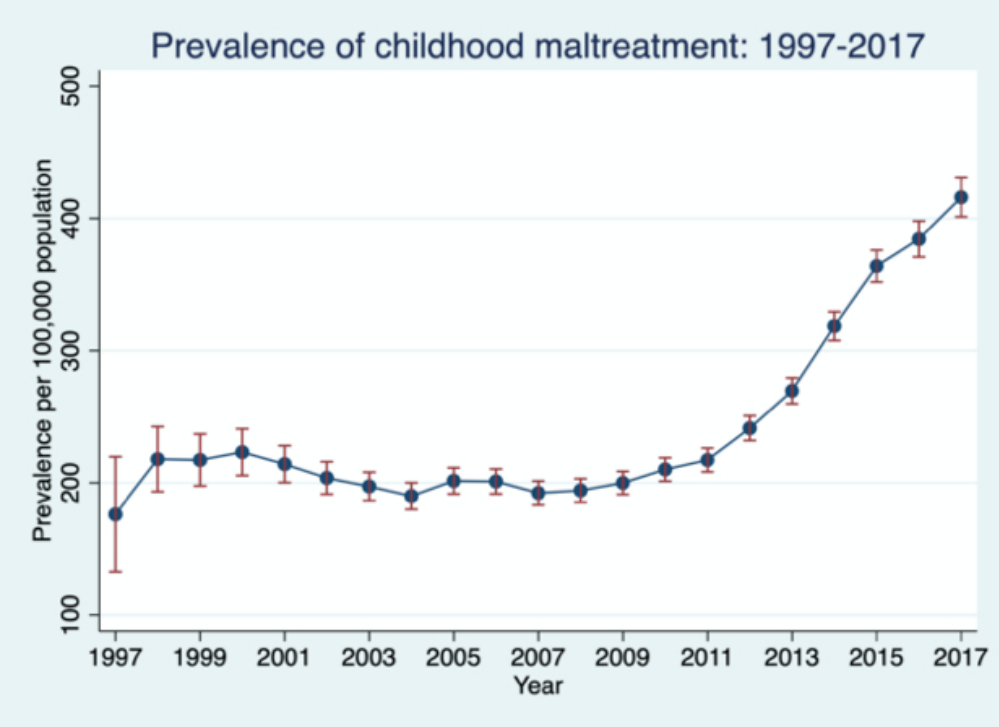
Table 1: Baseline characteristics of both the child and female adult cohort

	Child cohort (Under 18 years)			**Female adult cohort (Over 18 years)**	

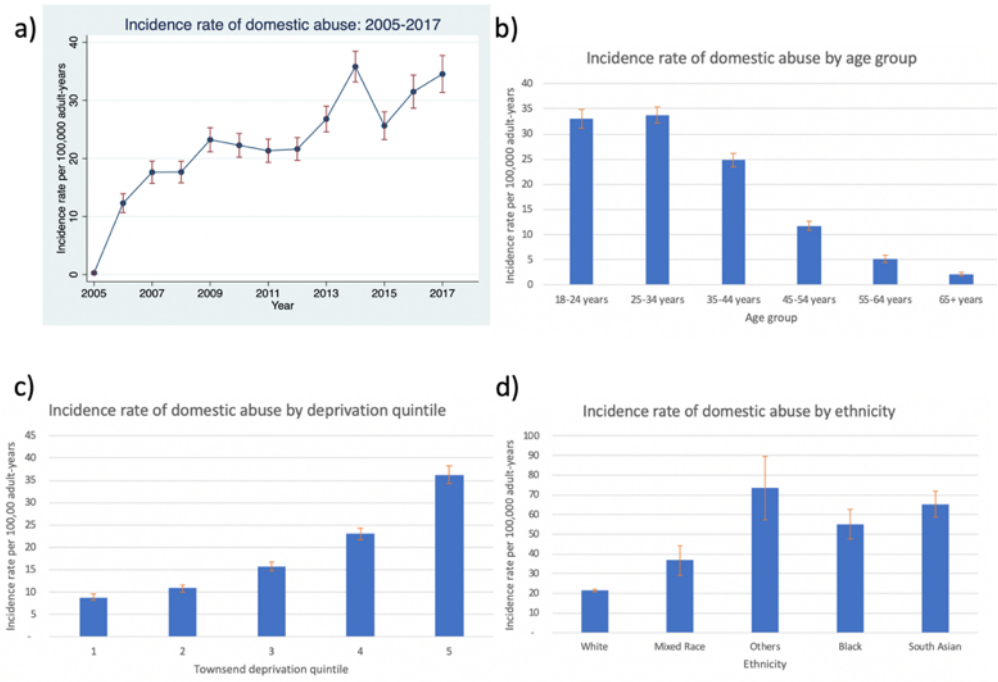
	Total cohort	Incident childhood maltreatment cases		Total cohort	Incident domestic abuse cases
Number of patients	3045456	4603	**Number of patients**	4982781	5598
Sex			**Sex**		
Male	1570986 (51.6%)	2041 (44.3%)			
Female	1474470 (48.4%)	2562 (55.7%)	Female	4982781 (100%)	5598 (100%)
Age at cohort entry			**Age at cohort entry**		
0-1 years	1030637 (33.8%)	1757 (38.2%)	18-24 years	1211022 (24.3%)	1897 (33.9%)
1-4 years	607294 (19.9%)	1184 (25.7%)	25-34 years	1138926 (22.9%)	1939 (34.6%)
5-9 years	580306 (19.1%)	886 (19.3%)	35-44 years	777795 (15.6%)	1136 (20.3%)
10-15 years	611693 (20.1%)	672 (14.6%)	45-54 years	596443 (12.0%)	411 (7.3%)
16-17 years	215526 (7.1%)	104 (2.3%)	55-64 years	470107 (9.4%)	145 (2.6%)
			65+ years	788488 (15.8%)	70 (1.3%)
Ethnicity			**Ethnicity**		
White	1089894 (35.8%)	1854 (40.3%)	White	2017299 (40.5%)	2905 (51.9%)
Mixed race	31067 (1.0%)	26 (0.6%)	Mixed race	69270 (1.4%)	99 (1.8%)
Black	63244 (2.1%)	135 (2.9%)	Black	80974 (1.6%)	212 (3.8%)
South Asian	80486 (2.6%)	145 (3.2%)	South Asian	109117 (2.2%)	374 (6.7%)
Others	37318 (1.2%)	82 (1.8%)	Others	27071 (0.5%)	87 (1.6%)
Missing	1743447 (57.3%)	2361 (51.3%)	Missing	2679050 (53.8%)	1921 (32.3%)
Townsend Deprivation Index			**Townsend Deprivation Index**		
1 (Least deprived)	536645 (17.6%)	378 (8.2%)	1 (Least deprived)	9107759 (18.3%)	614 (11.0%)
2	482613 (15.9%)	418 (9.1%)	2	848614 (17.0%)	664 (11.9%)
3	538247 (17.7%)	729 (15.8%)	3	904034 (18.1%)	959 (17.1%)
4	524151 (17.2%)	1080 (23.5%)	4	849248 (17.0%)	1225 (21.9%)
5 (Most deprived)	410246 (13.5%)	1279 (27.8%)	5 (Most deprived)	612744 (12.3%)	1322 (23.6%)
Missing	553554 (18.2%)	719 (15.6%)	Missing	857382 (17.2%)	814 (14.5%)



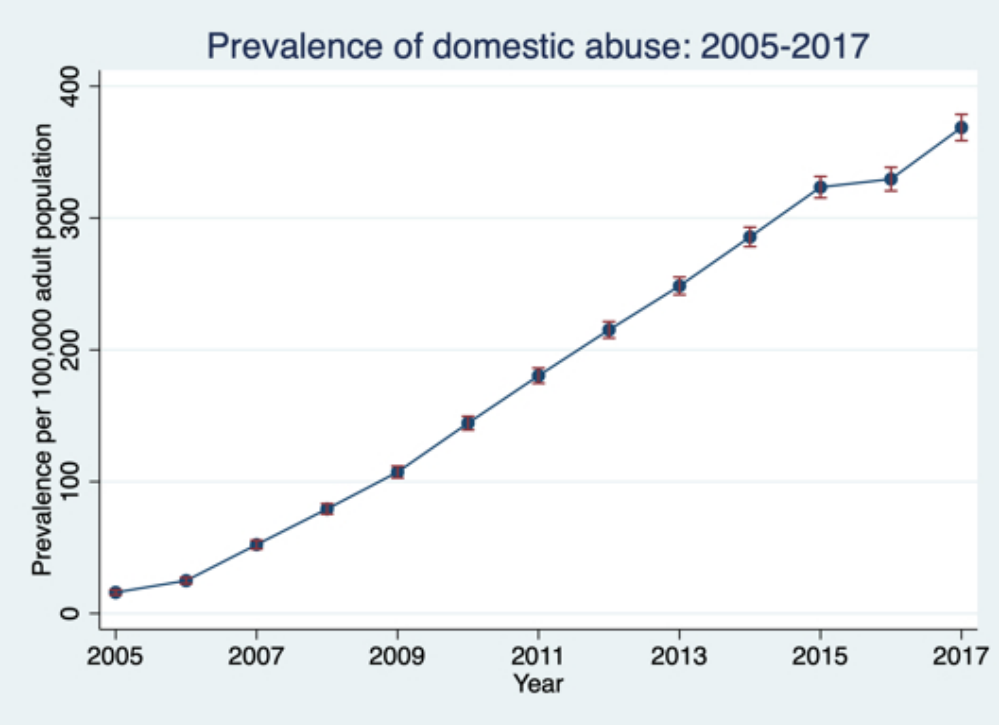
The incidence rate of childhood maltreatment broken down by sex, age, deprivation and ethnicity



Prevalence of childhood maltreatment: 1997-2017



The incidence rate of domestic abuse broken down by age, deprivation and ethnicity



Prevalence of domestic abuse: 2005-2017

Supplementary

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Read code lists

Childhood maltreatment- Incident only codes

Code	Description
13Ih.00	Subject to supervision order under Children Act 1989
13II.00	Child deserted by parents
13Ii.00	Subject to care order under Children Act 1989
13II.11	Child deserted by mother
13Ii000	Subject to care order under section 20 of Children Act 1989
13Ii100	Subject to care order under section 21 of Children Act 1989
13Ii200	Subject to care order under section 25 of Children Act 1989
13Ii300	Subject to care order under section 31 of Children Act 1989
13Ij.00	Subject to interim care order under Children Act 1989
13Ij000	Sub to interim care order under section 38 Children Act 1989
13Ij100	Emergency protective order section 44 Children Act 1989
13W3.00	Child abuse in family
13W4.00	Parent/child conflict
13W4000	Child/parent violence
13WT.00	Child protection observation
13WT000	Child protection category
13WT100	Child protection category emotional
13WT200	Child protection category physical
13WT300	Child protection category sexual
13WT400	Child protection category neglect
14X5.00	Victim of physical abuse
14X6.00	Victim of sexual abuse
14X6000	Victim of sexual harassment
14X7.00	Victim of emotional abuse
14X8.00	Victim of domestic violence
14XF.00	Victim of human trafficking
14XG.00	Victim of domestic abuse
14XH.00	Victim of child sexual exploitation
14XJ.00	Victim of psychological abuse
14XK.00	Victim of financial abuse
14XP.00	Victim of discriminatory abuse

14XR.00	Victim neglect & acts omission
222R.00	Neglected appearance
R037.00	[D]Insufficient intake of food and water due to self neglect
R2y3.11	[D] Self neglect
Ry18.00	[D]Self neglect
SN42000	Deprivation of food, unspecified
SN43000	Deprivation of water
SN55.00	Child maltreatment syndrome
SN55000	Emotional maltreatment of child
SN55011	Emotional deprivation of child
SN55012	Emotional abuse of child
SN55100	Nutritional maltreatment of child
SN55111	Nutritional deprivation of child
SN55112	Malnutrition in child maltreatment syndrome
SN55200	Non-accidental injury to child
SN55211	NAI - non-accidental injury to child
SN55212	Physical injury to child
SN55300	Battered baby or child syndrome NOS
SN55311	Battered baby syndrome NOS
SN55312	Battered child syndrome NOS
SN55400	Multiple deprivation of child
SN55500	Physical abuse of child
SN55600	Non-accidental traumatic head injury to child
SN55z00	Child maltreatment syndrome NOS
SN55z11	Child abuse NEC
SN55z12	Child deprivation syndrome
SN55z13	Neglect affecting child NEC
SN56000	Battered person unspecified, syndrome
SN57.00	Maltreatment syndromes
SN57000	Neglect or abandonment
SN57100	Sexual abuse
SN57200	Child affected by Munchausen's by proxy
SyuH500	[X]Other maltreatment syndromes
TE40.00	Accidents due to abandonment or neglect of helpless person
TL7..00	Child battering and other maltreatment
TL70.00	Child battering or other maltreatment by parent
TL7y.00	Child battering or other maltreatment by other spec person
TL7z.00	Child battering or other maltreatment by person NOS
TLx4.00	Assault by criminal neglect
U3M..00	[X]Neglect and abandonment
U3M0.00	[X]Neglect and abandonment, by spouse or partner
U3M1.00	[X]Neglect and abandonment, by parent
U3M2.00	[X]Neglect and abandonment, by acquaintance or friend
U3My.00	[X]Neglect and abandonment, by other specified persons
U3Mz.00	[X]Neglect and abandonment, by unspecified person

U3N..00	[X]Other maltreatment syndromes
U3N0.00	[X]Other maltreatment syndromes, by spouse or partner
U3N1.00	[X]Other maltreatment syndromes, by parent
U3N2.00	[X]Other maltreatment syndromes, by acquaintance or friend
U3N3.00	[X]Other maltreatment syndromes, by official authorities
U3Ny.00	[X]Other maltreatment syndromes, by other specified persons
U3Nz.00	[X]Other maltreatment syndromes, by unspecified person
U3P..00	[X]Maltreatment
U3P0.00	[X]Maltreatment, by spouse or partner
U3P1.00	[X]Maltreatment, by parent
U3P2.00	[X]Maltreatment, by acquaintance or friend
Z352.11	Child abuse investigation
Z787.00	Self-neglect
Z787200	Neglect of clothes
Z787400	Neglect of personal hygiene
Z787500	Neglect of physical health
Z787600	Neglect of dental care
Z787700	Neglect of physical illness
Z787800	Neglect of common dangers
ZV1B400	[V]Personal history of neglect
ZV4H300	[V]Emotional neglect of child
ZV4H400	[V]Other problems related to neglect in upbringing
ZV61200	[V]Child abuse
ZV61211	[V]Child battering
ZV61212	[V]Child neglect
ZV61213	[V]Parent - child conflict
ZVu4B00	[X]Other problems related to neglect in upbringing

Childhood maltreatment- Prevalent codes

Code	Description
6254.00	A/N care: H/O child abuse
13Ih.00	Subject to supervision order under Children Act 1989
13II.00	Child deserted by parents
13Ii.00	Subject to care order under Children Act 1989
13II.11	Child deserted by mother
13Ii000	Subject to care order under section 20 of Children Act 1989
13Ii100	Subject to care order under section 21 of Children Act 1989
13Ii200	Subject to care order under section 25 of Children Act 1989
13Ii300	Subject to care order under section 31 of Children Act 1989
13Ij.00	Subject to interim care order under Children Act 1989
13Ij000	Sub to interim care order under section 38 Children Act 1989
13Ij100	Emergency protective order section 44 Children Act 1989
13W3.00	Child abuse in family
13W4.00	Parent/child conflict

13W4000	Child/parent violence
13WT.00	Child protection observation
13WT000	Child protection category
13WT100	Child protection category emotional
13WT200	Child protection category physical
13WT300	Child protection category sexual
13WT400	Child protection category neglect
14X..00	History of abuse
14X0.00	History of physical abuse
14X1.00	History of sexual abuse
14X2.00	History of emotional abuse
14X3.00	History of domestic violence
14X5.00	Victim of physical abuse
14X6.00	Victim of sexual abuse
14X6000	Victim of sexual harassment
14X7.00	Victim of emotional abuse
14X8.00	Victim of domestic violence
14XD.00	History of domestic abuse
14XD000	H/O domestic emotional abuse
14XD100	H/O domestic physical abuse
14XD200	H/O domestic sexual abuse
14XE.00	History of being victim of domestic violence
14XF.00	Victim of human trafficking
14XG.00	Victim of domestic abuse
14XH.00	Victim of child sexual exploitation
14XJ.00	Victim of psychological abuse
14XK.00	Victim of financial abuse
14XP.00	Victim of discriminatory abuse
14XR.00	Victim neglect & acts omission
222R.00	Neglected appearance
R037.00	[D]Insufficient intake of food and water due to self neglect
R2y3.11	[D] Self neglect
Ry18.00	[D]Self neglect
SN42000	Deprivation of food, unspecified
SN43000	Deprivation of water
SN55.00	Child maltreatment syndrome
SN55000	Emotional maltreatment of child
SN55011	Emotional deprivation of child
SN55012	Emotional abuse of child
SN55100	Nutritional maltreatment of child
SN55111	Nutritional deprivation of child
SN55112	Malnutrition in child maltreatment syndrome
SN55200	Non-accidental injury to child
SN55211	NAI - non-accidental injury to child
SN55212	Physical injury to child

SN55300	Battered baby or child syndrome NOS
SN55311	Battered baby syndrome NOS
SN55312	Battered child syndrome NOS
SN55400	Multiple deprivation of child
SN55500	Physical abuse of child
SN55600	Non-accidental traumatic head injury to child
SN55z00	Child maltreatment syndrome NOS
SN55z11	Child abuse NEC
SN55z12	Child deprivation syndrome
SN55z13	Neglect affecting child NEC
SN56000	Battered person unspecified, syndrome
SN57.00	Maltreatment syndromes
SN57000	Neglect or abandonment
SN57100	Sexual abuse
SN57200	Child affected by Munchausen's by proxy
SyuH500	[X]Other maltreatment syndromes
TE40.00	Accidents due to abandonment or neglect of helpless person
TL7..00	Child battering and other maltreatment
TL70.00	Child battering or other maltreatment by parent
TL7y.00	Child battering or other maltreatment by other spec person
TL7z.00	Child battering or other maltreatment by person NOS
TLx4.00	Assault by criminal neglect
U3M..00	[X]Neglect and abandonment
U3M0.00	[X]Neglect and abandonment, by spouse or partner
U3M1.00	[X]Neglect and abandonment, by parent
U3M2.00	[X]Neglect and abandonment, by acquaintance or friend
U3My.00	[X]Neglect and abandonment, by other specified persons
U3Mz.00	[X]Neglect and abandonment, by unspecified person
U3N..00	[X]Other maltreatment syndromes
U3N0.00	[X]Other maltreatment syndromes, by spouse or partner
U3N1.00	[X]Other maltreatment syndromes, by parent
U3N2.00	[X]Other maltreatment syndromes, by acquaintance or friend
U3N3.00	[X]Other maltreatment syndromes, by official authorities
U3Ny.00	[X]Other maltreatment syndromes, by other specified persons
U3Nz.00	[X]Other maltreatment syndromes, by unspecified person
U3P..00	[X]Maltreatment
U3P0.00	[X]Maltreatment, by spouse or partner
U3P1.00	[X]Maltreatment, by parent
U3P2.00	[X]Maltreatment, by acquaintance or friend
Z352.11	Child abuse investigation
Z787.00	Self-neglect
Z787200	Neglect of clothes
Z787400	Neglect of personal hygiene
Z787500	Neglect of physical health
Z787600	Neglect of dental care

Z787700	Neglect of physical illness
Z787800	Neglect of common dangers
ZV1B400	[V]Personal history of neglect
ZV4H300	[V]Emotional neglect of child
ZV4H400	[V]Other problems related to neglect in upbringing
ZV61200	[V]Child abuse
ZV61211	[V]Child battering
ZV61212	[V]Child neglect
ZV61213	[V]Parent - child conflict
ZVu4B00	[X]Other problems related to neglect in upbringing

Domestic abuse- Incident only codes

Code	Description
14X8.00	Victim of domestic violence
14XG.00	Victim of domestic abuse

Domestic abuse- Prevalent codes

Code	Description
14X3.00	History of domestic violence
14X8.00	Victim of domestic violence
14XD.00	History of domestic abuse
14XD000	H/O domestic emotional abuse
14XD100	H/O domestic physical abuse
14XD200	H/O domestic sexual abuse
14XE.00	History of being victim of domestic violence
14XG.00	Victim of domestic abuse

Supplementary table 1: Annual incidence rate of domestic abuse in men between 2005-2017

Year	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
2005	0	1636719	0.00	0.00	0.00
2006	9	1734689	0.52	0.18	0.86
2007	13	1806891	0.72	0.33	1.11
2008	17	1906963	0.89	0.47	1.32
2009	38	1994312	1.91	1.30	2.51
2010	16	1983802	0.81	0.41	1.20
2011	27	1998716	1.35	0.84	1.86
2012	26	2059505	1.26	0.78	1.75
2013	30	2009399	1.49	0.96	2.03
2014	53	1891262	2.80	2.05	3.56
2015	29	1671621	1.73	1.10	2.37
2016	38	1433446	2.65	1.81	3.49
2017	26	1272745	2.04	1.26	2.83

Supplementary table 2: Prevalence of domestic abuse in men between 2005-2017

Year	Cases (numerator)	Denominator (total population)	Prevalence per 100,000	Lower confidence interval	Upper confidence interval
2005	27	1560540	1.73	1.08	2.38
2006	30	1715061	1.75	1.12	2.38
2007	48	1791798	2.68	1.92	3.44
2008	80	1861532	4.30	3.36	5.24
2009	123	1986921	6.19	5.10	7.28
2010	207	2009811	10.30	8.90	11.70
2011	251	1998732	12.56	11.00	14.11
2012	327	2030437	16.10	14.36	17.85
2013	431	2071595	20.81	18.84	22.77
2014	499	1948992	25.60	23.36	27.85
2015	565	1816180	31.11	28.54	33.67
2016	425	1518731	27.98	25.32	30.64
2017	444	1365746	32.51	29.49	35.53

Supplementary table 3: Annual incidence rate of childhood maltreatment between 1996-2017

Year	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
1996	3	8818.982	34.02	-4.47	72.51
1997	17	75578.7	22.49	11.80	33.18
1998	35	166631.5	21.00	14.05	27.96
1999	47	235954.6	19.92	14.23	25.61
2000	67	308085.1	21.75	16.54	26.95
2001	76	450754.2	16.86	13.07	20.65
2002	90	575967.3	15.63	12.40	18.85
2003	94	695178.8	13.52	10.79	16.25
2004	142	747512.6	19.00	15.87	22.12
2005	99	825747.7	11.99	9.63	14.35
2006	140	876234.6	15.98	13.33	18.62
2007	106	914492.9	11.59	9.38	13.80
2008	142	966390.4	14.69	12.28	17.11
2009	175	1014605	17.25	14.69	19.80
2010	192	1013900	18.94	16.26	21.61
2011	237	1032857	22.95	20.03	25.87
2012	322	1071219	30.06	26.78	33.34
2013	551	1053495	52.30	47.94	56.67
2014	560	992752.1	56.41	51.74	61.08
2015	503	880922.4	57.10	52.11	62.09
2016	463	757597.2	61.11	55.55	66.68
2017	403	670155.5	60.14	54.27	66.01

Supplementary table 4: Incidence rate of childhood maltreatment in females between 1996-2017

Female					
Year	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
1996	2	4110.859	48.65	-18.76	116.07
1997	14	34754.82	40.28	19.18	61.38
1998	19	77101.73	24.64	13.56	35.72
1999	29	109675.7	26.44	16.82	36.06
2000	41	143745.1	28.52	19.79	37.25
2001	47	210921.2	22.28	15.91	28.65
2002	62	271017.4	22.88	17.18	28.57
2003	53	328723.9	16.12	11.78	20.46
2004	78	354401.6	22.01	17.13	26.89
2005	62	392607.8	15.79	11.86	19.72
2006	88	417941.8	21.06	16.66	25.45
2007	67	437464.5	15.32	11.65	18.98
2008	78	463663.1	16.82	13.09	20.56
2009	113	488113.5	23.15	18.88	27.42
2010	112	489196.9	22.89	18.66	27.13
2011	123	499857.8	24.61	20.26	28.95
2012	171	519861.3	32.89	27.96	37.82
2013	301	511966	58.79	52.15	65.43
2014	315	483076.8	65.21	58.01	72.41
2015	250	429453.4	58.21	51.00	65.43
2016	239	369898	64.61	56.42	72.80
2017	217	327614.6	66.24	57.42	75.05

Supplementary table 5: Incidence rate of childhood maltreatment in males between 1996-2017

Male					
Year	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
1996	1	4708.124	21.24	-20.38	62.86
1997	3	40823.88	7.35	-0.97	15.66
1998	16	89529.8	17.87	9.12	26.63
1999	18	126278.8	14.25	7.67	20.84
2000	26	164340	15.82	9.74	21.90
2001	29	239833	12.09	7.69	16.49
2002	28	304949.9	9.18	5.78	12.58
2003	41	366454.9	11.19	7.76	14.61
2004	64	393111	16.28	12.29	20.27
2005	37	433139.9	8.54	5.79	11.29
2006	52	458292.7	11.35	8.26	14.43
2007	39	477028.4	8.18	5.61	10.74
2008	64	502727.3	12.73	9.61	15.85
2009	62	526491.6	11.78	8.85	14.71
2010	80	524703.3	15.25	11.91	18.59
2011	114	532999.4	21.39	17.46	25.31
2012	151	551357.7	27.39	23.02	31.75
2013	250	541528.6	46.17	40.44	51.89
2014	245	509675.2	48.07	42.05	54.09
2015	253	451469	56.04	49.14	62.94
2016	224	387699.2	57.78	50.21	65.34
2017	186	342540.9	54.30	46.50	62.10

Supplementary table 6: Incidence rate of childhood maltreatment per age group

Age group	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
0-1 years	423	802550	52.71	47.92	57.98
1-4 years	1244	3584000	34.71	32.83	36.69
5-9 years	1185	4373600	27.09	25.60	28.68
10-15 years	1289	5026870	25.64	24.28	27.08
16-17 years	342	1616180	21.16	19.03	23.53

Supplementary table 7: Incidence rate of childhood maltreatment per deprivation quintile

Townsend deprivation quintile	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
1	370	3977881	9.30	8.35	10.25
2	403	3367785	11.97	10.80	13.13
3	711	3556979	19.99	18.52	21.46
4	1057	3295050	32.08	30.14	34.01
5	1241	2541212	48.83	46.12	51.55

Supplementary table 8: Incidence rate of childhood maltreatment per ethnic group

Ethnicity	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
White	1802	6497060	27.74	26.46	29.02
Mixed	26	119173.4	21.82	13.43	30.20
Other	76	158165.8	48.05	37.25	58.85
Black	130	288266.2	45.10	37.35	52.85
South Asian	143	411692.6	34.73	29.04	40.43

Supplementary table 9: Prevalence of childhood maltreatment: 1996-2017

Year	Cases (numerator)	Denominator (total population)	Prevalence per 100,000	Lower confidence interval	Upper confidence interval
1996	4	1650	242.42	5.18	479.67
1997	63	35734	176.30	132.81	219.79
1998	300	137636	217.97	193.33	242.60
1999	469	215811	217.32	197.68	236.96
2000	612	274138	223.25	205.58	240.91
2001	901	420664	214.19	200.22	228.15
2002	1052	516432	203.71	191.41	216.00
2003	1290	653780	197.31	186.56	208.07
2004	1378	725049	190.06	180.03	200.08
2005	1582	785056	201.51	191.60	211.43
2006	1742	866447	201.05	191.62	210.48
2007	1741	905158	192.34	183.32	201.37
2008	1828	941016	194.26	185.36	203.15
2009	2015	1007729	199.95	191.23	208.67
2010	2152	1024011	210.15	201.29	219.02
2011	2231	1026713	217.30	208.29	226.30
2012	2544	1053725	241.43	232.06	250.80
2013	2914	1081001	269.57	259.79	279.34
2014	3253	1021024	318.60	307.67	329.53
2015	3487	957937	364.01	351.95	376.07
2016	3076	800060	384.47	370.91	398.03
2017	3009	723126	416.11	401.28	430.94

Supplementary table 10: Regression model describing the risk of experiencing childhood maltreatment

Incidence of childhood maltreatment		
	Adjusted* incidence rate ratio (95% CI)	P value
Sex		
Male	1 (ref)	
Female	1.35 (1.28-1.44)	<0.001
Age at cohort entry		
0-1 years	1 (ref)	
1-4 years	0.96 (0.89-1.03)	0.264
5-9 years	0.67 (0.61-0.72)	<0.001
10-15 years	0.47 (0.43-0.51)	<0.001
16-17 years	0.23 (0.19-0.28)	<0.001
Ethnicity		
White	1 (ref)	
Mixed race	0.72 (0.49-1.07)	0.102
Black	1.25 (1.04-1.49)	0.015
South Asian	1.06 (0.89-1.26)	0.512
Others	1.45 (1.15-1.82)	0.002
Missing	0.78 (0.73-0.83)	<0.001
Townsend Deprivation Index		
1 (Least deprived)	1 (ref)	
2	1.29 (1.12-1.48)	<0.001
3	2.13 (1.88-2.42)	<0.001
4	3.41 (3.02-3.84)	<0.001
5 (Most deprived)	5.14 (4.57-5.77)	<0.001
Missing	2.67 (2.35-3.03)	<0.001

*Adjusted for other demographic factors within the table

Supplementary table 11: Annual incidence rate of domestic abuse between 1996-2017

Year	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
1996	0	19347.05	-	-	-
1997	0	166965.5	-	-	-
1998	0	370905.7	-	-	-
1999	1	522522.3	0.19	-0.18	0.57
2000	0	669896.3	-	-	-
2001	1	963631.1	0.10	-0.10	0.31
2002	0	1216535	-	-	-
2003	0	1447347	-	-	-
2004	3	1543475	0.19	-0.03	0.41
2005	5	1690775	0.30	0.04	0.55
2006	220	1788113	12.30	10.68	13.93
2007	328	1860393	17.63	15.72	19.54
2008	347	1964404	17.66	15.81	19.52
2009	477	2054123	23.22	21.14	25.31
2010	455	2043540	22.27	20.22	24.31
2011	441	2066927	21.34	19.35	23.33
2012	461	2131583	21.63	19.65	23.60
2013	558	2082465	26.80	24.57	29.02
2014	702	1960191	35.81	33.16	38.46
2015	444	1731272	25.65	23.26	28.03
2016	467	1482673	31.50	28.64	34.35
2017	453	1311287	34.55	31.37	37.73

Supplementary table 12: Incidence rate of domestic abuse per age group

Age Group	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
18-25	1185	3592040	32.99	31.16	34.92
25-35	1780	5277210	33.73	32.20	35.33
35-45	1406	5668310	24.80	23.54	26.14
45-55	627	5317300	11.79	10.90	12.75
55-65	233	4524270	5.15	4.53	5.86
65+	145	6847960	2.12	1.80	2.49

Supplementary table 13: Incidence rate of domestic abuse per deprivation quintile

Townsend deprivation quintile	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
1	600	6770554	8.86	8.15	9.57
2	645	5941074	10.86	10.02	11.69
3	912	5803875	15.71	14.69	16.73
4	1162	5046996	23.02	21.70	24.35
5	1269	3496615	36.29	34.30	38.29

Supplementary table 14: Incidence rate of domestic abuse per ethnic group

Ethnic group	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
White	2771	12900000	21.46	20.66	22.26
Mixed	94	255581.1	36.78	29.35	44.21
Other	80	108769.6	73.55	57.44	89.66
Black	204	370777.9	55.02	47.47	62.57
South Asian	356	544591.4	65.37	58.58	72.16

Supplementary table 15: Prevalence of domestic abuse between 1996-2017

Year	Cases (numerator)	Denominator (total population)	Prevalence per 100,000	Lower confidence interval	Upper confidence interval
1996	0	3791	-	-	-
1997	6	79878	7.51	1.50	13.52
1998	10	299182	3.34	1.27	5.41
1999	24	479834	5.00	3.00	7.00
2000	32	599694	5.34	3.49	7.18
2001	55	900147	6.11	4.50	7.72
2002	79	1098533	7.19	5.61	8.78
2003	115	1369800	8.40	6.86	9.93
2004	148	1502468	9.85	8.26	11.44
2005	258	1614733	15.98	14.03	17.93
2006	441	1770849	24.90	22.58	27.23
2007	964	1846500	52.21	48.91	55.50
2008	1520	1916648	79.31	75.32	83.29
2009	2199	2049874	107.27	102.79	111.76
2010	2993	2072657	144.40	139.24	149.57
2011	3729	2066914	180.41	174.63	186.20
2012	4534	2107103	215.18	208.92	221.43
2013	5340	2148786	248.51	241.86	255.17
2014	5790	2026564	285.71	278.36	293.05
2015	6111	1889368	323.44	315.35	331.54
2016	5199	1577517	329.57	320.63	338.51
2017	5217	1414986	368.70	358.71	378.68

Supplementary table 16: Regression model describing the risk of experiencing domestic abuse in women

Incidence of domestic abuse in women		
	Adjusted* incidence rate ratio (95% CI)	P value
Age categories		
18-24 years	1 (ref)	
25-34 years	0.84 (0.79-0.90)	<0.001
35-44 years	0.57 (0.52-0.61)	<0.001
45-54 years	0.26 (0.23-0.29)	<0.001
55-64 years	0.12 (0.10-0.14)	<0.001
65+ years	0.05 (0.04-0.06)	<0.001
Ethnicity		
White	1 (ref)	
Mixed race	1.16 (0.95-1.43)	0.152
Black	1.64 (1.42-1.89)	<0.001
South Asian	2.14 (1.92-2.39)	<0.001
Others	2.19 (1.75-2.73)	<0.001
Missing	0.53 (0.50-0.56)	<0.001
Townsend Deprivation Index		
1 (Least deprived)	1 (ref)	0.001
2	1.20 (1.08-1.35)	<0.001
3	1.55 (1.40-1.72)	<0.001
4	2.08 (1.88-2.30)	<0.001
5 (Most deprived)	2.30 (2.71-3.30)	<0.001
Missing	1.65 (1.48-1.84)	<0.001

*Adjusted for other demographic factors within the table

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Reporting location
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	Title and abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	Title and abstract
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Introduction
Objectives	3	State specific objectives, including any prespecified hypotheses	Introduction
Methods			
Study design	4	Present key elements of study design early in the paper	Methods
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Methods
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	Methods
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Methods
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Methods
Bias	9	Describe any efforts to address potential sources of bias	Methods and discussion
Study size	10	Explain how the study size was arrived at	Methods
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Methods
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	Methods
		(*b*) Describe any methods used to examine subgroups and interactions	Methods
		(*c*) Explain how missing data were addressed	Methods
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases	Methods

	and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	
	(*e*) Describe any sensitivity analyses	Methods

Continued on next page

Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Results
		(b) Give reasons for non-participation at each stage	n/a
		(c) Consider use of a flow diagram	n/a
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Results
		(b) Indicate number of participants with missing data for each variable of interest	Table 1
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	Results
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	Results
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	
		Cross-sectional study—Report numbers of outcome events or summary measures	
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Results
		(*b*) Report category boundaries when continuous variables were categorized	Results
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Results
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Results
Discussion			
Key results	18	Summarise key results with reference to study objectives	Discussion
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Discussion
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Discussion
Generalisability	21	Discuss the generalisability (external validity) of the study results	Discussion
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Funding statement

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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An exploration of trends in the incidence and prevalence of childhood maltreatment and domestic abuse recording in UK primary care: a retrospective cohort study using 'The Health Improvement Network' database

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An exploration of trends in the incidence and prevalence of childhood maltreatment and domestic abuse recording in UK primary care: a retrospective cohort study using 'The Health Improvement Network' database

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Abstract

Objectives: Describe the epidemiology of childhood maltreatment and domestic abuse (in women)

Design: Analysis of longitudinal records between 1st January 1995 to 31st December 2018

Setting: A UK primary care database: 'The Health Improvement Network' (THIN)

Participants: 11,831,850 eligible patients from 787 contributing practices. Childhood maltreatment and domestic abuse (women only) were defined as the presence of a recorded Read code.

Outcome measures: The incidence rate (IR) and prevalence of childhood maltreatment (in children aged 0-18 years) and domestic abuse (in women aged over 18) between 1996-2017. An adjusted incidence rate ratio (aIRR) is given to examine the differences in IRs based on sex, ethnicity and deprivation.

Results: The age and gender breakdown of THIN has been previously reported to be representative of the UK population, however, there is substantial missing information on deprivation quintiles (<20%) and ethnicity (approximately 50%).The IR (IR 60.1; 95% CI 54.3-66.0 per 100,000 child years) and prevalence (416.1; 95% CI 401.3-430.9 per 100,000 child population) of childhood maltreatment rose until 2017. The aIRR was greater in patients from the most deprived backgrounds (aIRR 5.14; 95% CI 4.57-5.77 compared to least deprived) and from an ethnic minority community (e.g. Black aIRR 1.25;1.04-1.49 compared to White). When examining domestic abuse in women, in 2017, the IR was 34.5 (31.4-37.7) per 100,000 adult years and prevalence 368.7 (358.7-378.7) per 100,000 adult population. Similarly, the IR was highest in the lowest socio-economic class (aIRR 2.30; 2.71-3.30) and in ethnic minorities (South Asian aIRR 2.14;1.92-2.39 and Black aIRR 1.64;1.42-1.89).

Conclusion: Despite recent improvements in recording, there is still a substantial under-recording of maltreatment and abuse within UK primary care records, compared to

currently existing sources of childhood maltreatment and domestic abuse data. Approaches must be implemented to improve recording and detection of childhood maltreatment and domestic abuse within medical records.

Keywords: Domestic abuse, childhood maltreatment, epidemiology, primary care, incidence

Strengths and limitations of this study

- Primary care data encompasses a vast proportion of society, and as current guidance is to ensure identification of domestic abuse and childhood maltreatment by General Practitioners, studying the epidemiology within this dataset is important
- Despite the vast cohort size, our results demonstrate substantial under-recording of childhood maltreatment and domestic abuse
- Although the study was able to examine trends by age, gender, deprivation and ethnicity, trends by ethnicity were limited due to extensive missing data within UK primary care
- Before primary care data can used as a tool for public health surveillance of childhood maltreatment and domestic abuse, there is a definite need for improved recording and/or reporting

INTRODUCTION

Childhood maltreatment (physical, sexual or emotional abuse and neglect against those under the age of 18 years)[1] and domestic abuse (controlling, coercive, threatening behaviour, violence or abuse between those who are, or have been, intimate partners or family members)[2] are global public health problems. The negative downstream social, psychological and physical health effects of childhood maltreatment and domestic abuse bear a substantial societal cost.[3–11] Therefore, a public health approach is urgently needed to prevent both the occurrence of childhood maltreatment and domestic abuse as well as their secondary consequences. In order to support a public health approach, high quality data recording relating to these exposures plays an important role. Exploring the role of routinely collected data (which due its repeatable nature can be used for surveillance) in the UK as well as other countries is crucial in both the estimation of the societal burden of disease as well as the identification of risk and protective factors.[12]

Exposure to domestic abuse and childhood maltreatment remain taboo topics in many cultures, despite the adverse consequences in terms of health and wellbeing, with significant stigma around disclosure of traumatic events.[13,14] As a result, survivors of such traumatic experiences often find it difficult to attend and seek support from public sector authorities such as healthcare staff.[15,16] There are also challenges for healthcare staff to routinely enquire or ask about such experiences in their patients' lives.[17] The combination of barriers to disclosure and enquiry are likely to lead to a hidden burden of domestic abuse and childhood maltreatment not captured in administrative public sector data. However, since introductions of new guidelines in the UK (National Institute of Health and Care Excellence in 2016 and 2017), the hope has been that administrative recording will have improved.[18,19] This drive towards improved reporting is spurred on by UK media and governmental interest in these topics (high profile events leading to media and governmental interest include: the death of Baby P, the Jimmy Savile inquiry, Operation Yewtree, the death of Daniel Pelka, the identification and referral to improve safety (IRIS) trial and the consideration of the domestic abuse bill), and the consequent expectation that administrative recording will have improved.[20–24]

Current UK national estimates of domestic abuse are largely derived from self-reported surveys in conjunction with administrative data. The crime survey for England and Wales (CSEW) provides self-reported information and used in conjunction with police records of the number of recorded domestic abuse incidents to define epidemiological estimates of domestic abuse. In women, the reported prevalence from the CSEW (for those aged 16-59 years old) was 7.9% in the financial year 2017/2018 while the crude estimate derived from

police data for the year ending 2017 (not yet available for 2018 for those aged 16 and over) across England was 24.0/1,000 population (in men and women).[25,26]

Unfortunately, the use of alternative administrative records pertaining to information on domestic abuse are limited to recording processes such as hospital records. There is no specific international classification of disease code that are specific to domestic abuse: The closest matches are T74.1 (physical abuse, confirmed), Y07.0 (spouse or partner, perpetrator of maltreatment and neglect) and Z63.0 (and problems in a relationship with spouse or partner) which when specified in adults relate to physical abuse, maltreatment.[27] However, there are substantial limitations to utilising these codes to describe the epidemiology of domestic abuse, due to low numbers of such codes being recorded and also ambiguities in coding practice between hospital trusts.[27]

The state of epidemiological estimates when exploring childhood maltreatment suffers from similar challenges. A recent observational study utilised data from 1858-2016 that was derived from child mortality records, police recorded-homicides, crimes against children, child protection data, children in care and data taken from the National Society for the Prevention of Cruelty to Children (NSPCC) to study long term trends of child maltreatment. The study found a decreasing long-term trend in child maltreatment until the year 2000 but reported an increase thereafter.[28] However child mortality continued to decrease.[28] A recommendation of the report was to further research and establish whether child maltreatment is continuing to increase.[28] However, once again when taken from the CSEW, the estimated prevalence of experiencing childhood maltreatment was 18.9% (financial year end 2016).[29] The information relating to the incidence rate for those at risk of childhood maltreatment or domestic abuse is low. One approach to attempt to do so is to use records taken from general practice (GP). A previous study using GP recorded data between 1995 to 2010 explored the incidence rates and prevalence of childhood maltreatment related concerns (includes information relating to suspected and possible maltreatment) and identified an increase in incidence and prevalence of maltreatment related concerns between this time.[30]

In summary, the limitations of existing estimates relate to challenges with: 1) continuous recording of survey data to allow for active surveillance and examination of trends; 2) social desirability bias[31] leading to an under-estimation in survey estimates; 3) selection bias[32] leading to an under-estimation in administrative datasets; 4) an appropriate denominator population to describe prevalence in administrative data.

Primary care data from sources such as 'The Health Improvement Network' (THIN) database have previously been shown to representative of the UK population in terms of age structure and can provide a suitable denominator population to examine the epidemiology of public health risk factors.[33] Additionally, new guidelines and interventions have been put in place to improve recording of childhood maltreatment and domestic abuse.[18,19,24,34] The last time primary care data was explored to describe a similar risk factor was in 2010 prior to these improvements. Therefore, there is a need to describe the current estimates of childhood maltreatment and domestic abuse from primary care data and compare these to existing estimates to describe the possibility of further use of primary care data to support

policy makers/public health professionals in decisions relating to the burden of maltreatment and abuse.

Our aim was to investigate how the incidence and prevalence of childhood maltreatment and domestic abuse have changed between 1996-2017 using 'The Health Improvement Network' (THIN) primary care database.

METHODS

Study design and data source

A cohort was extracted of eligible patients who contributed to the dataset between 1st January 1995 and 31st December 2018. Using this cohort, it was possible to describe the yearly incidence rate (IR) and prevalence of childhood maltreatment and domestic abuse. Using the cohort it was also possible to describe the cumulative IR broken down by age group, gender (in childhood maltreatment), deprivation and ethnicity.

During the study period, the dataset consisted of medical records taken from 787 UK general practices and deemed to be representative of the UK population.[35] THIN records information relating to demographics, disease progression and management.[36] Information relating to symptoms, examinations, and diagnoses are documented using a hierarchical clinical coding system called Read codes.[37]

Population, exposure and outcomes

General practices were eligible for inclusion 12 months following installation of electronic health records or from the practice's acceptable mortality recording date.[38,39] Inclusion of data after these points were measures of quality assurance for the dataset. During the study period from 1st January 1995 and 31st December 2018, there were 11,831,850 eligible patient records following this inclusion criteria.

The outcomes of interest (childhood maltreatment or domestic abuse) were both defined by presence of a relevant Read code relating to patient exposure. As the aim of this study was to examine incidence and prevalence, the code list used to define incidence and prevalence varied to account for codes that mention a history of the exposure (for the calculation of prevalence but not for incidence rate). The list of Read codes used in this study to describe childhood maltreatment/domestic abuse (varied by incidence and prevalence) are documented in the supplementary (supplementary read code lists) and selection of such codes are described in previous published work.[7,9,40,41] Domestic abuse exposure in this study was limited to only female patients as comparatively very low numbers of men had recorded incidents of domestic abuse during the study period (displayed in table 1). The annual incidence rate and prevalence of domestic abuse experienced by men between 2005-2017 is displayed on supplementary tables 1-2.

Dependent on the outcome of interest, there were further inclusion criteria on the study population which was eligible for inclusion. To calculate the IR and prevalence of childhood maltreatment, we only included patients under the age of 18 at cohort entry. We enforced a study criterion that patients would have to exit the study by their 18th birthday as they would no longer be contributing child-years (CY) at risk. During the study period the total

population amounted to 3,045,456 children. In order to calculate the IR and prevalence of domestic abuse, a female adult cohort was selected who had an eligible cohort entry date from the age of 18 years onwards (4,982,781 eligible patients). The purpose being to allow us to calculate an IR of adult years (AY) at risk. Additionally, there is debate about whether children living in a household where there is domestic abuse overlaps with the definition of child maltreatment as a form of adverse childhood experience (ACEs).[42] Therefore, to avoid confusion in definition between childhood maltreatment and experiencing ACEs which include other markers of household adversity, we have restricted our domestic abuse population to only those over the age of 18 years.

Statistical analysis and follow up

For annual point prevalence, the numerator was the cumulative count of eligible individuals with any record of domestic abuse (occurred over 18 years) or childhood maltreatment (occurred under 18 years) identified at the 1st January each year from 1996 to 2017 who were then divided by the total eligible population on the same date (denominator). The prevalence is described per 100,000 population (in the domestic abuse cohort per 100,000 adult population and childhood maltreatment cohort per 100,000 child population) with their associated confidence intervals (CI).

A series of yearly cohort studies were performed to calculate the crude IR of domestic abuse and childhood maltreatment for each year from 1996 to 2017. The numerator was the new number of cases in that calendar year, divided by the total number of person-years at risk (denominator) for the given year. In each annual cohort study to determine IR, the period of follow up was defined as:

Entry date: The latest date of either study start date (1st of January each year), one year after electronic medical records were implemented, one year after the practice reached acceptable mortality recording date or when the patient met the age inclusion criteria if one was present (e.g. patients had to reach 18 years before they were eligible for entry into the domestic abuse study population).

Exit date: The earliest date of either study end date (31st of December each year), outcome date (new incident of childhood maltreatment or domestic abuse), death date, transfer date (when patient moved practice and were censored from the dataset), collection date (last date the practice contributed to the dataset) and the date when patient's age crosses the age inclusion criteria (e.g. patients will exit the cohort when they turn 18 for the IR calculation of childhood maltreatment).

Graphical representations of the incidence and prevalence was conducted from years where there were 5 or more incident cases of domestic abuse (2005) or childhood maltreatment (1997). The annual IR and prevalence are also stratified by sex (male or female) for childhood maltreatment.

Additionally, the cumulative IR for the whole time period from the 1st January 1995 to 31st December 2018 was stratified by age category of outcome incidence (defined using categories used by the Department of Education to allow for comparison),[43] Townsend

deprivation quintile,[44] ethnicity and sex when using data for the whole time period from the 1st January 1995 to 31st December 2018.

To discern differences between ethnic groups and deprivation quintiles (in the child cohort) a multivariate (adjusting for each other, sex and age at cohort entry) Poisson regression offsetting for person years of follow-up was used to calculate an adjusted incidence rate ratio (aIRR). Where there were missing data in our covariates (Ethnicity and Townsend quintile), these were treated as a separate missing category and included in the final model. Significance was set at $p<0.05$.

Statistical analysis was conducted using STATA MP/4 v15.1 (Statacorp 2017). Wherever IR, IRR and prevalence are presented, associated 95% confidence intervals (CI) are given in conjunction.

Patient and public involvement

No patients were actively involved in setting the research question, outcome measures, study design, results interpretation of write up of the results. There are plans for the results to be disseminated to the community affected by this research through childhood maltreatment and domestic abuse charities and social media channels.

Ethical Approval

Anonymised data were used throughout the study provided by the data provider to the University of Birmingham. Studies using The Health Improvement Network (THIN) database have had initial ethical approval from the NHS South-East Multicentre Research Ethics Committee, subject to prior independent scientific review. The Scientific Review Committee (IQVIA) approved the study protocol (SRC Reference Number: SRC18THIN034) prior to its undertaking.

RESULTS

During the study period there was a total of 4,603 incident episodes of childhood maltreatment cohort in a cohort of 3,045,456 children (aged under 18). In the adult female cohort (aged over 18), there were 5,598 incident recorded episodes of domestic abuse in the total female population of 4,982,781 patients. Table 1 outlines the characteristics of both cohorts at cohort entry as well as the patients who were incident cases of childhood maltreatment and domestic abuse.

Childhood maltreatment

The IR of childhood maltreatment increased from 22.5 per 100,000 CY (95% CI 11.8-33.2) in 1997 to 60.1 per 100,000 CY (95% CI 54.3-66.0) in 2017. The was a steadily increasing trend from 2007 to 2012 and a steep rise between the year 2012 (IR 30.0; 95% CI 26.8-33.3 per 100,000 CY) and 2013 (IR 52.3; 95% CI 47.9-56.7 per 100,000 CY), after which it remained relatively stable until 2017. Further details can be seen in figure 1a and supplementary table 3.

When broken down by sex, a similar temporal trend is noted between both males and females. However, the cumulative IR was higher in the female cohort (IR 27.2; 95% CI 26.1-18.6 per 100,000 CY) was greater when compared to the male cohort (IR 19.4; 95% CI 18.6-

20.3 per 100,000 CY). The IR in females in 2017 was 66.2 (95% CI 57.4-75.1) per 100,000 CY compared to IR of 54.3 (95% CI 46.5-62.1) per 100,000 CY in males. Further details of the trends are seen on figure 1 b-c and supplementary tables 4-5.

The age range was broken down into the categories 0-1, 1-4, 5-9, 10-15 and 16-17 years. The group with the highest IR was the 0-1-year cohort (IR 52.7; 95% CI 47.9-58.0 per 100,000 CY) and whereas the 16-17 group (IR 21.2; 95% CI 19.0-23.5 per 100,000 CY) had the lowest IR (figure 1d and supplementary table 6). When examining by socio-economic deprivation quintile there was a linear relationship observed between IR and deprivation. More details are seen in figure 1e and supplementary table 7. Lastly, the IR was higher in the ethnic minority groups (Black (IR 45.1; 95% CI 37.4-52.9 per 100,000 CY), South Asian (IR 34.7; 95% CI 29.0-40.4 per 100,000 CY) and Other backgrounds (IR 48.1; 95% CI 37.3-58.9 per 100,000 CY)) when compared with those who had a White (IR 27.7; 95% CI 26.5-29.0 per 100,000 CY)) or mixed ethnicity (IR 21.8; 95% CI 13.4-30.2 per 100,000 CY). Further details are provided in figure 1f and supplementary table 8.

The prevalence of childhood maltreatment steadily increased from 176.3 (95% CI 132.8-219.8) per 100,000 child population in 1997 to 416.1 (95% CI 401.3-430.9) per 100,000 population in 2017. This can be seen in figure 2 and supplementary table 9.

In the multivariate analysis following adjustment for age at cohort entry, sex and deprivation quintile, the increased risk apparent in South Asians compared to White children was not evident (aIRR 1.06; 95% CI 0.89-1.26). However, the Black (aIRR 1.25; 95% CI 1.04-1.49) and other (aIRR 1.45; 95% CI 1.15-1.82) populations were at a greater risk. In the above analysis there was a gradient increase observed in the risk of childhood maltreatment with worsening deprivation. The most deprived quintile had a five-fold increased risk of childhood maltreatment (aIRR 5.14; 95% CI 4.57-5.77). Further details are seen in supplementary table 10.

Domestic abuse

The IR of domestic abuse increased from 0.3 per 100,000 AY (95% CI 0.0-0.6) in 2005 to 34.6 per 100,000 AY (95% CI 31.4.1-37.7) in 2017. The trend was increasing relatively steadily from 2006 to 2013 followed by a steep increase in 2014 (IR 35.8; 95% CI 33.2-38.5 per 100,000 AY). Further details can be seen in figure 3a and supplementary table 11.

The age range was broken down into the categories 18-24, 25-34, 35-44, 45-54, 55-64 and over 65 years. The groups with the highest IR were 18-24 (IR 33.0; 95% CI 31.2-34.9 per 100,000 AY) and 25-34-year cohorts (IR 33.7; 95% CI 32.2-35.3 per 100,000 AY), followed by a decline by age group. Further details are seen in figure 3b and supplementary table 12. When examining by deprivation quintile, again a linear trend was seen where there was a fourfold increased risk of new domestic abuse incidence in the most deprived quintile (IR 36.3; 95% CI 34.3-38.3 per 100,000 AY) compared to the least deprived (IR 8.9; 95% CI 8.2-9.6 per 100,000 AY). More information can be found in figure 3c and supplementary table 13. Lastly, similar to childhood maltreatment, a disparity was seen in relation to ethnic group, where Black (IR 55.0; 95% CI 47.7-62.6 per 100,000 AY), South Asian (IR 65.4; 95% CI 58.6-72.2 per 100,000 AY) and Other background (IR 73.6; 95% CI 57.4-89.7 per 100,000

AY)) had a higher incidence rate when compared with those who had a White (IR 21.5; 95% CI 20.7-22.3 per 100,000 AY)) or mixed ethnic (IR 36.8; 95% CI 29.4-44.2 per 100,000 AY) background. Figure 3d and supplementary table 14 contain additional detail.

The prevalence of domestic abuse increased in an almost linear manner from 16.0 (95% CI 14.0-17.9) per 100,000 adult population to 368.7 (95% CI 358.7-378.9) per 100,000 adult population in 2017. This can be seen in figure 4 and from supplementary table 15.

In the multivariate regression analysis, it was evident that ethnicity played a factor in the risk of domestic abuse. South Asians (aIRR 2.14; 95% CI 1.92-2.39), Black (aIRR 1.64; 95% CI 1.42-1.89) and Other (aIRR 2.19; 95% CI 1.75-2.73) populations were all at a greater risk than the White cohort. Similar to childhood maltreatment there was a gradient increase between worsening deprivation and the risk of domestic abuse. The most deprived quintile had an aIRR of 2.30; 95%CI 2.71-3.30. Further details contained within supplementary table 16.

DISCUSSION

Summary of key findings

The IR of both childhood maltreatment and domestic abuse increased until 2017 (60.1 (95% CI 54.3-66.0) per 100,000 CY and 34.6 (95% CI 31.4.1-37.7) per 100,000 AY respectively in 2017). Additionally, the prevalence of both childhood maltreatment and domestic abuse continued to increase in a linear fashion until 2017. Of interest there were similar patterns of risk in both groups. For both childhood maltreatment and domestic abuse, there was a substantially increased aIRR seen in those from a more deprived background when compared to the least deprived, and a greater incidence rate of new cases of both childhood maltreatment and domestic abuse in those from an ethnic minority background despite taking into account other co-variates. The IR was also highest in the 0-1-year group and in females for childhood maltreatment and the 18-24-year group for those experiencing domestic abuse. The most notable finding is the high level of under-recording of childhood maltreatment and domestic abuse in the dataset in comparison to those reported in self-reported surveys including the CSEW and NSPCC survey.

Comparison to current literature

As this was the first cohort to the authors' knowledge to explore the annual incidence and prevalence of domestic abuse (in women) using UK primary care records, it is difficult to compare the incidence rates directly with other studies. However for childhood maltreatment, one previous study (including data from 1995-2010) reported the IR of childhood maltreatment related concerns using THIN.[30] The maltreatment related concern codes included cases of suspected or probable maltreatment which would explain why their documented IR and prevalence are substantially higher than those reported in our study.[30] However, of note in that study they demonstrated an increased IR of childhood maltreatment related concerns in those in the under one group, those who are female and almost a five times increased risk in those from the most deprived group when compared to the lowest group, all of which are similar to our findings.[30]

Of particular note, a key finding of our study was the prevalence and IR were much lower than estimates derived from currently existing sources of childhood maltreatment and domestic abuse epidemiology. When examining UK police reports of domestic abuse, although for both genders, the prevalence in England was 24.0 per 1,000 population, much higher than in our study even though we only included a female denominator population.[25] When compared to the CSEW data which showed a prevalence of 7.9% in women, our figure seems even lower.[26] Similarly, although no combined child maltreatment figure exists for police reports, if we examine the estimated prevalence from the CSEW which suggested 18.9% of all adults have experienced some form of childhood maltreatment our figure of 4.2 per 1,000 population (2017) is substantially lower.[29] When compared to other administrative data such as children in need data, which contains the rate of children on Child protection plans, GP recorded prevalence still remains low, which has also been shown in previous literature on maltreatment related concerns.[30,45]

The low values of incidence and prevalence of childhood maltreatment and domestic abuse and other interesting findings resonate and build on known literature. There have been national policy reports highlighting inconsistencies in data collected relating domestic abuse and childhood maltreatment to poverty and ethnicity.[46,47] However, we clearly demonstrate a linear relationship between IR and socio-economic deprivation following adjustment for ethnicity. When adjusting for deprivation, GP data still highlights the burden of maltreatment and abuse experienced in ethnic minorities (although South Asians were not at a higher risk of childhood maltreatment, and mixed raced individuals were not at a higher risk of either childhood maltreatment or domestic abuse). It has been previously highlighted that black and minority ethnic children are over-represented in child protection records within the UK, but this may be related to poverty (a form of which we have been able to adjust for in our study), isolation and willingness to seek help due to stigma in some communities.[48] In contrast to our findings, the prevalence reported for domestic abuse exposure CSEW was highest in those from a mixed race background, and lower in those from the South Asian, Black or Other community.[26]

There are clear messages that need to be taken from this study relating to the under-recording of domestic abuse and childhood maltreatment in GP records. Although approaches and intervention have been implemented and evaluated to record both of these traumatic experiences, more needs to be done.[24,34] Healthcare professionals should be aware of the morbidity burden caused by such exposures and also the referral tools at their disposal highlighted in recent national guidelines.[18,19] Attempts to overcome barriers in asking about domestic abuse and childhood maltreatment such as the use of short question proformas are options to be trialled more broadly.[49] Although recording of domestic abuse and childhood maltreatment do not yet fall under the incentivised payment system for GPs, it should be strongly encouraged to improve our recording and implementation of appropriate referral mechanisms.[50] Although this study was unable to explore the reasons for under-recording by GPs, there is substantial literature on reasons for the under-recording and under-reporting of maltreatment and abuse summarised in a recent review.[51] Factors refer to either challenges in the recognition or reporting of maltreatment and abuse. Variables which may affect recognition include experience and knowledge levels of the treating clinician or variation in the threshold between clinicians as to what is reasonable suspicion of maltreatment or abuse.[51,52] Additionally, factors which affect the

clinician reporting the maltreatment or abuse include; 1) knowledge of the family; 2) expected negative outcomes of reporting to child-protection services; 3) lack of confidence that reporting would improve patient outcomes and 4) damage to the patient-clinician relationship.[51] Therefore, education approaches going beyond data improvement and screening are needed to improve not only recognition but reporting practices.

Strengths and limitations

Although our data are derived from a large population-based cohort, the results demonstrate substantial under-recording of childhood maltreatment and domestic abuse. Therefore, our results are likely to underestimate the burden of childhood maltreatment and domestic abuse by GPs. The increasing trends in IR and prevalence suggest that recording is improving and with the introduction of national guidelines and standards, this will continue to improve.[18,19] Before this dataset can be used for surveillance purposes or tracking of long term trends in childhood maltreatment or domestic abuse, there need to be further improvements in the rate or recording and reporting. Although this study was not designed to assess the impact of public policy or media attention at certain time points, it is also possible that spikes in IR seen in the dataset such as in 2012-2013 in the childhood maltreatment cohort may be related to high profile news events such as the exposure of Jimmy Savile which was shown to result in an increase of reports of childhood maltreatment to UK statutory bodies.[53] Additionally, as time progress it may be possible to conduct an interrupted time series analysis to assess the impact of changes in the NICE guidance and whether this has led to improved recording and reporting.

It is also important to note that the reliability of the findings are largely reliant on the accuracy of the coding practices by the GP. As seen in this study, there are a wide variety of codes relating to childhood maltreatment and domestic abuse. It is possible that information relating to maltreatment and abuse is included in the free-text narrative during clinical consultation which is not accessible. Therefore, we advise that in future studies, that where possible, free text analysis is conducted on clinical records to assess if this increases the number of reported cases.

In our IR subgroup analysis, we also have limitations in the recorded ethnicity of patients (highlighted in table 1). Ethnicity recording has historically been poor, although improving in primary care data, with missing rates of around 50%.[54] Therefore, future research should aim to explore the IR of these outcomes in other cohorts which have utilised similar UK census categories for ethnicity. Another approach in future analyses, is if the dataset provides information on linked family members, it may be possible to infer the ethnicity if missing data is present.

Conclusion

In conclusion, our study showed an in-depth exploration of the incidence rate and prevalence trends of childhood maltreatment and domestic abuse using UK primary care records. It is clear that there is a severe under-reporting of both of these important exposures which relate to substantial morbidity and mortality burdens. Therefore,

approaches to improve recording of abuse and strategies to detect and prevent negative consequences of childhood maltreatment and domestic abuse should be implemented.

Figure legends:

Figure 1: The incidence rate of childhood maltreatment broken down by sex, age, deprivation and ethnicity

Figure 2: Prevalence of childhood maltreatment: 1997-2017

Figure 3: The incidence rate of domestic abuse broken down by age, deprivation and ethnicity

Figure 4: Prevalence of domestic abuse: 2005-2017

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Data statement
The original data can be requested from the study team. However, ethics approval may need to be sought by the data provider prior to release of data.

Author contributions
This study contributed to the PhD thesis for the main author JSC. JSC, JT, SB and KN were responsible for initial conception of the study. JSC and KG were responsible for data extraction, analysis and first draft of the manuscript. All authors were then involved in critical discussion of the draft. The final manuscript was authorised by all the authors with JT providing expert knowledge on childhood maltreatment, CBJ provided expertise on domestic abuse whereas SB and KN provided methodological expertise. All authors agree to be accountable for all aspects of the work.

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Declaration of Interests
All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work, no financial relationships with any organisations that might have an interest in the submitted work in the previous three years, no other relationships or activities that could appear to have influenced the submitted work.

References

1 HM Government. Working Together to Safeguard Children: A guide to inter-agency working to safeguard and promote the welfare of children. 2018https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/722305/Working_Together_to_Safeguard_Children_-_Guide.pdf (accessed 11 Jul2018).

2 HM Government. Guidance: Domestic violence and abuse. UK Gov. 2016.https://www.gov.uk/guidance/domestic-violence-and-abuse#domestic-violence-and-abuse-new-definition (accessed 19 Feb2018).

3 Bellis MA, Hughes K, Ford K, Ramos Rodriguez G, Sethi D, Passmore J. Life course health consequences and associated annual costs of adverse childhood experiences across Europe and North America: a systematic review and meta-analysis. *Lancet Public Heal* 2019; **0**. doi:10.1016/S2468-2667(19)30145-8.

4 Gilbert R, Widom CS, Browne K, Fergusson D, Webb E, Janson S. Burden and consequences of child maltreatment in high-income countries. *Lancet* 2009; **373**: 68–81.

5 Bacchus LJ, Ranganathan M, Watts C, Devries K. Recent intimate partner violence against women and health: a systematic review and meta-analysis of cohort studies. *BMJ Open* 2018; **8**: e019995.

6 Krug EG, Dahlberg LL, Mercy JA, Zwi AB, Lozano R. World report on violence and health. http://apps.who.int/iris/bitstream/handle/10665/42495/9241545615_eng.pdf;jsessionid=38974668595BA31895E557DC1CB1EFEC?sequence=1 (accessed 4 Jul2018).

7 Chandan JS, Thomas T, Bradbury-Jones C, Russell R, Bandyopadhyay S, Nirantharakumar K *et al.* Female survivors of intimate partner violence and risk of depression, anxiety and serious mental illness. *Br J Psychiatry* 2019; : 1–6.

8 Chandan JS, Thomas T, Raza K, Bradbury-Jones C, Taylor J, Bandyopadhyay S *et al.* Intimate Partner Violence and the Risk of Developing Fibromyalgia and Chronic Fatigue Syndrome. *J Interpers Violence* 2019; : 088626051988851.

9 Chandan JS, Thomas T, Gokhale KM, Bandyopadhyay S, Taylor J, Nirantharakumar K. The burden of mental ill health associated with childhood maltreatment in the UK, using The Health Improvement Network database: a population-based retrospective cohort study. *The Lancet Psychiatry* 2019; **6**: 926–934.

10 Chandan JS, Thomas T, Bradbury-Jones C, Taylor J, Bandyopadhyay S, Nirantharakumar K. Intimate partner violence and temporomandibular joint disorder. *J Dent* 2019; **82**: 98–100.

11 Chandan JS, Thomas T, Bradbury-Jones C, Taylor J, Bandyopadhyay S, Nirantharakumar K. Risk of Cardiometabolic Disease and All-Cause Mortality in Female Survivors of Domestic Abuse. *J Am Heart Assoc* 2020; **9**: e014580.

12 World Health Organization. The public health approach. WHO. 2011.http://www.who.int/violenceprevention/approach/public_health/en/ (accessed 8 Nov2018).

13 Overstreet NM, Quinn DM. The Intimate Partner Violence Stigmatization Model and Barriers to Help-Seeking. *Basic Appl Soc Psych* 2013; **35**: 109–122.

14 Allnock D, Miller P. No one noticed no one heard report. 2013.https://pdfs.semanticscholar.org/7258/5fbe2269c865ac7c42aaf0e4bec5224a938b.pdf (accessed 29 Jul2019).

15 Smith CS. Coping Strategies of Female Victims of Child Abuse in Treatment for Substance Abuse Relapse: Their Advice to Other Women and Healthcare Professionals. *J Addict Nurs* 2007; **18**: 75–80.
16 Robinson L, Spilsbury K. Systematic review of the perceptions and experiences of accessing health services by adult victims of domestic violence. *Health Soc Care Community* 2007; **16**: 16–30.
17 Taket A. Responding to domestic violence in primary care. *BMJ* 2012; **344**: e757.
18 NICE. Overview | Child abuse and neglect | Guidance | NICE. 2017.https://www.nice.org.uk/guidance/ng76 (accessed 16 Dec2019).
19 NICE. Overview | Domestic violence and abuse | Quality standards | NICE. 2016.https://www.nice.org.uk/guidance/qs116 (accessed 16 Dec2019).
20 Parish E. Who should we blame for the death of Baby P? *BMJ* 2014; **349**: g6643.
21 STAFFORDSHIRE & STOKE-ON-TRENT SAFEGUARDING CHILDREN BOARDS. LESSONS TO BE LEARNED BRIEFING NO. 16: IN RESPECT OF THE DEATH OF DANIEL PELKA. 2013https://www.staffordbc.gov.uk/sites/default/files/cme/DocMan1/PolicyAndImprovement/Serious--Case-Review---Daniel-Pelka.pdf (accessed 16 Dec2019).
22 Department for Education. Investigations relating to Jimmy Savile - GOV.UK. 2015https://www.gov.uk/government/publications/investigations-relating-to-jimmy-savile (accessed 16 Dec2019).
23 UK Parliament. Domestic Abuse Bill 2017-19. 2017.https://services.parliament.uk/bills/2017-19/domesticabuse.html (accessed 16 Dec2019).
24 Feder G, Davies RA, Baird K, Dunne D, Eldridge S, Griffiths C *et al.* Identification and Referral to Improve Safety (IRIS) of women experiencing domestic violence with a primary care training and support programme: a cluster randomised controlled trial. *Lancet* 2011; **378**: 1788–1795.
25 Public health England. Public Health Profiles domestic abuse. 2018.https://fingertips.phe.org.uk/search/Domestic Abuse#page/4/gid/1/pat/6/par/E12000004/ati/102/are/E06000015/iid/92863/age/164/sex/4 (accessed 16 Dec2019).
26 Office for national statistics. Domestic abuse in England and Wales: year ending March 2018. 2018.https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/bulletins/domesticabuseinenglandandwales/yearendingmarch2018#prevalence-of-domestic-abuse.
27 Olive P. Intimate partner violence and clinical coding: issues with the use of the International Classification of Disease (ICD-10) in England. *J Health Serv Res Policy* 2018; **23**: 212–221.
28 Degli Esposti M, Humphreys DK, Jenkins BM, Gasparrini A, Pooley S, Eisner M *et al.* Long-term trends in child maltreatment in England and Wales, 1858-2016: an observational, time-series analysis. *Lancet Public Heal* 2019; **4**: e148–e158.
29 Office for National Statistics. Abuse during childhood. 2016.https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/articles/abuseduringchildhood/findingsfromtheyearendingmarch2016crimesurveyforenglandandwales (accessed 16 Dec2019).
30 Woodman J, Freemantle N, Allister J, de Lusignan S, Gilbert R, Petersen I. Variation in recorded child maltreatment concerns in UK primary care records: a cohort study

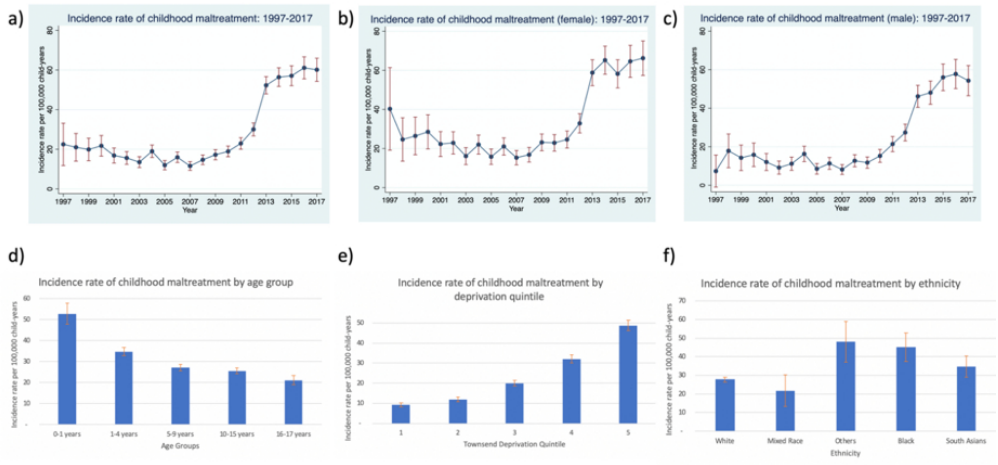
using The Health Improvement Network (THIN) database. *PLoS One* 2012; **7**: e49808.
31 Grimm P. Social Desirability Bias. In: *Wiley International Encyclopedia of Marketing*. John Wiley & Sons, Ltd: Chichester, UK, 2010 doi:10.1002/9781444316568.wiem02057.
32 Drake B, Jonson-Reid M, Kim H. Surveillance Bias in Child Maltreatment: A Tempest in a Teapot. *Int J Environ Res Public Health* 2017; **14**. doi:10.3390/ijerph14090971.
33 Blak BT, Thompson M, Dattani H, Bourke A. Generalisability of The Health Improvement Network (THIN) database: demographics, chronic disease prevalence and mortality rates. *Inform Prim Care* 2011; **19**: 251–5.
34 McGovern A, van Vlymen J, Liyanage H, Jones S, de Lusignan S, Woodman J *et al.* A simple clinical coding strategy to improve recording of child maltreatment concerns: an audit study. *Br J Gen Pract* 2014; **64**: 389–90.
35 Blak BT, Thompson M, Dattani H, Bourke A. Generalisability of The Health Improvement Network (THIN) database: demographics, chronic disease prevalence and mortality rates. *Inform Prim Care* 2011; **19**: 251–5.
36 IQVIA. IQVIA Medical Research Data - Health Research Authority. 2018.https://www.hra.nhs.uk/planning-and-improving-research/application-summaries/research-summaries/the-health-improvement-network-thin-database/ (accessed 20 Aug2019).
37 Booth N. What are the Read Codes? *Health Libr Rev* 1994; **11**: 177–82.
38 Maguire A, Blak BT, Thompson M. The importance of defining periods of complete mortality reporting for research using automated data from primary care. *Pharmacoepidemiol Drug Saf* 2009; **18**: 76–83.
39 Horsfall L, Walters K, Petersen I. Identifying periods of acceptable computer usage in primary care research databases. *Pharmacoepidemiol Drug Saf* 2013; **22**: 64–69.
40 Chandan JS, Thomas T, Bradbury-Jones C, Taylor J, Bandyopadhyay S, Nirantharakumar K. Intimate partner violence and temporomandibular joint disorder. *J Dent* 2019; **82**: 98–100.
41 Chandan JS, Thomas T, Raza K, Bandyopadhyay S, Nirantharakumar K, Taylor J. Association between child maltreatment and central sensitivity syndromes: A systematic review protocol. BMJ Open. 2019; **9**: bmjopen-2018-025436.
42 Hughes K, Bellis MA, Hardcastle KA, Sethi D, Butchart A, Mikton C *et al.* The effect of multiple adverse childhood experiences on health: a systematic review and meta-analysis. *Lancet Public Heal* 2017; **2**: e356–e366.
43 Department for Education. Children looked after in England including adoption: 2018 to 2019 - GOV.UK. 2019.https://www.gov.uk/government/statistics/children-looked-after-in-england-including-adoption-2018-to-2019 (accessed 15 Dec2019).
44 Townsend P, Phillimore P, Beattie A. Health and deprivation: inequality and the North. 1988. *London Croom Helm Google Sch* 1988.
45 Public Health England. Public Health Profiles Children subject to a child protection plan with initial category of abuse: rate per 10,000 children aged under 18. 2019.https://fingertips.phe.org.uk/search/child protection#page/4/gid/1/pat/6/par/E12000004/ati/102/are/E06000015/iid/92853/age/173/sex/4 (accessed 16 Dec2019).
46 Eldin Fahmy, Emma Williamson CP. Evidence and policy review: Domestic violence and poverty. 2016 doi:https://research-information.bris.ac.uk/en/publications/evidence-and-policy-review(af69c4ab-ff0b-

4392-9318-890dc0fcc359).html.
47 Bywaters P, Bunting L, Davidson G, Hanratty J. The relationship between poverty, child abuse and neglect: an evidence review. 2016; : 74.
48 Owen C, Statham J. Disproportionality in child welfare : the prevalence of black and minority ethnic children within the 'looked after' and 'children in need' populations and on child protection registers in England. 2009.https://www.semanticscholar.org/paper/Disproportionality-in-child-welfare-%3A-the-of-black-Owen-Statham/c3bec39040bc3816b2bce4cde6e51dc05321996b (accessed 16 Dec2019).
49 Gerbert B, Moe J, Caspers N, Salber P, Feldman M, Herzig K *et al.* Simplifying physicians' response to domestic violence. *West J Med* 2000; **172**: 329–31.
50 National Institute for Health and Care Excellence. Quality and Outcomes Framework Indicators - Standards & Indicators. 2016.https://www.nice.org.uk/Standards-and-Indicators/QOFIndicators (accessed 28 Jul2019).
51 Gilbert R, Kemp A, Thoburn J, Sidebotham P, Radford L, Glaser D *et al.* Recognising and responding to child maltreatment. *Lancet* 2009; **373**: 167–180.
52 Fraser JA, Mathews B, Walsh K, Chen L, Dunne M. Factors influencing child abuse and neglect recognition and reporting by nurses: A multivariate analysis. *Int J Nurs Stud* 2010; **47**: 146–153.
53 NSPCC. Giving victims a voice. 2013.https://www.nspcc.org.uk/globalassets/documents/research-reports/yewtree-report-giving-victims-voice-jimmy-savile.pdf (accessed 16 Dec2019).
54 Mathur R, Bhaskaran K, Chaturvedi N, Leon DA, vanStaa T, Grundy E *et al.* Completeness and usability of ethnicity data in UK-based primary care and hospital databases. *J Public Health (Oxf)* 2014; **36**: 684.

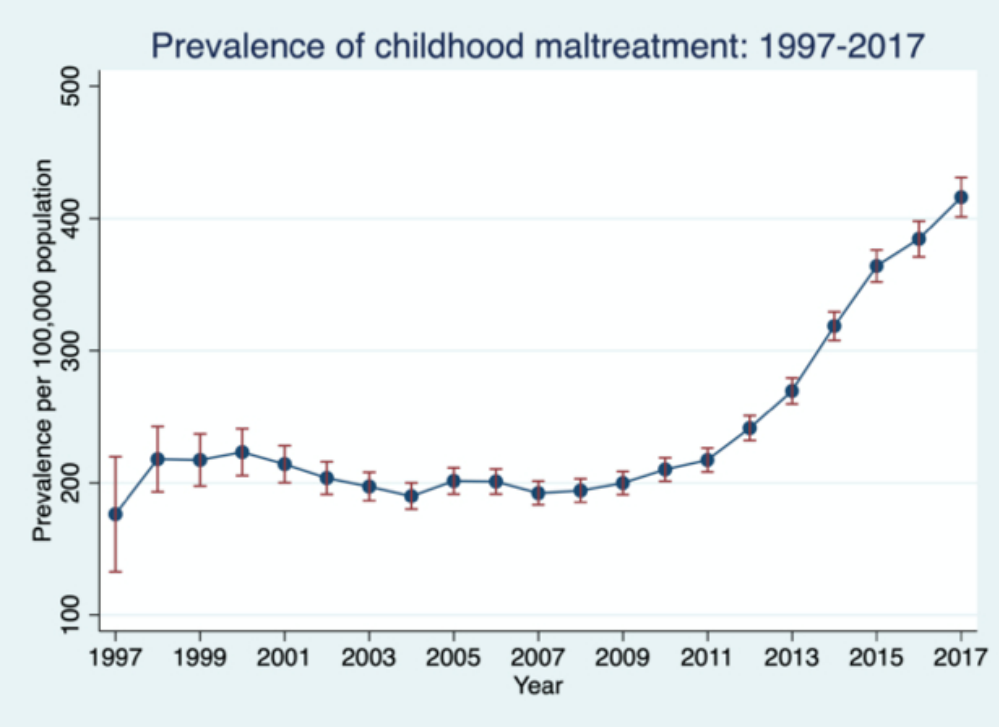
Table 1: Baseline characteristics of both the child and female adult cohort

	Child cohort (Under 18 years)			Female adult cohort (Over 18 years)			Male adult cohort (Over 18 years)	
	Total cohort	**Incident childhood maltreatment cases**		**Total cohort**	**Incident domestic abuse cases**		**Total cohort**	**Incident domestic abuse cases**
Number of patients	3045456	4603	**Number of patients**	4982781	5598	**Number of patients**	4605963	325
Sex			**Sex**			**Sex**		
Male	1570986 (51.6%)	2041 (44.3%)				Male	4605963 (100%)	325 (100%)
Female	1474470 (48.4%)	2562 (55.7%)	Female	4982781 (100%)	5598 (100%)			
Age at cohort entry			**Age at cohort entry**			**Age at cohort entry**		
0-1 years	1030637 (33.8%)	1757 (38.2%)	18-24 years	1211022 (24.3%)	1897 (33.9%)	18-24 years	1042526 (22.6%)	69 (21.2%)
1-4 years	607294 (19.9%)	1184 (25.7%)	25-34 years	1138926 (22.9%)	1939 (34.6%)	25-34 years	1042973 (22.6%)	76 (23.4%)
5-9 years	580306 (19.1%)	886 (19.3%)	35-44 years	777795 (15.6%)	1136 (20.3%)	35-44 years	852692 (18.5%)	96 (29.5%)
10-15 years	611693 (20.1%)	672 (14.6%)	45-54 years	596443 (12.0%)	411 (7.3%)	45-54 years	632223 (13.7%)	43 (13.2%)
16-17 years	215526 (7.1%)	104 (2.3%)	55-64 years	470107 (9.4%)	145 (2.6%)	55-64 years	468772 (10.2%)	23 (7.1%)
			65+ years	788488 (15.8%)	70 (1.3%)	65+ years	566767 (12.3%)	18 (5.5%)
Ethnicity			**Ethnicity**			**Ethnicity**		
White	1089894 (35.8%)	1854 (40.3%)	White	2017299 (40.5%)	2905 (51.9%)	White	1733115 (37.6%)	162 (49.9%)

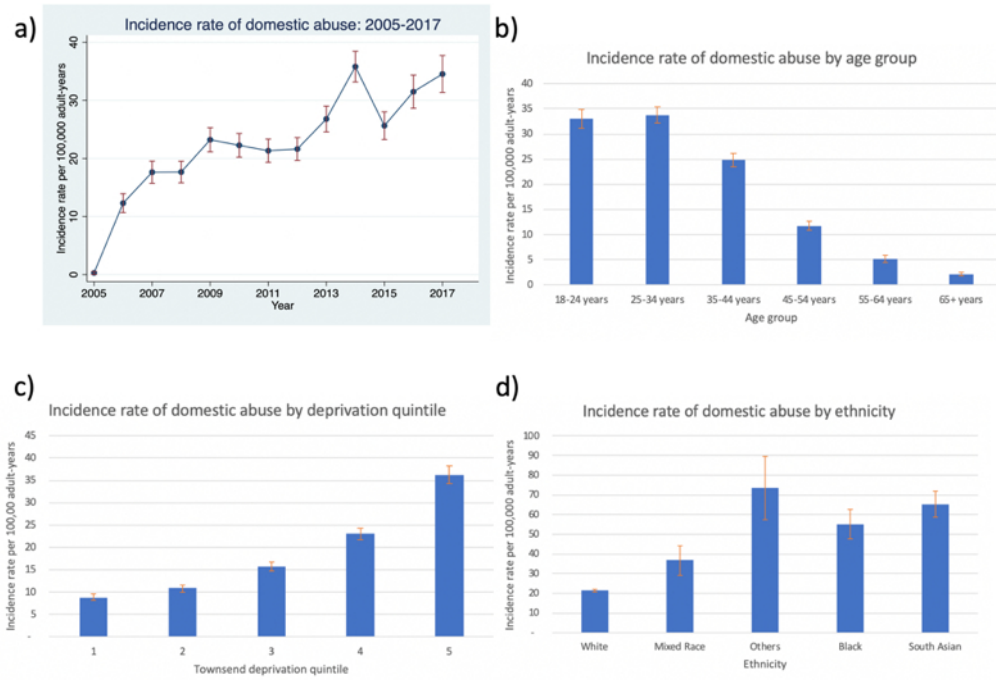
Mixed race	31067 (1.0%)	26 (0.6%)	Mixed race	69270 (1.4%)	99 (1.8%)	Mixed race	52952 (1.2%)	3 (0.9%)
Black	63244 (2.1%)	135 (2.9%)	Black	80974 (1.6%)	212 (3.8%)	Black	67232 (1.5%)	9 (2.8%)
South Asian	80486 (2.6%)	145 (3.2%)	South Asian	109117 (2.2%)	374 (6.7%)	South Asian	115324 (2.5%)	21 (6.5%)
Others	37318 (1.2%)	82 (1.8%)	Others	27071 (0.5%)	87 (1.6%)	Others	21291 (0.5%)	4 (1.2%)
Missing	1743447 (57.3%)	2361 (51.3%)	Missing	2679050 (53.8%)	1921 (32.3%)	Missing	2616039 (56.8%)	126 (38.8%)
Townsend Deprivation Index			**Townsend Deprivation Index**			**Townsend Deprivation Index**		
1 (Least deprived)	536645 (17.6%)	378 (8.2%)	1 (Least deprived)	9107759 (18.3%)	614 (11.0%)	1 (Least deprived)	856406 (18.6%)	55 (16.9%)
2	482613 (15.9%)	418 (9.1%)	2	848614 (17.0%)	664 (11.9%)	2	785170 (17.1%)	42 (12.9%)
3	538247 (17.7%)	729 (15.8%)	3	904034 (18.1%)	959 (17.1%)	3	832270 (18.1%)	65 (20.0%)
4	524151 (17.2%)	1080 (23.5%)	4	849248 (17.0%)	1225 (21.9%)	4	582622 (12.7%)	66 (20.3%)
5 (Most deprived)	410246 (13.5%)	1279 (27.8%)	5 (Most deprived)	612744 (12.3%)	1322 (23.6%)	5 (Most deprived)	582622 (12.7%)	55 (16.9%)
Missing	553554 (18.2%)	719 (15.6%)	Missing	857382 (17.2%)	814 (14.5%)	Missing	774144 (16.8%)	42 (12.9%)



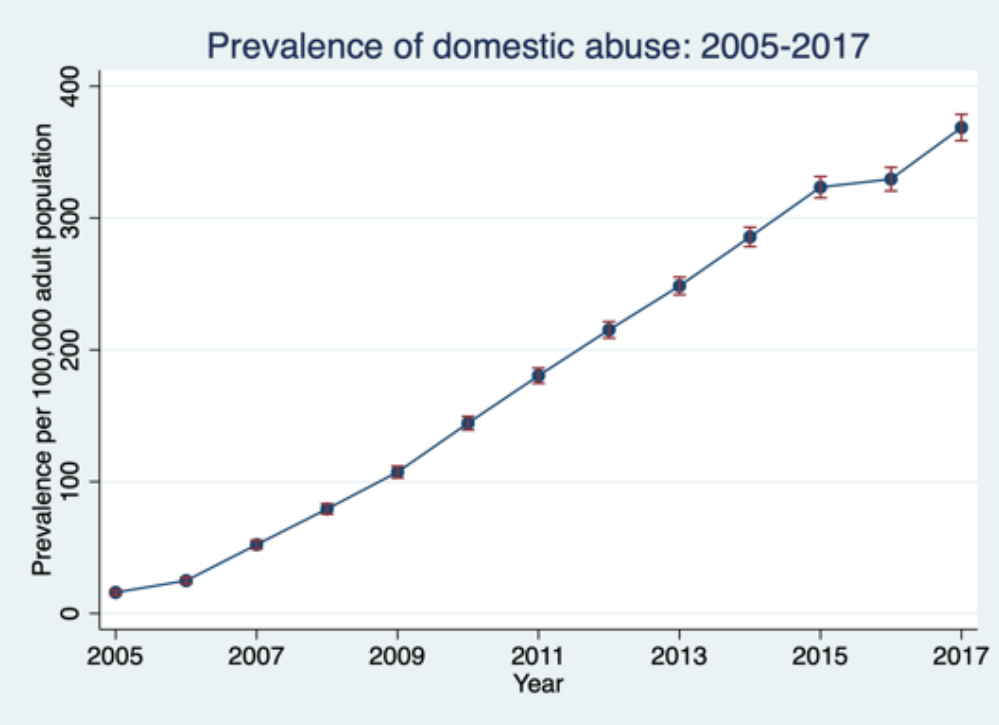
The incidence rate of childhood maltreatment broken down by sex, age, deprivation and ethnicity



Prevalence of childhood maltreatment: 1997-2017



The incidence rate of domestic abuse broken down by age, deprivation and ethnicity



Prevalence of domestic abuse: 2005-2017

Supplementary

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Read code lists

Childhood maltreatment- Incident only codes

Code	Description
13Ih.00	Subject to supervision order under Children Act 1989
13II.00	Child deserted by parents
13Ii.00	Subject to care order under Children Act 1989
13II.11	Child deserted by mother
13Ii000	Subject to care order under section 20 of Children Act 1989
13Ii100	Subject to care order under section 21 of Children Act 1989
13Ii200	Subject to care order under section 25 of Children Act 1989
13Ii300	Subject to care order under section 31 of Children Act 1989
13Ij.00	Subject to interim care order under Children Act 1989
13Ij000	Sub to interim care order under section 38 Children Act 1989
13Ij100	Emergency protective order section 44 Children Act 1989
13W3.00	Child abuse in family
13W4.00	Parent/child conflict
13W4000	Child/parent violence
13WT.00	Child protection observation
13WT000	Child protection category
13WT100	Child protection category emotional
13WT200	Child protection category physical
13WT300	Child protection category sexual
13WT400	Child protection category neglect
14X5.00	Victim of physical abuse
14X6.00	Victim of sexual abuse
14X6000	Victim of sexual harassment
14X7.00	Victim of emotional abuse
14X8.00	Victim of domestic violence
14XF.00	Victim of human trafficking
14XG.00	Victim of domestic abuse
14XH.00	Victim of child sexual exploitation
14XJ.00	Victim of psychological abuse
14XK.00	Victim of financial abuse
14XP.00	Victim of discriminatory abuse

14XR.00	Victim neglect & acts omission
222R.00	Neglected appearance
R037.00	[D]Insufficient intake of food and water due to self neglect
R2y3.11	[D] Self neglect
Ry18.00	[D]Self neglect
SN42000	Deprivation of food, unspecified
SN43000	Deprivation of water
SN55.00	Child maltreatment syndrome
SN55000	Emotional maltreatment of child
SN55011	Emotional deprivation of child
SN55012	Emotional abuse of child
SN55100	Nutritional maltreatment of child
SN55111	Nutritional deprivation of child
SN55112	Malnutrition in child maltreatment syndrome
SN55200	Non-accidental injury to child
SN55211	NAI - non-accidental injury to child
SN55212	Physical injury to child
SN55300	Battered baby or child syndrome NOS
SN55311	Battered baby syndrome NOS
SN55312	Battered child syndrome NOS
SN55400	Multiple deprivation of child
SN55500	Physical abuse of child
SN55600	Non-accidental traumatic head injury to child
SN55z00	Child maltreatment syndrome NOS
SN55z11	Child abuse NEC
SN55z12	Child deprivation syndrome
SN55z13	Neglect affecting child NEC
SN56000	Battered person unspecified, syndrome
SN57.00	Maltreatment syndromes
SN57000	Neglect or abandonment
SN57100	Sexual abuse
SN57200	Child affected by Munchausen's by proxy
SyuH500	[X]Other maltreatment syndromes
TE40.00	Accidents due to abandonment or neglect of helpless person
TL7..00	Child battering and other maltreatment
TL70.00	Child battering or other maltreatment by parent
TL7y.00	Child battering or other maltreatment by other spec person
TL7z.00	Child battering or other maltreatment by person NOS
TLx4.00	Assault by criminal neglect
U3M..00	[X]Neglect and abandonment
U3M0.00	[X]Neglect and abandonment, by spouse or partner
U3M1.00	[X]Neglect and abandonment, by parent
U3M2.00	[X]Neglect and abandonment, by acquaintance or friend
U3My.00	[X]Neglect and abandonment, by other specified persons
U3Mz.00	[X]Neglect and abandonment, by unspecified person

U3N..00	[X]Other maltreatment syndromes
U3N0.00	[X]Other maltreatment syndromes, by spouse or partner
U3N1.00	[X]Other maltreatment syndromes, by parent
U3N2.00	[X]Other maltreatment syndromes, by acquaintance or friend
U3N3.00	[X]Other maltreatment syndromes, by official authorities
U3Ny.00	[X]Other maltreatment syndromes, by other specified persons
U3Nz.00	[X]Other maltreatment syndromes, by unspecified person
U3P..00	[X]Maltreatment
U3P0.00	[X]Maltreatment, by spouse or partner
U3P1.00	[X]Maltreatment, by parent
U3P2.00	[X]Maltreatment, by acquaintance or friend
Z352.11	Child abuse investigation
Z787.00	Self-neglect
Z787200	Neglect of clothes
Z787400	Neglect of personal hygiene
Z787500	Neglect of physical health
Z787600	Neglect of dental care
Z787700	Neglect of physical illness
Z787800	Neglect of common dangers
ZV1B400	[V]Personal history of neglect
ZV4H300	[V]Emotional neglect of child
ZV4H400	[V]Other problems related to neglect in upbringing
ZV61200	[V]Child abuse
ZV61211	[V]Child battering
ZV61212	[V]Child neglect
ZV61213	[V]Parent - child conflict
ZVu4B00	[X]Other problems related to neglect in upbringing

Childhood maltreatment- Prevalent codes

Code	Description
6254.00	A/N care: H/O child abuse
13Ih.00	Subject to supervision order under Children Act 1989
13II.00	Child deserted by parents
13Ii.00	Subject to care order under Children Act 1989
13II.11	Child deserted by mother
13Ii000	Subject to care order under section 20 of Children Act 1989
13Ii100	Subject to care order under section 21 of Children Act 1989
13Ii200	Subject to care order under section 25 of Children Act 1989
13Ii300	Subject to care order under section 31 of Children Act 1989
13Ij.00	Subject to interim care order under Children Act 1989
13Ij000	Sub to interim care order under section 38 Children Act 1989
13Ij100	Emergency protective order section 44 Children Act 1989
13W3.00	Child abuse in family
13W4.00	Parent/child conflict

13W4000	Child/parent violence
13WT.00	Child protection observation
13WT000	Child protection category
13WT100	Child protection category emotional
13WT200	Child protection category physical
13WT300	Child protection category sexual
13WT400	Child protection category neglect
14X..00	History of abuse
14X0.00	History of physical abuse
14X1.00	History of sexual abuse
14X2.00	History of emotional abuse
14X3.00	History of domestic violence
14X5.00	Victim of physical abuse
14X6.00	Victim of sexual abuse
14X6000	Victim of sexual harassment
14X7.00	Victim of emotional abuse
14X8.00	Victim of domestic violence
14XD.00	History of domestic abuse
14XD000	H/O domestic emotional abuse
14XD100	H/O domestic physical abuse
14XD200	H/O domestic sexual abuse
14XE.00	History of being victim of domestic violence
14XF.00	Victim of human trafficking
14XG.00	Victim of domestic abuse
14XH.00	Victim of child sexual exploitation
14XJ.00	Victim of psychological abuse
14XK.00	Victim of financial abuse
14XP.00	Victim of discriminatory abuse
14XR.00	Victim neglect & acts omission
222R.00	Neglected appearance
R037.00	[D]Insufficient intake of food and water due to self neglect
R2y3.11	[D] Self neglect
Ry18.00	[D]Self neglect
SN42000	Deprivation of food, unspecified
SN43000	Deprivation of water
SN55.00	Child maltreatment syndrome
SN55000	Emotional maltreatment of child
SN55011	Emotional deprivation of child
SN55012	Emotional abuse of child
SN55100	Nutritional maltreatment of child
SN55111	Nutritional deprivation of child
SN55112	Malnutrition in child maltreatment syndrome
SN55200	Non-accidental injury to child
SN55211	NAI - non-accidental injury to child
SN55212	Physical injury to child

SN55300	Battered baby or child syndrome NOS
SN55311	Battered baby syndrome NOS
SN55312	Battered child syndrome NOS
SN55400	Multiple deprivation of child
SN55500	Physical abuse of child
SN55600	Non-accidental traumatic head injury to child
SN55z00	Child maltreatment syndrome NOS
SN55z11	Child abuse NEC
SN55z12	Child deprivation syndrome
SN55z13	Neglect affecting child NEC
SN56000	Battered person unspecified, syndrome
SN57.00	Maltreatment syndromes
SN57000	Neglect or abandonment
SN57100	Sexual abuse
SN57200	Child affected by Munchausen's by proxy
SyuH500	[X]Other maltreatment syndromes
TE40.00	Accidents due to abandonment or neglect of helpless person
TL7..00	Child battering and other maltreatment
TL70.00	Child battering or other maltreatment by parent
TL7y.00	Child battering or other maltreatment by other spec person
TL7z.00	Child battering or other maltreatment by person NOS
TLx4.00	Assault by criminal neglect
U3M..00	[X]Neglect and abandonment
U3M0.00	[X]Neglect and abandonment, by spouse or partner
U3M1.00	[X]Neglect and abandonment, by parent
U3M2.00	[X]Neglect and abandonment, by acquaintance or friend
U3My.00	[X]Neglect and abandonment, by other specified persons
U3Mz.00	[X]Neglect and abandonment, by unspecified person
U3N..00	[X]Other maltreatment syndromes
U3N0.00	[X]Other maltreatment syndromes, by spouse or partner
U3N1.00	[X]Other maltreatment syndromes, by parent
U3N2.00	[X]Other maltreatment syndromes, by acquaintance or friend
U3N3.00	[X]Other maltreatment syndromes, by official authorities
U3Ny.00	[X]Other maltreatment syndromes, by other specified persons
U3Nz.00	[X]Other maltreatment syndromes, by unspecified person
U3P..00	[X]Maltreatment
U3P0.00	[X]Maltreatment, by spouse or partner
U3P1.00	[X]Maltreatment, by parent
U3P2.00	[X]Maltreatment, by acquaintance or friend
Z352.11	Child abuse investigation
Z787.00	Self-neglect
Z787200	Neglect of clothes
Z787400	Neglect of personal hygiene
Z787500	Neglect of physical health
Z787600	Neglect of dental care

Z787700	Neglect of physical illness
Z787800	Neglect of common dangers
ZV1B400	[V]Personal history of neglect
ZV4H300	[V]Emotional neglect of child
ZV4H400	[V]Other problems related to neglect in upbringing
ZV61200	[V]Child abuse
ZV61211	[V]Child battering
ZV61212	[V]Child neglect
ZV61213	[V]Parent - child conflict
ZVu4B00	[X]Other problems related to neglect in upbringing

Domestic abuse- Incident only codes

Code	Description
14X8.00	Victim of domestic violence
14XG.00	Victim of domestic abuse

Domestic abuse- Prevalent codes

Code	Description
14X3.00	History of domestic violence
14X8.00	Victim of domestic violence
14XD.00	History of domestic abuse
14XD000	H/O domestic emotional abuse
14XD100	H/O domestic physical abuse
14XD200	H/O domestic sexual abuse
14XE.00	History of being victim of domestic violence
14XG.00	Victim of domestic abuse

Supplementary table 1: Annual incidence rate of domestic abuse in men between 2005-2017

Year	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
2005	0	1636719	0.00	0.00	0.00
2006	9	1734689	0.52	0.18	0.86
2007	13	1806891	0.72	0.33	1.11
2008	17	1906963	0.89	0.47	1.32
2009	38	1994312	1.91	1.30	2.51
2010	16	1983802	0.81	0.41	1.20
2011	27	1998716	1.35	0.84	1.86
2012	26	2059505	1.26	0.78	1.75
2013	30	2009399	1.49	0.96	2.03
2014	53	1891262	2.80	2.05	3.56
2015	29	1671621	1.73	1.10	2.37
2016	38	1433446	2.65	1.81	3.49
2017	26	1272745	2.04	1.26	2.83

Supplementary table 2: Prevalence of domestic abuse in men between 2005-2017

Year	Cases (numerator)	Denominator (total population)	Prevalence per 100,000	Lower confidence interval	Upper confidence interval
2005	27	1560540	1.73	1.08	2.38
2006	30	1715061	1.75	1.12	2.38
2007	48	1791798	2.68	1.92	3.44
2008	80	1861532	4.30	3.36	5.24
2009	123	1986921	6.19	5.10	7.28
2010	207	2009811	10.30	8.90	11.70
2011	251	1998732	12.56	11.00	14.11
2012	327	2030437	16.10	14.36	17.85
2013	431	2071595	20.81	18.84	22.77
2014	499	1948992	25.60	23.36	27.85
2015	565	1816180	31.11	28.54	33.67
2016	425	1518731	27.98	25.32	30.64
2017	444	1365746	32.51	29.49	35.53

Supplementary table 3: Annual incidence rate of childhood maltreatment between 1996-2017

Year	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
1996	3	8818.982	34.02	-4.47	72.51
1997	17	75578.7	22.49	11.80	33.18
1998	35	166631.5	21.00	14.05	27.96
1999	47	235954.6	19.92	14.23	25.61
2000	67	308085.1	21.75	16.54	26.95
2001	76	450754.2	16.86	13.07	20.65
2002	90	575967.3	15.63	12.40	18.85
2003	94	695178.8	13.52	10.79	16.25
2004	142	747512.6	19.00	15.87	22.12
2005	99	825747.7	11.99	9.63	14.35
2006	140	876234.6	15.98	13.33	18.62
2007	106	914492.9	11.59	9.38	13.80
2008	142	966390.4	14.69	12.28	17.11
2009	175	1014605	17.25	14.69	19.80
2010	192	1013900	18.94	16.26	21.61
2011	237	1032857	22.95	20.03	25.87
2012	322	1071219	30.06	26.78	33.34
2013	551	1053495	52.30	47.94	56.67
2014	560	992752.1	56.41	51.74	61.08
2015	503	880922.4	57.10	52.11	62.09
2016	463	757597.2	61.11	55.55	66.68
2017	403	670155.5	60.14	54.27	66.01

Supplementary table 4: Incidence rate of childhood maltreatment in females between 1996-2017

Female					
Year	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
1996	2	4110.859	48.65	-18.76	116.07
1997	14	34754.82	40.28	19.18	61.38
1998	19	77101.73	24.64	13.56	35.72
1999	29	109675.7	26.44	16.82	36.06
2000	41	143745.1	28.52	19.79	37.25
2001	47	210921.2	22.28	15.91	28.65
2002	62	271017.4	22.88	17.18	28.57
2003	53	328723.9	16.12	11.78	20.46
2004	78	354401.6	22.01	17.13	26.89
2005	62	392607.8	15.79	11.86	19.72
2006	88	417941.8	21.06	16.66	25.45
2007	67	437464.5	15.32	11.65	18.98
2008	78	463663.1	16.82	13.09	20.56
2009	113	488113.5	23.15	18.88	27.42
2010	112	489196.9	22.89	18.66	27.13
2011	123	499857.8	24.61	20.26	28.95
2012	171	519861.3	32.89	27.96	37.82
2013	301	511966	58.79	52.15	65.43
2014	315	483076.8	65.21	58.01	72.41
2015	250	429453.4	58.21	51.00	65.43
2016	239	369898	64.61	56.42	72.80
2017	217	327614.6	66.24	57.42	75.05

Supplementary table 5: Incidence rate of childhood maltreatment in males between 1996-2017

Male					
Year	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
1996	1	4708.124	21.24	-20.38	62.86
1997	3	40823.88	7.35	-0.97	15.66
1998	16	89529.8	17.87	9.12	26.63
1999	18	126278.8	14.25	7.67	20.84
2000	26	164340	15.82	9.74	21.90
2001	29	239833	12.09	7.69	16.49
2002	28	304949.9	9.18	5.78	12.58
2003	41	366454.9	11.19	7.76	14.61
2004	64	393111	16.28	12.29	20.27
2005	37	433139.9	8.54	5.79	11.29
2006	52	458292.7	11.35	8.26	14.43
2007	39	477028.4	8.18	5.61	10.74
2008	64	502727.3	12.73	9.61	15.85
2009	62	526491.6	11.78	8.85	14.71
2010	80	524703.3	15.25	11.91	18.59
2011	114	532999.4	21.39	17.46	25.31
2012	151	551357.7	27.39	23.02	31.75
2013	250	541528.6	46.17	40.44	51.89
2014	245	509675.2	48.07	42.05	54.09
2015	253	451469	56.04	49.14	62.94
2016	224	387699.2	57.78	50.21	65.34
2017	186	342540.9	54.30	46.50	62.10

Supplementary table 6: Incidence rate of childhood maltreatment per age group

Age group	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
0-1 years	423	802550	52.71	47.92	57.98
1-4 years	1244	3584000	34.71	32.83	36.69
5-9 years	1185	4373600	27.09	25.60	28.68
10-15 years	1289	5026870	25.64	24.28	27.08
16-17 years	342	1616180	21.16	19.03	23.53

Supplementary table 7: Incidence rate of childhood maltreatment per deprivation quintile

Townsend deprivation quintile	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
1	370	3977881	9.30	8.35	10.25
2	403	3367785	11.97	10.80	13.13
3	711	3556979	19.99	18.52	21.46
4	1057	3295050	32.08	30.14	34.01
5	1241	2541212	48.83	46.12	51.55

Supplementary table 8: Incidence rate of childhood maltreatment per ethnic group

Ethnicity	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
White	1802	6497060	27.74	26.46	29.02
Mixed	26	119173.4	21.82	13.43	30.20
Other	76	158165.8	48.05	37.25	58.85
Black	130	288266.2	45.10	37.35	52.85
South Asian	143	411692.6	34.73	29.04	40.43

Supplementary table 9: Prevalence of childhood maltreatment: 1996-2017

Year	Cases (numerator)	Denominator (total population)	Prevalence per 100,000	Lower confidence interval	Upper confidence interval
1996	4	1650	242.42	5.18	479.67
1997	63	35734	176.30	132.81	219.79
1998	300	137636	217.97	193.33	242.60
1999	469	215811	217.32	197.68	236.96
2000	612	274138	223.25	205.58	240.91
2001	901	420664	214.19	200.22	228.15
2002	1052	516432	203.71	191.41	216.00
2003	1290	653780	197.31	186.56	208.07
2004	1378	725049	190.06	180.03	200.08
2005	1582	785056	201.51	191.60	211.43
2006	1742	866447	201.05	191.62	210.48
2007	1741	905158	192.34	183.32	201.37
2008	1828	941016	194.26	185.36	203.15
2009	2015	1007729	199.95	191.23	208.67
2010	2152	1024011	210.15	201.29	219.02
2011	2231	1026713	217.30	208.29	226.30
2012	2544	1053725	241.43	232.06	250.80
2013	2914	1081001	269.57	259.79	279.34
2014	3253	1021024	318.60	307.67	329.53
2015	3487	957937	364.01	351.95	376.07
2016	3076	800060	384.47	370.91	398.03
2017	3009	723126	416.11	401.28	430.94

Supplementary table 10: Regression model describing the risk of experiencing childhood maltreatment

Incidence of childhood maltreatment		
	Adjusted* incidence rate ratio (95% CI)	P value
Sex		
Male	1 (ref)	
Female	1.35 (1.28-1.44)	<0.001
Age at cohort entry		
0-1 years	1 (ref)	
1-4 years	0.96 (0.89-1.03)	0.264
5-9 years	0.67 (0.61-0.72)	<0.001
10-15 years	0.47 (0.43-0.51)	<0.001
16-17 years	0.23 (0.19-0.28)	<0.001
Ethnicity		
White	1 (ref)	
Mixed race	0.72 (0.49-1.07)	0.102
Black	1.25 (1.04-1.49)	0.015
South Asian	1.06 (0.89-1.26)	0.512
Others	1.45 (1.15-1.82)	0.002
Missing	0.78 (0.73-0.83)	<0.001
Townsend Deprivation Index		
1 (Least deprived)	1 (ref)	
2	1.29 (1.12-1.48)	<0.001
3	2.13 (1.88-2.42)	<0.001
4	3.41 (3.02-3.84)	<0.001
5 (Most deprived)	5.14 (4.57-5.77)	<0.001
Missing	2.67 (2.35-3.03)	<0.001

*Adjusted for other demographic factors within the table

Supplementary table 11: Annual incidence rate of domestic abuse between 1996-2017

Year	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
1996	0	19347.05	-	-	-
1997	0	166965.5	-	-	-
1998	0	370905.7	-	-	-
1999	1	522522.3	0.19	-0.18	0.57
2000	0	669896.3	-	-	-
2001	1	963631.1	0.10	-0.10	0.31
2002	0	1216535	-	-	-
2003	0	1447347	-	-	-
2004	3	1543475	0.19	-0.03	0.41
2005	5	1690775	0.30	0.04	0.55
2006	220	1788113	12.30	10.68	13.93
2007	328	1860393	17.63	15.72	19.54
2008	347	1964404	17.66	15.81	19.52
2009	477	2054123	23.22	21.14	25.31
2010	455	2043540	22.27	20.22	24.31
2011	441	2066927	21.34	19.35	23.33
2012	461	2131583	21.63	19.65	23.60
2013	558	2082465	26.80	24.57	29.02
2014	702	1960191	35.81	33.16	38.46
2015	444	1731272	25.65	23.26	28.03
2016	467	1482673	31.50	28.64	34.35
2017	453	1311287	34.55	31.37	37.73

Supplementary table 12: Incidence rate of domestic abuse per age group

Age Group	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
18-25	1185	3592040	32.99	31.16	34.92
25-35	1780	5277210	33.73	32.20	35.33
35-45	1406	5668310	24.80	23.54	26.14
45-55	627	5317300	11.79	10.90	12.75
55-65	233	4524270	5.15	4.53	5.86
65+	145	6847960	2.12	1.80	2.49

Supplementary table 13: Incidence rate of domestic abuse per deprivation quintile

Townsend deprivation quintile	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
1	600	6770554	8.86	8.15	9.57
2	645	5941074	10.86	10.02	11.69
3	912	5803875	15.71	14.69	16.73
4	1162	5046996	23.02	21.70	24.35
5	1269	3496615	36.29	34.30	38.29

Supplementary table 14: Incidence rate of domestic abuse per ethnic group

Ethnic group	New cases (Numerator)	Person years at risk (Denominator)	Incidence rate per 100,000	Lower confidence interval	Upper confidence interval
White	2771	12900000	21.46	20.66	22.26
Mixed	94	255581.1	36.78	29.35	44.21
Other	80	108769.6	73.55	57.44	89.66
Black	204	370777.9	55.02	47.47	62.57
South Asian	356	544591.4	65.37	58.58	72.16

Supplementary table 15: Prevalence of domestic abuse between 1996-2017

Year	Cases (numerator)	Denominator (total population)	Prevalence per 100,000	Lower confidence interval	Upper confidence interval
1996	0	3791	-	-	-
1997	6	79878	7.51	1.50	13.52
1998	10	299182	3.34	1.27	5.41
1999	24	479834	5.00	3.00	7.00
2000	32	599694	5.34	3.49	7.18
2001	55	900147	6.11	4.50	7.72
2002	79	1098533	7.19	5.61	8.78
2003	115	1369800	8.40	6.86	9.93
2004	148	1502468	9.85	8.26	11.44
2005	258	1614733	15.98	14.03	17.93
2006	441	1770849	24.90	22.58	27.23
2007	964	1846500	52.21	48.91	55.50
2008	1520	1916648	79.31	75.32	83.29
2009	2199	2049874	107.27	102.79	111.76
2010	2993	2072657	144.40	139.24	149.57
2011	3729	2066914	180.41	174.63	186.20
2012	4534	2107103	215.18	208.92	221.43
2013	5340	2148786	248.51	241.86	255.17
2014	5790	2026564	285.71	278.36	293.05
2015	6111	1889368	323.44	315.35	331.54
2016	5199	1577517	329.57	320.63	338.51
2017	5217	1414986	368.70	358.71	378.68

Supplementary table 16: Regression model describing the risk of experiencing domestic abuse in women

Incidence of domestic abuse in women		
	Adjusted* incidence rate ratio (95% CI)	P value
Age categories		
18-24 years	1 (ref)	
25-34 years	0.84 (0.79-0.90)	<0.001
35-44 years	0.57 (0.52-0.61)	<0.001
45-54 years	0.26 (0.23-0.29)	<0.001
55-64 years	0.12 (0.10-0.14)	<0.001
65+ years	0.05 (0.04-0.06)	<0.001
Ethnicity		
White	1 (ref)	
Mixed race	1.16 (0.95-1.43)	0.152
Black	1.64 (1.42-1.89)	<0.001
South Asian	2.14 (1.92-2.39)	<0.001
Others	2.19 (1.75-2.73)	<0.001
Missing	0.53 (0.50-0.56)	<0.001
Townsend Deprivation Index		
1 (Least deprived)	1 (ref)	0.001
2	1.20 (1.08-1.35)	<0.001
3	1.55 (1.40-1.72)	<0.001
4	2.08 (1.88-2.30)	<0.001
5 (Most deprived)	2.30 (2.71-3.30)	<0.001
Missing	1.65 (1.48-1.84)	<0.001

*Adjusted for other demographic factors within the table

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Reporting location
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	Title and abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	Title and abstract
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Introduction
Objectives	3	State specific objectives, including any prespecified hypotheses	Introduction
Methods			
Study design	4	Present key elements of study design early in the paper	Methods
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Methods
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	Methods
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Methods
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Methods
Bias	9	Describe any efforts to address potential sources of bias	Methods and discussion
Study size	10	Explain how the study size was arrived at	Methods
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Methods
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	Methods
		(*b*) Describe any methods used to examine subgroups and interactions	Methods
		(*c*) Explain how missing data were addressed	Methods
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases	Methods

	and controls was addressed	
	Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy	
	(*e*) Describe any sensitivity analyses	Methods

Continued on next page

Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Results
		(b) Give reasons for non-participation at each stage	n/a
		(c) Consider use of a flow diagram	n/a
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Results
		(b) Indicate number of participants with missing data for each variable of interest	Table 1
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	Results
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	Results
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	
		Cross-sectional study—Report numbers of outcome events or summary measures	
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Results
		(*b*) Report category boundaries when continuous variables were categorized	Results
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Results
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Results
Discussion			
Key results	18	Summarise key results with reference to study objectives	Discussion
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Discussion
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Discussion
Generalisability	21	Discuss the generalisability (external validity) of the study results	Discussion
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Funding statement

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.