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ORIGINAL RESEARCH

Risk of Cardiometabolic Disease and All-Cause Mortality in Female Survivors of Domestic Abuse

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***Background*—**Domestic abuse (DA) against women is a global public health problem. Although the possible health burden could be substantial, the associations between DA and subsequent cardiometabolic disease (cardiovascular disease, hypertension, and type 2 diabetes mellitus) and all-cause mortality are poorly understood.

***Methods and Results*—**This retrospective cohort study consisted of UK-based primary care patients between January 1, 1995, to December 1, 2017. Overall, 18 547 women exposed to DA were matched to 72 231 unexposed women by age and lifestyle factors. The main outcomes, presented as adjusted incidence rate ratios (IRRs), were the risk of developing cardiovascular disease, hypertension, type 2 diabetes mellitus, and all-cause mortality. In total, 181 exposed women experienced a cardiovascular disease event compared with 644 of the unexposed control group, relating to an increased adjusted IRR of 1.31 (95% CI, 1.11–1.55; P=0.001). There was also an increased risk of subsequent type 2 diabetes mellitus (adjusted IRR: 1.51; 95% CI, 1.30–1.76; P<0.001) and all-cause mortality (adjusted IRR: 1.44; 95% CI, 1.24–1.67; P<0.001) following exposure to DA. This observation was not seen with hypertension (adjusted IRR: 0.99; 95% CI, 0.88–1.12; P=0.873).

***Conclusions*—**There is an increased risk of subsequent cardiovascular disease, type 2 diabetes mellitus, and all-cause mortality in female survivors of DA. However, there is no association with the development of hypertension in this group, in keeping with previous literature. Considering the high prevalence of DA, clinicians should be made aware of the disproportionally increased risk and thus are encouraged to manage modifiable risk factors actively in this group. **(*J Am Heart Assoc*. 2020;9:e014580. DOI: 10.1161/JAHA.119.014580.)**

Key Words: cardiovascular disease • domestic abuse • epidemiology • hypertension • type 2 diabetes mellitus

Domestic abuse (DA) against women is a global public health problem and a violation of human rights.[1] It is defined by the UK government as "any incident or patterns of incidents of controlling, coercive, threatening behavior, violence or abuse between those aged 16 or over who are, or have been, intimate partners or family members regardless of gender or sexuality."[2] The UK prevalence of lifetime exposure to DA in the female population is estimated to be 27.1%.[3]

Population-based studies have identified an association between being a survivor of DA and a variety of physical and psychological consequences in this group.[4–7] A previous systematic review[8] assessed the impact of being a survivor of DA and the development of cardiovascular disease (CVD) and hypertension. This review[8] included 13 cross-sectional studies and 2 prospective studies (both examining the development of hypertension). The included cross-sectional studies provided conflicting evidence of a potential association between exposure to DA and the development of CVD. The largest cross-sectional study[9] (n=70 156) included both male and female participants and found a higher risk of developing self-reported coronary heart disease and heart attacks among DA survivors. This result was consistent with findings from a more recent small (n=151) study in a Polish population[10] for which self-reported DA was associated with a 6-fold increased risk of developing ischemic heart disease (IHD). In contrast, a

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Accompanying Table S1 and S2 are available at https://www.ahajournals.org/doi/suppl/10.1161/JAHA.119.014580

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Clinical Perspective

What Is New?

- The global health burden of domestic abuse (DA) is substantial and a key cause of morbidity and mortality for women; however, few studies have explored the relationship between DA and the subsequent development of cardiometabolic disease or all-cause mortality.
- We demonstrate 31%, 51%, and 44% increased risk of subsequent cardiovascular disease, type 2 diabetes mellitus and all-cause mortality following consideration of important lifestyle factors.
- There is no clear increased risk of hypertension following DA in line with previous literature.

What Are the Clinical Implications?

- Considering the high prevalence of DA among women, clinicians should be made aware of the disproportionally increased risk and thus are encouraged to consider the need for intervention in this cohort.
- Women exposed to DA also appear to have a higher burden of lifestyle risk factors such as smoking and excessive alcohol use compared with the general population.
- This lifestyle risk may play a role in the described association and will require a coordinated public health approach to manage.

cross-sectional study[11] conducted in South Africa suggested that survivors of DA were not at increased risk of developing heart disease or heart attacks. More recent systematic reviews examining physical outcomes of DA survivors[5,12] have not identified any global cohort study designed to assess CVD risk following DA exposure.

Interestingly, despite the possible association with CVD development, many studies report no association between DA and the subsequent development of hypertension,[11,13–17] suggesting that hypertension may not be a mediating factor in the relationship between DA and CVD. The NHSII (Nurses' Health Study II)[18] was a prospective study that demonstrated being a victim of severe emotional abuse is associated with the development of hypertension, but this relationship was not present in survivors of sexual and violent forms of DA. The other relevant prospective study[19] was conducted in Norway (N=5593 women) and discerned a positive association between physical and sexual DA with the subsequent use of antihypertensive drugs. However, neither of these prospective studies used clinical CVD end points such as IHD, stroke, transient ischemic attack (TIA), peripheral vascular disease, or heart failure.

Similar to CVD, there is sparse literature assessing the relationship between DA and the development or incidence of type 2 diabetes mellitus (T2DM). The association between childhood abuse and development of T2DM in later life[20–22] has been well documented; however, few studies have explored this association in the DA population. The NHSII was one of the few studies investigating this link and identified a 61% adjusted increased risk in the incidence of T2DM in DA survivors who had undergone severe psychological abuse, but this finding was not statistically significant in survivors of physical and sexual abuse.[23]

The pathophysiologic link between DA and cardiometabolic disease is complex and unclear. It is thought that the acute and sustained elevated stress response triggered by DA can compromise the neuroendocrine and immune systems and induce changes in brain structure, leading to an increased risk of a variety of physical and psychological disorders.[1] Similar to survivors of childhood abuse,[24] female survivors of DA[25] appear to have elevated levels of CRP (C-reactive protein) in their plasma and salivary glands that may be associated with the development of cardiometabolic disease[26,27]; however, little research on this topic has been conducted in a population exposed to DA. A recent consensus on the association between childhood adversity and subsequent cardiometabolic development considered that the relationship may be tied to 3 pathways that may occur following abuse: adoption of poor lifestyle behaviors (physical inactivity, poor diet, disrupted sleep, substance misuse, and smoking); mental ill health; and alteration of immune, metabolic, neuroendocrine, and autonomic nervous systems.[28] It is likely that similar pathways may be mediating the relationship between DA and cardiometabolic disease. For example, previous research has identified that DA survivors experience higher rates of smoking, obesity, and excessive alcohol use compared with the general population.[5,29–33] However, previous studies have not been able to address the impact of these lifestyle factors.

Globally, cardiometabolic disease still remains an important, albeit preventable, cause of mortality.[34] Literature exploring the association between DA and mortality risk is scarce. Of the available evidence, it is clear that being a victim of DA is associated with a disproportionally increased risk of homicide and nonaccidental injuries as causes of death.[35,36] However, there is absence of evidence examining the association between DA and all-cause mortality risk compared with the general population.

It is evident that no previous cohort study has investigated the relationship between exposure to DA and the development of CVD and all-cause mortality in the female population, and only a few studies have explored the relationship between DA and the development of hypertension and T2DM in a cohort setting. Consequently, considering the sizeable prevalence of DA and the public health burden posed by cardiometabolic disease, we aimed to explore the relationship

between DA and cardiometabolic disease (CVD, hypertension, and T2DM) alongside mortality.

Methods

The anonymized data that support the findings of this study are available from the senior author (k.nirantharan@bham.ac.uk). However, this will be subject to approval from the data providers and data owners (IQVIA and Cegedim). Ethics approval: anonymized data were used throughout the study, provided by the data provider IQVIA to the University of Birmingham. Studies using the Health Improvement Network (THIN) database have had initial ethics approval from the NHS South-East Multicentre Research Ethics Committee, subject to prior independent scientific review. The Scientific Review Committee (IMS Health) approved the study protocol (SRC Reference Number: SRC18THIN034) before its undertaking. Informed consent was not required in this study as the data were anonymized.

Study Design and Data Source

This population-based, retrospective, open, cohort study using the Health Improvement Network (THIN) database compared female patients coded with previous exposure of DA with female patients not coded to have experienced DA. The THIN database consists of UK electronically recorded person-level medical records derived from >750 general practices and is considered to be representative of the UK population.[37] Patient information is entered into electronic record software that uses Read codes.[38] Diagnosis and clinical presentations are represented in the Read code hierarchy system. Other available data in the database relate to demographic, prescription, biochemistry results, and mortality data. To reduce underrecording of events, individual practices were included 12 months following their electronic practice system was installed or from the practice's acceptable mortality recording date.

Study Population

Women noted by general practitioners to have been exposed to DA (exposed cohort) were identified during the study period (January 1, 1995, to December 1, 2017). The index date in the exposed group was stated to be the first documentation of an DA Read code once a patient was eligible to take part in the study during the study period or the study start date for patients with a previous record of DA. An open cohort study allows for patients to enter and exit the study at different time points, with each individual patient contributing only person-years of follow-up from the time of cohort entry (index date) to the time she leaves the cohort (exit date).

Each exposed woman was matched to up to 4 women who had no DA Read code from random general practitioner practices in the data set (unexposed cohort). Controls from the unexposed group were matched individually to cases based on age at index date (±1 year), body mass index (to within 2 kg/m^2), smoking status, and Townsend deprivation score[39] at baseline.

To mitigate immortality time bias,[40] the same index date was assigned to the corresponding unexposed patient. The follow-up period for each patient was from the index date until the exit date. *Exit date* is defined as the earliest of the following dates: study end date, last date of data collection from a given general practice, date the patient transferred from general practice, date of death, or date the outcome of interest occurred.

The primary outcome was the development of cardiometabolic disease, exploring the outcomes of CVD (IHD, heart failure, peripheral vascular disease, and stroke or TIA during the observation period), hypertension, and T2DM as identified through Read codes. In the UK primary setting, there is a mandatory requirement to maintain an accurate register of CVD, hypertension, and T2DM patients that is further incentivized through the national Quality and Outcome Framework system recording an individual's identification and management of these conditions.[41] All patients with a recorded code of DA who were eligible during the study period with their corresponding controls were included in the risk calculation for all-cause mortality. The details for these patients are highlighted in Table 1. However, when examining each outcome of interest (CVD, hypertension, or T2DM), patients were excluded from the study if they had a diagnosis relating to the corresponding condition before the index date of the study. For example, patients highlighted in Table 1 with existing diagnoses of hypertension at baseline were excluded from the main cohort when we examined the risk of developing hypertension.

Covariates known to affect the development of CVD, hypertension, or T2DM were included in the study population baseline data. These included body mass index, Townsend deprivation score, the use of lipid-lowering medications, smoking status, hypertension and diabetes mellitus, alcohol excess, and comorbidity identified through the Charlson comorbidity index.[42]

Read code lists for exposure, outcomes, and covariates are provided in Table S1. Table S2 contains the RECORD (Reporting of studies conducted using observational routinely-collected data) reporting checklist for this study.[43]

Statistical Analysis

Categorical baseline data were described using proportions, and parametric continuous variables were described using mean±SD. Missing data are described in the baseline characteristics (Table 1).

Table 1. Baseline Characteristics

	Exposed Group	Unexposed Group
Patients, n	18 547	73 231
Follow-up period (person-years)	2.2±2.3	3.1±2.7
Age, y	36.9±12.5	36.9±12.4
Body mass index		
<25	7916 (42.7)	31 692 (42.3)
25–30	3999 (21.6)	15 940 (21.8)
>30	3568 (19.2)	13 680 (18.7)
Not available	3064 (16.5)	11 919 (16.3)
Current smoking	8096 (44.7)	32 064 (44.7)
Hypertension	1106 (6.0)	4200 (5.7)
Lipid-regulating medications	955 (5.2)	3418 (4.7)
T2DM	463 (2.5)	1431 (2.0)
Drinking status		
Nondrinker	5149 (27.8)	13 709 (18.7)
Drinker not excess	8353 (45.0)	41 993 (57.3)
Excessive drinker	1870 (10.1)	2558 (3.5)
Not available	3175 (17.1)	14 971 (20.4)
Townsend index		
(Least deprived) 1	1773 (9.6)	8303 (11.3)
2	2104 (11.3)	9553 (13.1)
3	3149 (17.0)	13 695 (18.7)
4	4215 (22.7)	16 818 (23.0)
5	4266 (23.0)	16 110 (22.0)
Not available	3040 (16.4)	8752 (12.0)
Charlson comorbidity index		
0 (Least comorbid)	13 569 (73.2)	57 030 (77.9)
1	4130 (22.3)	13 352 (18.2)
2	571 (3.1)	1983 (2.7)
3	170 (0.9)	542 (0.7)
≥4	108 (0.6)	324 (0.4)
CVD at baseline		
IHD	199 (1.1)	539 (0.7)
Stroke/TIA	208 (1.2)	488 (0.7)
Heart failure	24 (0.1)	109 (0.2)
Peripheral vascular disease	44 (0.2)	136 (0.2)
All CVD	413 (2.2)	1116 (1.5)

Data are shown as mean±SD or n (%) except as noted. CVD indicates cardiovascular disease; IHD, ischemic heart disease; TIA indicates transient ischemic attack; T2DM, type 2 diabetes mellitus.

The number of outcomes in each group is described and then an incidence rate (IR) per 1000 person-years was calculated. Poisson regression was then used to calculate an IR ratio (IRR) for each outcome of interest, offsetting for person-years of follow-up. The IRR was adjusted for known covariates independently affecting the outcome of interest (eg, age, deprivation, body mass index, use of lipid-lowering medications, smoking status, hypertension, and T2DM [for individual components of CVD] and alcohol excess and Charlson comorbidity score [for mortality]), and an adjusted IRR for each outcome of interest was calculated. IRRs were calculated with 95% CIs, and statistical significance was set at $P<0.05$. In addition, for the calculation of the risk of individual components of CVD, a composite CVD risk was calculated, composed of the risk of developing IHD, stroke or TIA, heart failure, and peripheral vascular disease.

Stata version 14.2 software (StataCorp) was used to conduct all analyses throughout the study. This particular study obtained study specific approval from the scientific review committee in May 2018 (SRC18THIN034).

Results

Baseline Characteristics

A total of 18 547 women who had experienced DA were matched to 73 231 unexposed women as controls. The mean length of follow-up was shorter at 2.2±2.3 years in the exposed group compared with 3.1±2.7 years in the unexposed group. This result was due to women in the exposed group transferring practice more frequently than those in the unexposed group. The mean age (37 years) was similar in both exposed and unexposed groups. Given the matching process, body mass index, smoking, and deprivation levels were similar between groups. Of particular note, both groups had high prevalence of smoking (44.7%) and high levels of deprivation compared with the national UK average. Excessive drinking at baseline was more prevalent at 10.1% in the exposed group compared with 3.5% in the unexposed group. The exposed group at baseline had higher proportion of patients with T2DM, greater comorbidity, higher prevalence of hypertension, and more use of lipid-lowering medications. Baseline characteristics are presented in Table 1.

Association Between DA and Subsequent Development of Cardiometabolic Disease

During the study period, 181 women (IR: 3.1 per 1000 person-years) in the exposed group compared with 644 women (IR: 2.3 per 1000 person-years) in the unexposed group developed a CVD outcome. This translated into an increased adjusted IRR of composite CVD (1.31; 95% CI, 1.11–1.55; $P=0.001$). Specifically, the DA group had a significantly higher risk of developing IHD (1.40; 95% CI, 1.09–1.79; $P=0.007$) and stroke or TIA (1.29; 95% CI, 1.02–1.63; $P=0.035$). There were

not statistically significant differences between the likelihood of developing heart failure or peripheral vascular disease.

Overall, 316 women in the exposed group developed hypertension (IR: 5.7 per 1000 person-years) compared with 1496 women in the unexposed group (IR: 5.6 per 1000 person-years). There was no association observed between DA and hypertension (IRR: 0.99; 95% CI, 0.88–1.12; P=0.873). In total, 222 women (IR: 3.8 per 1000 person-years) in the exposed group compared with 678 women (IR: 2.4 per 1000 person-years) in the unexposed group developed T2DM. The risk of developing T2DM was found to be higher in the exposed cohort than in the unexposed cohort (IRR: 1.51; 95% CI, 1.30–1.76; P<0.001). These results are presented in Figure and Table 2.

Mortality Analysis

Table 3 demonstrates the variation in risk of all-cause mortality between the exposed and unexposed groups. A total of 248 patients in the DA group died during the study period compared with 700 in the unexposed group. This relates to an IR per 1000 person-years of 6.0 and 3.1 between the DA and unexposed groups, respectively. Following adjustment, this translated into an IRR of 1.44 (95% CI, 1.24–1.67; P<0.001).

Discussion

Summary of Key Results

After matching and adjusting for key lifestyle factors, this study found that women who were coded with exposure to DA were at a higher risk of developing CVD (particularly IHD and stroke or TIA) and T2DM than those not coded for exposure to DA. In addition, the risk of all-cause mortality was higher in the group of women who had experienced DA. However, there was no association between exposure to DA and the development of hypertension.

Relationship to Current Literature

To the authors knowledge, this cohort study is the first to assess the CVD outcomes and all-cause mortality risk associated with DA and has added to the literature exploring the association between DA and the development of hypertension and T2DM.

Because no cohort study has previously been designed to compare the IR of CVD in the cohort of women who have experienced DA, it is difficult to directly compare this study with studies that demonstrate an increased risk of developing of CVD outcomes.[19,44] However, this study supports the suggestion that exposure to DA increases the risk of developing CVD suggested by previously cross-sectional studies.[8] In particular, our study is consistent with the assertion that DA may particularly correlate with the development of IHD.[8,10] Interestingly, in agreement with previous work (cross-sectional studies[13–17] and 1 prospective study[18]), our study supports no statistical association between being a survivor of DA and hypertension. Our study also demonstrates an association between DA and T2DM. This relationship mirrors the positive association between DA and T2DM previously reported in the NHSII[23] in survivors of severe psychological forms of DA.

This study made efforts to account for the impact of lifestyle choices on the development of cardiometabolic disease by matching similar patients. Previous studies suggested that women exposed to DA had high rates of smoking, alcohol use, and obesity,[5,29–33] which was clearly demonstrated in our study. Both cohorts had high baseline rates of smoking (44.7%), and more patients in the DA cohort were excessive drinkers. Interestingly, however, following matching and adjustment for these factors, there still appeared to be a relationship between DA and cardiometabolic disease. This finding suggests that lifestyle risk factors may not be the sole explanation for the observed increased risk of cardiometabolic disease in this population. Further investigation must be conducted into

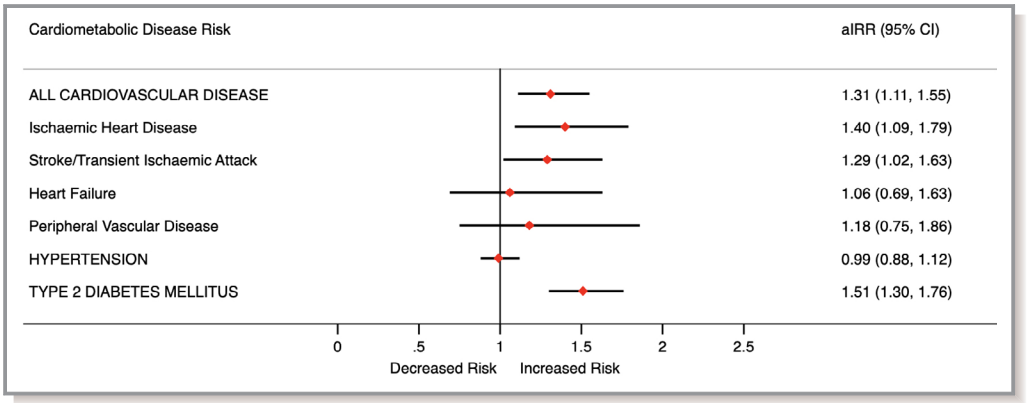

Figure. Cardiometabolic disease risk. aIRR indicates adjusted incidence rate ratio.

Table 2. Risk of Subsequent Development of Cardiometabolic Disease in Exposed and Unexposed Groups

	All CVD		IHD		Stroke/TIA		Heart Failure		Peripheral Vascular Disease		Hypertension		T2DM	
	Exposed	Unexposed	Exposed	Unexposed	Exposed	Unexposed	Exposed	Unexposed	Exposed	Unexposed	Exposed	Unexposed	Exposed	Unexposed
Patients, n	18 134	72 115	18 348	72 692	18 339	72 743	18 523	73 122	18 503	73 095	17 441	69 031	18 084	71 800
No. of outcomes	181	644	83	270	89	316	26	106	24	89	316	1469	222	678
Person-years	58 732	278 372	59 635	281 484	59 686	281 778	60 507	283 995	60 421	283 761	55 373	261 695	58 462	277 134
IR (per 1000 person years)	3.1	2.3	1.4	1.0	1.5	1.1	0.4	0.4	0.4	0.3	5.7	5.6	3.8	2.4
IRR (95% CI)*	1.33 (1.13–1.57)		1.45 (1.130–1.85)		1.33 (1.05–1.68)		1.15 (0.75–1.77)		1.27 (0.81–1.99)		1.02 (0.90–1.15)		1.55 (1.33–1.81)	
P value	0.001		0.003		0.018		0.520		0.304		0.790		<0.001	
aIRR (95% CI)†	1.31 (1.11–1.55)		1.40 (1.09–1.79)		1.29 (1.02–1.63)		1.06 (0.69–1.63)		1.18 (0.75–1.86)		0.99 (0.88–1.12)		1.51 (1.30–1.76)	
P value	0.001		0.007		0.035		0.796		0.465		0.873		<0.001	

aIRR indicates adjusted incidence rate ratio; CVD, cardiovascular disease; IHD, ischemic heart disease; IR, incidence rate; IRR, incidence rate ratio; TIA indicates transient ischemic attack; T2DM, type 2 diabetes mellitus.
*Unadjusted incidence rate ratio.
†All CVD, IHD, stroke/TIA, heart failure, and peripheral vascular disease outcomes were adjusted for body mass index, age, sex, smoking, diabetes mellitus status, lipid-lowering drug use, hypertension, and Townsend deprivation score at baseline. The hypertension outcome was adjusted for these factors excluding hypertension. The T2DM outcome was adjusted for these factors excluding hypertension and diabetes mellitus status.

Table 3. Risk of Mortality in the Exposed and Unexposed Groups

	Exposed	Unexposed
Patients, n	18 547	73 231
No. of outcomes	248	700
Person-years	41 213	225 438
IR (per 1000 person-years)	6.0	3.1
IRR (95% CI)*	1.94 (1.68–2.24)	
P value	<0.001	
aIRR (95% CI)†	1.44 (1.24–1.67)	
P value	<0.001	

aIRR indicates adjusted incidence rate ratio; IR, incidence rate; IRR, incidence rate ratio.
*Unadjusted incidence rate ratio.
†Adjusted for body mass index, age, sex, smoking status, diabetes mellitus status, lipid-lowering drug use, hypertension, Charlson comorbidity score, alcohol status, and Townsend deprivation score.

other possible mediating pathways that are responsible for this relationship.

Similarly, because there have been no cohorts examining the association between all-cause mortality and DA exposure, it is not possible to compare the IR in our study with others. We show an increased mortality risk associated with DA, and this may correlate with literature identifying that victims of DA are at an increased risk of violent injury that may lead to death.[35,36] However, it may also raise the possibility that there is an increased burden of CVD and other morbidities that may increase mortality.

Study Limitations

The use of a primary care database to undertake retrospective analysis relies on the correct coding of Read codes by general practitioners. Therefore, the validity of coding will be affected by differing coding practices. An important limitation to note is that the overall number of women experiencing DA appears to be extremely low in this study population compared with the estimates provided previously in the United Kingdom.[3] Consequently, it is possible that women of the unexposed group may actually have experienced DA but were misclassified as unexposed. This possible misclassification bias may lead to underestimation of the true effect size. Similarly, we may have identified only women with severe DA, which may result in an overestimate of the effect size. To minimize this risk, we attempted to use multiple codes relating to DA to capture as many patients as possible. It is worth highlighting that the underrecording of DA in a primary care setting suggests the importance of ensuring that clinicians make a concerted effort to ask at-risk patients about a history of abuse.

Given the nature of the data collected, we were unable to assess for the dose relationship between the severity of DA

and CVD, hypertension, and T2DM, which could have provided further useful information. It is possible, for example, that more severe abuse may be correlated with worse cardiometabolic outcomes. It is also important to identify that although we matched women's lifestyle choices at baseline, it would be interesting to identify whether exposure to DA leads to poorer lifestyle choices in the future, which also may mediate the described effect size.

Conclusions

This is the first cohort study to demonstrate an association between DA and the development of CVD. This study has reaffirmed the relationship between exposure to DA and the development of T2DM, even after consideration of the impact of contributing lifestyle risk factors, and identifies this population as having higher risk of all-cause mortality. This cohort study also supports previous research demonstrating no association between the development of hypertension and being a female survivor of DA. However, this result needs to be viewed in light of the limitations of the study design. Regardless, given the sizeable population that these results may affect, physicians should pay particular notice to managing risk factors for CVD and T2DM in this group. Further studies in other cohorts are needed to confirm this relationship, and basic scientific research is required to understand the biological plausibility of the associations between DA exposure and the subsequent development of cardiometabolic disease.

Acknowledgments

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Disclosures

None.

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SUPPLEMENTAL MATERIAL

Table S1. Read codes for domestic abuse, outcomes, baseline data and co-variates.

Domestic abuse

Clinical Code	Description
14X3.00	History of domestic violence
14X8.00	Victim of domestic violence
14XD.00	History of domestic abuse
14XE.00	History of being victim of domestic violence
14XG.00	Victim of domestic abuse

Type 2 Diabetes

Clinical Code	**Description**
C10..00	Diabetes mellitus
C100.00	Diabetes mellitus with no mention of complication
C100100	Diabetes mellitus, adult onset, no mention of complication
C100111	Maturity onset diabetes
C100112	Non-insulin dependent diabetes mellitus
C100z00	Diabetes mellitus NOS with no mention of complication
C101.00	Diabetes mellitus with ketoacidosis
C101100	Diabetes mellitus, adult onset, with ketoacidosis
C101y00	Other specified diabetes mellitus with ketoacidosis
C101z00	Diabetes mellitus NOS with ketoacidosis
C102.00	Diabetes mellitus with hyperosmolar coma
C102100	Diabetes mellitus, adult onset, with hyperosmolar coma
C102z00	Diabetes mellitus NOS with hyperosmolar coma
C103.00	Diabetes mellitus with ketoacidotic coma
C103100	Diabetes mellitus, adult onset, with ketoacidotic coma
C103y00	Other specified diabetes mellitus with coma
C103z00	Diabetes mellitus NOS with ketoacidotic coma
C104.00	Diabetes mellitus with renal manifestation
C104.11	Diabetic nephropathy
C104100	Diabetes mellitus, adult onset, with renal manifestation
C104y00	Other specified diabetes mellitus with renal complications
C104z00	Diabetes mellitus with nephropathy NOS
C105.00	Diabetes mellitus with ophthalmic manifestation
C105100	Diabetes mellitus, adult onset, + ophthalmic manifestation
C105y00	Other specified diabetes mellitus with ophthalmic complicatn

C105z00	Diabetes mellitus NOS with ophthalmic manifestation
C106.00	Diabetes mellitus with neurological manifestation
C106.11	Diabetic amyotrophy
C106.12	Diabetes mellitus with neuropathy
C106.13	Diabetes mellitus with polyneuropathy
C106100	Diabetes mellitus, adult onset, + neurological manifestation
C106y00	Other specified diabetes mellitus with neurological comps
C106z00	Diabetes mellitus NOS with neurological manifestation
C107.00	Diabetes mellitus with peripheral circulatory disorder
C107.11	Diabetes mellitus with gangrene
C107.12	Diabetes with gangrene
C107100	Diabetes mellitus, adult, + peripheral circulatory disorder
C107200	Diabetes mellitus, adult with gangrene
C107400	NIDDM with peripheral circulatory disorder
C107y00	Other specified diabetes mellitus with periph circ comps
C107z00	Diabetes mellitus NOS with peripheral circulatory disorder
C108y00	Other specified diabetes mellitus with multiple comps
C108z00	Unspecified diabetes mellitus with multiple complications
C109.00	Non-insulin dependent diabetes mellitus
C109.11	NIDDM - Non-insulin dependent diabetes mellitus
C109.12	Type 2 diabetes mellitus
C109.13	Type II diabetes mellitus
C109000	Non-insulin-dependent diabetes mellitus with renal comps
C109011	Type II diabetes mellitus with renal complications
C109012	Type 2 diabetes mellitus with renal complications
C109100	Non-insulin-dependent diabetes mellitus with ophthalm comps
C109111	Type II diabetes mellitus with ophthalmic complications
C109112	Type 2 diabetes mellitus with ophthalmic complications
C109200	Non-insulin-dependent diabetes mellitus with neuro comps
C109211	Type II diabetes mellitus with neurological complications
C109212	Type 2 diabetes mellitus with neurological complications
C109300	Non-insulin-dependent diabetes mellitus with multiple comps
C109311	Type II diabetes mellitus with multiple complications
C109312	Type 2 diabetes mellitus with multiple complications
C109400	Non-insulin dependent diabetes mellitus with ulcer
C109411	Type II diabetes mellitus with ulcer
C109412	Type 2 diabetes mellitus with ulcer
C109500	Non-insulin dependent diabetes mellitus with gangrene
C109511	Type II diabetes mellitus with gangrene
C109512	Type 2 diabetes mellitus with gangrene
C109600	Non-insulin-dependent diabetes mellitus with retinopathy

C109611	Type II diabetes mellitus with retinopathy
C109612	Type 2 diabetes mellitus with retinopathy
C109700	Non-insulin dependent diabetes mellitus - poor control
C109711	Type II diabetes mellitus - poor control
C109712	Type 2 diabetes mellitus - poor control
C109800	Reaven's syndrome
C109900	Non-insulin-dependent diabetes mellitus without complication
C109911	Type II diabetes mellitus without complication
C109912	Type 2 diabetes mellitus without complication
C109A00	Non-insulin dependent diabetes mellitus with mononeuropathy
C109A11	Type II diabetes mellitus with mononeuropathy
C109A12	Type 2 diabetes mellitus with mononeuropathy
C109B00	Non-insulin dependent diabetes mellitus with polyneuropathy
C109B11	Type II diabetes mellitus with polyneuropathy
C109B12	Type 2 diabetes mellitus with polyneuropathy
C109C00	Non-insulin dependent diabetes mellitus with nephropathy
C109C11	Type II diabetes mellitus with nephropathy
C109C12	Type 2 diabetes mellitus with nephropathy
C109D00	Non-insulin dependent diabetes mellitus with hypoglyca coma
C109D11	Type II diabetes mellitus with hypoglycaemic coma
C109D12	Type 2 diabetes mellitus with hypoglycaemic coma
C109E00	Non-insulin depend diabetes mellitus with diabetic cataract
C109E11	Type II diabetes mellitus with diabetic cataract
C109E12	Type 2 diabetes mellitus with diabetic cataract
C109F00	Non-insulin-dependent d m with peripheral angiopath
C109F11	Type II diabetes mellitus with peripheral angiopathy
C109F12	Type 2 diabetes mellitus with peripheral angiopathy
C109G00	Non-insulin dependent diabetes mellitus with arthropathy
C109G11	Type II diabetes mellitus with arthropathy
C109G12	Type 2 diabetes mellitus with arthropathy
C109H00	Non-insulin dependent d m with neuropathic arthropathy
C109H11	Type II diabetes mellitus with neuropathic arthropathy
C109H12	Type 2 diabetes mellitus with neuropathic arthropathy
C109J00	Insulin treated Type 2 diabetes mellitus
C109J11	Insulin treated non-insulin dependent diabetes mellitus
C109J12	Insulin treated Type II diabetes mellitus
C109K00	Hyperosmolar non-ketotic state in type 2 diabetes mellitus
C10A.00	Malnutrition-related diabetes mellitus
C10A.11	Jamaica type diabetes

C10A000	Malnutrition-related diabetes mellitus with coma
C10A100	Malnutrition-related diabetes mellitus with ketoacidosis
C10A200	Malnutrition-related diabetes mellitus with renal complicatn
C10A300	Malnutrit-related diabetes mellitus wth ophthalmic complicat
C10A400	Malnutrition-related diabetes mellitus wth neuro complicatns
C10A500	Malnutritn-relat diabetes melitus wth periph circul complctn
C10A600	Malnutrition-related diabetes mellitus with multiple comps
C10A700	Malnutrition-related diabetes mellitus without complications
C10AW00	Malnutrit-related diabetes mellitus with unspec complics
C10AX00	Malnutrit-relat diabetes mellitus with other spec comps
C10B.00	Diabetes mellitus induced by steroids
C10B000	Steroid induced diabetes mellitus without complication
C10C.00	Diabetes mellitus autosomal dominant
C10C.11	Maturity onset diabetes in youth
C10D.00	Diabetes mellitus autosomal dominant type 2
C10D.11	Maturity onset diabetes in youth type 2
C10ER00	Latent autoimmune diabetes mellitus in adult
C10F.00	Type 2 diabetes mellitus
C10F.11	Type II diabetes mellitus
C10F000	Type 2 diabetes mellitus with renal complications
C10F011	Type II diabetes mellitus with renal complications
C10F100	Type 2 diabetes mellitus with ophthalmic complications
C10F111	Type II diabetes mellitus with ophthalmic complications
C10F200	Type 2 diabetes mellitus with neurological complications
C10F211	Type II diabetes mellitus with neurological complications
C10F300	Type 2 diabetes mellitus with multiple complications
C10F311	Type II diabetes mellitus with multiple complications
C10F400	Type 2 diabetes mellitus with ulcer
C10F411	Type II diabetes mellitus with ulcer
C10F500	Type 2 diabetes mellitus with gangrene
C10F511	Type II diabetes mellitus with gangrene
C10F600	Type 2 diabetes mellitus with retinopathy
C10F611	Type II diabetes mellitus with retinopathy
C10F700	Type 2 diabetes mellitus - poor control
C10F711	Type II diabetes mellitus - poor control
C10F800	Reaven's syndrome
C10F811	Metabolic syndrome X
C10F900	Type 2 diabetes mellitus without complication
C10F911	Type II diabetes mellitus without complication
C10FA00	Type 2 diabetes mellitus with mononeuropathy
C10FA11	Type II diabetes mellitus with mononeuropathy
C10FB00	Type 2 diabetes mellitus with polyneuropathy

C10FB11	Type II diabetes mellitus with polyneuropathy
C10FC00	Type 2 diabetes mellitus with nephropathy
C10FC11	Type II diabetes mellitus with nephropathy
C10FD00	Type 2 diabetes mellitus with hypoglycaemic coma
C10FD11	Type II diabetes mellitus with hypoglycaemic coma
C10FE00	Type 2 diabetes mellitus with diabetic cataract
C10FE11	Type II diabetes mellitus with diabetic cataract
C10FF00	Type 2 diabetes mellitus with peripheral angiopathy
C10FF11	Type II diabetes mellitus with peripheral angiopathy
C10FG00	Type 2 diabetes mellitus with arthropathy
C10FG11	Type II diabetes mellitus with arthropathy
C10FH00	Type 2 diabetes mellitus with neuropathic arthropathy
C10FH11	Type II diabetes mellitus with neuropathic arthropathy
C10FJ00	Insulin treated Type 2 diabetes mellitus
C10FJ11	Insulin treated Type II diabetes mellitus
C10FK00	Hyperosmolar non-ketotic state in type 2 diabetes mellitus
C10FK11	Hyperosmolar non-ketotic state in type II diabetes mellitus
C10FL00	Type 2 diabetes mellitus with persistent proteinuria
C10FL11	Type II diabetes mellitus with persistent proteinuria
C10FM00	Type 2 diabetes mellitus with persistent microalbuminuria
C10FM11	Type II diabetes mellitus with persistent microalbuminuria
C10FN00	Type 2 diabetes mellitus with ketoacidosis
C10FN11	Type II diabetes mellitus with ketoacidosis
C10FP00	Type 2 diabetes mellitus with ketoacidotic coma
C10FP11	Type II diabetes mellitus with ketoacidotic coma
C10FQ00	Type 2 diabetes mellitus with exudative maculopathy
C10FQ11	Type II diabetes mellitus with exudative maculopathy
C10FR00	Type 2 diabetes mellitus with gastroparesis
C10FR11	Type II diabetes mellitus with gastroparesis
C10FS00	Maternally inherited diabetes mellitus
C10G.00	Secondary pancreatic diabetes mellitus
C10G000	Secondary pancreatic diabetes mellitus without complication
C10H.00	Diabetes mellitus induced by non-steroid drugs
C10H000	DM induced by non-steroid drugs without complication
C10J.00	Insulin autoimmune syndrome
C10J000	Insulin autoimmune syndrome without complication
C10K.00	Type A insulin resistance
C10K000	Type A insulin resistance without complication
C10L.00	Fibrocalculous pancreatopathy
C10L000	Fibrocalculous pancreatopathy without complication
C10M.00	Lipoatrophic diabetes mellitus
C10M000	Lipoatrophic diabetes mellitus without complication

C10N.00	Secondary diabetes mellitus
C10N000	Secondary diabetes mellitus without complication
C10N100	Cystic fibrosis related diabetes mellitus
C10P.00	Diabetes mellitus in remission
C10P100	Type II diabetes mellitus in remission
C10P111	Type 2 diabetes mellitus in remission
C10y.00	Diabetes mellitus with other specified manifestation
C10y100	Diabetes mellitus, adult, + other specified manifestation
C10yy00	Other specified diabetes mellitus with other spec comps
C10yz00	Diabetes mellitus NOS with other specified manifestation
C10z.00	Diabetes mellitus with unspecified complication
C10z100	Diabetes mellitus, adult onset, + unspecified complication
C10zy00	Other specified diabetes mellitus with unspecified comps
C10zz00	Diabetes mellitus NOS with unspecified complication

Ischaemic Heart Disease

Clinical Code	Description
G3...00	Ischaemic heart disease
G3...11	Arteriosclerotic heart disease
G3...12	Atherosclerotic heart disease
G3...13	IHD - Ischaemic heart disease
G30..00	Acute myocardial infarction
G30..11	Attack - heart
G30..12	Coronary thrombosis
G30..13	Cardiac rupture following myocardial infarction (MI)
G30..14	Heart attack
G30..15	MI - acute myocardial infarction
G30..16	Thrombosis - coronary
G30..17	Silent myocardial infarction
G300.00	Acute anterolateral infarction
G301.00	Other specified anterior myocardial infarction
G301000	Acute anteroapical infarction
G301100	Acute anteroseptal infarction
G301z00	Anterior myocardial infarction NOS
G302.00	Acute inferolateral infarction
G303.00	Acute inferoposterior infarction
G304.00	Posterior myocardial infarction NOS
G305.00	Lateral myocardial infarction NOS
G306.00	True posterior myocardial infarction
G307.00	Acute subendocardial infarction

G307000	Acute non-Q wave infarction
G307100	Acute non-ST segment elevation myocardial infarction
G308.00	Inferior myocardial infarction NOS
G309.00	Acute Q-wave infarct
G30A.00	Mural thrombosis
G30B.00	Acute posterolateral myocardial infarction
G30X.00	Acute transmural myocardial infarction of unspecif site
G30X000	Acute ST segment elevation myocardial infarction
G30y.00	Other acute myocardial infarction
G30y000	Acute atrial infarction
G30y100	Acute papillary muscle infarction
G30y200	Acute septal infarction
G30yz00	Other acute myocardial infarction NOS
G30z.00	Acute myocardial infarction NOS
G31..00	Other acute and subacute ischaemic heart disease
G310.00	Postmyocardial infarction syndrome
G310.11	Dressler's syndrome
G311.00	Preinfarction syndrome
G311.11	Crescendo angina
G311.12	Impending infarction
G311.13	Unstable angina
G311.14	Angina at rest
G311000	Myocardial infarction aborted
G311011	MI - myocardial infarction aborted
G311100	Unstable angina
G311200	Angina at rest
G311300	Refractory angina
G311400	Worsening angina
G311500	Acute coronary syndrome
G311z00	Preinfarction syndrome NOS
G312.00	Coronary thrombosis not resulting in myocardial infarction
G31y.00	Other acute and subacute ischaemic heart disease
G31y000	Acute coronary insufficiency
G31y100	Microinfarction of heart
G31y200	Subendocardial ischaemia
G31y300	Transient myocardial ischaemia
G31yz00	Other acute and subacute ischaemic heart disease NOS
G32..00	Old myocardial infarction
G32..11	Healed myocardial infarction
G32..12	Personal history of myocardial infarction
G33..00	Angina pectoris
G330.00	Angina decubitus

G330000	Nocturnal angina
G330z00	Angina decubitus NOS
G331.00	Prinzmetal's angina
G331.11	Variant angina pectoris
G332.00	Coronary artery spasm
G33z.00	Angina pectoris NOS
G33z000	Status anginosus
G33z100	Stenocardia
G33z200	Syncope anginosa
G33z300	Angina on effort
G33z400	Ischaemic chest pain
G33z500	Post infarct angina
G33z600	New onset angina
G33z700	Stable angina
G33zz00	Angina pectoris NOS
G34..00	Other chronic ischaemic heart disease
G340.00	Coronary atherosclerosis
G340.11	Triple vessel disease of the heart
G340.12	Coronary artery disease
G340000	Single coronary vessel disease
G340100	Double coronary vessel disease
G341.00	Aneurysm of heart
G341.11	Cardiac aneurysm
G341000	Ventricular cardiac aneurysm
G341100	Other cardiac wall aneurysm
G341111	Mural cardiac aneurysm
G341200	Aneurysm of coronary vessels
G341300	Acquired atrioventricular fistula of heart
G341z00	Aneurysm of heart NOS
G342.00	Atherosclerotic cardiovascular disease
G343.00	Ischaemic cardiomyopathy
G344.00	Silent myocardial ischaemia
G34y.00	Other specified chronic ischaemic heart disease
G34y000	Chronic coronary insufficiency
G34y100	Chronic myocardial ischaemia
G34yz00	Other specified chronic ischaemic heart disease NOS
G34z.00	Other chronic ischaemic heart disease NOS
G34z000	Asymptomatic coronary heart disease
G35..00	Subsequent myocardial infarction
G350.00	Subsequent myocardial infarction of anterior wall
G351.00	Subsequent myocardial infarction of inferior wall
G353.00	Subsequent myocardial infarction of other sites

G35X.00	Subsequent myocardial infarction of unspecified site
G36..00	Certain current complication follow acute myocardial infarct
G360.00	Haemopericardium/current comp folow acut myocard infarct
G361.00	Atrial septal defect/curr comp folow acut myocardal infarct
G362.00	Ventric septal defect/curr comp fol acut myocardal infarctn
G363.00	Ruptur cardiac wall w'out haemopericard/cur comp fol ac MI
G364.00	Ruptur chordae tendinae/curr comp fol acute myocard infarct
G365.00	Rupture papillary muscle/curr comp fol acute myocard infarct
G366.00	Thrombosis atrium,auric append&vent/curr comp foll acute MI
G37..00	Cardiac syndrome X
G38..00	Postoperative myocardial infarction
G380.00	Postoperative transmural myocardial infarction anterior wall
G381.00	Postoperative transmural myocardial infarction inferior wall
G382.00	Postoperative transmural myocardial infarction other sites
G383.00	Postoperative transmural myocardial infarction unspec site
G384.00	Postoperative subendocardial myocardial infarction
G38z.00	Postoperative myocardial infarction, unspecified
G39..00	Coronary microvascular disease
G3y..00	Other specified ischaemic heart disease
G3z..00	Ischaemic heart disease NOS
Gyu3.00	[X]Ischaemic heart diseases
Gyu3000	[X]Other forms of angina pectoris
Gyu3100	[X]Other current complicatns following acute myocard infarct
Gyu3200	[X]Other forms of acute ischaemic heart disease
Gyu3300	[X]Other forms of chronic ischaemic heart disease
Gyu3400	[X]Acute transmural myocardial infarction of unspecif site
Gyu3500	[X]Subsequent myocardial infarction of other sites
Gyu3600	[X]Subsequent myocardial infarction of unspecified site

Heart Failure

Clinical Code	Description
1O1..00	Heart failure confirmed
2JZ..00	On optimal heart failure therapy
662f.00	New York Heart Association classification - class I
662g.00	New York Heart Association classification - class II
662h.00	New York Heart Association classification - class III
662i.00	New York Heart Association classification - class IV
8B29.00	Cardiac failure therapy
G58..00	Heart failure
G58..11	Cardiac failure

G580.00	Congestive heart failure
G580.11	Congestive cardiac failure
G580.12	Right heart failure
G580.13	Right ventricular failure
G580.14	Biventricular failure
G580000	Acute congestive heart failure
G580100	Chronic congestive heart failure
G580200	Decompensated cardiac failure
G580300	Compensated cardiac failure
G580400	Congestive heart failure due to valvular disease
G581.00	Left ventricular failure
G581.11	Asthma - cardiac
G581.13	Impaired left ventricular function
G581000	Acute left ventricular failure
G582.00	Acute heart failure
G583.00	Heart failure with normal ejection fraction
G583.11	HFNEF - heart failure with normal ejection fraction
G583.12	Heart failure with preserved ejection fraction
G584.00	Right ventricular failure
G58z.00	Heart failure NOS
G58z.12	Weak heart
G5y4z00	Post cardiac operation heart failure NOS
661M500	Heart failure self-management plan agreed
661N500	Heart failure self-management plan review
662p.00	Heart failure 6 month review
662T.00	Congestive heart failure monitoring
662W.00	Heart failure annual review
679W100	Education about deteriorating heart failure
8H2S.00	Admit heart failure emergency
8HBE.00	Heart failure follow-up
8HTL000	Referral to rapid access heart failure clinic
G232.00	Hypertensive heart&renal dis wth (congestive) heart failure
G234.00	Hyperten heart&renal dis+both(congestv)heart and renal fail
G581.12	Pulmonary oedema - acute
G58z.11	Weak heart
SP11111	Heart failure as a complication of care
SP11200	Cardiorespiratory failure as a complication of care
G554000	Congestive cardiomyopathy

Peripheral Vascular Disease

Clinical Code	Description
7A11211	Y graft of abdominal Aortic aneurysm (emergency)
7A11311	Y graft of abdominal Aortic aneurysm (emergency)
7A13.11	Emergency repair of aortic aneurysm
7A13411	Tube graft abdominal Aortic aneurysm (emergency)
7A14.11	Aortic aneurysm repair
7A14411	Tube graft of Abdominal aortic aneurysm
C107.12	Diabetes with gangrene
G71..00	Aortic aneurysm
G710.00	Dissecting aortic aneurysm
G711.00	Thoracic aortic aneurysm which has ruptured
G711.11	Ruptured thoracic aortic aneurysm
G712.00	Thoracic aortic aneurysm without mention of rupture
G713.00	Abdominal aortic aneurysm which has ruptured
G713.11	Ruptured abdominal aortic aneurysm
G713000	Ruptured suprarenal aortic aneurysm
G714.00	Abdominal aortic aneurysm without mention of rupture
G714.11	AAA - Abdominal aortic aneurysm without mention of rupture
G714000	Juxtarenal aortic aneurysm
G714100	Inflammatory abdominal aortic aneurysm
G715.00	Ruptured aortic aneurysm NOS
G715000	Thoracoabdominal aortic aneurysm, ruptured
G716.00	Aortic aneurysm without mention of rupture NOS
G716000	Thoracoabdominal aortic aneurysm, without mention of rupture
G718.00	Leaking abdominal aortic aneurysm
G71z.00	Aortic aneurysm NOS
G73..00	Other peripheral vascular disease
G73..11	Peripheral ischaemic vascular disease
G731100	Vibratory white finger
G732.00	Peripheral gangrene
G732000	Gangrene of toe
G732100	Gangrene of foot
G732200	Gangrene of finger
G732300	Gangrene of thumb
G732400	Gangrene of hand
G73y.00	Other specified peripheral vascular disease
G73yz00	Other specified peripheral vascular disease NOS
G73z.00	Peripheral vascular disease NOS
G73z000	Intermittent claudication
G73z011	Claudication
G73zz00	Peripheral vascular disease NOS
Gyu7100	[X]Aortic aneurysm of unspecified site, ruptured
Gyu7200	[X]Aortic aneurysm of unspecified site, nonruptured

Gyu7400	[X]Other specified peripheral vascular diseases
R054.00	[D]Gangrene
R054000	[D]Gangrene, spreading cutaneous
R054200	[D]Gangrene of toe in diabetic
R054300	[D]Widespread diabetic foot gangrene
R054z00	[D]Gangrene NOS
G714200	Infrarenal abdominal aortic aneurysm
G714300	Aneurysm of suprarenal aorta
G717.00	Aortic aneurysm - syphilitic
G71A.00	Aortic root dilatation
G72..00	Other aneurysm
G720.00	Aneurysm of artery of arm
G720000	Aneurysm of brachial artery
G720100	Aneurysm of radial artery
G720200	Aneurysm of ulnar artery
G720z00	Aneurysm of arm artery NOS
G721.00	Aneurysm of renal artery
G721000	Acquired renal artery aneurysm
G721100	Congenital renal artery aneurysm
G722.00	Aneurysm of iliac artery
G722000	Aneurysm of common iliac artery
G722100	Aneurysm of external iliac artery
G722200	Aneurysm of internal iliac artery
G722z00	Aneurysm of iliac artery NOS
G723.00	Aneurysm of leg artery
G723000	Aneurysm of femoral artery
G723100	Aneurysm of popliteal artery
G723200	Aneurysm of anterior tibial artery
G723300	Aneurysm of dorsalis pedis artery
G723400	Aneurysm of posterior tibial artery
G723500	Ruptured popliteal artery aneurysm
G723z00	Aneurysm of leg artery NOS
G725.00	Dissection of artery of upper extremity
G725.11	Dissection of artery of arm
G726.00	Dissection of renal artery
G727.00	Dissection of iliac artery
G728.00	Dissection of artery of lower extremity
G728.11	Dissection of artery of leg
G729.00	Aneurysm and dissection of precerebral artery
G72A.00	Dissection of other specified arteries
G72B.00	Dissection of artery
G72B000	Dissection of transplant artery
G72y.00	Aneurysm of other artery
G72y000	Aneurysm of common carotid art

G72y100	Aneurysm of external carotid artery
G72y200	Aneurysm of internal carotid artery
G72y300	Aneurysm of neck artery NOS
G72y400	Aneurysm of subclavian artery
G72y500	Aneurysm of splenic artery
G72y600	Aneurysm of axillary artery
G72y700	Aneurysm of coeliac artery
G72y800	Aneurysm of superior mesenteric artery
G72y900	Aneurysm of inferior mesenteric artery
G72yA00	Aneurysm of hepatic artery
G72yB00	Aneurysm of other visceral artery
G72yz00	Vertebral artery aneurysm
G72z.00	Other aneurysm NOS
G73..12	Ischaemia of legs
G73..13	Peripheral ischaemia
G731.00	Raynaud's syndrome
G731000	Raynaud's disease
G731z00	Thromboangiitis obliterans NOS
G733.00	Ischaemic foot
G734.00	Peripheral arterial disease
G73y000	Diabetic peripheral angiopathy
G73y100	Peripheral angiopathic disease EC NOS
G73y200	Acrocyanosis
G73z012	Vascular claudication
G73z100	Spasm of peripheral artery
Gyu7300	[X]Aneurysm of other specified arteries
14AE.00	H/O: aortic aneurysm
14NB.00	H/O: Peripheral vascular disease procedure
2I16.00	O/E - gangrene
g71..00	Aortic aneurysm

Stroke/Trans-ischaemic attack

Clinical code	**Description**
G6...00	Cerebrovascular disease
G60..00	Subarachnoid haemorrhage
G600.00	Ruptured berry aneurysm
G601.00	Subarachnoid haemorrhage from carotid siphon and bifurcation
G602.00	Subarachnoid haemorrhage from middle cerebral artery
G603.00	Subarachnoid haemorrhage from anterior communicating artery
G604.00	Subarachnoid haemorrhage from posterior communicating artery
G605.00	Subarachnoid haemorrhage from basilar artery
G606.00	Subarachnoid haemorrhage from vertebral artery

G60X.00	Subarachnoid haemorrh from intracranial artery, unspecif
G60z.00	Subarachnoid haemorrhage NOS
G61..00	Intracerebral haemorrhage
G61..11	CVA - cerebrovascular accid due to intracerebral haemorrhage
G61..12	Stroke due to intracerebral haemorrhage
G610.00	Cortical haemorrhage
G611.00	Internal capsule haemorrhage
G612.00	Basal nucleus haemorrhage
G613.00	Cerebellar haemorrhage
G614.00	Pontine haemorrhage
G615.00	Bulbar haemorrhage
G616.00	External capsule haemorrhage
G617.00	Intracerebral haemorrhage, intraventricular
G618.00	Intracerebral haemorrhage, multiple localized
G619.00	Lobar cerebral haemorrhage
G61X.00	Intracerebral haemorrhage in hemisphere, unspecified
G61X000	Left sided intracerebral haemorrhage, unspecified
G61X100	Right sided intracerebral haemorrhage, unspecified
G61z.00	Intracerebral haemorrhage NOS
G62..00	Other and unspecified intracranial haemorrhage
G620.00	Extradural haemorrhage - nontraumatic
G621.00	Subdural haemorrhage - nontraumatic
G622.00	Subdural haematoma - nontraumatic
G623.00	Subdural haemorrhage NOS
G62z.00	Intracranial haemorrhage NOS
G63..00	Precerebral arterial occlusion
G63..11	Infarction - precerebral
G63..12	Stenosis of precerebral arteries
G630.00	Basilar artery occlusion
G631.00	Carotid artery occlusion
G631.11	Stenosis, carotid artery
G631.12	Thrombosis, carotid artery
G632.00	Vertebral artery occlusion
G633.00	Multiple and bilateral precerebral arterial occlusion
G634.00	Carotid artery stenosis
G63y.00	Other precerebral artery occlusion
G63y000	Cerebral infarct due to thrombosis of precerebral arteries
G63y100	Cerebral infarction due to embolism of precerebral arteries
G63z.00	Precerebral artery occlusion NOS
G64..00	Cerebral arterial occlusion
G64..11	CVA - cerebral artery occlusion
G64..12	Infarction - cerebral

G64..13	Stroke due to cerebral arterial occlusion
G640.00	Cerebral thrombosis
G640000	Cerebral infarction due to thrombosis of cerebral arteries
G641.00	Cerebral embolism
G641.11	Cerebral embolus
G641000	Cerebral infarction due to embolism of cerebral arteries
G64z.00	Cerebral infarction NOS
G64z.11	Brainstem infarction NOS
G64z.12	Cerebellar infarction
G64z000	Brainstem infarction
G64z100	Wallenberg syndrome
G64z111	Lateral medullary syndrome
G64z200	Left sided cerebral infarction
G64z300	Right sided cerebral infarction
G64z400	Infarction of basal ganglia
G65..00	Transient cerebral ischaemia
G65..11	Drop attack
G65..12	Transient ischaemic attack
G65..13	Vertebro-basilar insufficiency
G650.00	Basilar artery syndrome
G650.11	Insufficiency - basilar artery
G651.00	Vertebral artery syndrome
G651000	Vertebro-basilar artery syndrome
G652.00	Subclavian steal syndrome
G653.00	Carotid artery syndrome hemispheric
G654.00	Multiple and bilateral precerebral artery syndromes
G655.00	Transient global amnesia
G656.00	Vertebrobasilar insufficiency
G657.00	Carotid territory transient ischaemic attack
G65y.00	Other transient cerebral ischaemia
G65z.00	Transient cerebral ischaemia NOS
G65z000	Impending cerebral ischaemia
G65z100	Intermittent cerebral ischaemia
G65zz00	Transient cerebral ischaemia NOS
G66..00	Stroke and cerebrovascular accident unspecified
G66..11	CVA unspecified
G66..12	Stroke unspecified
G66..13	CVA - Cerebrovascular accident unspecified
G660.00	Middle cerebral artery syndrome
G661.00	Anterior cerebral artery syndrome
G662.00	Posterior cerebral artery syndrome
G663.00	Brain stem stroke syndrome

G664.00	Cerebellar stroke syndrome
G665.00	Pure motor lacunar syndrome
G666.00	Pure sensory lacunar syndrome
G667.00	Left sided CVA
G668.00	Right sided CVA
G669.00	Cerebral palsy, not congenital or infantile, acute
G67..00	Other cerebrovascular disease
G670.00	Cerebral atherosclerosis
G670.11	Precerebral atherosclerosis
G671.00	Generalised ischaemic cerebrovascular disease NOS
G671000	Acute cerebrovascular insufficiency NOS
G671100	Chronic cerebral ischaemia
G671z00	Generalised ischaemic cerebrovascular disease NOS
G672.00	Hypertensive encephalopathy
G672.11	Hypertensive crisis
G673.00	Cerebral aneurysm, nonruptured
G673000	Dissection of cerebral arteries, nonruptured
G673100	Carotico-cavernous sinus fistula
G673200	Carotid artery dissection
G673300	Vertebral artery dissection
G674.00	Cerebral arteritis
G674000	Cerebral amyloid angiopathy
G675.00	Moyamoya disease
G676.00	Nonpyogenic venous sinus thrombosis
G676000	Cereb infarct due cerebral venous thrombosis, nonpyogenic
G677.00	Occlusion/stenosis cerebral arts not result cerebral infarct
G677000	Occlusion and stenosis of middle cerebral artery
G677100	Occlusion and stenosis of anterior cerebral artery
G677200	Occlusion and stenosis of posterior cerebral artery
G677300	Occlusion and stenosis of cerebellar arteries
G677400	Occlusion+stenosis of multiple and bilat cerebral arteries
G678.00	Cereb autosom dominant arteriop subcort infarcts leukoenceph
G679.00	Small vessel cerebrovascular disease
G67A.00	Cerebral vein thrombosis
G67B.00	Reversible cerebral vasoconstriction syndrome
G67B.11	Call-Fleming syndrome
G67y.00	Other cerebrovascular disease OS
G67z.00	Other cerebrovascular disease NOS
G68..00	Late effects of cerebrovascular disease
G680.00	Sequelae of subarachnoid haemorrhage
G681.00	Sequelae of intracerebral haemorrhage
G682.00	Sequelae of other nontraumatic intracranial haemorrhage

G683.00	Sequelae of cerebral infarction
G68W.00	Sequelae/other + unspecified cerebrovascular diseases
G68X.00	Sequelae of stroke,not specfd as h'morrhage or infarction
G6y..00	Other specified cerebrovascular disease
G6z..00	Cerebrovascular disease NOS
Gyu6.00	[X]Cerebrovascular diseases
Gyu6000	[X]Subarachnoid haemorrhage from other intracranial arteries
Gyu6100	[X]Other subarachnoid haemorrhage
Gyu6200	[X]Other intracerebral haemorrhage
Gyu6300	[X]Cerebrl infarctn due/unspcf occlusn or sten/cerebrl artrs
Gyu6400	[X]Other cerebral infarction
Gyu6500	[X]Occlusion and stenosis of other precerebral arteries
Gyu6600	[X]Occlusion and stenosis of other cerebral arteries
Gyu6700	[X]Other specified cerebrovascular diseases
Gyu6C00	[X]Sequelae of stroke;not specfd as h'morrhage or infarction
Gyu6D00	[X]Sequelae/other unspecified cerebrovascular diseases
Gyu6E00	[X]Subarachnoid haemorrh from intracranial artery, unspecif
Gyu6F00	[X]Intracerebral haemorrhage in hemisphere, unspecified
Gyu6G00	[X]Cereb infarct due unsp occlus/stenos precerebr arteries
G6W..00	Cereb infarct due unsp occlus/stenos precerebr arteries
G6X..00	Cerebrl infarctn due/unspcf occlusn or sten/cerebrl artrs

Hypertension

Clinical Code	Description
G2...00	Hypertensive disease
G2...11	BP - hypertensive disease
G20..00	Essential hypertension
G20..11	High blood pressure
G20..12	Primary hypertension
G200.00	Malignant essential hypertension
G201.00	Benign essential hypertension
G202.00	Systolic hypertension
G203.00	Diastolic hypertension
G20z.00	Essential hypertension NOS
G20z.11	Hypertension NOS
G21..00	Hypertensive heart disease
G210.00	Malignant hypertensive heart disease
G210000	Malignant hypertensive heart disease without CCF
G210100	Malignant hypertensive heart disease with CCF
G210z00	Malignant hypertensive heart disease NOS

G211.00	Benign hypertensive heart disease
G211000	Benign hypertensive heart disease without CCF
G211100	Benign hypertensive heart disease with CCF
G211z00	Benign hypertensive heart disease NOS
G21z.00	Hypertensive heart disease NOS
G21z000	Hypertensive heart disease NOS without CCF
G21z011	Cardiomegaly - hypertensive
G21z100	Hypertensive heart disease NOS with CCF
G21zz00	Hypertensive heart disease NOS
G22..00	Hypertensive renal disease
G22..11	Nephrosclerosis
G220.00	Malignant hypertensive renal disease
G221.00	Benign hypertensive renal disease
G222.00	Hypertensive renal disease with renal failure
G22z.00	Hypertensive renal disease NOS
G22z.11	Renal hypertension
G23..00	Hypertensive heart and renal disease
G230.00	Malignant hypertensive heart and renal disease
G231.00	Benign hypertensive heart and renal disease
G232.00	Hypertensive heart&renal dis wth (congestive) heart failure
G233.00	Hypertensive heart and renal disease with renal failure
G234.00	Hyperten heart&renal dis+both(congestv)heart and renal fail
G23z.00	Hypertensive heart and renal disease NOS
G24..00	Secondary hypertension
G240.00	Secondary malignant hypertension
G240000	Secondary malignant renovascular hypertension
G240z00	Secondary malignant hypertension NOS
G241.00	Secondary benign hypertension
G241000	Secondary benign renovascular hypertension
G241z00	Secondary benign hypertension NOS
G244.00	Hypertension secondary to endocrine disorders
G24z.00	Secondary hypertension NOS
G24z000	Secondary renovascular hypertension NOS
G24z100	Hypertension secondary to drug
G24zz00	Secondary hypertension NOS
G25..00	Stage 1 hypertension (NICE - Nat Ins for Hth Clin Excl 2011)
G25..11	Stage 1 hypertension
G250.00	Stage 1 hyperten (NICE 2011) without evidnce end organ damge
G251.00	Stage 1 hyperten (NICE 2011) with evidnce end organ damge
G26..00	Severe hypertension (Nat Inst for Health Clinical Ex 2011)
G26..11	Severe hypertension
G27..00	Hypertension resistant to drug therapy

G28..00	Stage 2 hypertension (NICE - Nat Ins for Hth Clin Excl 2011)
G2y..00	Other specified hypertensive disease
G2z..00	Hypertensive disease NOS
Gyu2.00	[X]Hypertensive diseases
Gyu2000	[X]Other secondary hypertension
Gyu2100	[X]Hypertension secondary to other renal disorders

Lipid Lowering Drugs

Clinical code	Description
81048998	Atorvastatin 20mg chewable tablets sugar free
81051998	Atorvastatin 10mg chewable tablets sugar free
83099998	Simvastatin 40mg/5ml oral suspension sugar free
82655998	Nicotinic acid & laropiprant 1g+20mg tablets
83030998	Simvastatin 80mg tablets
81050998	Atorvastatin 10mg chewable tablets sugar free
84268998	Colesevelam 625mg tablets
84267998	Colesevelam 625mg tablets
83594998	Nicotinic acid 1g / laropiprant 20mg modified-release tablets
79254979	Simvastatin 20mg/5ml oral suspension sugar free
83188998	Bezafibrate 200mg tablets
83187998	Bezafibrate 400mg modified-release tablets
81049998	Atorvastatin 20mg chewable tablets sugar free
82141978	Eicosapentaenoic acid 460mg / Docosahexaenoic acid 380mg capsules
87853998	Nicotinic acid 1g modified-release tablets
87852998	Nicotinic acid 500mg modified release tablets
89154996	Cerivastatin 300microgram tablets
86791998	Simvastatin 80mg / Ezetimibe 10mg tablets
87854998	Nicotinic acid 750mg modified-release tablets
89153996	Cerivastatin sodium 300mcg tablets
88298997	Fenofibrate micronised 267mg capsules
88534998	Rosuvastatin 10mg tablets
86794998	Simvastatin 80mg / Ezetimibe 10mg tablets
86510979	Ispaghula husk 3.5g sugar free granules
87025998	Bezafibrate 400mg modified-release tablets
87418998	Simvastatin 10mg tablets
87918998	Simvastatin 10mg tablets
89401998	Bezafibrate 400mg modified-release tablets
87917998	Simvastatin 20mg tablets
89089998	Bezafibrate 400mg modified release tablets

87373998	Simvastatin 10mg tablets
87760998	Colestipol 5g granules sachets sugar free
86798998	Simvastatin 20mg / Ezetimibe 10mg tablets
88297996	Fenofibrate micronised 267mg capsules
87848998	Nicotinic acid pack
86796998	Simvastatin 40mg / Ezetimibe 10mg tablets
87849998	Nicotinic acid 375mg + 500mg + 750mg modified-release tablet
87850998	Nicotinic acid 1g modified release tablets
87851998	Nicotinic acid 750mg modified release tablets
86797998	Simvastatin 20mg / Ezetimibe 10mg tablets
87916998	Simvastatin 40mg tablets
89306996	Atorvastatin 40mg tablets
89311998	Atorvastatin 10mg tablets
89617998	Ispaghula husk 3.5g sugar free granules
89154997	Cerivastatin 200microgram tablets
86795998	Simvastatin 40mg / Ezetimibe 10mg tablets
89311997	Atorvastatin 20mg tablets
89306998	Atorvastatin 10mg tablets
89311996	Atorvastatin 40mg tablets
88298996	Fenofibrate micronised 200mg capsules
86788998	Simvastatin 40mg / Ezetimibe 10mg tablets
86789998	Simvastatin 20mg / Ezetimibe 10mg tablets
89153998	Cerivastatin sodium 100mcg tablets
86787998	Simvastatin 80mg / Ezetimibe 10mg tablets
89154998	Cerivastatin 100microgram tablets
88297998	Fenofibrate micronised 67mg capsules
86467998	Rosuvastatin 5mg tablets
89285979	Nicotinic acid 500mg modified release tablets
89800998	Eicosapentaenoic acid 460mg / Docosahexaenoic acid 380mg capsules
89284979	Nicotinic acid 750mg modified release tablets
88298998	Fenofibrate micronised 67mg capsules
88297997	Fenofibrate micronised 200mg capsules
89306997	Atorvastatin 20mg tablets
87855998	Nicotinic acid 500mg modified-release tablets
89283979	Nicotinic acid 1g modified release tablets
89153997	Cerivastatin sodium 200mcg tablets
86468998	Rosuvastatin 5mg tablets
92447998	Cerivastatin sodium 400mcg tablets
90973998	Rosuvastatin 20mg tablets
93619998	Simvastatin 10mg tablets
92408998	Rosuvastatin 20mg tablets

93620996	Simvastatin 40mg tablets
92448997	Cerivastatin 800microgram tablets
92410998	Rosuvastatin 40mg tablets
93620997	Simvastatin 20mg tablets
93620998	Simvastatin 10mg tablets
93871990	Simvastatin 40mg tablets
92409998	Rosuvastatin 10mg tablets
93243996	Pravastatin 40mg tablets
91194998	Fluvastatin 80mg modified-release tablets
93010990	Colestyramine 4g oral powder sachets sugar free
92549990	Fenofibrate micronised 200mg capsules
93244998	Pravastatin 10mg tablets
93244997	Pravastatin 20mg tablets
93244996	Pravastatin 40mg tablets
92539998	Rosuvastatin 40mg tablets
90310998	Atorvastatin 80mg tablets
93243997	Pravastatin 20mg tablets
92448998	Cerivastatin 400microgram tablets
94407990	Simvastatin 20mg tablets
93838990	Bezafibrate 200mg tablets
92471998	Simvastatin 80mg tablets
93851992	Colestipol 5g granules sachets sugar free
90309998	Atorvastatin 80mg tablets
92460998	Fenofibrate micronised 160mg tablets
91316998	Colestyramine sugar free powder
93243998	Pravastatin 10mg tablets
92292998	Ezetimibe 10mg tablets
92154990	Simvastatin 20mg/5ml oral suspension sugar free
93541998	Colestyramine 4g oral powder sachets
93542998	Colestyramine 4g oral powder sachets sugar free
92804997	Fluvastatin 40mg capsules
94189997	Fenofibrate micronised 200mg capsules
92293998	Ezetimibe 10mg tablets
90649998	Fenofibrate 200mg capsules
92805998	Fluvastatin 20mg capsules
92804998	Fluvastatin 20mg capsules
92805997	Fluvastatin 40mg capsules
93619996	Simvastatin 40mg tablets
92220998	Simvastatin 80mg tablets
90653998	Colestyramine 4g oral powder sachets sugar free
94188997	Fenofibrate micronised 200mg capsules
94112992	Cholestyramine 325 mg cap

94188998	Fenofibrate 100mg capsule
94189998	Fenofibrate 100mg capsules
92804996	Fluvastatin 80mg modified-release tablets
93619997	Simvastatin 20mg tablets
95480990	Simvastatin 10mg tablets
95479990	Simvastatin 20mg tablets
95952997	Bezafibrate 400mg modified-release tablets
95550990	Simvastatin 20mg tablets
95551990	Simvastatin 10mg tablets
94925998	Eicosapentaenoic acid 170mg / Docosahexaenoic acid 115mg capsules
95478990	Simvastatin 40mg tablets
95471990	Simvastatin 40mg tablets
95475990	Simvastatin 20mg tablets
94799998	Fenofibrate micronised 160mg tablets
96295997	Gemfibrozil 600mg tablets
95474990	Simvastatin 40mg tablets
95472990	Simvastatin 20mg tablets
95451990	Simvastatin 10mg tablets
95549990	Simvastatin 40mg tablets
96295998	Gemfibrozil 300mg capsules
94927990	Simvastatin 80mg tablets
94827992	Colestyramine 4g oral powder sachets
95501990	Simvastatin 40mg tablets
94782990	Pravastatin 20mg tablets
95185990	Simvastatin 80mg tablets
95494990	Simvastatin 20mg tablets
94605998	Colestipol 5g granules sachets sugar free
95495990	Simvastatin 10mg tablets
94851990	Pravastatin 10mg tablets
95500990	Simvastatin 80mg tablets
94830990	Pravastatin 20mg tablets
95502990	Simvastatin 20mg tablets
97078998	Fish oil concentrate 1g capsules
96685990	Bezafibrate 400mg modified-release tablets
96685989	Bezafibrate 200mg tablets
97377979	Cerivastatin sodium 300mcg tablets
94831990	Pravastatin 10mg tablets
97078997	Fish oil concentrate oral liquid
94661998	Colestipol 5g granules sachets sugar free
95482990	Simvastatin 20mg tablets
95483990	Simvastatin 10mg tablets

95486990	Simvastatin 40mg tablets
95508990	Simvastatin 10mg tablets
95487990	Simvastatin 20mg tablets
95952998	Bezafibrate 200mg tablets
97078996	Fish oil concentrate oral emulsion
94850990	Pravastatin 20mg tablets
94849990	Pravastatin 40mg tablets
94662998	Colestipol 5g granules sachets sugar free
95493990	Simvastatin 40mg tablets
95847990	Colestyramine 4g oral powder sachets sugar free
95098992	Hexopal 200 mg tab
97455979	Pravastatin 10mg tablets
95481990	Simvastatin 40mg tablets
94661997	Colestipol 5g granules sachets sugar free
97430979	Fluvastatin 20mg capsules
95805998	Bezafibrate 400mg modified release tablets
95405990	Simvastatin 40mg tablets
94789990	Pravastatin 10mg tablets
95401998	Probucol 250mg tablet
97247997	Gemfibrozil 600mg tablets
97247998	Gemfibrozil 300mg capsules
96134990	Colestyramine 4g oral powder sachets
95278990	Simvastatin 20mg tablets
95277990	Simvastatin 40mg tablets
95372990	Simvastatin 40mg tablets

Table S2. The RECORD statement – checklist of items, extended from the STROBE statement, that should be reported in observational studies using routinely collected health data.

	Item No.	STROBE items	Location in manuscript where items are reported	RECORD items	Location in manuscript where items are reported
Title and abstract					
	1	(a) Indicate the study's design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found	Abstract	RECORD 1.1: The type of data used should be specified in the title or abstract. When possible, the name of the databases used should be included. RECORD 1.2: If applicable, the geographic region and timeframe within which the study took place should be reported in the title or abstract. RECORD 1.3: If linkage between databases was conducted for the study, this should be clearly stated in the title or abstract.	Abstract Study time has been noted in the study population section.
Introduction					
Background rationale	2	Explain the scientific background and rationale for the investigation being reported	Introduction paragraphs 1-6		
Objectives	3	State specific objectives, including any prespecified hypotheses	Introduction paragraph 7		
Methods					
Study Design	4	Present key elements of study design early in the paper	Method: Study Design and Data Source		
Setting	5	Describe the setting, locations, and relevant dates, including	Method: Study Population		

		periods of recruitment, exposure, follow-up, and data collection			
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 *(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	Method: Study Population	RECORD 6.1: The methods of study population selection (such as codes or algorithms used to identify subjects) should be listed in detail. If this is not possible, an explanation should be provided. RECORD 6.2: Any validation studies of the codes or algorithms used to select the population should be referenced. If validation was conducted for this study and not published elsewhere, detailed methods and results should be provided. RECORD 6.3: If the study involved linkage of databases, consider use of a flow diagram or other graphical display to demonstrate the data linkage process, including the number of individuals with linked data at each stage.	Method: Study Population. No Validation studies were conducted for the use of the read codes in this study nor did this study include the use of linked datasets
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Method: Study Population	RECORD 7.1: A complete list of codes and algorithms used to classify exposures, outcomes, confounders, and effect modifiers should be provided. If these cannot be reported, an explanation should be provided.	Supplementary Materials 1
Data sources/ measurement	8	For each variable of interest, give sources of data and details of methods of assessment (measurement).	Method Study Population		

		Describe comparability of assessment methods if there is more than one group			
Bias	9	Describe any efforts to address potential sources of bias	Methods: Study design and data source, study population and statistical analysis		
Study size	10	Explain how the study size was arrived at	Methods: Study Population		
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why	Methods: Statistical analysis		
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding (b) Describe any methods used to examine subgroups and interactions (c) Explain how missing data were addressed (d) *Cohort study* - If applicable, explain how loss to follow-up was addressed *Case-control study* - If applicable, explain how matching of cases and controls was addressed *Cross-sectional study* - If applicable, describe analytical methods taking account of sampling strategy (e) Describe any sensitivity analyses	Methods: Statistical analysis		

Data access and cleaning methods		..		RECORD 12.1: Authors should describe the extent to which the investigators had access to the database population used to create the study population. RECORD 12.2: Authors should provide information on the data cleaning methods used in the study.	Methods: Study Design and data source
Linkage		..		RECORD 12.3: State whether the study included person-level, institutional-level, or other data linkage across two or more databases. The methods of linkage and methods of linkage quality evaluation should be provided.	Methods: Study Design and data source
Results					
Participants	13	(a) Report the numbers of individuals at each stage of the study (*e.g.*, numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed) (b) Give reasons for non-participation at each stage. (c) Consider use of a flow diagram	Results: baseline characteristics and table 1	RECORD 13.1: Describe in detail the selection of the persons included in the study (*i.e.*, study population selection) including filtering based on data quality, data availability and linkage. The selection of included persons can be described in the text and/or by means of the study flow diagram.	Methods: Study Population
Descriptive data	14	(a) Give characteristics of study participants (*e.g.*, demographic, clinical, social) and information on exposures and potential confounders (b) Indicate the number of participants with missing data for each variable of interest	Results: baseline characteristics and table 1		

		(c) *Cohort study* - summarise follow-up time (*e.g.*, average and total amount)			
Outcome data	15	*Cohort study* - Report numbers of outcome events or summary measures over time *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	Results: Association between DA and Cardiometabolic disease and Table 2		
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Results: Association between DA and Cardiometabolic disease and Table 2		
Other analyses	17	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses	Nil other sensitivity analyses		
Discussion					
Key results	18	Summarise key results with reference to study objectives	Discussion: Summary of key results		
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision.	Discussion: Study limitations	RECORD 19.1: Discuss the implications of using data that were not created or collected to answer the	Discussion: Summary of key results

		Discuss both direction and magnitude of any potential bias		specific research question(s). Include discussion of misclassification bias, unmeasured confounding, missing data, and changing eligibility over time, as they pertain to the study being reported.	
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Conclusion		
Generalisability	21	Discuss the generalisability (external validity) of the study results	Conclusion		
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 section		
Accessibility of protocol, raw data, and programming code		..		RECORD 22.1: Authors should provide information on how to access any supplemental information such as the study protocol, raw data, or programming code.	Data sharing and accessibility statement and supplementary 2

*Reference: Benchimol EI, Smeeth L, Guttmann A, Harron K, Moher D, Petersen I, Sørensen HT, von Elm E, Langan SM, the RECORD Working Committee. The REporting of studies Conducted using Observational Routinely-collected health Data (RECORD) Statement. *PLoS Medicine* 2015; in press.