Supplement 4. Study characteristics, and details for ethnicity, modifiable risk factors and methods. Notes: *N includes all eligible participants. Participants lost to the analysis are detailed as missing data. 12 MRF: 12 modifiable risk factors for dementia.

Supplementary material for Jordão, M., Gong, L., Andre, D., Akhtar, A., Nwofe, E., Hawkins, R., Best, K., Parveen, S., Windle, K., & Clegg, A. Minoritised ethnic groups and modifiable dementia risk: a scoping review of UK-based evidence

Study ID	**Study region**	**Study recruitment location**	**Data collection date**	**Aim** [quotes]	**Initial N***	**Ethnicity categories**	**N* per ethnicity**	**Ethnicity definition**
Adelman 2009 (1)	England	London (Islington and South London)	Detailed for included studies: Stewart et al 2001; Stewart et al 2003; Stevens et al 2004	To collate evidence regarding the prevalence and predictors of dementia or relative cognitive impairment in older, African-Caribbean people in Britain, as compared to their white, British peers.	583	African or Caribbean; black/African-Caribbean; UK-born	See included studies: Stewart et al 2001; Stewart et al 2003; Stevens et al 2004	See included studies: Stewart et al 2001; Stewart et al 2003; Stevens et al 2004
Bature 2018 (2)	England	Milton Keynes and Luton	2006 to 2016 for dementia diagnosis; retrospective health data from 27 years before on average	To identify patterns in signs and symptoms preceding the clinical diagnosis of AD to suggest a predictive model for earlier diagnosis of the disease in the primary care	109	Asian; black African; black/African-Caribbean; Middle Eastern; mixed; white	Non-White: 31 White: 78	Based on medical records
Bonnechere 2023 (3, 4)	England, Scotland and Wales	Edinburgh, Glasgow, Newcastle, Middlesbrough, Leeds, Sheffield, Bury, Manchester, Stockport, Liverpool, Wrexham, Stoke, Nottingham, Birmingham, Oxford, Reading, London, Croydon, Hounslow, Bristol, Cardiff, Swansea	2006 to 2010	To quantify risk factors of dementia, stroke, and mortality in Asian and black participants compared to whites.	272660	Asian; black; white	Asian: 3686 Black: 2303 White: 266671	Self-reported based on UK census categories
Bothongo 2022 (5, 6)	England	East London: Hackney & City of London, Newham, Tower Hamlets, and	July 2009 to January 2018	To evaluate the relationships between ethnicity, area level socioeconomic deprivation and dementia risk	19891	Black; other; South Asian; unknown; white;	Black: 3769 White: 10301 Other: 1479 South Asian: 3232	Self-reported based on UK census categories

		Waltham Forest					Unknown: 1110	
Mukadam 2022 (7)	England, Scotland and Wales	Edinburgh, Glasgow, Newcastle, Middlesbrough, Leeds, Sheffield, Bury, Manchester, Stockport, Liverpool, Wrexham, Stoke, Nottingham, Birmingham, Oxford, Reading, London, Croydon, Hounslow, Bristol, Cardiff, Swansea	Baseline: 2006 to 2010; Follow-up: continuously until 2020	To address a critical need to understand risks for all-cause dementia across ethnic groups, and whether ethnicity affects the association between established risk factors and dementia risk	294162	Black; South Asian; white;	Black: 2766 South Asian: 3590 White: 287806	Self-reported based on UK census categories
Mukadam 2023 (8-10)	England	Not applicable	1997 to 2018	To investigate ethnic differences in the associations of potentially modifiable risk factors with dementia	1189090	Black; other; South Asian; unknown; white	Black: 9166 Other: 13860 South Asian: 13082 Unknown: 322441 White: 830541	Based on medical records
Richards 2000 (11)	England	Bellenden Ward and London borough of Southwark	Not mentioned	To shed light on sources of bias in interpreting cognitive test scores obtained in cultures different from those on which they were standardised	90	Black/African-Caribbean; white	Black/African-Caribbean: 45 White: 45	Self-reported based on UK census categories
Sharma 2022 (12)	All 4 UK nations	Not applicable	1999 to 2018	To compare 20-year cardiometabolic trajectories, stratified by ethnicity, in those with type 2 diabetes who did and did not develop dementia	117730	Non-white; white	Not available	Based on medical records
Stevens 2004 (13)	England	Islington, London	Not mentioned	To determine the association between African/Caribbean COB (country of birth) compared to UK COB and type of dementia; To explore whether people of African/Caribbean birth with hypertension were taking the	1085	African or Caribbean; UK-born	African or Caribbean: 98 UK-born: 667	Self-reported country of birth

				treatments for this group which have been demonstrated to be the most effective				
Stewart 2001 (14)	England	South London	Not mentioned	To ascertain clinical vascular disease and risk in an older British African-Caribbean population and investigate associations with cognitive impairment	290	Black/African-Caribbean	Black/African-Caribbean: 290	Attributed by clinical staff, subsequently confirmed based on participants self-reported country of birth and ancestry
Stewart 2003 (15)	England	South London	Baseline: 1997 to 1998; Follow-up: 2000 to 2001	To investigate associations between baseline factors and subsequent cognitive decline in an older African-Caribbean population	216	Black/African-Caribbean	Black/African-Caribbean: 216	Attributed by clinical staff, subsequently confirmed based on participants self-reported country of birth and ancestry
Stewart 2012 (16, 17)	England	Southall and Brent, London	Baseline: 1988 to 1991; Follow-up: 2008-2011	To estimate the relationships between vascular risk factors and cognitive impairment among three ethnic groups (Black/South Asian/White UK residents)	1187	Black; South Asian; white	Black: 185 South Asian: 432 White: 570	Attributed by researchers
Taylor 2013 (18)	England	Southall and Brent, London	Baseline: 1988 to 1991; Follow-up: 2008-2011	To investigate long-term prospective associations between a range of measurements of hypertensive status in midlife and cognitive impairment 20 years later	4857	Black/African-Caribbean; South Asian; white	Black/African-Caribbean: 241 South Asian: 551 White: 692	Attributed by researchers
Tsamakis 2021 (19, 20)	England	Southeast London	2007 to 2015	To compare ethnic group differences in symptom profile, functioning and pharmacotherapy at dementia diagnosis	12154	Black African; black/African-Caribbean; other white; South Asian; white Irish; white	Black African: 310 Black/African-Caribbean: 1661 Other White: 773 South Asian: 364 White Irish: 626 White: 8420	Based on medical records

Study ID	**12 MDF**	**12 MDF**	**Risk factors definitions**	**Other risk**

	predictors	**controlled**		**factors**
Adelman 2009 (1)	less education; hypertension; physical inactivity; diabetes	none	See included studies: Stewart et al 2001; Stewart et al 2003; Stevens et al 2004	none
Bature 2018 (2)	hearing impairment; depression	none	Hearing impairment: based on medical records, otherwise unspecified Depression: based on medical records, otherwise unspecified	smelling impairment
Bonnechere 2023 (3, 4)	less education; hypertension; hearing impairment; smoking; obesity; depression; physical inactivity; diabetes; low social contact; alcohol consumption; traumatic brain injury; air pollution	none	Education: low education when participants did not have a college or university degree, or A levels or equivalent (academic advanced-levels, post-compulsory education) Hypertension: self-report of hypertension medication and/or mean of 2 blood pressure readings >=140 systolic blood pressure or >=90 diastolic blood pressure Hearing impairment: self-report of hearing difficulties or deafness Smoking: classified as never, previous or current presumably based on self-report Obesity: >30 kg/m2 calculated from measured weight and height Depression: self-report or record of depression episode (single episode, recurrent moderate, recurrent severe) by the first assessment Physical inactivity: low IPAQ (International Physical Activity Questionnaire) Diabetes: self-reported diabetes or record of any type of diabetes (type 1, 2, gestational and insipidus), or HbA1c >= 6.5% (48 mmol/mol) Low social contact: no self-reported social group activity Alcohol consumption: presumably based on self-report and categorised as: None - less than one dose per week; low - 1-2 per week; Mid - 3-4 per week; High - daily or almost daily Traumatic brain injury: self -report or record of neurological / intracranial injury or trauma and fracture of skull or head before the first assessment Air pollution: PM2.5, otherwise unspecified	none
Bothongo 2022 (5, 6)	hypertension; hearing impairment; smoking; obesity; depression; diabetes; alcohol consumption; traumatic brain injury	none	Hypertension: medical record diagnosis Hearing impairment: medical record diagnosis or referral for hearing assessment Smoking: categorised current, previous, or never having smoked, based on medical records. Obesity: categories based on BMI calculated using height and weight measurements and participants were categorised as overweight/obese (BMI 25-50 kg/m2), normal weight (BMI 20-24.9kg/m2), or underweight (10-19.9kg/m2). Depression: medical record diagnosis Diabetes: medical record diagnosis Alcohol consumption: medical record of high alcohol intake Traumatic brain injury: medical record diagnosis	deprivation
Mukadam 2022 (7)	less education; hypertension;	none	Education: self-report education up to age 16 and higher than this (two categories) Hypertension: self-report or reported use of hypertensive medications	deprivation

	hearing impairment; smoking; obesity; depression; physical inactivity; diabetes; low social contact; alcohol consumption; air pollution		Hearing impairment: self-reported problems with hearing including in a noisy environment; use of hearing aid Smoking: self-report as current or non-current smokers Obesity: BMI>30kg/m2 based on weight and height at baseline Depression: self-report of having ever seen the doctor for anxiety or depression Physical inactivity: self-reported duration, intensity and frequency, over previous four-week and categorized as meeting the WHO guidance for physical activity or not (metabolic equivalent per week calculated based on published guidance) Diabetes: self-report of diabetes diagnosis or the use of diabetes medication Low social contact: cohabitation and self-reported frequency of contact with friends and family, used to categorise those with daily/almost daily social contact and less frequent contact Alcohol consumption: self-report of frequency, quantity and type of alcohol per week. Categorised as drinking no alcohol, up to 21 or less units, or over 21 units per week splitting into concentrations below or equal to and above the WHO recommended threshold of an annual average Air pollution: exposed to PM2.5 air pollution or not, based on estimates for the year 2010 modelled for each address as part of the European Study of Cohorts for Air Pollution Effects (ESCAPE).	
Mukadam 2023 (8-10)	hypertension; hearing impairment; smoking; obesity; depression; diabetes; alcohol consumption; traumatic brain injury	none	Hypertension: at least two of the following before age 65: hypertension diagnostic code in CPRD or HES, blood pressure reading of >=140mmHg systolic or >=90mmHg diastolic, and at least two prescriptions of antihypertensive medications. Hearing impairment: sensorineural/central hearing loss or mixed hearing loss or presbycusis, not purely conductive hearing loss, at any age in medical record. Record of hearing aids (except bone-anchored). Referrals to audiology and testing. Congenital hearing loss, deafness as part of a medical syndrome, deaf-blind are excluded Smoking: medical record of current smoker or non-smoker at the closest date of the start of the cohort Obesity: any of the following before age 65: medical record of obesity, prescription of anti-obesity medications, referral for or record of bariatric surgery, recorded BMI of >=30kg/m2. Depression: any record of depression or depressive symptoms Diabetes: any of the following: medical record of diabetes or diabetes complications, prescription of diabetes medication, HbA1c >48 mmol/mol or 6.5%, plasma glucose >11.1 mmol/l, fasting plasma glucose>7.0 mmol/l, post-prandial glucose>11.1mmol/l, or v) abnormal glucose tolerance test (>11mmol/l after 2 hours). Alcohol consumption: medical record of binge or excess alcohol consumption, or excess alcohol based on records indicating consumption of >=14 units of alcohol per week for women and >=21 units per week for men was classified as drinking excess alcohol Traumatic brain injury: medical record of “concussion”, “cerebral contusion”, “head injury”, “brain injury”, “intracranial injury”, head or skull fracture, subarachnoid haemorrhage, extradural and subdural haemorrhage related to injury. Intracerebral haemorrhage excluded if not caused by trauma.	sleep; deprivation
Richards 2000 (11)	None	less education; hypertension;	Education: years of education Hypertension: presumably based on self-report of medical history	none

		diabetes	Diabetes: presumably based on self-report of medical history	
Sharma 2022 (12)	hypertension; diabetes	none	Hypertension: mean systolic blood pressure Diabetes: glycaemic control, fasting plasma glucose, HbA1c	none
Stevens 2004 (13)	hypertension	smoking; diabetes; alcohol consumption	Hypertension: blood pressure > 140/90 mm Hg. physical examination Other MRF unspecified	none
Stewart 2001 (14)	less education; hypertension; smoking; obesity; physical inactivity; diabetes; alcohol consumption	depression	Education: low education was defined as leaving school with less than 15 years old, around 8 years of education. Leaving school at 15 or older was categorized as normal/high education. Hypertension: diagnosis self-reported and medical examination including resting blood pressure, hypertension with proteinuria or hypertrophy on ECG Smoking: structured questionnaire for smoking (Cox et al 1997, The Health and Lifestyle Survey) Obesity: BMI and waist or waist/hip ratio Depression: Geriatric Depression Scale (GDS) (10 item) Physical inactivity: Structured questionnaire for physical activity - EPIC physical activity questionnaire (Pols et al., 1997) Diabetes: previous diagnosis, diabetes with poor control defined as glycosuria or HbA1c >= 8.2.% Alcohol consumption: Structured questionnaire for alcohol (Cox et al 1997, The Health and Lifestyle Survey)	none
Stewart 2003 (15)	less education; hypertension; physical inactivity; diabetes	none	Education: low education was defined as leaving school with less than 15 years old, Hypertension: diagnosis self-reported and medical examination including resting blood pressure, hypertension with proteinuria or hypertrophy on ECG Physical inactivity: Structured questionnaire for physical activity - EPIC physical activity questionnaire (Pols et al., 1997) A final item on the questionnaire asked whether participants had performed any regular activity over the last year that had caused them to sweat or increased their heart rate. A binary (present/absent) variable derived from this item was used a priori as a measure of activity. Diabetes: Diabetes: previous diagnosis, diabetes with poor control defined as glycosuria or HbA1c >= 8.2.% Diabetes mellitus was categorized as severe if glycosuria was detected.	none
Stewart 2012 (16, 17)	hypertension; diabetes	less education	Education: years of education Hypertension: resting blood pressure >140/90 or antihypertensive at treatment at baseline Diabetes: unspecified	none
Taylor 2013 (18)	hypertension	less education; smoking; obesity; diabetes; alcohol consumption	Education: duration of education categorized as less than 10 years, or 10 years or more. Hypertension: hypertension treatment, systolic and diastolic blood pressure, pulse pressure, mean arterial pressure, mean ambulatory SBP at 3-5am, 9-11am and 5-7pm, mean ambulatory DBP at 3-5am, 9-11am and 5-7pm. Smoking: status was ascertained by questionnaire and coded as never, current, or previous Obesity: BMI greater than 30.0 kg/m2 Diabetes: diabetes mellitus was ascertained from self-report and retrospective application of World Health Organization (WHO) 1999 criteria	none

			Alcohol consumption: coded as less than weekly, one to two times per week, and daily or almost daily	
Tsamakis 2021 (19, 20)	depression	none	Depression: depressive symptoms based on the Health of the Nation Outcome Scales for Elderly People (HoNOS 65+, Burns et al, 1999)	housing; deprivation

Study ID	**Study design**	**Data source and recruitment**	**Outcome measure**	**Type of analysis**	**Risk findings per subgroup**	**Interaction between 12 MRF and ethnicity**	**Interaction between risk factors**	**Adjustments for all performed analyses**	**Missing data**	**Imputation**
Adelman 2009 (1)	Systematic review	Secondary, systematic search	See included studies: Stewart et al 2001; Stewart et al 2003; Stevens et al 2004	See included studies	See included studies	See included studies	See included studies	See included studies	See included studies	See included studies
Bature 2018 (2)	Case control study	Secondary, Medical records of 3 GP practices	Dementia diagnosis based on medical record	Multivariate	No	Yes	No	Unadjusted	Not mentioned	Not applicable
Bonnechere 2023 (3, 4)	Cohort study	Primary; invitation sent based on population-based registers; UK Biobank	Dementia diagnosis based on self-report or medical record	Multivariate	Yes	Yes	No	Adjusted	Not mentioned	Not applicable
Bothongo 2022 (5, 6)	Case control study	Secondary; medical records for the Secure Health Analysis and Research in East London project	Dementia diagnosis based on medical record	Multivariate	No	Yes	Yes	Adjusted	<10% missing for any variable	Missing data for ethnicity was included in the analysis as unknown. Sensitivity analysis with imputation were

										conducted.
Mukadam 2022 (7)	Cohort study	Secondary; records in UK Biobank	Dementia diagnosis based on self-report or medical record	Multivariate	Yes	Yes	No	For subgroup analysis, adjusted and unadjusted analyses are presented. For Interaction between risk factors and ethnicity the analysis is adjusted	No missing data for: hypertension, hearing loss, obesity, physical inactivity and alcohol intake. Missing data for: smoking (0.59%), deprivation (Townsend score, 0.13%), social isolation (0.20%), diabetes (0.52%), educational attainment (0.74%), ethnicity (0.74%), depressive symptoms (1.0%), and air pollution (8.22%).	Not mentioned
Mukadam 2023 (8-10)	Cohort study	Secondary; medical records in CALIBER (electronic patient health records from CPRD, linked to Hospital Episode Statistics and	Dementia diagnosis based on medical record	Multivariate	Yes	Yes	No	Adjusted	27% missing for ethnicity	In some subgroup analyses and in the interaction between risk factors and ethnicity,

		Mortality Statistics)								imputation was used.
Richards 2000 (11)	Cross sectional study	Primary; non-medical record list subsequent door to door contact	Dementia diagnosis based on cognitive and clinical assessment	Multivariate	Yes	No	No	Adjusted	4.4% missing, partial data from direct and informant data in some cases	Not mentioned
Sharma 2022 (12)	Case control study	Secondary; medical records in the Clinical Practice Research Database	Dementia diagnosis based on medical record	Multivariate	Yes	No	No	Adjusted	Not mentioned	Not applicable
Stevens 2004 (13)	Cross sectional study	Primary; door to door	Dementia diagnosis based on cognitive and clinical assessment	Univariate	Yes	No	No	Unadjusted	Not mentioned	Not applicable
Stewart 2001 (14)	Cross sectional study	Primary; medical records and subsequent contact by NHS services	Cognitive function testing (cutoff not validated externally)	Uni and multivariate	Yes	No	Yes	Adjusted and unadjusted	4% missing data due to lack of cognitive data; 16% missing data in the adjusted analysis	Not mentioned
Stewart 2003 (15)	Cohort study	Primary; medical records and subsequent contact by NHS services	Cognitive function testing (cutoff not validated externally)	Univariate	Yes	No	No	Unadjusted	4.2% missing data	Not mentioned

Stewart 2012 (16, 17)	Cohort study	Primary; NHS services, primary care and industrial workforce lists	Cognitive function testing (cutoff not validated externally)	Multivariate	Yes	No	No	Adjusted	Not mentioned	Not applicable
Taylor 2013 (18)	Cohort study	Primary; traced participants in previous study through health service tracing system	Cognitive function testing (cutoff not validated externally)	Multivariate	No	Yes	No	Adjusted	62% missing at 20 years follow up, and 7% additionally missing due to lack of cognitive data	Not mentioned
Tsamakis 2021 (19, 20)	Cross sectional study	Secondary; medical records in Clinical Record Interactive Search System	Dementia diagnosis based on medical record	Multivariate	No	Yes	No	Adjusted	23% missing data on at least 1 covariate	Yes

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