



# Untreated hypertension in the UK household population – Who are missed by the general health checks?

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## ABSTRACT

Hypertension is an age-related, long-term condition and a leading risk factor for premature death and disability worldwide. Due to its asymptomatic nature it can often be left undiagnosed. Long-term treatment is available, but blood pressure can also be reduced through health behaviour changes in weight control, smoking cessation, higher physical activity levels, reduced salt and alcohol intake, and healthful diets if discovered early. This paper investigates the prevalence and characteristics of those with untreated (compared to treated) hypertension who did not have a history of cardiovascular disease (CVD); a group who is in effect missed by general health checks.

Untreated hypertension was studied in 8933 individuals aged 40–74 years representative of the UK household population, who were interviewed and underwent a physical health examination in their home, 2010–2012. The prevalence of untreated hypertension without a history of CVD was 7% for men, 2% for women, and 5% overall. Untreated hypertension was particularly high among the 55–64 year age group.

Age and sex-adjusted analyses found strong positive associations with male gender, smoking, self-reported good–excellent health, full fat dairy preference, white bread preference, higher alcohol consumption, and living alone. Strong negative associations were found for possessing 5+ prescription drugs, statins or antiplatelets, being diagnosed with diabetes or possessing antidiabetics, and long-term limiting illness status.

Notably, many reported their health as good to excellent. A fact which emphasises the importance of motivating individuals to take part in the general health checks for an asymptomatic condition such as hypertension.

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## 1. Introduction

Hypertension is a common, asymptomatic, age-related, long-term condition reported as the leading risk factor for premature death and disability in the 2010 Global Burden of Disease report (Lim et al., 2012). At ages 40–69 years, each difference of 20 mm Hg in systolic blood pressure is associated with more than a twofold difference in the stroke death rate, and with twofold differences in the death rates from ischaemic heart disease and other vascular causes (Lewington et al., 2002). Hypertension is also one of the main risk factors addressed in the English government's recently published strategy for combating cardiovascular disease (CVD) (Department of Health, 2013). Due to the fact that it is an asymptomatic condition that can only be diagnosed based on blood pressure measurements it can often be left undiagnosed. Once diagnosed hypertension can be controlled through long-term use of antihypertensive medication. Blood pressure can also be reduced and

managed through health behaviour changes in weight control, smoking cessation, higher physical activity levels, reduced salt and alcohol intake, and healthful diets if discovered early (Department of Health, 2013; Yang et al., 2012).

The English government set out the new CVD outcome strategy in 2013 to improve CVD prevention, treatment pathways, and long-term care (Department of Health, 2013). Central to the strategy for primary prevention, and a major investment, is the NHS Health Check screening programme offering free CVD risk assessments to 40–74 year olds not already diagnosed with CVD, diabetes, or renal disease. The programme was rolled out in its first phase 2009–2012 and continues to be implemented nationally under a new 5-year plan from 2013. The evidence base for the general health checks programme was models showing that the increase in early diagnosis of asymptomatic, high CVD-risk, yet treatable conditions such as hypertension, diabetes and dyslipidaemia together with directed lifestyle advice would deliver cost-effectiveness and longer, healthier lives (Department of Health, 2013). Uptake has so far been close to 50% (Artac et al., 2013b). General practice audits suggest that uptake has been greater among older age groups and higher in non-smokers than smokers (Artac et al., 2013a, 2013b; Cochrane et al., 2013; Dryden et al., 2012; Kumar et al., 2011).

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The overall aim of this study was to identify the characteristics of individuals with untreated (compared to treated) hypertension who did not have a history of CVD in the general population in order to understand who in effect are not reached by the NHS Health Check programme. Thus, we calculated the prevalence of untreated CVD-free hypertension in the UK household population. Subsequently we described the health, health behaviours, social and economic characteristics of individuals with untreated versus treated CVD-free hypertension. We used data from *Understanding Society*, a general household survey, which covers a broad section of the population and not only those in frequent contact with the healthcare system. It is in that way possible to capture individuals who are in effect hard to reach by general screening programmes.

## 2. Methods

### 2.1. Data source

This study was based on data from *Understanding Society*, a general longitudinal household survey initiated in 2009 (Wave 1) (University of Essex, 2014), and included data from a home health assessment visit in May 2010–July 2012 (carried out an average 148 days (SD 26) after the Wave 2 interview). *Understanding Society* was designed as a stratified, clustered, equal probability sample study (Lynn, 2009). The household response rates at baseline (Wave 1) were 57% and 87% of adults within these households took part. At Wave 2 72% of eligible adults took part, and of those interviewed in English, resident in Great Britain, excluding pregnant women, 59% took part (Lynn and Knies, 2016; McFall et al., 2014).

### 2.2. Identification of individuals eligible of antihypertensive therapy

The health assessment interview was conducted by a nurse in the respondent's own homes and included a short questionnaire, a range of physical measurements, and the nurse coding the medications in the respondent's possession (National Centre for Social Research, 2010). Blood pressure was measured three times with the Omron HEM 907; respondents were asked to sit quietly for five minutes before the measurements were taken using the right arm where possible. Only the second and third measurements were used here to avoid the 'white coat' effect, i.e. the fact the blood pressure may become raised initially in apprehensive individuals. Untreated hypertension was defined as individuals without any history of CVD, who were eligible to antihypertensive treatment and did not possess any antihypertensives. Eligibility for antihypertensive therapy followed NICE guidelines, i.e. individuals with stage 2 hypertension (150 mm Hg systolic/95 mm Hg diastolic home measurement; average of second and third measurements) and individuals with stage 1 (135/85) with either diabetes or a 10 year CVD risk exceeding 20% (NICE, 2011). Anti-hypertension therapy was defined as anti-hypertensive medication including diuretics. These are listed in British National Formulary (BNF) (BMJ/RPS, 2009) sections 2.2.1–2.2.8, beta blockers (BNF 2.4), ACE inhibitors (BNF 2.5.5.1, 2.5.5.3), calcium blockers (BNF 2.6.2), and other drugs affecting blood pressure (BNF 2.5.1–2.5.4).

### 2.3. Variables in the analysis

To understand who might be missing general health checks for diagnosis and treatment of hypertension, a range of variables were investigated including risk factors for CVD (Department of Health, 2013) and non-attendance in participatory health check programmes (Dryden et al., 2012). Variables included were age (40–54 years, 55–64 years, 65–74 years), gender, living alone, education (higher education, GCSE/A-level, none), net equivalised monthly household income, current cigarette smoking, participation in the recommended 150 min of moderate intensity physical activity per week (NICE, 2013) measured as

**Table 1**

Characteristics of participants with no history of CVD: untreated versus treated hypertension (weighted frequencies and percentages).

	Untreated hypertension		Treated hypertension	
	N	%	N	%
Gender				
Male	266	73.6	644	48.8
Female	95	26.4	675	51.2
Age groups				
40–54 years	131	36.2	304	23
55–64 years	156	43.2	466	35.3
65–74 years	74	20.5	549	41.6
Qualifications				
Higher education	114	31.7	356	27
GCSE, A-level or other	188	52.2	619	47
No qualifications	58	16.1	342	26
Net eq. household income per month				
<£1200	119	33	510	38.7
£1200–1800	120	33.3	435	33
£1800+	122	33.7	374	28.4
Area deprivation quintiles				
Q1.Least deprived	94	26.1	310	23.5
Q2	74	20.4	266	20.2
Q3	69	19	275	20.8
Q4	66	18.3	236	17.9
Q5.Most deprived	58	16.2	231	17.6
Rural locality				
No	270	74.8	1025	77.7
Yes	91	25.2	294	22.3
Living alone				
No	283	78.5	1073	81.3
Yes	78	21.5	246	18.7
Current smoker				
No	234	64.7	1100	83.4
Yes	127	35.3	219	16.6
Alcohol consumption (relative to recommended)				
<1.5	58	16	283	21.5
1.5+	191	53	453	34.3
No data	112	31	583	44.2
Low physical activity				
No	92	25.5	239	18.1
Yes	269	74.5	1080	81.9
<5 portions of fruit/veg a day				
No	77	21.3	353	26.8
Yes	284	78.7	966	73.2
White bread preference				
No	205	56.6	913	69.2
Yes	157	43.4	406	30.8
Full fat dairy preference				
No	297	82.2	1180	89.5
Yes	64	17.8	139	10.5
Obese				
No	186	51.6	656	49.7
Yes	175	48.4	663	50.3
LTLI				
No	227	62.7	489	37.1
Yes	135	37.3	830	62.9
Diabetic				
No	338	93.6	1048	79.5
Yes	23	6.4	271	20.5
Statins				
No	319	88.2	741	56.2
Yes	42	11.8	578	43.8
Antiplatelets				
No	346	95.8	1080	81.9
Yes	15	4.2	239	18.1
Antidepressants				
No	333	92.1	1170	88.7
Yes	29	7.9	149	11.3
Polypharmacy				
No	341	94.3	793	60.1
Yes	20	5.7	526	39.9
General health good–excellent				
No	93	25.7	479	36.3
Yes	268	74.3	840	63.7
Total	361	100	1319	100

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