

High blood pressure in pregnancy - a window of opportunity for predicting heart disease?

What is the problem?

Hypertensive disorders of pregnancy are a group of high blood pressure disorders that may occur during the pregnancy period. They are one of the most common medical complications of pregnancy, affecting around 8-10% of pregnancies worldwide. There are four clinical subtypes (see Figure 1). Women with a history of preeclampsia or high blood pressure in pregnancy are nearly twice as likely to develop diseases of the heart and blood vessels (cardiovascular disease) than women with normal blood pressure during pregnancy. However, we know very little about the risk factors that can predict who will develop heart disease after experiencing high blood pressure during pregnancy.

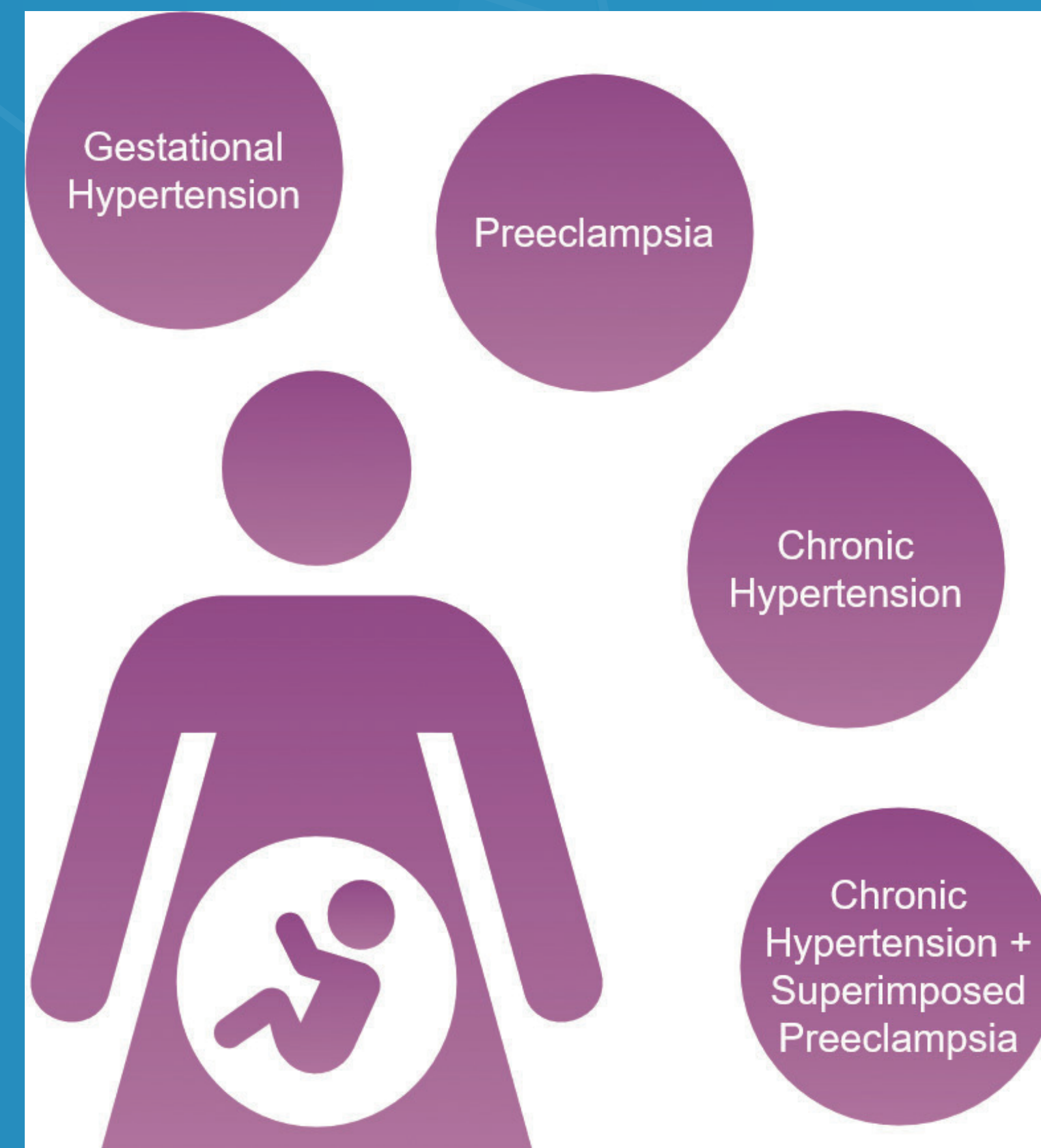


Figure 1 Clinical subtypes of hypertensive disorders of pregnancy. Gestational hypertension is high blood pressure after 20 weeks of pregnancy without protein in urine. Preeclampsia is high blood pressure in pregnancy with protein loss in urine. Chronic hypertension is high blood pressure that predates pregnancy and chronic hypertension + superimposed preeclampsia is chronic hypertension in association with features of preeclampsia, such as protein loss in urine.

What are we interested in?

We wanted to determine the associations between hypertensive disorders of pregnancy and risk factors for developing cardiovascular disease after pregnancy. Identifying these is critical to help develop future preventative strategies for women at risk.

What did we do?

We analysed data from two large studies (the Aberdeen Study of Cardiovascular Health in Women (ASCHW) and the European Prospective Investigation into Cancer (EPIC)-Norfolk cohort) and identified 4,186 women with a history of hypertensive disorders of pregnancy. The studies followed the women up after their pregnancy and recorded which patients went on to develop cardiovascular disease. Of the 4,186 women, 3,468 had attended clinic assessment where clinical measurements were taken, such as blood pressure, levels of cardiovascular biomarkers (molecules which are used to evaluate the health of your heart and blood vessels) and waist-hip ratios, which we were able to access.

We carried out statistical tests on the data to examine the relationship between hypertensive disorders of pregnancy and cardiovascular disease. The statistical tests took into account many different risk factors for cardiovascular disease that the women may have had.

What did we find?

We found that statistically significant predictors for cardiovascular disease in women with prior hypertensive disorder of pregnancy included: age over 49 years; no university education; high body mass index (BMI - a measure of whether an individual is under, over or of healthy weight), high total cholesterol, triglyceride and plasma fibrinogen levels; use of aspirin and lipid lowering medications; hypertension; family history of heart disease; repeated hypertensive disorder of pregnancy exposure; and being in the EPIC-Norfolk population, the majority of whom were English (see Figure 2).

Of these predictors, the cardiovascular risk factors which conferred the greatest likelihood (odds) of cardiovascular disease (more than twice as likely) were: age beyond 49 years, hypertension, aspirin users, having a morbidly obese BMI and belonging to the EPIC-Norfolk population.

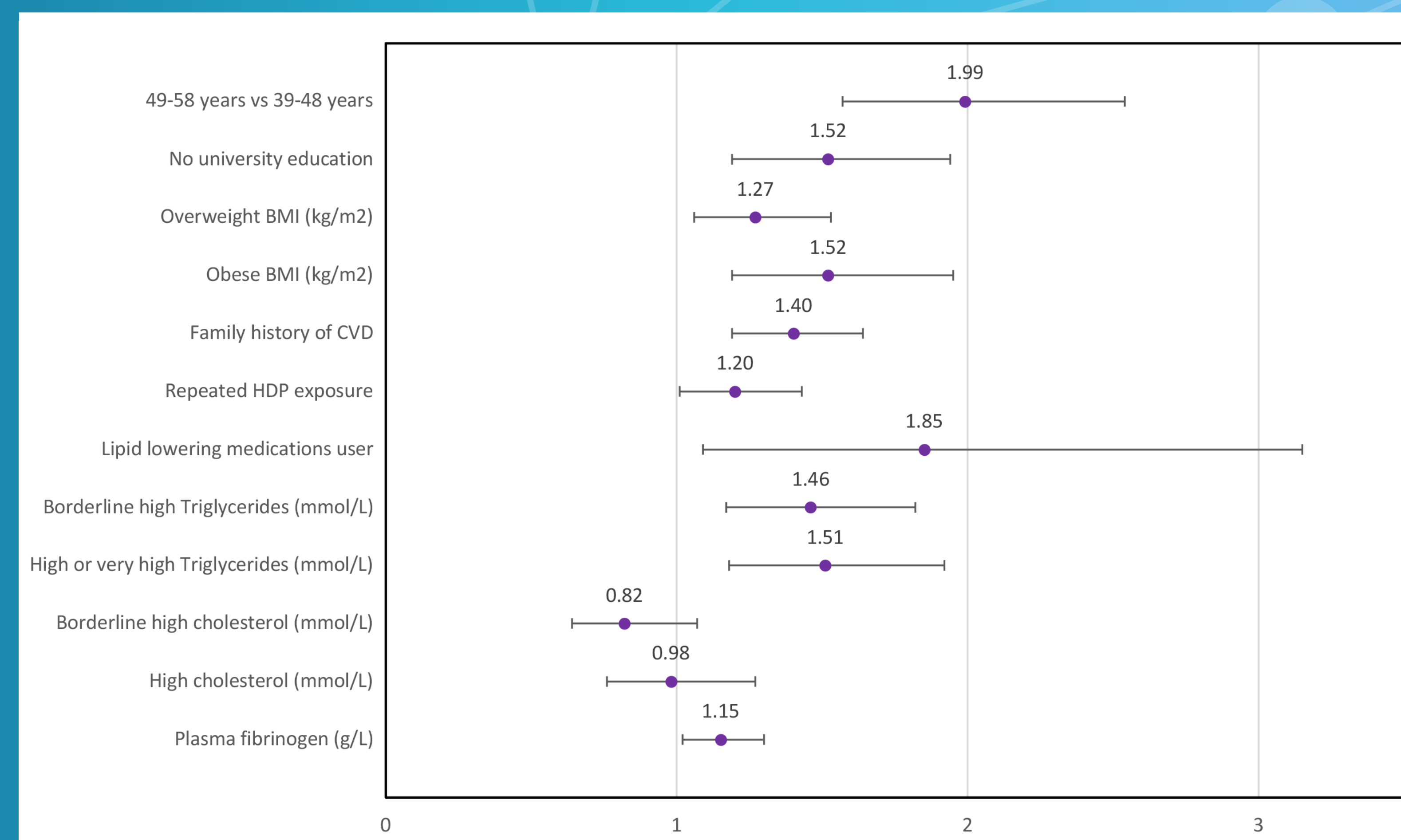


Figure 2 Plot detailing cardiovascular risk factors in women with hypertensive disorders of pregnancy and the odds (likelihood) of developing cardiovascular disease. An odds of 2 means the outcome (cardiovascular disease) is twice as likely. BMI = body mass index; HDP = hypertensive disorders of pregnancy; lipid = fat, cholesterol and triglycerides indicate fat levels; plasma fibrinogen = protein in blood which is responsible for blood clotting.

What does this mean?

Our findings suggest that women with hypertensive disorders of pregnancy should be screened with measurement of their blood pressure, BMI, triglyceride levels and fibrinogen levels to monitor patients for early warning of cardiovascular disease. These women should also be advised and supported to maintain a healthy weight and risk factors such as family history of cardiovascular disease and previous exposure of hypertensive disorders of pregnancy, should be evaluated.

Who am I?

I am a third year medical student at the University of Aberdeen. I have been carrying out research related to women's health and cardiovascular disease alongside my studies. I hope to pursue my interest in research by undertaking an intercalated degree. This involves taking a year out from studying medicine to complete a bachelor's or master's degree. It is a great opportunity to become better acquainted with science and research. In the long-run, I hope to continue doing research and be involved in academic medicine.