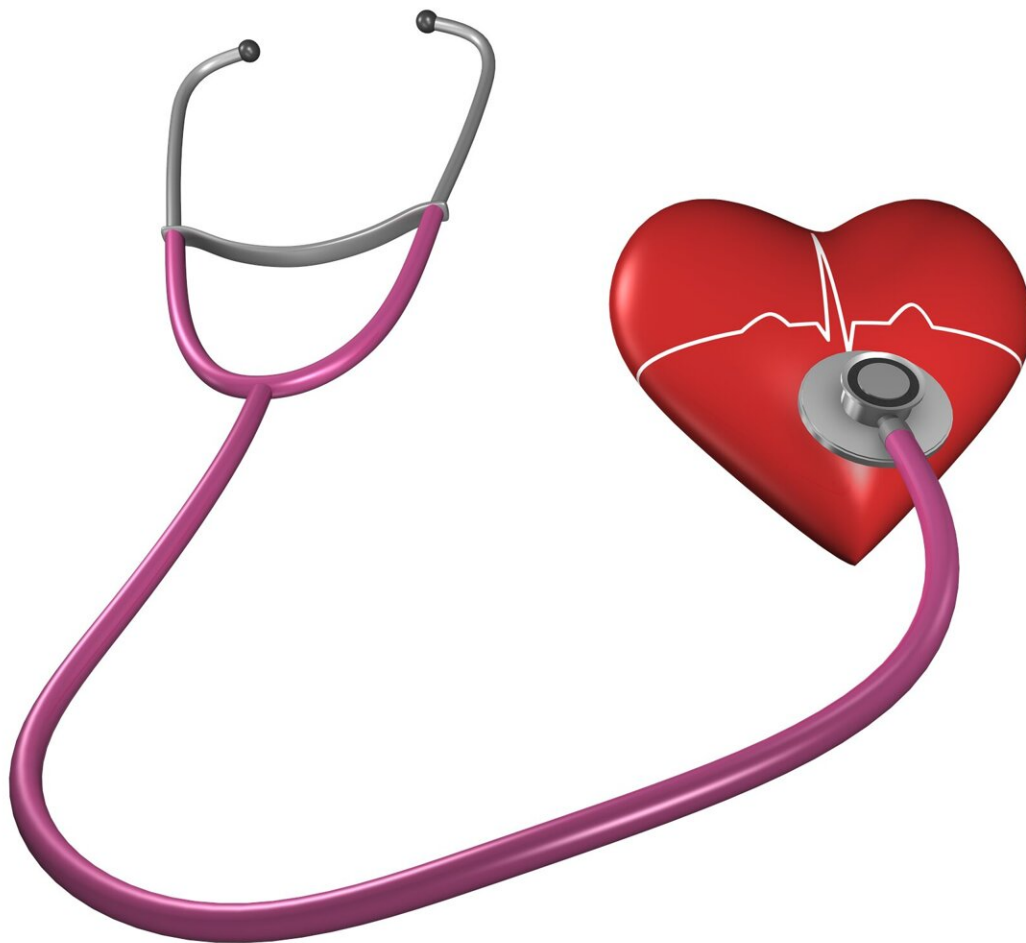


# Combo of bad cholesterol and high blood pressure may increase heart attack or stroke risk

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High levels of lipoprotein(a), a type of "bad" cholesterol, may be associated with an 18-20% higher risk of cardiovascular disease among people who have hypertension, however, CVD risk was not higher among those without hypertension, according to new research published today in *Hypertension*, an American Heart Association journal.

"High blood pressure is a known cardiovascular disease risk factor, and lipoprotein(a) is a type of inherited 'bad' cholesterol that may also lead to cardiovascular disease," said lead study author Rishi Rikhi, M.D., M.S., a [cardiovascular medicine](#) fellow at Atrium Health Wake Forest Baptist Medical Center in Winston-Salem, North Carolina. "We found that among people with [hypertension](#) who have never experienced a stroke or heart attack before, lipoprotein(a) seems to increase the risk of cardiovascular disease and risk of a major cardiovascular event like heart attack or stroke."

Hypertension is a key risk factor for cardiovascular disease. In this study, hypertension was defined as a top number of 140 mmHg or higher, a bottom number of 90 or mmHg or the use of blood pressure medication. In 2017, the Association [updated its definition](#) of hypertension to be a top number of 130 mmHg or higher or a bottom number of 80 mmHg or higher. Previous studies have indicated that when a person has hypertension and lipid imbalance, or dyslipidemia, their cardiovascular disease risk substantially increases. According to the study's authors, there is less information on how much of an affect lipoprotein(a) may have on cardiovascular disease risk among people with hypertension.

Lipoproteins, which are made up of protein and fat, carry cholesterol through the blood. The subtypes of lipoproteins include [low-density lipoprotein](#) (LDL), [high-density lipoprotein](#) (HDL) and lipoprotein(a), or Lp(a). Much like LDL cholesterol, lipoprotein(a) cholesterol may deposit and build up in the walls of blood vessels, thus increasing a person's risk of a heart attack or stroke.

The research used health data from the Multi-Ethnic Study of Atherosclerosis (MESA) study, an ongoing community-based study in the U.S. of subclinical cardiovascular disease—meaning the disease is discovered before there are clinical signs and symptoms. MESA is a research study including nearly 7,000 adults that began in 2000 and is still following participants in six locations across the U.S.: Baltimore; Chicago; New York; Los Angeles County, California; Forsyth County, North Carolina; and St. Paul, Minnesota. At the time of enrollment in the study, all participants were free from cardiovascular disease.

The current study included 6,674 MESA participants who had lipoprotein(a) levels and blood pressure assessed and for whom there was documented cardiovascular disease event data throughout MESA's follow-up exams in approximately 2001, 2003, 2004, 2006, 2010, 2017 and in telephone interviews every 9 to 12 months to gather interim data on new diagnoses, procedures, hospitalization and deaths. The study's participants were from diverse racial and [ethnic groups](#): 38.6% self-identified as white adults; 27.5% self-identified as African American adults; 22.1% self-identified as Hispanic adults; and 11.9% self-identified as Chinese American (n=791) adults. Additionally, more than half of the group was female (52.8%).

To evaluate the potential correlation between hypertension and lipoprotein(a) on the development of cardiovascular disease, the researchers first categorized the participants into groups based on their lipoprotein(a) levels and blood pressure measures obtained once at

baseline:

- Group 1 (2,837 people): lipoprotein(a) levels less than 50 mg/dL and no hypertension.
- Group 2 (615 people): lipoprotein(a) levels greater than or equal to 50mg/dL and no hypertension
- Group 3 (2,502 people): lipoprotein(a) levels less than 50mg/dL and hypertension
- Group 4 (720 people): lipoprotein(a) levels  $\geq$  50mg/dL and hypertension

Participants were followed for an average of approximately 14 years and cardiovascular events, including [heart attack](#), cardiac arrest, stroke or death from [coronary artery disease](#), were tracked.

The study's results include:

- A total of 809 of the participants experienced a cardiovascular disease event.
- Lipoprotein(a) levels had an effect on hypertension status that was statistically significant (meaning it was not due to chance).
- When compared to Group 1 (low lipoprotein(a) levels and no hypertension), Group 2 (higher lipoprotein(a) levels and no hypertension) did not have an increased risk for cardiovascular disease events.
- Less than 10% of Group 1 (7.7%) and Group 2 (participants 8%) had cardiovascular disease events.
- Participants in Groups 3 and 4, all of whom had hypertension, demonstrated a statistically significant increase in risk for cardiovascular disease events when compared to those in Group 1.
- Approximately 16.2% of the people in Group 3 (lower lipoprotein(a) levels and hypertension) had cardiovascular

disease events, and 18.8% of the participants in Group 4 (higher lipoprotein(a) levels and hypertension) experienced cardiovascular disease events.

"We found that the overwhelming amount of cardiovascular risk in this diverse population appears to be due to hypertension," Rikhi said.

"Additionally, individuals with hypertension had even higher cardiovascular risk when lipoprotein(a) was elevated. The fact that lipoprotein(a) appears to modify the relationship between hypertension and cardiovascular disease is interesting, and suggests important interactions or relationships for hypertension, [lipoprotein\(a\)](#) and [cardiovascular disease](#), and more research is needed."

Everyone can improve their cardiovascular health by following the [American Heart Association's Life's Essential 8](#): eating [healthy food](#), being physically active, not smoking, getting enough sleep, maintaining a healthy weight, and controlling cholesterol, blood sugar and blood pressure levels. [Cardiovascular disease claims more lives each year in the U.S. than all forms of cancer and chronic lower respiratory disease combined](#), according to the American Heart Association.

The study had limitations, including potential selection bias from participants—potentially disproportionately from one of the four subgroups—dropping out because the study was long-term. Additionally, the study participants may have developed hypertension during the follow-up period, which may have resulted in misclassification.

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