

# Young women more likely to return to the hospital in year following heart attack

May 1 2023

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Young women who experience a heart attack have more adverse outcomes and are more likely to end up back in the hospital compared to men of a similar age in the year following discharge. According to a study published in the *Journal of the American College of Cardiology*, second heart attack and chest pain due to the heart are the most common causes of rehospitalization, but non-cardiac hospitalizations showed the

most significant disparity.

"This all begins with public awareness towards preventing heart attacks and screening programs to detect traditional risk factors before a patient has a heart attack. Many people think heart attacks only occur in middle-aged or older men, which is not true," said Mitsuaki Sawano, MD, Ph.D., postdoctoral associate at Yale-New Haven Hospital Center for Outcomes Research and Evaluation and the study's lead author.

"People need to be aware that heart attacks occur in young women as well and they can present with atypical symptoms. After experiencing a heart attack, young women will be more likely to need a 360-level approach."

Researchers used data from the VIRGO study, an observational study of the presentation, treatment and outcomes of young women and men who experienced a heart attack between ages 18 and 55 years old. In the current study, 2,985 U.S. patients (2,009 women vs. 976 men) hospitalized for heart attack were included. After excluding in-hospital deaths, the final cohort included 2,979 patients (2,007 women vs. 972 men).

The study examined all-cause and cause-specific acute events that required hospitalization, which was defined as any hospital or observation stay longer than 24 hours within one-year of discharge following heart attack. The events were categorized as follows:

- Coronary-related hospitalization: a composite of hospitalizations due to recurrent heart attack or stable/unstable angina (chest pain due to the heart)
- Other cardiac or stroke hospitalization: a composite of heart failure, arrhythmias, valvular disease and stroke
- Non-cardiac hospitalization: any hospitalization not attributed to

cardiac issues, including chest pain not related to the heart, gastrointestinal problems, bleeding, psychiatric conditions, etc.

"We think young women who present with heart attacks tend to have a greater burden of cardiovascular risk factors compared with men. In general, young, premenopausal women are protected by their own estrogen hormone to have lower incidence of heart attacks. Thus, to overcome this physiological protection, we think a higher accumulation of risk factors, such as obesity, [high blood pressure](#), high cholesterol, cigarette smoking, etc., is needed to cause a 'breakthrough' effect," Sawano said.

The average age was 47 years and 70% self-identified as non-Hispanic White. A high proportion of women self-identified as non-Hispanic Black compared to men. Women also had a higher prevalence of comorbidities, including obesity, congestive heart failure, prior stroke and renal disease. In the patient cohort, the [young women](#) were more likely to be low-income, have a history of depression and significantly worse health status compared to men in the study.

"For women, this greater number of risk factors are likely to cause difficulty controlling them after discharge," Sawano said. "Worse control of risk factors is associated with worse outcomes, including recurrence of heart attacks, chest pain due to the heart, as well as other atherosclerotic diseases like stroke."

According to the researchers, women were less likely to present to the hospital with [chest pain](#) and more likely to arrive more than six hours after symptom on-set. They were also more likely to have a non ST-elevated [myocardial infarction](#) or a myocardial infarction with nonobstructive coronary arteries (MINOCA). The women experiencing MINOCA were younger, more likely to be a non-Hispanic Black patient, smokers, lower education status and had the lowest proportion of

previous coronary artery disease.

These patients also reported lower treatment satisfaction compared with men or women presenting with myocardial infarction with obstructive coronary artery disease (MI-CAD). On average, women stayed in the hospital longer and received lower rates of guideline-recommended medical therapies including aspirin, statins, beta-blockers and angiotensin-converting enzyme inhibitors (ACE inhibitors).

All-cause hospitalization rates within one year of discharge were 34.8% for women and 23% for men. The leading cause of hospitalizations for women were coronary-related, followed by non-cardiac then other cardiac and stroke-related hospitalizations. Women with MINOCA had lower rates of one-year outcomes compared with women who experienced MI-CAD. There was a more significant sex disparity between women and men for non-cardiac hospitalizations compared to all other hospitalizations (145.8 vs. 69.6 per 1,000 person-years).

"We think that the accumulation of risk factors seen in the MI-CAD population is associated with the high incidence of hospitalization one year after [heart attack](#)," Sawano said. "We must emphasize, however, that does not mean that MINOCA patients are 'low risk.' We know from recent studies that MINOCA is not a benign disease compared with similarly aged women and these cases warrant further evaluation to understand the underlying mechanism and treatment of certain conditions."

According to the researchers, the findings demonstrate the need for continued efforts to optimize secondary preventive strategies to reduce coronary-related hospitalizations, but also highlight the need for further research into the causes and mechanisms of non-cardiac hospitalization especially given the significant sex disparity.

In an accompanying editorial, Martha Gulati, MD, Ms, said, "This study importantly identifies an increased rate of cardiovascular and non-cardiovascular rehospitalization in women as compared to men, with a clear association between psychosocial and demographic factors. Yet the root cause of sex differences in psychosocial factors and rates of comorbid conditions remains elusive."

"Why are more women than men identified as [low-income](#) in this cohort? Why does this cohort demonstrate a nearly two-fold greater prevalence of depression in women as compared to men? As a cardiovascular community, by continuing to ask why perhaps we can arrive at 'what next.'"

Study limitations include the details of non-cardiac hospitalizations were not collected and the results may not be generalizable to population groups that were underrepresented in the study cohort.

**More information:** Mitsuaki Sawano et al, *Journal of the American College of Cardiology* (2023). [DOI: 10.1016/j.jacc.2023.03.383](https://doi.org/10.1016/j.jacc.2023.03.383)

Provided by American College of Cardiology

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