

News and Perspectives

From Reactive to Proactive Care: Using AI to Detect Gender-Based Violence in Brazil

Luke Taylor, JMIR Correspondent

Abstract

Femicide is an urgent and growing concern in Brazil—a new health care AI tool may offer a way to detect gender-based violence before it can get to that point. In this *News and Perspectives* article, JMIR Correspondent Luke Taylor reports on the potential of the ClarIA tool, the first story in his two-part series on how AI is helping make health care more proactive in Brazil.

Key Takeaways:

- A new frontier for AI is emerging: spotting hidden risks before they become crises by identifying patterns that are otherwise easy to miss.
- ClarIA, a new AI tool being used to detect gender-based violence from health records in Brazil in an effort to address femicide, may help facilitate earlier intervention.

A wave of grisly femicide and gender-based violence (GBV) cases have shocked Brazil in recent years.

Among the most appalling were those of Alana Anísio Rosa, who was stabbed 50 times by a man at her gym after rejecting his advances, and Tainara Souza Santos, who was run over and dragged beneath a car for around a kilometer by a man she had dated; she died from her injuries a month later.

Brazil documented [1571 femicides](#) in 2025, breaking the record for the fourth year in a row.

The rise in cases has sparked national [protests](#) and the government has [responded](#) by lengthening prison sentences and increasing victim protection. Lawmakers have even proposed a “[red pill bill](#)” criminalizing the promotion of online misogyny amid concerns that digital hatred of women is fueling real-world violence.

But, according to Pedro de Paula, PhD, Senior Vice President of Innovation at the global health nonprofit Vital Strategies, if the Brazilian government wants to save women’s lives, it should start with addressing health care.

A New Tool

“We estimate only 20% of the violence that comes through the clinic or hospital doors actually gets reported in Brazil,” de Paula says. “And of those cases that are reported, 80% are made too late—in hospitals or emergency rooms when women are already at a high risk of femicide.”

Vital Strategies, which advises national governments on public health, began developing its AI tool to combat GBV, ClarIA, after its researchers studied the causes of rising femicide cases in Brazil.

“In one case, a woman was recorded as having died in a car crash,” de Paula says. “But when we took a closer look, we saw she was actually thrown out of a moving truck by her former husband!”

Shocked by the number of deaths that were misclassified in the national health database, Vital Strategies and the computational linguistics lab of the Federal University of Juiz de Fora (UFJF) undertook a [pilot study](#) of 13,000 formally recorded GBV cases in the city of Recife.

They found that most of those cases were recorded in hospitals and emergency clinics, when violence was already severe. These cases had not gone unnoticed until then because the women avoided health services; they’d actually started visiting the clinic more frequently—on average, 92 days before their cases of GBV were recorded.

In some cases, the women told health care professionals they were victims of GBV and health care professionals did not formally report the violence.

In most cases, however, they did not openly state that violence was the reason for their visit.

The study identified subtle patterns across the women’s health records—an increase in complaints of headaches, mental health problems, and other issues.

“What we saw is that domestic violence takes the space of other things. It is precisely these things that we are trying to detect with ClarIA,” de Paula says.

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How ClarIA Works

ClarIA uses AI to search for signs of GBV in a patient's clinical notes and medical history, flagging possible unreported cases to health care professionals.

Depending on the pattern that the program spots, it provides an amber or red alert.

“A red alert identifies women who have disclosed violence in a previous visit or who have been reported as a victim by a health professional in the past, while amber identifies women whose medical record[s] have a pattern of signs, symptoms, and complaints very similar to women who have a clear history of [experiencing] violence,” explains Sofia Reinach, former Deputy Director of Public Health Systems and Violence Prevention at Vital Strategies.

ClarIA mostly identifies probable cases by detecting similarities in language between current victims of GBV and previous confirmed victims of GBV—signs that are typically too subtle for health care professionals to see.

“The system is not looking for specific keywords. A word like ‘headache’ or ‘depression’ on its own would not trigger an alert,” says Tiago Torrent, a linguistics professor at the University of Juiz de Fora who helped develop the program. “Rather, the AI learns to recognize semantic patterns across the clinical narratives, identifying different ways health care professionals may describe situations, symptoms, or circumstances that, when considered together, may be associated with an increased risk of violence. This allows the system to recognize similar situations even when they are described using very different words or expressions.”

After the Recife pilot, the city of approximately 1.6 million in northeastern Brazil began rolling out ClarIA in March. The program is now implemented in 39 clinics and hospitals.

The professionals receiving ClarIA's alerts are trained on how to manage patients ethically and sensitively while respecting

their rights and privacy. They are also given workflows to determine the appropriate next steps, such as specialist referrals or calling for protective services when necessary.

“An alert is not a diagnosis but prompts the health care professional to look more closely for any possible clinical, psychosomatic, and social signs of violence,” Reinach says.

The program is new, so data are thin, but since ClarIA was rolled out, health professionals have formally reported 8 notifications of GBV after receiving alerts.

“That may seem small but that could be the lives of [eight] women we otherwise could have lost,” says Marcella Abath, PhD, Recife's executive secretary for health surveillance. “Some of those cases were documented in units that did not report a single case last year.”

Women whose assaults were not formally notified (reported to the public health surveillance system by a health professional or reporting body) had an 8 times greater risk of death than those whose assaults were reported. But notification often comes only when violence is already severe. Among femicide victims identified by linking violence and mortality records, more than 60% were killed within 30 days of a GBV notification being made in the health care system,

The opportunity is to turn earlier encounters with health care into chances to intervene before violence reaches this point.

“In our focus groups, we can already see that the alert changed the way health care professionals provided care. It influences their approach, how they receive the woman, and even their tone of voice,” she says.

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Marcella Abath, PhD

Expansion and Improvement

Vital Strategies is in talks with the city of Rio de Janeiro and hopes to eventually expand the program there and across the world, as about [1 in every 3 women](#) experiences GBV.

They are also exploring the possibility of using the same language-based methodology to identify other problems before they escalate, including suicidal ideation or even cancer.

The largest priority, Abath said, was finding ways to avoid “alert fatigue.”

“Health workers told us that if electronic records generate too many warnings for different conditions, staff may eventually stop paying attention to them,” Abath says. “We have to be careful not to overload them with this information.”

False positives are another potential issue; it could be highly distressing if an alert leads to a woman being unnecessarily

questioned about possible violence when there is another explanation for the pattern in her health records.

Abath said Recife is developing a feedback function that will allow health workers to record whether an alert was ruled out, confirmed as suspected violence, or led to a referral, helping officials better understand how accurately the system is performing. “Technology helps, but it will never replace human action,” she says.

Keywords: femicide; gender-based violence; artificial intelligence; medical records systems; computerized; early diagnosis; risk assessment; Brazil; public health

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