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Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our Editorial Policies and the Editorial Policy Checklist.

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a	Confirmed
☐	☒ The exact sample size (*n*) for each experimental group/condition, given as a discrete number and unit of measurement
☐	☒ A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
☐	☒ The statistical test(s) used AND whether they are one- or two-sided *Only common tests should be described solely by name; describe more complex techniques in the Methods section.*
☐	☒ A description of all covariates tested
☒	☐ A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
☐	☒ A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
☐	☒ For null hypothesis testing, the test statistic (e.g. *F*, *t*, *r*) with confidence intervals, effect sizes, degrees of freedom and *P* value noted *Give P values as exact values whenever suitable.*
☒	☐ For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
☒	☐ For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
☐	☒ Estimates of effect sizes (e.g. Cohen's *d*, Pearson's *r*), indicating how they were calculated

Our web collection on statistics for biologists contains articles on many of the points above.

Software and code

Policy information about availability of computer code

Data collection	ECGs were recorded with commercially available devices (GE MAC 2 000 and Eko DUO Digital Stethoscope). Commercially available AI algorithms were also utilized in this study: The Eko Low Ejection Fraction Tool -ELEFT (software version - ELEFT 7.2.0), and Anumana's Low Ejection Fraction AI-ECG Algorithm (software version - lvef_v2.2.0). Both algorithms have now received FDA clearance and are classified as reduced ejection fraction machine learning-based notification software.
Data analysis	The AI algorithms listed above were used to analyze the ECG and phonocardiogram data. All other statistical analyses were performed using R version 4.1.2. Data were collected and stored using REDCap version 14.0.36.

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio guidelines for submitting code & software for further information.

Data

Policy information about availability of data

All manuscripts must include a data availability statement. This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our policy

The underlying data supporting the findings of this study can be made available to clinical investigators and researchers upon request. Written requests for data sharing including an analysis plan will be required prior to approval. These requests will be individually assessed in consultation with the study team leads and co-investigators as appropriate. If other investigators are interested in performing additional analyses, these requests can be made to the corresponding author (DAA) and analyses will be performed in collaboration with the Mayo Clinic. In all cases, any data, and materials to be shared will be released via a Material Transfer Agreement. Individual-level data will be available and data sharing will ensure that the rights and privacy of individuals participating in the research always remains protected. Anticipated time frame to respond to initial data requests is 1 month.

Human research participants

Policy information about studies involving human research participants and Sex and Gender in Research.

Reporting on sex and gender	Information on only one sex (female) was collected as part of this study as the trial aimed to study a condition that occurs exclusively in pregnant and postpartum females.
Population characteristics	Study participants were female, aged 18-49 years, pregnant or within 12 months postpartum, and receiving obstetric care (prenatal and postpartum) at 6 participating hospitals in Nigeria
Recruitment	All enrolling sites in Nigeria identified and enrolled consecutive consenting participants from outpatient, inpatient settings, or other hospital encounter. Potential participants were approached by members of the study team at the time of a scheduled clinic/hospital encounter (following initial screening procedures for eligibility) and information regarding the study was provided. If they agree to participate, consent was obtained in accordance with study protocol. Following informed consent, randomization was performed using an online-based tool and then study related testing and documentation completed based on assigned arm. (1) All participating sites were tertiary centers (teaching hospitals with a licensed cardiologist and echocardiography capabilities) as such, LVSD prevalence seen may not be reflective of the general obstetric patient population in Nigeria. (2) All sites communicated in and utilized English consent forms and documents being the official language spoken across the country. All sites were also approved to utilize oral consent and in situations were a potential participant did not speak English, the study description was communicated by the study teams in the patient's preferred language or in pidgin English in keeping with standard procedures used in providing clinical care. Study staff were fluent in the predominant non-English language (or dialect) at their respective site (i.e., Yoruba in the Southern locations and Hausa in the Northern locations). (3) Due to cultural and religious norms, participation of women in the Northern sites was influenced by the need to obtain permissions from their husbands and those who did not give permission for their wives to be enrolled in the study were deemed ineligible as these women also did not provide informed consent in these circumstances. Other than listed above, no additional forms of selection bias is assumed to be present.
Ethics oversight	The study was approved by the Mayo Clinic institutional review board as well as local ethics research committees at all participating sites in Nigeria: Aminu Kano Teaching Hospital, Lagos University Teaching Hospital, Olabisi Onabanjo University Teaching Hospital, Rasheed Shekoni Specialist Hospital, University College Hospital Ibadan, and University of Ilorin Teaching Hospital)

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☒ Life sciences ☐ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see nature.com/documents/nr-reporting-summary-flat.pdf

Life sciences study design

All studies must disclose on these points even when the disclosure is negative.

Sample size	We assumed the prevalence of LVEF <50% would be 4% in the intervention arm and 1% rate in the control group4,34, which yielded an estimate of 848 (424/per group) women to achieve 80% power at an alpha of 0.05. The estimates were rounded up to 500/group to account for the uncertainties in the calculations. In April 2023, an amendment to the protocol was submitted to increase the total study sample size to

	1200 to allow for each of the six sites to enroll up to 200 participants. The decision to increase the sample size was made blinded to all clinical data collected in the study at time of the modification.
Data exclusions	The final analysis set excluded participants who did not complete the baseline visit (i.e., for the control arm, ECG not completed and for the intervention arm, ECG and echocardiogram not completed) or declined to participate (withdrew consent) following randomization resulting in a modified intention to treat analysis set.
Replication	- All echocardiogram images with a reported low ejection fraction in addition to a sample of those with normal ejection fraction were uploaded to a secure file share portal and reviewed at the coordinating center by DAA. These echocardiograms were over read at the coordinating center and verified to be consistent with clinical interpretations at the enrolling site. In cases where ejection fraction estimates by the local site and the coordinating center were discordant or in cases where images were of poor quality to make an adequate assessment of left ventricular ejection, a repeat echocardiogram was performed at the site and reviewed at the coordinating center. These attempts at replication of echocardiogram results were deemed successful. - Three different AI algorithms were evaluated in this study. These algorithms have been previously developed and 2 have received US FDA approval. No new algorithms were developed as part of this study. As such, no replications or additional tests for reproducibility was performed.
Randomization	Study participants were randomized in a 1:1 fashion to either AI-guided ECG-based screening for cardiomyopathy (intervention arm) or a standard 12-lead clinical ECG in addition to usual care as dictated by the managing physician (control arm). Randomization was performed in real-time using dynamic minimization with the study site as a stratification factor, through a web-based application (iMedidata).
Blinding	No blinding was done. This was designed as an open-label, pragmatic, randomized clinical trial.

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

n/a	Involved in the study
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☒	☐ Animals and other organisms
☐	☒ Clinical data
☒	☐ Dual use research of concern

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging

Clinical data

Policy information about clinical studies

All manuscripts should comply with the ICMJE guidelines for publication of clinical research and a completed CONSORT checklist must be included with all submissions.

Clinical trial registration	NCT05438576
Study protocol	Supplemental appendix and published study design manuscript available at https://pubmed.ncbi.nlm.nih.gov/36966922/
Data collection	Participants were randomized between August 15, 2022 and September 28, 2023, at 6 participating hospitals in Nigeria: Aminu Kano Teaching Hospital, Lagos University Teaching Hospital, Olabisi Onabanjo University Teaching Hospital, Rasheed Shekoni Specialist Hospital, University College Hospital Ibadan, and University of Ilorin Teaching Hospital
Outcomes	The primary study endpoint was identification of LVSD during the study period. In the intervention arm, this was the number of identified participants with LVSD, as determined by a positive AI-ECG screen, confirmed by echocardiography at the time of ECG acquisition. In the control arm, this was the number of participants with clinical recognition and documentation of LVSD confirmed by echocardiography in keeping with current standard of care. All participants in the intervention arm had a confirmatory echocardiogram at baseline for validation of AI model effectiveness; however, for the detection of LVSD at baseline, a positive AI screen was required to be considered a detection. Secondary endpoints were evaluation of the primary endpoint within prespecified subgroups, and effectiveness of the AI-ECG at various LVEF cut points in the intervention arm