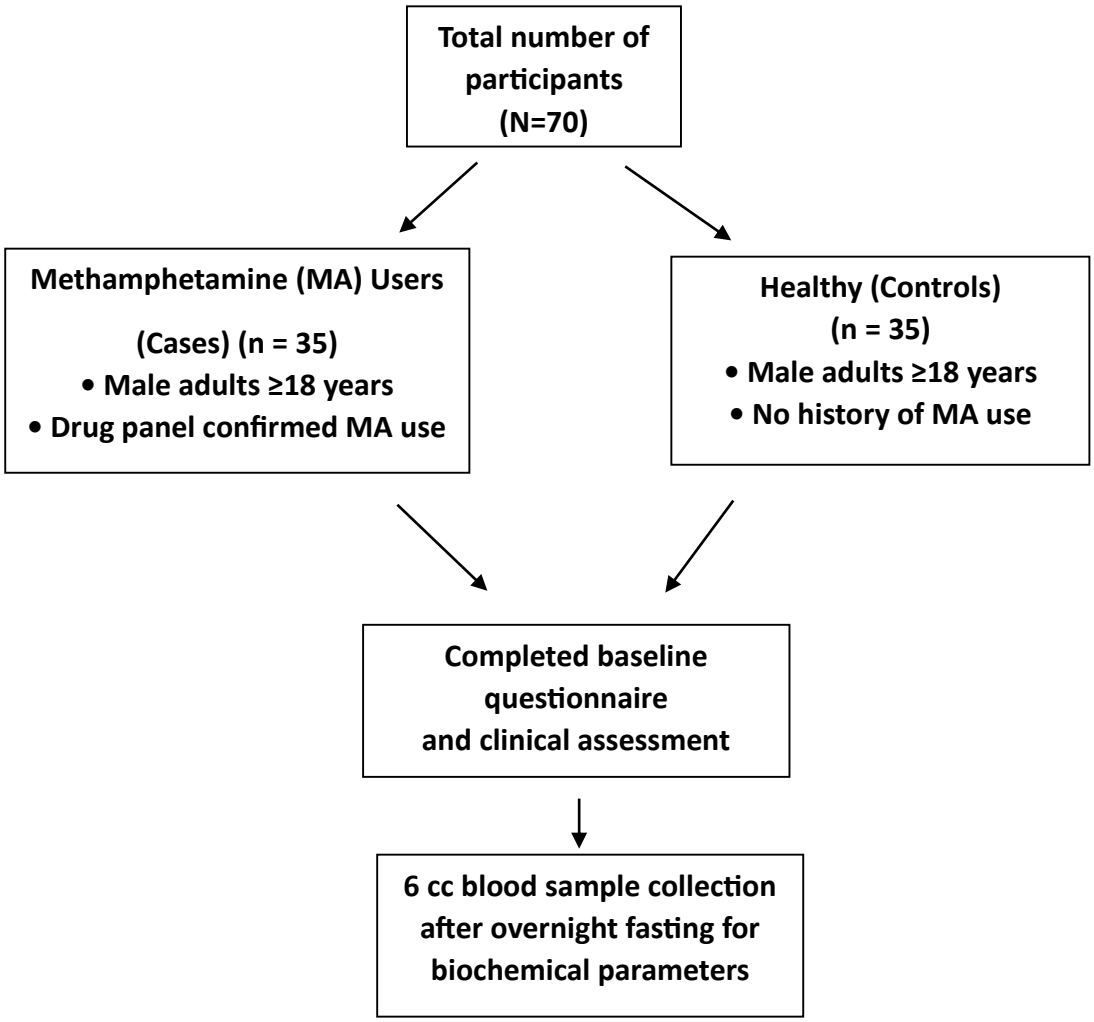
Fig. S1: Visual diagram of participants recruitment



STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No.	Recommendation	Page No.	Relevant text from manuscript
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	01	A cross-sectional study of antioxcidant enzyme (catalase and superoxide dismutase)and cordiometabolic health marker among methampetamine users and healthy controls
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	01	What was done This cross sectional study was conducted to evaluate impact of antioxcidant enzyme (Catalase and SOD)on cordiometabolic health markers among methampetamine users and healthy controls What was found MA use is associated with considerable cardiometabolic disturbances and compromised antioxidant defenses, highlighting the need for early screening and preventive interventions.
Introduction				Methamphetamine (MA), a potent psychostimulant within the amphetamine-type stimulant
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	2	background, medical and family history, physical activity and detailed drug-use
Objectives	3	State specific objectives, including any prespecified hypotheses	01	Objective: This study is to compare and explore the association between oxidative stress markers and cardio metabolic risk factors in order to elucidate potential mechanisms linking MA use with metabolic and cardiovascular complications.
Methods				
Study design	4	Present key elements of study design early in the paper	01	A comparative cross-sectional study
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure,	01	

		follow-up, and data collection		Mamajee Welfare Trust: 35 healthy controls (Group A) and 35 MA users (Group B)
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	03	70 male adults, aged 18 years and above comprising 35 MA users confirmed by drug panel testing from Mamajee Adicare and Welfare Trust and 35 healthy non-users enrolled as controls.
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case		N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	01, 08	Outcome: MA use is associated with considerable cardiometabolic disturbances and compromised antioxidant defenses, highlighting the need for early screening and preventive interventions. Exposure: Methamphetamine Confounder: History of smoking and Alcohol,
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	*04*	*All the data present in manscript* *For method* *Fasting blood sugar,lipid profile, by colorimetric methods in using humsn analyser machine* *SOD and CATALASE by ELISA method in using BIORAD machine*
Bias	9	Describe any efforts to address potential sources of bias	07	The relatively small sample size and recruitment from a single center may limit generalizability to broader populations. The sampling method was convenience sampling, which introduces significant selection bias.
Study size	10	Explain how the study size was arrived at	01	74

Continued on next page

Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	2	Statistical analyses were conducted using the Statistical

				Package for the Social Sciences (SPSS), version 20. Continuous variables were summarized as mean ± standard deviation (SD), whereas categorical variables were reported as frequencies and percentages. Data distribution was evaluated using the Shapiro–Wilk test for normality.
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	02	Multivariable linear regression
		(*b*) Describe any methods used to examine subgroups and interactions		N/A
		(*c*) Explain how missing data were addressed		N/A
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	02	Continuous variables were summarized as mean ± standard deviation (SD), whereas categorical variables were reported as frequencies and percentages.
		(*e*) Describe any sensitivity analyses		N/A
Results				
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed		Eligibility Participant given with concert included only once
		(b) Give reasons for non-participation at each stage		N/A
		(c) Consider use of a flow diagram	-	Fig. S1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	05	DEMOGRAPHIC:Age, Ethnicity, Height, Weight, BP, FBS,Cholestrol,,TG,HDL,LDL,VLDL,Catalase,SOD
		(b) Indicate number of participants with missing data for each variable of interest		NA
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)		N/A
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time		
		Case-control study—Report numbers in each exposure category, or summary measures of exposure		
		Cross-sectional study—Report numbers of outcome events or summary measures	08	*Prolonged MA exposure is associated with substantial cardiometabolic alterations and a pronounced reduction in*

				the antioxidant enzymes catalase and superoxide dismutase (SOD).
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	02	Models were adjusted for age, BMI (except when BMI was the outcome), smoking, alcohol use, physical inactivity, and ethnicity.
		(*b*) Report category boundaries when continuous variables were categorized		NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period		N/A

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Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses		
Discussion				
Key results	18	Summarise key results with reference to study objectives	08	Prolonged MA exposure is associated with substantial cardiometabolic alterations and a pronounced reduction in the antioxidant enzymes catalase and superoxide dismutase (SOD). The diminished activities of these enzymes indicate the presence of MA - induced oxidative stress. Furthermore, reduced catalase and SOD levels demonstrated moderate correlations with adverse lipid profiles and increased body mass index. This highlights the dual burden of oxidative and cardiometabolic risk, supporting their potential as biomarkers and therapeutic targets in this population.
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	04	The relatively small sample size and recruitment from a single center may limit generalizability to broader populations. The sampling method was convenience sampling, which introduces significant selection bias, and only males were included, which is another limitation. The history of smoking and alcohol use as confounders is more prominent in meth users, and this is also one of our limitations.
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	03	MA users showed significantly higher BMI and systolic blood pressure, with pronounced dyslipidemia characterized by elevated total cholesterol, triglycerides, LDL and VLDL, accompanied by reduced HDL. CAT and SOD activities were

				significantly reduced in MA users. Correlation analyses revealed weak associations of antioxidant enzymes with metabolic parameters in healthy controls, whereas in MA users, both CAT and SOD correlated moderately with adverse lipid markers, blood pressure and BMI. Notably, CAT and SOD were positively inter-correlated in MA users, suggesting coordinated regulation of antioxidant defenses under chronic oxidative stress. Multivariable analysis indicates that MA use was independently associated with higher BMI, blood pressure, and adverse lipid profiles, even after adjusting for confounders. CAT and SOD levels were also linked to cardiometabolic markers, suggesting a role of oxidative stress. These findings also highlight the combined impact of substance use and antioxidant imbalance on Generalisabilitycardiometabolic health.
Generalisability	21	Discuss the generalisability (external validity) of the study results	07	The relatively small sample size and recruitment from a single center may limit generalizability to broader populations.
Other information				
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based		NO

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.