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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	No software was used for data collection.
Data analysis	Stata v17 was used for the analyses

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 datasets generated during and/or analyzed during the current study are not publicly available, but may be made available upon reasonable request to the corresponding author.

Research involving human participants, their data, or biological material

Policy information about studies with human participants or human data. See also policy information about sex, gender (identity/presentation), and sexual orientation and race, ethnicity and racism.

Reporting on sex and gender	The sex of participants was determined during an in-person study visit conducted by the outcome assessors. Sex was self-reported. The distribution of sex is presented in Table 1. The main analyses apply to the whole sample, including both sex, and additional analyses stratifying by sex is presented in Appendix Table 4.
Reporting on race, ethnicity, or other socially relevant groupings	The socioeconomic status of participants was determined during an in-person study visit conducted by the outcome assessors.The distribution is presented in Table 1. We did not conduct the analysis grouped by race, ethnicity, or other social relevant groupings.
Population characteristics	To be eligible for the study, participants must meet the following inclusion criteria: (1) age ≥ 18 and ≤ 85 years, and; (2) confirmed diagnosis of diabetes, and; (3) PHQ-9 score ≥10, and; (4) not serious hearing or vision impairment, able to complete telephone interviews, and; (5) willingness to consent to randomization. If any of the following conditions exist, individuals will be excluded from participation: (1) have a serious medical condition and/or are in an advanced stage (e.g., heart disease, kidney failure, cancer, major organ failure, etc.), or; (2) have been diagnosed with bipolar disorder or schizophrenia, are currently on antipsychotic medication or mood stabilizers, or require psychiatric treatment in a medical facility, or; (3) have active suicidal thoughts and intent (item # 9 of the PHQ-9), or; (4) are pregnant or lactating, or; (5) live in a long-term care facility, or; (6) currently participate in other clinical trials, or; (7) no fixed address or contact details, or; (8) PCPs have removed them from the practice diabetes database, or; (9) for other reasons, the PCPs considered it unsuitable to participate in this study.
Recruitment	We employ a two-phase approach to patients' recruitment: initial screening and eligibility testing. The target population for this study consists of diabetic patients who are over 18 years old and exhibit depressive symptoms (indicated by a PHQ-9 score ≥10). Based on the estimated prevalence of depression among individuals with diabetes, we anticipate screening 4000 diabetes patients to achieve the desired sample size. Initial screening PCPs will contact diabetic patients and provide them with brief information about the CIC-PDD project, without mentioning terms related to depression. Then, PCPs will review existing electronic health records to identify preliminary qualified participants with diabetes. PCPs will receive compensation for initial screening. Eligibility testing Individuals who are found eligible after the initial screening will have the study details fully explained to them, and they will be invited to complete an eligibility test assessment through telephone or face-to-face surveys. During this phase, PCPs will conduct a detailed eligibility test questionnaire with potential participants.
Ethics oversight	Ethics approval for the entire the project and associated interventions has been obtained from Institutional Review Board at Peking University (no. IRB00001052-21104).

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

Behavioural & social sciences study design

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

Study description	The study is designed to evaluate the real-world effectiveness of integrated, shared-care intervention project (Community-based Integrated Care for Patients with Diabetes and Depression, CIC-PDD) compared to usual care (UC) for patients with diabetes and depression in China.

Research sample	We enrolled 630 participants, with 275 in intervention group and 355 in control group.
Sampling strategy	The study sites are 8 CHCs from two counties of Weifang, Shandong, a province in eastern China. There are several reasons for choosing Weifang as our study settings. First, this is a priority city for several initiatives to strengthen primary care, including the integrated chronic diseases care approach and the establishment of single disease group management. Additionally, Weifang is a national pilot city for the construction of social psychosocial service system designated by China National Department of Health, making it feasible to conduct the interventions of both mental and physical conditions. Furthermore, both selected counties have tertiary hospitals, which can meet the need for a multidisciplinary team of specialists.
Data collection	The data for the CIC-PDD project consists of interviewer-based data (face-to-face) and register data. Participants are interviewed face to face at baseline, and again after 6 and 12 months. Data collection through interviews will be conducted by outcome assessors trained in the specific instruments.
Timing	The trial was registered on ClinicalTrials.gov on November 9, 2022. Recruitment commenced on January 12, 2022, and has completed in May 2022. The intervention occurred from August 2022 to August 2023.
Data exclusions	During the trial, a total of 12 individuals (1.90%) out of the 630 patients passed away, and 33 (5.24%) withdrew from the study.
Non-participation	We recruited 8 CHCs which collectively served 4735 patients with diabetes.A total of 3,759 patients were invited to participate in the baseline assessment. Among these patients, eventually, 275 individuals were assigned to CIC-PDD group and 355 were assigned to control group.
Randomization	We randomized community health centers (CHCs) in each county on a 1:1 ratio, ensuring an equal number of CHCs (n = 4) in each group. Additionally, the ratio of urban to rural CHCs in both the intervention and control group was maintained at 1:1. Before implementation, allocation of clusters to each study arms were conducted by a statistician at the Peking University China Center for Health Development Studies. The statistician was not involved in implementation of the study.

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
☒	☐ Plants

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	ClinicalTrials.gov registration number ChiCTR2200065608 (China Clinical Trials Registry https://www.chictr.org.cn)
Study protocol	The study protocol has been included in the submission.
Data collection	Patients in both groups attended study assessments at baseline (prior to randomization), 6 and 12 months. Data collection through interviews was carried out by trained and blinded outcome assessors. Throughout the study, patients were asked about the occurrence of serious adverse events. In addition, considering the nature of patients, the occurrence of deaths was expected. Patients' CMs reported full details of each adverse event and death and any potential association between the intervention and these occurrences. Additionally, we utilized medical insurance system and work logs to obtain data on some costs and health care utilization (outpatient and inpatient utilization), which were linked with the patient survey data.
Outcomes	Here, we evaluated the health effects, cost and cost-effectiveness over the 12-month follow-up evaluation period. (1) Health effects In assessing effectiveness, we employed two measures: health utility and health effects, specifically focusing on quality-adjusted life years (QALYs) and the number of depression-free days (DFDs) during the follow-up period. (2) Cost Components Direct costs: screening/case finding, intervention setup and delivery, and health care utilization Indirect costs: time, lost productivity, food, and transportation costs

Plants

Seed stocks	*Report on the source of all seed stocks or other plant material used. If applicable, state the seed stock centre and catalogue number. If plant specimens were collected from the field, describe the collection location, date and sampling procedures.*
Novel plant genotypes	*Describe the methods by which all novel plant genotypes were produced. This includes those generated by transgenic approaches, gene editing, chemical/radiation-based mutagenesis and hybridization. For transgenic lines, describe the transformation method, the number of independent lines analyzed and the generation upon which experiments were performed. For gene-edited lines, describe the editor used, the endogenous sequence targeted for editing, the targeting guide RNA sequence (if applicable) and how the editor was applied.*
Authentication	*Describe any authentication procedures for each seed stock used or novel genotype generated. Describe any experiments used to assess the effect of a mutation and, where applicable, how potential secondary effects (e.g. second site T-DNA insertions, mosiacism, off-target gene editing) were examined.*