ARIC Manuscript Proposal #2830

1.a. Full Title: Depressive symptoms and glycemia in older adults with and without diabetes

  b. Abbreviated Title (Length 26 characters): Depression and glycemia visit5

2. Writing Group:
Writing group members: Andreea M. Rawlings; A. Richey Sharrett; Sherita H. Golden; Tope Oladimeji; B. Gwen Windham; Elizabeth Selvin, others welcome

I, the first author, confirm that all the coauthors have given their approval for this manuscript proposal. _AR__ **[please confirm with your initials electronically or in writing]**

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3. Timeline: All data is currently available, we plan to submit for publication within 12 months of approval of the manuscript proposal.

4.   Rationale:

Among adults age 65 and older, those with diabetes are two to four times more likely to experience depressive symptoms compared to older adults without diabetes[1–3]. In persons with diabetes, depressive symptoms are associated with worsening glycemic control and have a negative impact on medication adherence and self-care regimens[1]. The American Diabetes Association recommends screening older adults with diabetes for depression[4]; timely diagnosis and treatment of depression in this population of older adults with diabetes is necessary to reduce long-term complications, however fewer than 25% of cases are identified and treated in clinical practice[5,6].

The prevalence of prediabetes among older adults is 24%[7]. The association between prediabetes and depression has been less studied, with a few studies documenting no association between prediabetes, undiagnosed diabetes, and depression[8–10]. However studies have generally been small, and have generally not accounted for a full range of potential confounders. Additionally, few have characterized whether depressive symptoms reported vary across the glycemic range, and whether the association between depressive symptoms and diabetes differ by race, socioeconomic status (SES), and access to healthcare or type of healthcare.

ARIC is a large, bi-ethnic, community-based study, and includes a validated measure of depressive symptoms, self-reported diagnosis of depression, measures to classify individuals across the glycemic spectrum (HbA1c, fasting glucose, novel biomarkers of glycemia), information on diabetes medication type, data to characterize SES (income, occupation type, education), data on access, utilization, and quality of healthcare received, and comprehensive measurements of potential confounders.

5.   Main Study Questions:

Aim 1
To characterize the prevalence of depressive symptoms across glycemic status (no diabetes, prediabetes, undiagnosed diabetes, well-controlled diabetes, poorly controlled diabetes) overall and by race, SES, and diabetes medication use (those on insulin will have higher prevalence of depressive symptoms compare to those on oral medication)

Aim 2
To examine if the association between glycemia and depressive symptoms (Aim 1) is modified by health insurance coverage, utilization, and quality of care

Aim 3
To examine the disparity between the estimated prevalence of depressive symptoms based on objective measures (CES-D) and self-reported diagnosis of depression in persons with diabetes

Hypotheses:

- Depressive symptoms will vary across the glycemic range, with worsening symptoms from no diabetes, prediabetes, and diabetes.
- Depressive symptoms will vary by glycemic control and diabetes medication type, but will not vary by race and SES after adjustment for potential confounders.
- Access, utilization, and quality of care will modify these associations.

6. Design and analysis (study design, inclusion/exclusion, outcome and other variables of interest with specific reference to the time of their collection, summary of data analysis, and any anticipated methodologic limitations or challenges if present).

Study Design
Cross-sectional using data from visit 5

Exclusions
We will exclude participants who meet any of the following criteria:
- Did not attend visit 5
- Race other than black or white, and blacks in Minneapolis or Washington County centers
- Missing exposure, outcome, or covariates included in statistical models (listed below)

Exposure – diabetes and HbA1c
- We will examine prevalence of depressive symptoms by the following categories:
  o Diabetes (yes/no) defined based on self-reported doctor diagnosis or medication use at visit 5
  o Clinical categories of HbA1c:
    ▪ Among persons without a self-report of diabetes: <5.7%, 5.7-6.4% (prediabetes), ≥6.5% (undiagnosed diabetes)
    ▪ Among persons with a self-report of diabetes: <7%, ≥7%
  o Among persons with diabetes:
    ▪ By duration of diabetes using prior visit information to characterize diabetes duration into the following groups: newly diagnosed diabetes (<3 years), diabetes of intermediate duration (3-10 years), and long-standing diabetes (>10 years). We will also characterize duration by tertitles and quartiles.
  o We will also examine associations between depressive symptoms and 1,5-anhydroglucitol, a marker of glucose peaks

Outcome – depressive symptoms
Depressive symptoms were measured by the Center for Epidemiologic Studies Depression Scale (CES-D) Short Form[11], which is an 11-item version derived from the original 20-item CES-D[12]. We will examine CES-D scores continuously and dichotomized as <9 or ≥9, the latter of which suggests probable major depression.

We will also examine the questions related to having received a diagnosis of depression:
- Have you ever been diagnosed by a doctor with depression?
- Have you been diagnosed with depression in the past 2 years?
- Were you ever diagnosed with depression prior to 2 years ago?
- Have you ever been treated for depression?

Lastly, we will examine the use of anti-depressant medication.

Covariates
We will evaluate the following variables as covariates: age, sex, race-center, body mass index, education, cognitive function, marital status, hypertension, presence of comorbid conditions (hypertension, CHD, CHF, et), medication use, smoking, alcohol use, diabetes duration, income, occupation, and physical activity.

Statistical Analysis:
We will characterize our analytic population using means/standard deviations or percent for all covariates. We will analyze the association between the exposure groups for depressive symptoms using log-binomial or Poisson regression to estimate prevalence ratios.

Effect Modification
We will examine possible effect modification by access, utilization, and quality of care of care received, age, race, and sex.

Challenges/Limitations
- Single measurement of depressive symptoms
- We may have limited power in some analyses
- We will not be able to rule out the possibility of residual confounding

7.a. Will the data be used for non-CVD analysis in this manuscript? x Yes _ No

b. If Yes, is the author aware that the file ICTDER03 must be used to exclude persons with a value RES_OTH = "CVD Research" for non-DNA analysis, and for DNA analysis RES_DNA = "CVD Research" would be used? _x Yes _ No
(This file ICTDER03 has been distributed to ARIC PIs, and contains the responses to consent updates related to stored sample use for research.)

8.a. Will the DNA data be used in this manuscript?   x_ Yes ___ No

8.b. If yes, is the author aware that either DNA data distributed by the Coordinating Center must be used, or the file ICTDER03 must be used to exclude those with value RES_DNA = "No use/storage DNA"?
          __x__ Yes ____ No

9. The lead author of this manuscript proposal has reviewed the list of existing ARIC Study manuscript proposals and has found no overlap between this

proposal and previously approved manuscript proposals either published or still in active status. ARIC Investigators have access to the publications lists under the Study Members Area of the web site at: http://www.cscc.unc.edu/ARIC/search.php
__x____ Yes   _____ No

10. What are the most related manuscript proposals in ARIC (authors are encouraged to contact lead authors of these proposals for comments on the new proposal or collaboration)?

MP #770: Depressive symptoms and the risk of type 2 diabetes: the Atherosclerosis Risk in Communities study (Golden)
MP #1491: The association of hemoglobin a1c with depressive symptoms in persons with and without diabetes (Wyman)
MP

11.a. Is this manuscript proposal associated with any ARIC ancillary studies or use any ancillary study data?   __x__ Yes ____ No
ARIC NCS

11.b. If yes, is the proposal
          x   **A. primarily the result of an ancillary study (list number* 2008.06)**
          ___   **B. primarily based on ARIC data with ancillary data playing a minor role (usually control variables; list number(s)* _____)**

*ancillary studies are listed by number at http://www.cscc.unc.edu/aric/forms/

12a. Manuscript preparation is expected to be completed in one to three years. If a manuscript is not submitted for ARIC review at the end of the 3-years from the date of the approval, the manuscript proposal will expire.

12b. The NIH instituted a Public Access Policy in April, 2008 which ensures that the public has access to the published results of NIH funded research. It is **your responsibility to upload manuscripts to PUBMED Central** whenever the journal does not and be in compliance with this policy. Four files about the public access policy from http://publicaccess.nih.gov/ are posted in http://www.cscc.unc.edu/aric/index.php, under Publications, Policies & Forms. http://publicaccess.nih.gov/submit_process_journals.htm shows you which journals automatically upload articles to Pubmed central.

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