

ARIC STUDY MANUSCRIPT PROPOSAL # 822

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1a. Full Title:

Women's Employment Status: Association with Cardiovascular Disease and Overall Mortality

1b. Abbreviated Title: Women's employment status, CVD, and mortality

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3. TIMELINE:

Analysis would begin as soon as possible. A preliminary literature review exists and a related ARIC manuscript (MS # 365) has been published. Thus, it is anticipated that a draft of this paper would be completed during **Summer, 2002**.

4. BACKGROUND AND RATIONALE

Women's laborforce participation has steadily increased over the past several decades. **Some** hypotheses in both the biomedical and sociologic literature have predicted that increased laborforce participation among women would be associated with higher rates of CVD in women, primarily via increased levels of stress (1,2). **Others have hypothesized that employed women should have a health advantage over full-time housewives as paid work is a sources of self-esteem, social support, and financial remunertaion (3)**. The literature to date examining CVD, CHD, and overall mortality, however, has been inconclusive (4-9). **The lack of consistency in findings may in part reflect differences in how employment status was conceptualized as well as differences in the historical periods, and socioeconomic and demographic characteristics of the cohorts studied.**

Investigations carried out by some members of the proposed writing group (KR, HAT) have found (both in ARIC (ARIC MS # 365 (10)) and in a study using national health survey data (11)) employed women, **overall**, to have a **modestly** lower occurrence of hypertension than housewives. In both studies, **there was effect modification such that** the magnitude of the "**protective**" effect was strongest in socioeconomically disadvantaged groups (e.g., African-American women, unmarried women). **These are groups that, historically have had greater attachment to the labor force.**

They tend to be employed for a greater portion of their adult life span and according to census data (12), contribute more substantially to the total family income than do white, married women. Thus, their exposure to both the positive and the negative consequences of work would be greater than for those with less attachment.

Occupation status tends to be a consistent predictor of CVD-related outcomes in men. However, among employed women, many studies based on US samples report the lack of a clear gradient in CVD-related outcomes by occupational categories (4, 7, 10). This has been true in studies of the ARIC cohort when occupations were classified based on census categories (11, 13). One explanation for the lack of clear inverse associations is that, at least historically, women's occupation are not necessarily a good marker of their SES (15,16). Alternative occupational categorization schemes including those based on job stress/ characteristics of work organization have also been used (17). In a study of employed ARIC participants, Muntaner and colleagues (14) examined the association of seven work organization characteristics (substantive, complexity, physical demands, job insecurity, skill discretion, decision authority, physical exertion) with carotid IMT. Among black and white women, both substantive and skill discretion indicators were associated with IMT in crude but not adjusted analyses. Additionally, in unadjusted models, job insecurity was associated with IMT in white women and physical demands was associated with IMT in black women.

Thus, we (KR, HAT) would like to extend our **earlier** work to examine prospective associations of women's employment status with CVD-related outcomes (incident CHD and stroke) and total mortality. The ARIC cohort could provide a contribution to the existing literature given its relatively large sample size and ethnic diversity. **Per the request of the ARIC Publications Committee, we will expand the scope of our work from considering variations among employed women by traditional census-based indicators of occupational status to also include variations among employed women by characteristics related to occupational stress / work organization (e.g., physical demands, skill discretion).**

HYPOTHESES

- Employed women will have a lower incidence of CVD (CHD and stroke) and a lower all-cause mortality rate than will homemakers.
 - **The “protective” employment effect will not vary inversely by type of occupation (census-based).**
 - **Among employed women, the “protective” effect of employment will be greatest among those in low strain/high decision latitude jobs**
- The “protective” effect of employment will be stronger among groups with higher proportions of socioeconomically disadvantaged women (e.g., African-Americans vs. whites; unmarried vs. married women, lower SES vs. higher SES).
- Assuming that the above hypotheses are confirmed, it is further hypothesized that:
 - Excess rates of all cause mortality and of CHD and stroke among homemakers will be partly explained by differences in baseline levels of CVD risk factors.
 - Higher rates of mortality among homemakers will be partly attributable to less favorable health profiles at baseline.

DATA, DESIGN, AND ANALYSIS

Women participants of the ARIC study, who were either employed or homemakers at the baseline examination will be included. This study would be restricted to women because virtually no men in the ARIC cohort were homemakers. As the focus of this study will be to contrast employed women to homemakers, those who are unemployed or temporarily out of the work force will be excluded. In analyses of all-cause mortality (through 1998) no further exclusions will be made. In analyses of incident CHD and stroke, those with prevalent CHD and stroke at baseline will be excluded. For our preliminary analysis, participants would be followed up for the occurrence of incident CHD and stroke and total mortality through 1998. Assuming that updated files reflecting new events for 1999 is distributed in the spring of 2002, we would then re-run our analyses with the additional events.

In our earlier work examining the association between employment status and hypertension, associations were stronger among African-American than white women. Thus, race specific analyses will be done. Additional covariates to be considered include: age, SBP, hypertensive status, diabetes, total, HDL and LDL cholesterol, physical activity, alcohol intake, perceived health status, BMI, waist circumference, smoking status, menopausal status/HRT use, educational attainment, family income, and occupation. We will examine the impact of the “healthy worker” effect by assessing the contribution of selected baseline co-morbidities (e.g., CVD, cancer, diabetes) to the employment status – all cause mortality association. Proportional hazards regression analysis will be the primary analytic technique used in the proposed study.

Number of Events / Power Calculations

Through December of 1998, 370 CHD events (**4.5%**) had occurred among women free of CHD at baseline (125 in African-American women (**5%**) and 245 in white women (**4.2%**). Additionally as of December 1988, 213 incident stroke events (115 in African-American women (**4.4%**) and 98 in white women (**1.6%**) and 621 deaths (**7%**) from all causes (291 in African-American women (**11%**) and 330 in white women (**5.5%**)) had occurred among the women enrolled at baseline.

As requested, power calculations for each of the three outcomes are included, overall and by race (see Tables 1-3). Estimates of the expected ORs and the number of employed women and housewives used in the calculations were based on numbers of women included in our earlier work in the ARIC cohort (11). The proportions used to generate the ORs were based on variations in the proportion of events presented in the paragraph above. The alpha level used was 0.05 and a two sided (more conservative) test was assumed. Nquery software was used to generate these estimates. The estimates do not take into account time to event. I consulted with Dr. Diane Catellier, a biostatistician at the Coordinating Center, who said that this technique is a reasonable substitute and that in fact, it produces a more conservative estimate than one would obtain if time to event was taken into account. We expect our power to increase when the 1999 events become available, and thus our ability to detect effects of smaller magnitude will increase. Also, while we acknowledge that our power to detect modest effects is limited for Black women, based on our earlier work, we expect effects of a greater magnitude and in the range at which power is acceptable.

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