Social Science & Medicine 116 (2014) 64–72

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

Cohort differences in the marriage–health relationship for midlife women

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ARTICLE INFO

Article history:
Received 26 January 2014
Received in revised form
14 May 2014
Accepted 23 June 2014
Available online 24 June 2014

Keywords:
Midlife women
Health
Cohort
Marital status

ABSTRACT

The present study aimed to identify potential cohort differences in midlife women's self-reported functional limitations and chronic diseases. Additionally, we examined the relationship between marital status and health, comparing the health of divorced, widowed, and never married women with married women, and how this relationship differs by cohort.

Using data from the Health and Retirement Study (HRS), we examined potential differences in the level of functional limitations and six chronic diseases in two age-matched cohorts of midlife women in the United States: Pre-Baby Boomers, born 1933–1942, $N = 4574$; and Early Baby Boomers, born 1947–1956, $N = 2098$. Linear and logistic regressions tested the marital status/health relationship, as well as cohort differences in this relationship, controlling for age, education, race, number of marriages, length of time in marital status, physical activity, and smoking status.

We found that Early Baby Boom women had fewer functional limitations but higher risk of chronic disease diagnosis compared to Pre-Baby Boom women. In both cohorts, marriage was associated with lower disease risk and fewer functional limitations; however, never-married Early Baby Boom women had more functional limitations, as well as greater likelihood of lung disease than their Pre-Baby Boom counterparts (OR = 0.28).

Results are discussed in terms of the stress model of marriage, and the association between historical context and cohort health (e.g., the influence of economic hardship vs. economic prosperity). Additionally, we discuss cohort differences in selection into marital status, particularly as they pertain to never-married women, and the relative impact of marital dissolution on physical health for the two cohorts of women.

Much of the research on women in midlife has examined the developmental course of specific cohorts that were affected by unique historical events (e.g., Stewart and Healy, 1989), and patterns of health over the life course (e.g., Yasui et al., 2011). Further, marital trajectories have changed in recent cohorts (Ryan et al., 2012), with marital status related to a multitude of health outcomes in middle-aged women (Pienta et al., 2000). However, relatively few studies have examined the association between all three: cohort, marital status, and health in midlife women.

Historical and/or social events have contributed to significant contextual changes in the lives of women who were middle-aged in 1992 (Pre-Baby Boom) and 2006 (Early Baby Boomers). Social roles and expectations for women have changed relatively dramatically since the 1960s; women who came of age in the years following the Women's Movement were exposed to greater freedoms and opportunities (Stewart and Healy, 1989). Comparatively, women in the Pre- and Early Baby Boom cohorts experienced different life histories and differential access to medical advances prior to reaching age 50. For example, Baby Boom women were particularly exposed to ideas promoting healthy lifestyles (e.g., exercising; healthy eating) as young adults, as well as ideas concerning age-related health concerns and illness prevention (Jackson, 2006).

Midlife is a time when many women notice an increase in health issues; middle-aged women have a higher prevalence of physical

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http://dx.doi.org/10.1016/j.socscimed.2014.06.040
0277-9536/

limitations (Pope et al., 2001), often due to osteoporosis or angina, and often related to menopause. According to the National Institute on Aging (NIA), the average age for onset of menopause is 51. Eighty-five percent of women who experience natural menopause do so by age 55 (Harlow and Signorello, 2000), but earlier onset of menopause is associated with greater risk of osteoporosis and heart disease (Gold et al., 2001). In sum, women in midlife may face myriad potential health concerns.

We use data concerning diagnosed chronic illnesses and functional limitations collected in the Health and Retirement Study (HRS) to compare the health status of these two cohorts of women in their 50s. While there is a substantial body of theory and research concerning the health of older women (e.g., Canetto, 2001; Gatz et al., 1995), most of the available empirical research has focused on the health of a single cohort, and neglected notions of inter-individual and inter-cohort differences. Moreover, because mean marital age is different across cohorts, and marital status is known to moderate the age–health relationship (Bennett, 1997; Pienta et al., 2000), we ask if different patterns are evident for married and single (divorced, widowed, and never-married) women in the two cohorts.

1. Theoretical framework: cohorts situated in contexts

We draw on a number of sources for our theoretical framework. Broadly, Bronfenbrenner's Bioecological model (1992) posits that individuals develop within a complex system of relationships affected by multiple levels of social context. Similarly, the biopsychosocial model (Seeman and Crimmins, 2001) describes how individuals' social relationships influence their physical (and mental) health through biological and psychological pathways. Because we are interested in cohorts situated in context, we also draw on the work of Riley, who commented: "Changing lives (aging and the succession of cohorts) are in continuing interplay with changes in society and its structures" (1998, p. 29). Finally, the influence of historical and social events on specific cohorts, particularly for women (Stewart and Healy, 1989) provides a more fine-grained foundation for this study. A recent review by Alwin (2012) suggests the need for greater understanding of the distinctive experiences of aging in different historical times. These ideas have been developed by various researchers who have focused on specific cohorts in the 20th century (e.g., Elder and Hareven, 1994; Stewart and Healy, 1989) whose development was shaped by experiencing historical and social events such as the Great Depression, World War II, and the Women's Movement.

Stewart and Healy (1989) studied the lives of different birth cohorts of women ranging from World War I to the Baby Boom. They posit that the importance of events in defining a sense of identity is mediated by the age at which they are experienced. Women of the Baby Boom (born approximately 1946–1964) who were young adults during the late 1960s/early 1970s, were more likely to find the Women's Movement a meaningful foundation on which to base their identities, particularly their expectations for marriage, education, and career opportunities. For more mature women, such as those born prior to the Baby Boom, the Women's Movement offered the same opportunities for behavioral change, but their identities would remain linked to more traditional roles such as wife and mother.

2. Cohort differences in midlife health

Some evidence suggests that people are living longer and in better health (Manton et al., 2008). Often, however, it is difficult to parse cohort from period effects, as Reither et al. (2009) found in their study of birth cohorts and obesity. This mix of cohort and period trend is also evident in life expectancy predictions. At age 55 in the early 1990s, Pre-Baby Boom women could be expected to live another 27.29 years, whereas by 2007, Early Baby Boomers had gained almost a full further year in life expectancy (28.2 years; U.S. Department of Health and Human Services, 2011). There are also cohort differences in certain types of diseases (Reynolds et al., 1998): although Baby Boomers may exhibit lower levels of cardiovascular disease, arthritis, and emphysema, they may also show faster increases in frailty, and higher levels of musculoskeletal disorders and orthopedic problems than earlier cohorts at the same age.

Much of the research regarding disability focuses on older individuals (e.g., Seeman et al., 2010). However, midlife individuals are not immune to disability; Verbrugge and Yang (2002) comment that "The greatest diversity of disability experience is at the middle ages" (p. 253). Women, in particular, are more likely to suffer from chronic, debilitating diseases (Verbrugge, 1990), such as arthritis, high blood pressure, and chronic back conditions (Verbrugge and Jette, 1994). Reynolds et al. (1998) also provide evidence of cohort differences in rates of disability, with women born between 1916 and the early 1950s showing successive decreases in disability, although disability rates increased for those born after these dates. Furthermore – and contrary to previously-mentioned improvements in health and fitness – shifts in patterns of eating and exercise have led to a 'fattening' of the overall population (Kelley-Moore, 2010, p. 102), with a related increase in prevalence of obesity-related disability. However, we might expect that women of the early Baby Boom (i.e., those in the current study born between 1947 and 1956) would exhibit predominantly lower levels of disability.

Regular exercise contributes to physical health and gains in life expectancy, even in midlife (e.g., Moore et al., 2012). Although intuitively we might expect Baby Boomers to be more physically active than previous cohorts, there is some evidence that this is not the case (Swan et al., 2008), although they possibly show a lesser decline in physical activity after age 50. Moreover, participation in exercise, whether vigorous or mild, can depend on myriad factors. For example, single people and those with a high level of spouse and family support tend to participate more in vigorous exercise (Grzywacz and Marks, 2001), and women engage in vigorous exercise less often than men (Moen, 2001).

3. Cohort and marital status

The rates of women who marry (or not), get divorced, or are widowed have changed over the past few decades. Rates of marriage have declined, post-WWII, a situation often attributed to – amongst other demographic shifts – women's increasing labor force participation (Becker, 1981; Oppenheimer, 1994). Waite (1995) also observed that the benefits to marriage for women are reduced, and that employed wives are less dependent on marriage as a source of financial and emotional security. Work by Waldron et al. (1996) supports this theory; they found health benefits of marriage only in those women who were not employed. Historically, long-term single women were more economically advantaged than their counterparts; this has changed as more married women become less dependent on their spouses, which in turn has ramifications for less economic disadvantage with marital dissolution.

For women born between 1931 and 1941, 36% of marriages ended in divorce, whereas for women born between 1946 and 1950, 41% of marriages ended in divorce (Schoen et al., 1985). In the 1970s, the majority of divorces for women were granted to those in the 35-to-44 age group. One in four divorces in 2010 involved adults aged 50 and over (Brown and Lin, 2012), and the rate for divorce in this age group doubled between 1990 and 2010. Rates of

remarriage for both cohorts were relatively high: 73% for the Pre-Baby Boomers (born 1931–1941) and 76% for the Early Baby Boomers (born 1946–1950). Thus, although post-divorce remarriage rates are similar for both cohorts, we expect the rate of divorce will be higher for Baby Boomers in the HRS.

However, widowhood and subsequent remarriage show a different pattern, most obviously in the age at which widowhood may occur. In the early 1980s, the average age at widowhood was approximately 68, whereas in the mid-1990s, it was 72 (Schoen and Standish, 2001). For both cohorts in our study, only 23% and 22%, respectively, of the few women who were widowed subsequently remarried. Thus, not only is long-term widowhood in midlife rare (even more so than long-term divorce), the age at widowhood seems to be increasing with subsequent cohorts. Though we make no formal hypothesis, given the age trends in widowhood outlined above, we expect to find more widows in the Pre-Baby Boom cohort than in the Early Baby Boom cohort of the HRS.

4. Marital status and health

A considerable amount of research has focused on the link between marriage and health (e.g., Carr and Springer, 2010; Robles and Kiecolt-Glaser, 2003), especially for women (e.g., Hunt, 2002; Lorenz et al., 2006). Many studies focus on the marital transition itself, rather than marital status or length of marital status, as a predictor of health (e.g., Hughes and Waite, 2009), and a number of theoretical frameworks have been used to assess the relationship between marital status and health.

For instance, Liu's (2012) findings support the *stress* or crisis model of marital transition, in that the process of transition to divorce or widowhood leads to a temporary decline in health. Liu found that, although continuously divorced and widowed men and women exhibited similar health trajectories as the continuously married across age and birth cohorts, transitions to divorce and widowhood had differential effects on self-rated health. Additionally, she makes the point that with the changing face of marriage for more recent cohorts, it may be that marital dissolution has less of an influence on health than it has for previous cohorts. In contrast, Lorenz et al. (2006) found evidence for the *marital resource* or chronic stress model, where being continuously divorced or widowed is detrimental to health. Although divorced women reported significantly higher levels of psychological distress than married women and no differences in physical illness immediately post-divorce, after a decade had passed, the divorced women reported significantly higher levels of physical illness. These somewhat contrary results highlight the importance of measuring physical and psychological health separately, as well as attending to specific health indicators used in particular studies.

Most research indicates that although married women's health is better than that of non-married women due to reasons such as improved economic and psychosocial resources, the marriage-health link can be complicated. Compared to non-married men and women, spouses have lower rates of disability (Verbrugge, 1979), mortality (Rogers, 1995), physical limitations, and chronic illnesses (Pienta et al., 2000). However, various factors, such as the timing and length of the marriage or the timing of, distance from, and age at marital transition (including dissolution) are all important considerations. As Dupre and Meadows (2007) observed, there is evidence that not only do the benefits of marriage accumulate with its length, but that the number and type of marital transitions can affect health, although the negative effect of divorce or widowhood can vary depending on the age at which is occurs, and the distance from martial dissolution ameliorates its negative impact.

Gender differences exist in the relationship between marital status and health. For example, Pienta et al. (2000) found that divorced women and widowed men had the worst overall health profile and the greatest health disadvantage. Among women, being divorced or widowed was associated with increased risk for compromised health. In a study of rural mothers, divorce followed by single parenthood undermined long-term physical health (Wickrama et al., 2006); that is, the added financial stress of divorce and being the sole parent can have long-term cumulative effects on single mothers' health, such as increased risk of cardiovascular disease (Zhang and Hayward, 2006).

For widows, Elwert and Christakis (2006) describe the Widowhood Effect, a post-marriage state that outlines benefits and losses along two dimensions: the lasting effects of marriage, such as the financial contribution of their husbands, and the transition to widowhood, often including grief, depression, and adjustment to changed social roles. This idea is reflected in the mixed findings concerning the association of length of widowhood with health. For example, Bennett (1997) found no relationship between the length of widowhood and health. However, Zhang and Hayward (2006) found that widowed women who do not remarry face worse health, especially in terms of chronic conditions, such as cardiovascular disease.

Studies usually compare multiple non-married statuses, or combine them into a single non-married status. Exceptions include Smith and Zick (1994), who focused on divorce, and found that it had negative consequences for midlife women's (and men's) mortality, and Bennett (1997), who found that widowhood had lasting effects on morale and mental health, but not physical health. Bennett also points out, however, that aging itself may produce these results, and the difficulty lies in separating social roles from development influences. The contextual mechanisms underlying the link between marital status and health have also been examined. Liu and Umberson (2008) suggest that marriage provides economic resources for women, especially if they are not engaged in paid employment (Jenkins, 2003; Waldron et al., 1996); thus, the dissolution of marriage, involving stress and the possibility of delaying necessary healthcare due to financial distress, is also a factor in poorer health for divorced or separated and widowed women.

5. The current study

We examine cohort differences in the health of widowed, divorced/separated, never married, and married women. Specifically, using data from two waves of HRS, we compare women of the Early Baby Boom (born 1947–1956; the 2006 wave of HRS) to women born in the decade prior to the United States' entry into WWII (1933–1942, or Pre-Baby Boom; the 1992 wave of HRS). We use self-reported indicators of objective health (functional limitations; chronic illnesses) to test the following hypotheses:

(1) Early Baby Boom women (assessed in 2006) will be less likely to have chronic diseases and will have fewer functional limitations than the Pre-Baby Boom women (assessed in 1992).
(2) For both cohorts, currently married women and never-married women will show indications of being healthier than their divorced or widowed counterparts.
(3) Between cohorts, the comparative advantage for married and never-married women will decrease, such that the relative health advantage for Early Baby Boom women who were married or who never married over their divorced or widowed colleagues will be smaller, whereas the relative health advantage for married and never married women will remain robust for the Pre-Baby Boom cohort.

6. Method

6.1. Participants

Participants were from the 1992 and 2006 HRS waves of data. The HRS is a longitudinal, nationally representative study of adults aged 51 and up in the United States (Juster and Suzman, 1995). Using a multi-stage probability sampling procedure, the HRS measured its first cohort in 1992, with additional cohorts added every 6 years. The overall sample used in this study ($N = 6672$) consisted of women age 51 to 60 ($M = 55.7$) from either 1992 (Pre-Baby Boomers; $n = 4572$) or 2006 (Early Baby Boomers; $n = 2098$). Participants were 79.5% White-Caucasian non-Hispanic, 10.7% Black or African American non-Hispanic, 1.4% Hispanic only, and 8.3% self-classified as other (see Table 1 for weighted descriptives by cohort). The sample included only those respondents with complete data and a non-zero weight. Those excluded were slightly younger, $t(7023) = 15.12$, $p < 0.001$, but did not differ on level of education, number of functional limitations, or in the number of chronic diseases.

6.2. Measures

6.2.1. Functional limitations

We used the sum of positive responses to 18 questions measuring activities of daily living (ADLs), instrumental activities of daily living (IADLs), and questions measuring mobility, strength, and motor skills. These items are adapted for HRS (Fonda and Herzog, 2004) and derived from widely-used measures (Nagi, 1976; Rosow and Breslau, 1966). Inconsistencies in the questions asked in 1992 and 2006 led us to use 18 items instead of the more common 23 items. Participants were asked if they had any difficulty with tasks such as climbing several flights of stairs without resting, or preparing a hot meal.

Table 1
Weighted descriptives (HRS pre-baby boom and early baby boom women, $N = 6670$).

Variables	Pre-baby boom		Early baby boom	
	Mean/%	S.E.	Mean/%	S.E.
Mean# functional limitations	4.7***	0.06	3.7	0.09
Mean# diseases	1.1***	0.02	1.2	0.03
% With hypertension	36.4**	0.76	40.6	1.18
% With diabetes	9.4***	0.45	13.4	0.79
% With lung disease	8.3	0.44	7.2	0.63
% With a heart disease	10.5	0.48	11.2	0.76
% With stroke	2.1*	0.22	2.7	0.37
% With arthritis	43.5**	0.79	47.9	1.21
Age	55.4***	0.05	55.9	0.06
% Married/partnered	71.5***	0.71	74.9	1.05
% Divorced/separated	15.7	0.57	16.6	0.90
% Widowed	9.5***	0.45	3.9	0.45
% Never married	3.3	0.27	4.6	0.51
Mean length of time in marital status	25.4***	0.20	27.6	0.26
Mean# marriages	1.3***	0.01	1.4	0.02
% No degree	23.8***	0.66	9.7	0.66
% High school degree	58.1	0.79	54.2	1.21
% GED	3.5***	0.30	8.0	0.67
% 2-year degree	8.8***	0.47	16.9	0.93
% 4-year degree	4.9***	0.35	9.8	0.73
% Professional degree	1.0*	0.17	1.5	0.31
% White non-Hispanic	80.5	0.54	78.4	0.89
% Black non-Hispanic	10.8**	0.39	9.2	0.63
% Hispanic	0.8***	0.12	1.9	0.28
% Other racial identity	7.8*	0.39	10.5	0.62
% With weekly exercise	21.1***	0.66	35.1	1.17
% Currently smokers	46.3***	1.09	36.0	1.68

Note: Cohort differences in mean functional limitations, diseases, age, length of marital status, and number of marriages were tested with independent samples t-tests and significant cohort differences are noted in the Pre-Baby Boom column. Cohort differences in the proportion of individual diseases, marital status categories, degree categories, race/ethnicity categories, and weekly exercise and current smokers were tested with chi-square analyses. Significant cohort differences in proportions are noted in the Pre-Baby Boom column.
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

6.2.2. Diseases

Using the question stem, "Has a doctor ever told you that you have [had] …" participants were asked about six chronic illnesses: high blood pressure or hypertension; diabetes or high blood sugar; chronic lung disease; heart attacks, coronary heart disease, angina, congestive heart failure, or other heart problems; stroke; and arthritis or rheumatism. Diseases were scored as 1 = yes, diagnosed and 0 = no diagnosis.

6.2.3. Cohort

Participants' cohort membership was included as a key predictor in the analysis. Women in the 2006 cohort (Early Baby Boomers born 1947–1956) were coded as 0; women in the 1992 cohort (Pre-Baby Boomers born 1933–1942) were coded as 1. The 2006 cohort acted as the referent group in the analyses.

6.2.4. Marital status

Current marital status was collected when participants first entered the study. Individuals were coded as 1 = married/partnered, 2 = divorced/separated, 3 = widowed, and 4 = never married. Analyses treated marital status as categorical, with married as the referent group.

6.2.5. Covariates

Age was centered at 51 years old to reflect the average age of menopause; highest degree of education used High School Degree as referent; and race used White-Caucasian non-Hispanic as referent. Length of current marital status was constructed from information in each wave about any changes to marital status, and the duration of the new marital status. For women who were never married, we subtracted their current age from the average age of marriage for that year (age 24 for the 1992 cohort and age 26 for the 2006 cohort). Individuals were scored as 1 (5 or more years), and 0 (less than 5 years). Additionally, to account for potential differences in marital histories, the total number of marriages was included as a control variable (centered at 1). Finally, to determine whether potential cohort differences in health were attributed to physical exercise and smoking behavior, we also included engaging in vigorous physical exercise at least once a week (1) or not (0), and smoking (1 = yes; 0 = no).

6.3. Analysis

The measure of functional limitations is a count variable, but maintained normal distributional properties (e.g. normal skew and acceptable kurtosis); thus, we employed linear regression models. To examine the likelihood of chronic disease diagnosis, individual diseases were modeled with logistic regression using SAS proc survey logistic. Unadjusted models first tested the associations of cohort and marital status with the health outcomes. Next we tested cohort by marital status interactions, which were retained in the fully adjusted models only if significant. Finally, the fully adjusted models included age, number of marriages, highest degree of education, race, vigorous exercise, current smoker status, and length of marital status. For all analyses, weights were applied to adjust for non-response bias and the complex sampling design.

7. Results

Descriptive results reported in Table 1 provide information on the similarity and differences across these two cohorts of midlife women. In terms of the key health outcomes, the Pre-Baby Boom cohort reported more functional limitations compared to the Early Baby Boomers; however, the Early Baby Boomers had higher rates of Hypertension, Diabetes, Stroke, and Arthritis. Women in the Pre-Baby Boomer cohort were slightly younger than the Early Baby Boomers, and had lower rates of being married/partnered and higher rates of widowhood. In addition, the Pre-Baby Boomers reported shorter mean length of time in current marital status but fewer average number of marriages.

We then examined marital status and cohort associations with functional limitations and chronic diseases using a series of regression models (see Tables 2 and 3). Fully adjusted models included covariates associated with health and/or likely to differ by cohort and marital status: age, education, race/ethnicity, total number of marriages, length of current marital status, engagement in weekly vigorous physical activity, and smoker status.

7.1. Are there cohort and marital status differences in the number of functional limitations?

As hypothesized, the Pre-Baby Boom women had more functional limitations compared to the Early Baby Boom women (unadjusted model $B = 93$; $p < 0.001$). In addition, all types of non-married status were significantly associated with higher levels of functional limitations compared to the married women. However, testing for a cohort by marital status interaction indicated that the higher number of functional limitations among the Pre-Baby Boomer women was not equivalent across all marital status types. Specifically, even after controlling for key covariates in the adjusted model, the results showed that these associations were attenuated among those who were widowed and never married in the Pre-Baby Boomer cohort (see Fig. 1). The adjusted model, after incorporating covariates, did not change the pattern of results in the unadjusted models.

Table 2
Linear regression model results for functional limitations ($N = 6672$).

	Unadjusted model		Unadjusted model with interactions		Adjusted model	
	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	3.48***	0.07	3.40***	0.07	3.71***	0.22
Pre boomer cohort	0.93***	0.09	1.11***	0.11	0.51***	0.10
Marital status						
Divorced/separated	0.97***	0.12	1.10***	0.16	0.89***	0.15
Widowed	1.28***	0.19	1.83***	0.31	1.06***	0.29
Never married	1.18***	0.23	1.83***	0.29	1.54***	0.28
Marital status by cohort						
Divorced/separated in pre-boomer			−0.32	0.25	−0.36	0.23
Widowed in pre-boomer			−0.91*	0.39	−0.84*	0.37
Never married in pre-boomer			−1.81***	0.48	−1.19**	0.45
Education						
No degree					1.61***	0.13
GED					−0.71***	0.18
2-Year college					−1.31***	0.13
4-Year college					−1.27***	0.16
Professional degree					−2.03***	0.38
Race						
Other					0.28	0.16
Hispanic only					0.03	0.36
Black non-Hispanic					0.89***	0.14
Number of marriages					0.22***	0.06
Length of marital status					0.07	0.19
Weekly vigorous activity					−1.77***	0.10
Current Smoker					0.21*	0.11
R-square	0.03		0.04		0.17	
F-value	57.93		35.93		68.51	

Note. Education referent group is high school degree; race and ethnicity referent group is White non-Hispanic; marital status referent group is married (for main effects and interactions); cohort referent group is the Early Baby Boomers (for main effects and interactions).
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

7.2. Are there cohort and marital status differences in the likelihood of chronic disease diagnosis?

Results from the fully adjusted models for each disease are reported in Table 3. Counter to the findings for functional limitations, the unadjusted and fully adjusted models indicate that overall, the Pre-Baby Boom cohort was less likely to have received a disease diagnosis, and that divorced/separated and widowed women tended to be at higher risk for a diagnosis. Results for each disease are presented separately below.

7.2.1. Hypertension

In the case of Hypertension, the unadjusted model indicates that the Pre-Baby Boom women were 18% less likely to have Hypertension compared to the Early Baby Boomers (Odds Ratio = 0.82 (0.73–0.92); $p < 0.001$). Compared to married women, those who were divorced or separated were 31% more likely to have Hypertension (Odds Ratio = 1.31 (1.11–1.55); $p < 0.01$), those who were widowed were 68% more likely to have Hypertension (Odds Ratio = 1.68 (1.35–2.09)), and those who were never married were 80% more likely to have Hypertension (Odds Ratio = 1.80 (1.31–2.47); $p < 0.001$). In the adjusted model, these effects were mainly attenuated; although the Pre-Baby Boom women were 26% less likely to be diagnosed with Hypertension compared to the Early Baby Boom women (Odds Ratio = 0.74 (0.66–0.85); $p < 0.001$), the divorced/separated were 22% more likely to have a diagnosis (Odds Ratio = 1.22 (1.02–1.45); $p < 0.05$), and the widowed women were 36% more likely to be diagnosed with Hypertension (Odds Ratio = 1.36 (1.07–1.72); $p < 0.05$). In the fully adjusted model, the never married women were no longer significantly more likely to have a diagnosis compared to the married women.

7.2.2. Diabetes

The unadjusted model for Diabetes found that women in the Pre-Baby Boom cohort were 35% less likely to have a Diabetes diagnosis compared to the Early Baby Boomers (Odds Ratio = 0.65 (0.55–0.77); $p < 0.001$). Compared to married women, those who were divorced or separated (Odds Ratio = 1.39 (1.09–1.78); $p < 0.01$) and widowed (Odds Ratio = 1.73 (1.30–2.32); $p < 0.001$) were significantly more likely to have Diabetes. In the adjusted model, the cohort difference was attenuated yet still significant (Odds Ratio = 0.55 (0.46–0.66); $p < 0.001$), as was the risk of a diagnosis in divorced/separated women compared to those who were married (Odds Ratio = 1.32 (1.02–1.71); $p < 0.05$). However, the differential likelihood between married and widowed women was no longer significant.

7.2.3. Lung disease

Risk of Lung Disease was the only chronic disease examined that did not show significantly different likelihoods across the two cohorts. The unadjusted model did find that divorced/separated (Odds Ratio = 1.69 (1.27–2.24); $p < 0.001$) and widowed (Odds Ratio = 2.20 (1.57–3.08); $p < 0.001$) women were significantly

Table 3
Fully adjusted logistic model results for individual chronic diseases ($N = 6672$).

	Hypertension	Diabetes	Lung	Heart	Stroke	Arthritis
Pre-boomer cohort	0.74*** (0.66–0.85)	0.55*** (0.46–0.66)	0.96	0.82* (0.67–0.99)	0.59** (0.39–0.88)	0.74*** (0.66–0.85)
Marital status						
Divorced/separated	1.22* (1.02–1.45)	1.32* (1.02–1.71)	1.59	1.23 (0.96–1.58)	1.31 (0.80–2.12)	1.29** (1.08–1.54)
Widowed	1.36* (1.07–1.72)	1.33 (0.98–1.81)	2.48**	1.00 (0.73–1.37)	1.32 (0.69–2.52)	1.08 (0.85–1.37)
Never married	1.32 (0.91–1.91)	1.22 (0.73–2.05)	2.67*	1.44 (0.86–2.41)	1.50 (0.48–4.66)	1.48* (1.04–2.10)
Marital status by cohort						
Divorced/separated pre-boomer	–	–	1.02	–	–	–
Widowed pre-boomer	–	–	0.60	–	–	–
Never married pre-boomer	–	–	0.28*	–	–	–
Age	1.05*** (1.02–1.07)	1.08*** (1.04–1.11)	1.04 (1.00–1.09)	1.05** (1.02–1.09)	1.09* (1.01–1.18)	1.09*** (1.07–1.12)
Education						
No degree	1.30** (1.10–1.53)	1.72*** (1.37–2.17)	1.75*** (1.34–2.30)	1.36* (1.07–1.72)	1.59* (1.03–2.45)	1.59*** (1.35–1.87)
GED	0.86 (0.63–1.17)	0.76 (0.48–1.22)	0.77 (0.41–1.45)	0.70 (0.42–1.16)	0.21* (0.59–0.71)	0.88 (0.66–1.18)
2-year college	0.78* (0.63–0.98)	0.61* (0.41–0.90)	0.68 (0.42–1.09)	0.51** (0.34–0.79)	0.32** (0.14–0.73)	0.86 (0.69–1.06)
4-year college	0.68** (0.52–0.89)	0.47** (0.28–0.78)	0.25*** (0.13–0.50)	0.47** (0.27–0.82)	0.67 (0.22–2.12)	0.65** (0.50–0.85)
Professional degree	0.71 (0.36–1.41)	0.41 (0.11–1.54)	1.16 (0.27–5.04)	0.55 (0.13–2.34)	0.00*** (0.00–0.00)	0.60 (0.31–1.16)
Race						
Other	1.27* (1.03–1.58)	1.59** (1.17–2.16)	0.49** (0.32–0.77)	0.94 (0.66–1.34)	1.12 (0.56–2.22)	0.78* (0.63–0.97)
Hispanic only	1.19 (0.74–1.90)	1.60 (0.89–2.89)	0.67 (0.29–1.54)	0.28** (0.12–0.69)	1.43 (0.45–4.58)	0.60 (0.36–1.00)
Black non-Hispanic	2.60*** (2.17–3.11)	1.92*** (1.51–2.43)	0.64** (0.46–0.89)	1.40** (1.12–1.76)	2.43*** (1.49–3.95)	1.07 (0.90–1.28)
Number of marriages	0.95 (0.86–1.05)	1.00 (0.86–1.16)	1.46*** (1.27–1.68)	1.29*** (1.12–1.48)	1.33* (1.06–1.69)	1.21*** (1.10–1.33)
Length of marital status	1.10 (0.85–1.42)	1.03 (0.75–1.43)	1.20 (0.80–1.80)	1.20 (0.81–1.78)	0.68 (0.33–1.41)	1.10 (0.86–1.42)
Weekly vigorous activity	0.66*** (0.56–0.77)	0.58*** (0.48–0.75)	0.46*** (0.32–0.64)	0.64*** (0.49–0.82)	0.52* (0.29–0.92)	0.71*** (0.61–0.82)
Current smoker	0.76** (0.66–0.91)	0.65*** (0.51–0.84)	2.06*** (1.60–2.64)	0.96 (0.76–1.21)	1.32 (0.87–2.00)	1.19* (1.02–1.39)
C-statistic	0.64	0.69	0.70	0.63	0.68	0.62

Note. Reporting odds ratios (95% Confidence Intervals).
Education referent group is high school degree; race and ethnicity referent group is White non-Hispanic; marital status referent group is married; cohort referent group is the Early Baby Boomers. Confidence intervals are not calculated for interaction term variables.
C-Statistic is an indicator of model predictive value, where levels over 0.5 indicate some predictive value.
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

more likely to have Lung Disease compared to married women. However, there was also a significant cohort by marital status interaction. Although the never married women were not significantly different from the married women in their likelihood of having Lung Disease, Pre-Baby Boom never married women were significantly less likely ($p < 0.05$) to have Lung Disease compared to the Early Baby Boomer never married women. As noted in Table 3, the adjusted model showed a similar pattern of findings. The primary difference is that after including covariates, the divorced/separated women were no longer significantly different from the married women in their likelihood of being diagnosed with Lung Disease. The significant cohort by marital status interaction suggests that, while the never married women were at increased risk of a Lung Disease diagnosis compared to the married women, this risk was significantly less among those from the Pre-Baby Boom cohort.

7.2.4. Heart disease

The unadjusted model for Heart Disease did not find a significant cohort difference in the likelihood of a diagnosis (Odds Ratio = 0.93 (0.77–1.11); $p = 0.41$) nor a significant effect of marital status. However, in the fully adjusted model, results indicated that the Pre-Baby Boom cohort was 18% less likely to have a Heart Disease diagnosis compared to the Early Baby Boomers (Odds Ratio = 0.82 (0.67–0.99); $p < 0.05$).

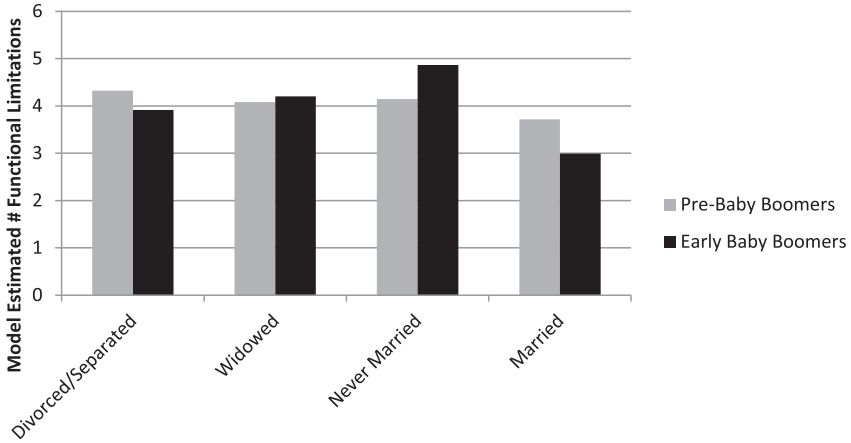

Fig. 1. Marital status by cohort interaction on functional limitations. This figure illustrates the model-based pattern of marital status and cohort effects on the number functional limitations.

7.2.5. Stroke

The unadjusted model for Stroke did not identify a significant cohort difference in the likelihood of a diagnosis (Odds Ratio = 0.74 (0.52–1.05); $p = 0.09$). However, the results of this model showed increased risk for Stroke among divorced/separated (Odds Ratio = 1.60 (1.02–2.51); $p < 0.05$) and widowed (Odds Ratio = 2.22 (1.17–4.20); $p < 0.05$) women compared to those who were married. In the adjusted model controlling for covariates (Table 3), the Pre-Baby Boomer women were significantly less likely to report a Stroke diagnosis (Odds Ratio = 0.59 (0.39–0.88); $p < 0.01$) and there were no significant effects of marital status.

7.2.6. Arthritis

Finally, the unadjusted models for an Arthritis diagnosis indicate that the Pre-Baby Boom women were 17% less likely to have a diagnosis compared to the Early Baby Boomers (Odds Ratio = 0.83 (0.74–0.93); $p < 0.01$). The unadjusted model also identified significant differences in the likelihood of an Arthritis diagnosis by marital status, where divorced/separated (Odds Ratio = 1.28 (1.08–1.51); $p < 0.01$) or widowed (Odds Ratio = 1.28 (1.03–1.59); $p < 0.05$) women were significantly more likely to have Arthritis. After accounting for covariates in the adjusted model, the reduced risk of Arthritis diagnosis in the Pre-Baby Boomer women was greater, such that they were 26% less likely to have a diagnosis compared to the Early Baby Boomer cohort (Odds Ratio = 0.74 (0.66–0.85); $p < 0.001$). The effects of marital status on diagnosis likelihood were also slightly modified. While the increased risk for divorced/separated women compared to those who were married stayed virtually unchanged from the unadjusted model, widowed women were no longer at greater risk compared to married women (Odds Ratio = 1.08 (0.85–1.37); $p = 0.54$). Rather, after accounting for covariates, the never married women had a 48% higher risk of Arthritis diagnosis compared to the married women (Odds Ratio = 1.48 (1.04–2.10); $p < 0.05$).

8. Discussion

The current study provides mixed support for prior research concerning the association of cohort, marital status, and health. In general, we expected that married women and never married women would be healthier than those who were divorced and widowed, and that Early Baby Boom women would be healthier than their earlier cohort counterparts. While we hypothesized that the later cohort of midlife women (the Early Baby Boomers) would have fewer functional limitations and chronic diseases compared to the Pre-Baby Boom cohort, this was only true for functional limitations. The Early Baby Boomers were significantly more likely to have every chronic disease examined in the current study – except lung disease – compared to their earlier counterparts, see both descriptive information (Table 1) and model estimates (Table 3).

However, the current paper did replicate associations with marital status and health: being currently married was associated with fewer functional limitations and risk of several chronic diseases compared to being divorced/separated, widowed, and never married. The descriptives reported in Table 1 confirm extant reports (e.g., Ryan et al., 2012) that marital status patterns are changing over time, with higher divorce rates and lower widowhood rates in later cohorts. Interestingly, Lung Disease was the only chronic illness to indicate a cohort difference in its association with marital status. Specifically, this effect was driven primarily by the never marrieds, where Early Baby Boomers were at higher risk for Lung Disease compared to never married Pre-Baby Boomers. This result should be considered critically, given that there were so few never married women in this age range, particularly among the Pre-Baby Boomers.

Never married women also showed cohort differences in functional limitations; in particular, Early Baby Boom women who never married had more functional limitations, relative to married women, when compared to their Pre-Baby Boom counterparts. While the current study cannot explain this difference or the similar finding for Lung Disease, it is possible that the never married Pre-Baby Boomers were a more select group than the Early Baby Boomers (Table 1): there was a smaller proportion of midlife women who were never married in 1992 compared to 2006, consistent with previous findings (Elliot et al., 2012). This may be because Pre-Baby Boom women faced greater limitations in access to education and employment opportunities (Cwikel et al., 2006); never married Pre-Baby Boom women also tended to be those with higher educational attainment, thus their numbers were smaller than succeeding cohorts of women who experienced fewer strictures on education and employment. Alternatively – although we are unable to gauge from the available data – the Early Baby Boom women may have remained unmarried as a result of their functional limitations.

We hypothesized interactions for the relationship between marital status and health by cohort, and found two marital status-by-cohort interactions, described above. While we included the length of time an individual was in her current marital status as a covariate, the results indicate that this variable was not associated with any of the health outcomes in the present study. This pattern is counter to extant research, which suggests marital stability is associated with better health (Pienta et al., 2000). However, this finding provides support for research based on the crisis (or stress) model of marriage (e.g., Liu, 2012): that is, marital *transitions* are related to temporary declines in physical health – as opposed to the status itself – especially in comparatively recent cohorts where divorce and widowhood are less stigmatized, and the economic and social handicaps are less prevalent for women.

In considering Stewart and Healy's (1989) theory that the Women's Movement differentially shaped the identities of Baby Boom women compared to older women, our results are inconclusive. This could have been the driving force behind the higher rates of divorce and remaining single in the general population of Baby Boom women, but the current study does not specifically examine the Women's Movement/marital status link: we merely use the Women's Movement to contextualize the differences in the two examined cohorts. Moreover, our results may reflect a confluence of the Women's Movement and the increased focus on healthy lifestyles (exercise; nutrition) beginning in the late 1960s/early 1970s, and the positive consequences for functional limitations. Supporting this, the current study found that a higher percentage of Early Baby Boom women reported weekly vigorous physical exercise and lower rates of smoking (Table 1). The increased focus on health in the 1970s allowed both greater access to improved healthcare and increased awareness of better nutrition at an earlier age for Baby Boom women. Additionally, greater focus on health may have encouraged many Baby Boomer women to take greater care of themselves.

Previous research has focused on the fact that later cohorts are healthier and will live longer; however, some newer studies (e.g., Olshansky et al., 2005) suggest that this pattern may not be maintained, especially with the increasing global obesity epidemic. Reports from the Organization for Economic Co-operation and Development (OECD) support this view: by 2015, an estimated 70% or more people in the U.S. will be overweight, with obesity responsible for 5–10% of total health expenditure (OECD, 2012). That Early Baby Boom women had more chronic diseases may well reflect increases in the prevalence of obesity-related disease (Kelley-Moore, 2010). As the current study was not able to adjust for differences in obesity across the cohorts and marital status

positions, future research should also consider this as a crucial factor associated with cohort differences in women's health. Alternatively, higher prevalence of a variety of diagnosed chronic diseases for Early Baby Boomers may be due to the measurement itself. We included five conditions common to the literature (see Ailshire et al., 2011; Ayalon and King-Kallimanis, 2010; Ferraro and Wilmoth, 2000): diabetes, hypertension, stroke, chronic lung disease, and heart disease; a sixth chronic condition – arthritis – was also included, due to its pertinence for midlife women's health. But perhaps the inclusion of other chronic diseases would paint a different picture.

Finally, there has been recent support for the idea that individuals born during times of economic hardship have better health in later life compared to those born in times of economic prosperity (Cutler et al., 2007); it is possible that children born into difficult social circumstances become hardier, providing lasting benefits into later life. The current study includes a cohort of women born during the end of the Great Depression and the early years of World War II (the Pre-Baby Boomers), and a cohort of women born in the comparatively prosperous post-WWII years (the Early Baby Boomers). The higher prevalence of chronic diseases in the later cohort may reflect this phenomenon.

8.1. Limitations and future directions

We found evidence that being married is positively associated with physical health, supporting existing literature. However, although our model was able to explain approximately 17% of the variance in functional limitations, the logistic regression models for chronic diseases – although statistically significant – report only low to moderate predictive value as indicated by the C-statistic. In future research, we should consider further explanation of the marriage–health relationship, such as selection into marriage, lifestyle, or other factors not measured in the current study.

The married versus singleton effect will be interesting to track in later members of the Baby Boom cohort, when higher rates of divorce and remaining single are even more common. Selection into singlehood is also important to bear in mind, especially in this age group (i.e., 50–60). That is, widowhood in this age group is rare and less 'on-time' than divorce, therefore possibly more distressing. However, divorce may be no less distressing, depending on who initiates the divorce; similarly, never married women may not have chosen to remain single. The reasons behind remaining in a marriage are also important, given that marital satisfaction can have a bearing on health and well-being, and vice versa. In future studies, this information may help explain both physical and psychological health for midlife women.

One further issue on the topic of selection is also worth considering: The current study's data may represent women who have selected to take part in the survey, and the data may therefore be skewed in some way. Due to the large sample sizes and the application of weights to the analysis that make corrections for non-response bias, this is a relatively small possibility; however, following these and future groups of women in HRS will help identify trends that mirror national patterns, and help to alleviate such concerns. And although the current study incorporated a wide range of covariates associated with marriage and health, it was not possible to include all potential control variables. For example, the analyses could not include measures of BMI and number of children due to critical differences in the way HRS measured these variables in 1992 versus 2006.

In this paper, we were interested in cohort differences, and as such, did not analyze period trends separately. No doubt there are elements of period trends intertwined within the cohort differences; however, it is very difficult to parse period from cohort effects. Shifts in social or cultural contexts as a consequence of environmental factors (e.g., war, economic recession, technological breakthrough) might similarly influence the lives of all people at a given time point. However, some researchers would argue that individuals are affected to varying degrees, depending on factors such as age and the salience of the particular socio-historical change (see, for example, Stewart and Healy, 1989). Future research concerning marital status and health could benefit from examining the independent contributions of both period and cohort.

Overall, we present a mixed picture for the health of future cohorts of women and, in particular, for the long-term health consequences for Early Baby Boomers. The upside is that the Boomers have fewer functional limitations compared to an earlier age-matched cohort of women, although they are more likely to be single compared to current cohorts of older adults (Ryan et al., 2012). However, the combination of increased propensity for chronic illness and remaining single suggests that Baby Boomers may have fewer available resources for informal care in later life (Ryan et al., 2012; Silverstein et al., 2006).

Our findings, combined with existing research, suggest that future work should focus on extending good health for women into later life, especially as the Early Baby Boom cohort and the Pre-Baby Boom cohort become the young-old and oldest-old, respectively. A follow-up examination of the women in this study could illuminate continuing health trajectories: Do both cohorts follow similar paths in their continued health trajectories? Additionally, fuller consideration of the motivation behind choosing or remaining in different marital statuses would also provide a more nuanced picture of the marital status/health relationship. Ultimately, future research in this area will be useful in finding practical solutions for care provision in future cohorts of women, especially for those with fewer familial resources.

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