Published in final edited form as:

Prev Med. 2016 July ; 88: 46–52. doi:10.1016/j.ypmed.2016.03.011.

Differences between husbands and wives in colonoscopy use: Results from a national sample of married couples

Ashwin A. Kotwal, MD, MS^a, Diane S. Lauderdale, PhD^b, Linda J. Waite, PhD^c, and William Dale, MD, PhD^d

^aBrigham and Women's Hospital, Department of Medicine, 75 Francis St, Boston, MA 02115, USA

^bUniversity of Chicago, Department of Public Health Sciences, 5841 S. Maryland Ave, Chicago, IL 60637, USA

^cUniversity of Chicago, Department of Sociology, 1159 E. 59th Street, Chicago, IL 60637, USA

^dUniversity of Chicago, Department of Medicine, Section of Geriatrics & Palliative Medicine and Hematology/Oncology, 5841 S. Maryland Ave, Chicago, IL 60637, USA

Abstract

Marriage is linked to improved colorectal cancer-related health, likely in part through preventive health behaviors, but it is unclear what role spouses play in colorectal cancer screening. We therefore determine whether self-reported colonoscopy rates are correlated within married couples and the characteristics of spouses associated with colonoscopy use in each partner. We use US nationally-representative 2010 data which includes 804 male-female married couples drawn from a total sample of 3,137 community-dwelling adults aged 55–90 years old. Using a logistic regression model in the full sample (N=3,137), we first find married men have higher adjusted colonoscopy rates than unmarried men (61% versus 52%, $p=0.023$), but women's rates do not differ by marital status. In the couples' sample (N=804 couples), we use a bivariate probit regression model to estimate multiple regression equations for the two spouses simultaneously as a function of individual and spousal covariates, as well as the adjusted correlation within couples. We find that individuals are nearly twice as likely to receive a colonoscopy if their spouse recently has had one (OR=1.94, 95% CI: 1.39, 2.67, $p<0.001$). Additionally, we find that husbands have higher adjusted colonoscopy rates whose wives are: 1) happier with the marital relationship (65% vs 51%, $p=0.020$); 2) more highly educated (72% vs 51%, $p=0.020$), and 3) viewed as more supportive (65% vs 52%, $p=0.020$). Recognizing the role of marital status, relationship quality, and spousal characteristics on colonoscopy uptake, particularly in men, could help physicians increase guideline adherence.

Corresponding Author: William Dale, MD, PhD, University of Chicago Medicine, Department of Medicine, Section of Geriatrics & Palliative Medicine, MC6098, 5841 S. Maryland Avenue, Chicago, IL 60637, wdale@medicine.bsd.uchicago.edu, Phone: 773-834-0508, Fax: 773-702-3538.

CONFLICT OF INTEREST STATEMENT:

The authors declare that there are no conflicts of interest

Keywords

Cancer screening; marriage; colonoscopy; social networks; colorectal cancer

INTRODUCTION

Guidelines recommend that individuals over age 50 have regular colorectal cancer screening due to large survival benefits,¹ which may include a colonoscopy every 10 years, sigmoidoscopy every 5 years, or annual fecal occult blood testing. Colonoscopies are the most commonly-used invasive screening modality for patients,^{2, 3} as well as the “preferred” screening strategy per the American College of Gastroenterology (ACG).⁴ While screening rates have increased in recent years,⁵ they still fall short of full adherence. One strategy for improving screening colonoscopy rates might include engagement with spouses,⁶ a strategy successfully incorporated into other preventative health interventions including smoking cessation,⁷ nutrition counseling,⁸ and exercise.⁹

A sizeable literature shows better health behaviors and health for the married than for the unmarried, and that behaviors are often concordant within couples.^{6, 10–12} For colorectal cancer, married individuals have both a lower incidence of metastatic disease and lower cancer-specific mortality.¹³ This may reflect improved screening rates, as studies have shown that marriage is associated with higher rates of colorectal cancer screening,¹⁴ particularly in men.¹⁵ However, there is limited research on why marriage is associated with higher screening rates.^{16–18} One theory on social integration and social control in marriage, developed by Umberson (1992), proposes that spouses, especially wives, monitor and encourage healthy behaviors in couples.^{19, 20} Perhaps as a result, husbands experience more consequent health benefits than do wives.²⁰ Alternatively, Lewis et al. (2006) propose interdependence theory, in which the health of the spouse becomes important to the continuation of the relationship.²¹ Indeed, one study showed that when partners believe being screened is important to the relationship, the attitudes and behaviors of one partner can influence the other partner.¹⁸ In the case of colonoscopies, spouses may directly encourage one another to receive a colonoscopy or indirectly model screening behavior. From a practical standpoint, spouses may also be important because of the procedure’s logistical complexities, including pre-procedure bowel preparation and post-procedure help in returning home, which typically requires substantial assistance.⁴ Of course, the influence of one spouse on the behavior of the other may depend on the quality of their relationship, although one small study found no association between relationship quality and intentions to be screened.¹⁸ Nevertheless, spouses in marriages of higher quality may be more able to influence their partners’ behavior and may be more willing to put forth the effort to do so. Partners in better marriages may be more willing to accede to the suggestions or demands of their spouse than those in more strained relationships.

We hypothesize that there are specific characteristics of married couples and their marital relationship that lead to higher cancer screening rates in their partners. Identifying these factors could point to strategies to improve colonoscopy use. We therefore use data from Wave 2 of the National Social Life Health and Aging Project (NSHAP), a nationally-

representative sample that includes older couples in the U.S in 2010. We utilize the theoretical framework developed by Umberson (1992) on social control in marriage.^{19, 20} We aim to determine the extent to which, in a national sample: 1) colonoscopy rates differ between the married and unmarried, 2) specific characteristics such as marital happiness and spousal education independently predict the likelihood of colonoscopy use, and 3) colonoscopy use is correlated within couples after adjusting for shared characteristics.

METHODS

Sample

We use the NSHAP Wave 2 sample (2010–2011), an in-person survey administered in the home by trained interviewers using computer-assisted personal interviewing (CAPI).^{22, 23} The weighted overall response rate was 76.9%. Complete details on the sample design are available elsewhere.²⁴

NSHAP Wave 2 included community-dwelling adults ages 62 to 90. NSHAP Wave 2 included information on a nationally-representative sample of older adults of any marital status (n=3,377), as well as a nationally-representative sample of older married and cohabiting couples (n=953 couples) within this larger sample. The weighted response rate for partners was 85.8%. We excluded individuals with a prior history of colorectal cancer, those missing information on key covariates and those with a diagnosis of dementia. We also excluded couples in which one member was younger than age 55, since we ask about colonoscopy in the last five years. We included couples only if both met the criteria above. This yielded an overall sample of 3,137 older adults and a separate partners sample of 1608 individuals in 804 partnerships.

Primary Outcome

The primary outcome variable was self-reported colonoscopy use within the last five years. This was measured by asking “About how long has it been since you had a colonoscopy”, with possible responses of: within the past year, between 1 and 5 years ago, more than 5 years ago, and never. The 5 year interval was chosen due to the greater possibility of spouses influencing one another if they received a colonoscopy more recently and around the same time interval. Sensitivity analyses using an “ever-received” outcome variable yielded results similar to those reported and are presented in supplemental content.

Marital Quality

The quality of the marital relationship was assessed by asking respondents “Taking all things together, how would you describe your (marriage/relationship)” on a 7-point scale, with responses dichotomized into: “not happy” (1 to 4), and “happy” (5 to 7). This global assessment is well-validated and widely used in the field, both because it represents overall marital satisfaction, and because satisfaction levels are easily compared between spouses.^{25–27} The scale was dichotomized due to a right skew as has been done in prior literature.²⁷ Sensitivity analyses utilizing a continuous variable and a cutoff at 4 instead of 5 points yielded similarly significant results.

We also included a modified previously validated 7-item scale describing perceived emotional and social support from the marital relationship.²⁵ Six of the seven items asked how often 1) things are going well with the relationship 2) you can rely on your spouse, 3) you can open up to your spouse, 4) your spouse make too many demands, 5) your spouse get on your nerves, and 6) your spouse criticizes you, with possible responses of “Never,” “Rarely,” “Sometimes,” or “Often.” One item asked how emotionally satisfying is your relationship, with responses “Not at all,” “Slightly,” “Moderately,” “Very,” and “Extremely.” Each item was standardized and combined to create a scale which has a Cronbach alpha of 0.73, suggesting acceptable internal reliability. The scale was divided into quartiles, with the bottom quartile representing the lowest perceived emotional and social support.

Sociodemographic Covariates

Based on our theoretical framework and prior literature on marriage and health, several covariates were included in the analysis.^{14, 28, 29} For each member of a couple, we included age and education (less than high school (<HS), HS/GED, some college or vocational certification, or bachelor’s degree or more). For the couple we defined race as both “Caucasian,” both “African American,” both “Hispanic,” both “Other,” or “Interracial” when couples had different responses to the question. Household assets in quartiles was used to measure socioeconomic status of couples. Research suggests that household assets better reflect available resources among retired adults than does income.³⁰ To account for missing data for the full sample for the assets variable, multiple imputation utilizing an unfolding bracket methodology was used (n=1152), as is detailed elsewhere.³¹

Health Status and Health Behaviors

Health status was measured separately in each partner for mental health, functional status and comorbidities. Depressive symptoms was measured using a modified version of the CES-D scale, dichotomized as “low” vs. “high” depressive symptoms.³² Functional status was measured based on the Instrumental Activities of Daily Living (IADLs) (meal preparation, taking medications, shopping, managing finances, telephone use, driving, and light housework) and Activities of Daily Living (ADLs) (toileting, dressing, eating, getting in and out of bed, and bathing), with each item having possible outcomes of “No difficulty” (0 points), “Some or much difficulty” (0.5 points), or “Unable to do” (1 point).³³ The items were summed to form a composite functional status scale of 0–12 points. The weighted NSHAP Comorbidity Index, which ranges from 0–21, measured the burden of chronic disease.³⁴ Health behaviors previously found to be associated with colorectal cancer screening – alcohol intake, exercise, and smoking – were also included.²⁸ “Risky” alcohol use was defined for individuals as consuming 14 or more alcoholic beverages a week or reporting at least three episodes of binge drinking (more than four drinks in one night) in the last three months.^{35, 36} Exercise was defined as “active” if an individual reported participating in vigorous physical activity or exercise for 30 minutes or more at least 1 time per week in the last 12 months.²⁸ Smoking was defined as being a current smoker.

Statistical Analysis

First, we used a logistic regression model to test whether marital status is associated with colonoscopy utilization in the entire sample (n=3,137), controlling for all covariates. We

tested for interactions between marital status and gender, based on our theoretical framework that predicts social relationships may have asymmetric effects on health behaviors by gender.²⁰ Additional analyses included married couples only (n=1,608). We tested the independence of partner colonoscopy use and the associations of colonoscopy use with each covariate using Pearson Chi-square tests. Given the matched couples data, we then used a bivariate probit multiple regression model, which simultaneously estimates parameters for each paired outcome (colonoscopy of husband and colonoscopy of wife) as a function of shared and individual covariates.³⁷ The probit model assumes there is an underlying unmeasurable continuous trait for each individual that reflects the likelihood he or she will get a colonoscopy. One advantage of this model is the ability to more precisely estimate an adjusted correlation coefficient between two outcomes, representing the correlation between the two underlying traits. We present adjusted marginal probabilities of colonoscopies in husbands and wives as estimated by the regression model including all covariates, with 95% confidence intervals. Additionally, to facilitate interpretation of the adjusted correlation coefficient, we re-estimated the correlation coefficient as an odds ratio.³⁸ To address the issue of collinearity, we determined the correlations among model covariates and where possible combined highly correlated variables into couple-level variables, including race and household assets. We also tested whether model coefficients remained stable after removing highly correlated variables (i.e. spousal education and age), which was the case. All analyses were survey weighted and done using Stata 12.1.³⁹

RESULTS

Characteristics of the full sample and couples sample appear in Table 1. In the full sample, the mean age was 72 years and 80.8% of men and 61.2% of women were married. In the couples' sample, the mean age was 72 years and 69 years for husbands and wives, respectively. Husbands and wives had similar colonoscopy rates of 63.1% and 61.2%, respectively.

Next, we determine the adjusted association between marital status and colonoscopy use in the last 5 years in the full sample of married and unmarried participants, stratified by gender (Figure 1). Married men have higher rates of colonoscopies than unmarried men, all else equal: 61% versus 52% (p=0.023). In contrast, there is no significant difference between rates in married and unmarried women: 57% versus 60% (p=0.27).

Next, using the couples' sample, we present associations of colonoscopy utilization within couples and the association between colonoscopy use and sample characteristics in Supplementary Table 1. In 43% of couples, both the husband and wife had a colonoscopy in the last 5 years, while in 19% of the couples neither had a colonoscopy in the last 5 years, representing an unadjusted odds ratio of 2.22 (95% CI: 1.63,3.01, p<0.001) for receiving a colonoscopy if the other spouse has received one. Higher education was associated with increased colonoscopy uptake for each member of the couple (p<0.01).

Table 2 presents the bivariate probit model estimates for the adjusted correlation between colonoscopy use within couples as 0.27 (95% CI: 0.15,0.38; p<0.001). Converting this correlation coefficient into an odds ratio and adjusting for covariates, an individual has

nearly twice the odds of receiving a colonoscopy in the last 5 years if his or her spouse had one (OR=1.94, 95% CI:1.39,2.67, $p<0.001$), and 3.6 times the odds of ever receiving a colonoscopy if his or her spouse has ever received one (OR=3.64, 95% CI: 2.51,5.33, $p<0.001$).

Table 3 presents the adjusted marginal probabilities of colonoscopies in the last 5 years estimated from the bivariate probit regression model. The colonoscopy rate is 65% in husbands whose wives are happy with the relationship, compared to 51% for husbands with wives who are not happy ($p=0.020$). Husbands who perceived low levels of support from their wives had significantly fewer colonoscopies than husbands who perceived more support ($p=0.020$). The colonoscopy rate is 51% for husbands whose wives have less than a high school education compared to 71% for men with college-educated wives ($p=0.020$). In contrast, neither the husband's happiness with the relationship ($p=0.68$) nor his education level ($p=0.17$) is significantly associated with colonoscopy rates in his wife. Household assets are associated with higher colonoscopy use for both husbands ($p=0.031$) and wives ($p=0.024$).

DISCUSSION

In a nationally-representative sample of older adults that includes married couples, we examine the role of each partner in colonoscopy use. First, we found that the likelihood of obtaining a colonoscopy is highly correlated within couples. Second, consistent with our theoretical model, we also found that marriage strongly predicts colonoscopy use in men but not in women. Third, we found that marital satisfaction and education level of wives predicts higher colonoscopy use in their husbands, and similarly that husbands who perceive low levels of support from their wives are less likely to have colonoscopies.

Married individuals had nearly twice the odds of receiving a colonoscopy if their spouse had received one in the last 5 years, and 3.6 times the odds of having a colonoscopy if their spouse ever had one. This is consistent with several studies showing that marriage is an important predictor of colorectal cancer screening,^{15, 28} including two studies with data from matched spouses.^{16, 18} One smaller, targeted study examining colorectal cancer screening intentions of non-adherent couples found that spouses have interdependent attitudes on screening and more often discuss screening intentions when they perceive it as important to the relationship.¹⁸ When screening had perceived implications for the relationship, discussions were associated with increased intentions to be screened.¹⁸ Another larger study, utilizing data from the Framingham cohort and focusing on fecal occult blood tests (FOBTs) and sigmoidoscopies, found that married individuals with screened spouses were more likely to be screened compared to unmarried individuals.¹⁶ We confirm and substantially extend these findings using a large, diverse nationally-representative sample and controlling for important shared covariates such as assets and marital quality. Prior literature suggests this correlation may be explained by spouses directly or indirectly influencing health behaviors and the decision to be screened.^{6, 21, 40, 41} However, there may be a role for other unmeasured, shared traits explaining the correlation, such as shared health-conscious behaviors or experiences. Of note, we found a larger association between spouses screening likelihood than in the Framingham study. We hypothesize that spouses play a larger role in

the more logistically complex colonoscopies, which require pre-procedure bowel preparation and post-procedure assistance in returning home, as compared to FOBTs and sigmoidoscopies. Based on this exploratory work, we hypothesize that in encouraging guideline adherence, if providers can convince one partner to receive a colonoscopy, there may be positive spillover effects increasing the likelihood of the partner also receiving a colonoscopy. Further research incorporating a longitudinal approach is needed to help clarify mechanisms of the high correlation among spouses.

In contrast to most studies examining the association of colorectal cancer screening with “marital status” in unmatched cohorts, we also investigated characteristics of spouses and the marital relationship. We confirm that marriage is associated with higher rates of colonoscopies in men than in women,¹⁵ and describe several features of the marital relationship associated with this asymmetric increased benefit for husbands: the wife’s happiness with the marital relationship, the wife’s education level, and the husband’s perception of emotional support from his wife. We speculate that women who are more emotionally invested in the relationship are more likely to encourage healthy behaviors in their husbands and that husbands are more likely to take their advice when they view their wives as supportive. We also hypothesize that highly educated women are more knowledgeable about screening guidelines and generally better connected to the health system and so may encourage their husbands to have colonoscopies. Taken together, these findings are consistent with the theory that women act as “gate-keepers”, managing decisions for health behaviors for the couple.^{20, 42, 43} In contrast, women appear to derive fewer direct health benefits from marriage, perhaps because they depend more on alternate support sources such as friends and other relatives.²⁶

The asymmetric results have two clinical implications. First, unmarried men are relatively more likely to fail to get colonoscopies and may benefit from targeted interventions such as one-on-one assistance by non-physician staff in navigating the pre-procedure instructions and logistics of screening. Targeted patient reminders and decision aids may also be helpful in the initial scheduling phase.⁴⁴ Second, men derive benefits from marriage in overall colonoscopy use, suggesting that interventions to improve colonoscopy utilization in married men may be enhanced by engaging their wives. For example, visits in which a man is accompanied by his wife would be excellent opportunities to discuss colonoscopy screening. In a clinical intervention utilizing decision support tools, providers might consider also sending materials home with the wife and encouraging her to discuss colonoscopy use with her husband, a strategy that has been effective in dietary-change interventions.⁸ Simultaneously inviting both spouses for colonoscopies may also be more successful in encouraging adherence than inviting individuals separately.⁴⁵ Further work should examine methods by which physicians may more effectively deliver screening recommendations that incorporate the spouse.

While NSHAP provides a unique opportunity to study a national sample of married couples, we recognize the following limitations. First, the colonoscopy variable does not have a category for “within the last 10 years,” which would be most consistent with screening guidelines. Thus, certain individuals may be misclassified as not screened. However, a sensitivity analysis using an “ever had a colonoscopy” cutoff showed larger within couple

correlations and similar significant covariates to the analysis presented (Supplementary Table 3), suggesting that the overall conclusions would be unchanged if a 10 year category were available. Second, the colonoscopy outcome is self-reported and may be subject to recall bias.⁴⁶ Nevertheless, several community-based studies have shown that self-reported colonoscopies have acceptable validity and reliability in comparison to medical records.^{46–49} Third, the colonoscopy variable does not distinguish among the many potential indications for colonoscopies, including screening, diagnostic, surveillance, or therapeutic. This is a difficult distinction to make in national surveys since patients are often unaware that colonoscopies can be performed for multiple indications. Thus, inclusion of non-elective colonoscopies may introduce error into our estimates. However, this error would likely result in an underestimation of the correlation between spouses, as such colonoscopies would be less subject to spousal influence; thus, our findings represent more conservative estimates. Furthermore, studies suggest that most colonoscopies performed in the US are done as screening for preventing colorectal cancer in asymptomatic individuals, particularly at older ages.⁵⁰ Fourth, other forms of colorectal cancer screening, such as FOBTs or sigmoidoscopies, were not available for analysis, and thus our conclusions can only be applied to colonoscopy. However, one study focusing on FOBTs and sigmoidoscopies showed a similar significant correlation among spouses, suggesting a similar relationship across modalities.¹⁶ In addition, a focus on colonoscopies is reasonable since they are more accurately reported,^{47, 49} and because colonoscopies are often the preferred screening strategy due to larger mortality benefits shown in observational studies.^{4, 51} In summary, the colonoscopy variable available in NSHAP has limitations that may introduce error into estimates, but these are unlikely to alter the overall conclusions of the study.

We also note limitations with the study design. First, the data are cross-sectional and we cannot make causal inferences, especially with regard to the timing of screening for each spouse and screening's association with marital quality. Second, as with all descriptive studies, there is the potential for bias from unmeasured confounders and residual confounding. Third, we did not include same-sex couples in our analysis due to inadequate power in our sample and likely distinct social dynamics. Finally, participation was limited to individuals with the cognitive and functional capacity to participate in a 2-hour survey, and therefore our results are generalizable to community-dwelling, heterosexual, unmarried and married older adults without dementia.

In conclusion, in a nationally-representative sample of older adults that includes matched married couples, we found that colonoscopy use is highly correlated among spouses. We also show that marriage is associated with larger benefits for men than women in obtaining a colonoscopy. Finally, we find that husbands have higher colonoscopy rates when their wives are happier with the marital relationship and/or are more highly educated, and when men perceive their wives as more supportive. In strategies to increase colonoscopy use, being aware of the role of spouses, especially wives, in health behaviors may help guide clinical or behavioral interventions as well as discussions on screening recommendations and procedural logistics.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

This study was supported by the Clinical and Translational Science Award (CTSA) TL1 pre-doctoral training grant. This work was supported by funding for *MERIT* Award R37 AG030481 (PI: Waite) from the National Institute on Aging, and from the National Institutes of Health, including the National Institute on Aging, the Office of Women's Health Research, the Office of AIDS Research, the Office of Behavioral and Social Sciences Research, and the National Institute on Child Health and Human Development for the National Health, Social Life, and Aging Project (NSHAP R01AG021487, R37AG030481), and the NSHAP Wave 2 Partner Project (R01AG033903). Funders had no involvement in the study design, collection, analysis, and interpretation of data, or in the writing of the report. We greatly appreciate the very helpful comments from Phil Schumm, MS, Ronald Thisted, PhD, and three anonymous reviewers on the manuscript and data analysis.

References

1. McFarland EG, Levin B, Lieberman DA, et al. Revised Colorectal Screening Guidelines: Joint Effort of the American Cancer Society, US Multisociety Task Force on Colorectal Cancer, and American College of Radiology. *Radiology*. 2008; 248(3):717–720. [PubMed: 18710970]
2. Ling BS, Moskowitz MA, Wachs D, Pearson B, Schroy PC. Attitudes toward colorectal cancer screening tests. *Journal of general internal medicine*. 2001; 16(12):822–830. [PubMed: 11903761]
3. Hawley ST, Volk RJ, Krishnamurthy P, Jibaja-Weiss M, Vernon SW, Kneuper S. Preferences for colorectal cancer screening among racially/ethnically diverse primary care patients. *Medical Care*. 2008; 46(9):S10–S16. [PubMed: 18725820]
4. Rex DK, Johnson DA, Lieberman DA, et al. Colorectal cancer prevention 2000. *Clinical Reviews*. 2000; 95(4)
5. Liang S-Y, Phillips KA, Nagamine M, Ladabaum U, Haas JS. Rates and Predictors of Colorectal Cancer Screening. *Preventing Chronic Disease*. 2006; 3(4)
6. Franks MM, Shields CG, Lim E, Sands LP, Mobley S, Boushey CJ. I Will If You Will Similarity in Married Partners' Readiness to Change Health Risk Behaviors. *Health Education & Behavior*. 2012; 39(3):324–331. [PubMed: 21498801]
7. Park E-W, Tudiver F, Schultz JK, Campbell T. Does enhancing partner support and interaction improve smoking cessation? A meta-analysis. *The Annals of Family Medicine*. 2004; 2(2):170–174. [PubMed: 15083859]
8. Shattuck AL, White E, Kristal AR. How women's adopted low-fat diets affect their husbands. *American journal of public health*. 1992; 82(9):1244–1250. [PubMed: 1503166]
9. Keefe FJ, Blumenthal J, Baucom D, et al. Effects of spouse-assisted coping skills training and exercise training in patients with osteoarthritic knee pain: a randomized controlled study. *Pain*. 2004; 110(3):539–549. [PubMed: 15288394]
10. Falba TA, Sindelar JL. Spousal concordance in health behavior change. *Health services research*. 2008; 43(1p1):96–116. [PubMed: 18211520]
11. Pai C-W, Godboldo-Brooks A, Edington DW. Spousal concordance for overall health risk status and preventive service compliance. *Annals of epidemiology*. 2010; 20(7):539–546. [PubMed: 20538197]
12. Schone BS, Weinick RM. Health-related behaviors and the benefits of marriage for elderly persons. *The Gerontologist*. 1998; 38(5):618–627. [PubMed: 9803650]
13. Aizer AA, Chen M-H, McCarthy EP, et al. Marital status and survival in patients with cancer. *Journal of Clinical Oncology*. 2013; 31(31):3869–3876. [PubMed: 24062405]
14. Guessous I, Dash C, Lapin P, Doroshenko M, Smith RA, Klabunde CN. Colorectal cancer screening barriers and facilitators in older persons. *Preventive Medicine*. 2010; 50(1):3–10. [PubMed: 20006644]

15. Stimpson JP, Wilson FA, Watanabe-Galloway S, Peek MK. The effect of marriage on utilization of colorectal endoscopy exam in the United States. *Cancer Epidemiology*. 2012; 36(5):e325–e332. [PubMed: 22633538]
16. Keating NL, O'Malley AJ, Murabito JM, Smith KP, Christakis NA. Minimal social network effects evident in cancer screening behavior. *Cancer*. 2011; 117(13):3045–3052. [PubMed: 21264828]
17. Manne S, Etz RS, Hudson SV, et al. A qualitative analysis of couples' communication regarding colorectal cancer screening using the Interdependence Model. *Patient Education and Counseling*. 2012; 87(1):18–22. [PubMed: 21835574]
18. Manne S, Kashy D, Weinberg DS, Boscarino JA, Bowen DJ. Using the interdependence model to understand spousal influence on colorectal cancer screening intentions: A structural equation model. *Annals of Behavioral Medicine*. 2012; 43(3):320–329. [PubMed: 22274725]
19. Umberson D. Family status and health behaviors: social control as a dimension of social integration. *Journal of health and social behavior*. 1987; 28(3):306–319. [PubMed: 3680922]
20. Umberson D. Gender, marital status and the social control of health behavior. *Social science & medicine*. 1992; 34(8):907–917. [PubMed: 1604380]
21. Lewis MA, McBride CM, Pollak KI, Puleo E, Butterfield RM, Emmons KM. Understanding health behavior change among couples: An interdependence and communal coping approach. *Social science & medicine*. 2006; 62(6):1369–1380. [PubMed: 16146666]
22. Smith S, Jaszczak A, Graber J, et al. Instrument development, study design implementation, and survey conduct for the National Social Life, Health, and Aging Project. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*. 2009; 64(suppl 1):i20–i29.
23. Jaszczak A, O'Doherty K, Colicchia M, et al. Continuity and innovation in the data collection protocols of the second wave of the National Social Life, Health, and Aging Project. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*. 2014; 69(S2):S4–S14.
24. O'Muircheartaigh C, English N, Pedlow S, Kwok PK. Sample Design, Sample Augmentation, and Estimation for Wave 2 of the NSHAP. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*. 2014; 69(Suppl 2):S15–S26.
25. Kim J, Waite LJ. Relationship Quality and Shared Activity in Marital and Cohabiting Dyads in the National Social Life, Health, and Aging Project, Wave 2. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*. 2014; 69(Suppl 2):S64–S74.
26. Fuhrer R, Stansfeld SA. How gender affects patterns of social relations and their impact on health: a comparison of one or multiple sources of support from "close persons". *Social Science & Medicine*. 2002; 54(5):811–825. [PubMed: 11999495]
27. Waite LJ, Luo Y, Lewin AC. Marital happiness and marital stability: Consequences for psychological well-being. *Social Science Research*. 2009; 38(1):201–212.
28. Seeff LC, Nadel MR, Klabunde CN, et al. Patterns and predictors of colorectal cancer test use in the adult US population. *Cancer*. 2004; 100(10):2093–2103. [PubMed: 15139050]
29. Ioannou GN, Chapko MK, Dominitz JA. Predictors of colorectal cancer screening participation in the United States. *The American journal of gastroenterology*. 2003; 98(9):2082–2091. [PubMed: 14499792]
30. Smith JP. Wealth inequality among older Americans. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*. 1997; 52(Special Issue):74–81.
31. Kim, J., Waite, L. Family Structure and Financial Well-Being: Evidence from the Great Recession. In: Couch, K, Daly, M., Zissimopoulos, J., editors. *Unexpected Lifecycle Events and Economic Security: The Roles of Job Loss, Disability, and Changing Family Structure*. Stanford University Press; 2013.
32. Payne C, Hedberg E, Kozloski M, Dale W, McClintock MK. Using and Interpreting Mental Health Measures in the National Social Life, Health, and Aging Project. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*. 2014; 69(Suppl 2):S99–S116.
33. Huisingh-Scheetz M, Kocherginsky M, Schumm PL, et al. Geriatric syndromes and functional status in NSHAP: rationale, measurement, and preliminary findings. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*. 2014; 69(Suppl 2):S177–S190.
34. Vasilopoulos T, Kotwal A, Huisingh-Scheetz MJ, Waite LJ, McClintock MK, Dale W. Comorbidity and Chronic Conditions in the National Social Life, Health and Aging Project (NSHAP), Wave 2.

- The Journals of Gerontology Series B: Psychological Sciences and Social Sciences. 2014; 69(Suppl 2):S154–S165.
35. Drum M, Shiovitz-Ezra S, Gaumer E, Lindau S. Assessment of Smoking Behaviors and Alcohol Use in the National Social Life, Health, and Aging Project. *The Journals of Gerontology: Series B*. 2009; 64(Supplement 1):i119.
  36. Coups E, Gaba A, Orleans C. Physician screening for multiple behavioral health risk factors. *American journal of preventive medicine*. 2004; 27(2):34–41. [PubMed: 15275672]
  37. Lesaffre E, Molenberghs G. Multivariate probit analysis: A neglected procedure in medical statistics. *Statistics in Medicine*. 1991; 10(9):1391–1403. [PubMed: 1925169]
  38. Carey V, Zeger SL, Diggle P. Modelling multivariate binary data with alternating logistic regressions. *Biometrika*. 1993; 80(3):517–526.
  39. Stata Statistical Software: Release 12 [computer program]. College Station, TX: StataCorp LP; 2011.
  40. Meyler D, Stimpson JP, Peek MK. Health concordance within couples: a systematic review. *Social science & medicine*. 2007; 64(11):2297–2310. [PubMed: 17374552]
  41. Tucker JS, Mueller JS. Spouses' social control of health behaviors: Use and effectiveness of specific strategies. *Personality and Social Psychology Bulletin*. 2000; 26(9):1120–1130.
  42. August KJ, Sorkin DH. Marital status and gender differences in managing a chronic illness: The function of health-related social control. *Social science & medicine*. 2010; 71(10):1831–1838. [PubMed: 20889249]
  43. Eng PM, Kawachi I, Fitzmaurice G, Rimm EB. Effects of marital transitions on changes in dietary and other health behaviours in US male health professionals. *Journal of epidemiology and community health*. 2005; 59(1):56–62. [PubMed: 15598728]
  44. Holden DJ, Jonas DE, Porterfield DS, Reuland D, Harris R. Systematic review: enhancing the use and quality of colorectal cancer screening. *Annals of Internal Medicine*. 2010; 152(10):668–676. [PubMed: 20388703]
  45. van Jaarsveld CH, Miles A, Edwards R, Wardle J. Marriage and cancer prevention: does marital status and inviting both spouses together influence colorectal cancer screening participation? *Journal of Medical Screening*. 2006; 13(4):172–176. [PubMed: 17217605]
  46. Jones RM, Mongin SJ, Lazovich D, Church TR, Yeazel MW. Validity of four self-reported colorectal cancer screening modalities in a general population: differences over time and by intervention assignment. *Cancer Epidemiology Biomarkers & Prevention*. 2008; 17(4):777–784.
  47. Madlensky L, McLaughlin J, Goel V. A comparison of self-reported colorectal cancer screening with medical records. *Cancer Epidemiology Biomarkers & Prevention*. 2003; 12(7):656–659.
  48. Ferrante JM, Ohman-Strickland P, Hahn KA, et al. Self-report versus medical records for assessing cancer-preventive services delivery. *Cancer Epidemiology Biomarkers & Prevention*. 2008; 17(11):2987–2994.
  49. Vernon SW, Tiro JA, Vojvodic RW, et al. Reliability and validity of a questionnaire to measure colorectal cancer screening behaviors: does mode of survey administration matter? *Cancer Epidemiology Biomarkers & Prevention*. 2008; 17(4):758–767.
  50. Lieberman DA, Holub J, Eisen G, Kraemer D, Morris CD. Utilization of colonoscopy in the United States: results from a national consortium. *Gastrointestinal endoscopy*. 2005; 62(6):875–883. [PubMed: 16301030]
  51. Nishihara R, Wu K, Lochhead P, et al. Long-term colorectal-cancer incidence and mortality after lower endoscopy. *New England Journal of Medicine*. 2013; 369(12):1095–1105. [PubMed: 24047059]

Highlights

- This study examines colonoscopy use in a national sample of married couples
- Marital status is associated with colonoscopy use in men, but not in women
- Individuals are twice as likely to have a colonoscopy if their spouse has one
- Wives' education and marital happiness predict their husbands' colonoscopy use

Figure 1.

Adjusted rates of colonoscopies by gender, marital status, and number of children for the 2010 National Social Life Health and Aging Project (NSHAP) Wave 2 sample (n=3,137). Model is adjusted for age, gender, education, ethnic group, household assets, comorbidities, depressive symptoms, ADLs/IADLs, smoking, exercise, and alcohol.

Table 1

Characteristics of individuals and couples in the 2010 US National Social Life Health and Aging Project (NSHAP), Wave 2

Characteristics		NSHAP Full Sample % or Mean (SD) (N=3,137)	NSHAP Couples Sample % or Mean (SD)	
			Husbands (N=804)	Wives (N=804)
Colonoscopy		58.6	63.1	61.2
Sociodemographics				
Age		71.6 (7.7)	72.2 (7.1)	69.2 (7.0)
Marital Status	Married/Partnered	66.6	100.0	100.0
	Not married	33.4	–	–
Education	<HS	15.6	18.5	14.3
	HS/GED	25.6	22.1	24.6
	Some college	33.3	28.5	36.3
	Bachelor+	25.5	30.9	24.8
Race	White	80.8	74.6	74.1
	AA	9.7	11.2	11.1
	Hispanic	6.8	11.9	12.4
	Other	2.8	2.3	2.4
Interracial Couples		–	5.1	5.1
Household Assets (in \$10,000s) (Ranges in each quartile) ^a	1st quartile	0.02–5.9	0.2–13.4	0.2–13.4
	2nd quartile	5.9–19.7	13.4–30.4	13.4–30.4
	3rd quartile	19.7–66.0	30.7–107.2	30.7–107.2
	4th quartile	66.1–3840.0	107.4–1548.4	107.4–1548.4
Health Characteristics and Behaviors				
High Depressive symptoms ^b		20	14.05	18.41
ADLs/IADLs ^c		0.6 (1.3)	0.5 (1.1)	0.5 (1.2)
NSHAP Comorbidity Index ^d		2.7 (1.9)	2.8 (2.2)	2.5 (1.8)
Risky Alcohol Use ^e		11.1	14.4	8.2
Current smoker		13.7	14.7	10.3
Exercise - Inactive ^f		40.5	39.8	41.8
Relationship Characteristics				
Happy with relationship (N=2306 in Full sample) ^g		91.2	94.0	89.9
Perceived support from relationship	1st quartile	23.3	22.9	25.7

Characteristics		NSHAP Full Sample % or Mean (SD) (N=3,137)	NSHAP Couples Sample % or Mean (SD)	
			Husbands (N=804)	Wives (N=804)
(N=2306 in Full sample) ^h				
	2nd quartile	26.0	25.6	24.0
	3rd quartile	23.4	27.7	26.0
	4th quartile	27.2	23.8	24.3

Abbreviations: SD - Standard Deviation, ADL - Activities of daily living, IADL - Instrumental activities of daily living

^aHousehold assets is the same for both individuals in the couple and in units of \$10,000

^bDepression measured by the Center for Epidemiological Studies-Depression Scale (CES-D), range: 0–33, with 0–8 points being low and a cutoff of 9+ points indicating high depressive symptoms

^cADLs and IADLs include dressing, bathing, eating, transferring from bed, toileting, meal prep, taking meds, managing money, shopping for food, light housework, using a phone, and driving during the day (0 pts for no impairment, 0.5 pt for some impairment, 1 pts for unable to do)

^dNSHAP comorbidity index is adapted from the Charlson index and includes the conditions: hypertension, congestive heart failure, myocardial infarction, stroke, local cancer diagnosis, cancer with metastases, diabetes, rheumatoid arthritis, osteoarthritis, osteoporosis, emphysema/COPD/asthma, Parkinsons disease, and stool or urinary incontinence

^eTwo criteria to define problem drinking: 1) >14 drinks/wk for men or >9 drinks/wk for women, or 2) 3 binge drinking episodes (4 or more drinks in one day) in last 3 months

^fExercise defined as active if >30 minutes of vigorous physical activity (sports, exercise classes, heavy housework, physical labor) at least 1 time per week

^gHappiness with relationship defined on 1–7 point scale with 1–4 as Not Happy, and 5–7 as Happy

^hPerceived support from the relationship scale includes 7 items: 1) how often are things going well with the relationship, 2) how emotionally satisfying is your relationship, 3) can you rely on your spouse, 4) can you open up to your spouse, 5) how often does your spouse make too many demands, 6) how often does your spouse get on your nerves, and 7) how often does your spouse criticize you.

Table 2

Association between husband's and wife's colonoscopy use in 2010 NSHAP Wave 2 (N=804)

		Colonoscopy in last 5 years			Colonoscopy Ever		
		Coefficient	95% CI	p-value	Coefficient	95% CI	p-value
Correlation	Unadjusted	0.30	(0.19, 0.40)	<0.001	0.48	(0.38, 0.58)	<0.001
	Adjusted ^a	0.27	(0.15, 0.38)	<0.001	0.47	(0.34, 0.58)	<0.001
Odds Ratio	Unadjusted OR	2.22	(1.63, 3.01)	<0.001	4.32	(2.96, 6.30)	<0.001
	Adjusted OR ^a	1.94	(1.39, 2.67)	<0.001	3.64	(2.51, 5.33)	<0.001

^a Adjusted for age, education, race, assets, comorbidities, ADLs/IADLs, depressive symptoms, alcohol, smoking, exercise, happiness with the relationship for both husbands and wives, and perceived support from the relationship for both husbands and wives

Table 3

Bivariate probit regression of male and female colonoscopies in the 2010 NSHAP couples samples adjusting for covariates (N=804)

Covariates	Husband Colonoscopy				Wife Colonoscopy			
		%	95% CI	p-value	%	95% CI	p-value	
Demographic/SES								
Age	Husband	55 years	63.6	(51.4,75.8)	0.915	55.0	(41.7,68.3)	0.243
		65 years	63.3	(57.5,69.1)		58.4	(52.2,64.7)	
		75 years	63.0	(59.3,66.7)		61.8	(58.0,65.6)	
	Wife	55 years	57.7	(46.8,68.7)	0.308	62.4	(51.7,73.1)	0.635
		65 years	61.5	(57.1,65.9)		61.3	(56.9,65.7)	
		75 years	65.2	(60.2,70.3)		60.2	(54.8,65.7)	
Education								
	Husband	<HS	58.3	(49.4,67.3)	0.131	58.1	(48.9,67.4)	0.172
		HS/GED	58.2	(51.0,65.4)		55.1	(47.4,62.7)	
		Some college	68.8	(62.8,74.7)		62.1	(55.7,68.4)	
		Bachelor+	64.5	(57.7,71.4)		65.5	(58.8,72.3)	
	Wife	<HS	50.9	(40.7,61.2)	0.020	54.5	(44.1,64.9)	0.247
		HS/GED	63.8	(56.9,70.6)		67.0	(60.3,73.7)	
		Some college	61.7	(56.1,67.2)		59.6	(54.0,65.3)	
		Bachelor+	71.9	(64.8,79.1)		60.2	(52.4,68.0)	
Race of Couple								
		White	60.0	(56.1,63.8)		58.4	(54.5,62.4)	
		AA	81.3	(73.6,89.0)	<0.001	70.8	(61.1,80.5)	0.04
		Hispanic	65.3	(54.4,76.2)	0.488	66.2	(55.0,77.4)	0.262
		Other	71.6	(42.0,100)	0.460	73.5	(43.8,100)	0.384
		Interracial	60.9	(46.7,75.0)	0.894	61.5	(47.4,75.7)	0.364
Household Assets ^a								
		1st quartile	55.3	(47.6,63.0)	0.031	50.5	(42.7,58.4)	0.024
		2nd quartile	60.2	(53.6,66.7)		63.5	(56.8,70.2)	
		3rd quartile	69.4	(63.2,75.7)		63.8	(57.2,70.4)	
		4th quartile	67.4	(60.5,74.3)		65.2	(58.2,72.2)	

Covariates	Husband Colonoscopy					Wife Colonoscopy			
		%	95% CI	p-value	%	95% CI	p-value		
Relationship Quality	Happiness with relationship ^b	Husband	Not Happy	62.8	(49.5,76.1)	–	64.2	(50.5,77.8)	–
			Happy	63.1	(59.9,66.4)	0.993	60.7	(57.3,64.0)	0.683
	Wife	Not Happy	51.3	(40.0,62.5)	–	55.8	(44.5,67.2)	–	
			Happy	64.5	(61.1,67.8)	0.020	61.4	(58.0,64.9)	0.369
	Perceived support from relationship ^c	Husband	1st quartile	52.8	(45.4,60.3)	0.020	60.2	(52.7,67.7)	0.583
			2nd quartile	68.1	(62.0,74.1)		57.1	(50.5,63.7)	
3rd quartile			65.2	(59.2,71.1)		64.4	(58.2,70.5)		
4th quartile			64.7	(58.1,71.4)		61.6	(54.6,68.6)		
Wife	1st quartile	63.1	(56.3,69.8)	0.654	66.5	(59.7,73.2)	0.379		
	2nd quartile	66.2	(59.8,72.6)		60.5	(53.7,67.3)			
	3rd quartile	60.2	(53.7,66.7)		57.3	(50.7,64.0)			
	4th quartile	63.2	(56.5,69.8)		59.1	(52.1,66.1)			

Abbreviations: CI – Confidence Interval, HS – High School, AA – African American

Model adjusts for age, education, race, assets, comorbidities, ADLs/IADLs, depressive symptoms, alcohol, smoking, exercise, happiness with the relationship, and perceived support from the relationship for both husbands and wives

^aHousehold assets is the same for both individuals in the couple and grouped into quartiles

^bHappiness with relationship defined on 1–7 point scale with 1–4 as Not Happy, and 5–7 as Happy

^cPerceived support from the relationship scale includes 7 items: 1) how often are things going well with the relationship, 2) how emotionally satisfying is your relationship, 3) can you rely on your spouse, 4) can you open up to your spouse, 5) how often does your spouse make too many demands, 6) how often does your spouse get on your nerves, and 7) how often does your spouse criticize you.