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2019-5

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Difference of Opinion: Spousal Influence on Cancer Risk-reducing Behavior

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Objective: Marriage is consistently associated with better health outcomes. Spouses' attempts to influence partners' lifestyle and general health behaviors may contribute to this effect, although partners may not be aware of this influence. Spousal worry of a cancer diagnosis for an at-risk partner may factor into attempts to influence. An examination of spousal worry and influence on lifestyle choices, general health behaviors, and cancer screening adherence for partners at higher risk of colorectal cancer may shed light on spousal influence and partners' perceptions of influence. **Methods:** A mixed-method design assessed cancer worry and spousal influence for risk-reducing behavior in first-degree relatives of colorectal cancer patients following personalized genetic counseling. Couples discussed current and future ways to reduce risk. **Results:** Both the at-risk partner and the spouses had moderately high cancer worries. Spouses reported exerting influence for healthier behavior and cancer screening adherence but at-risk partners did not always recognize it. Qualitative data demonstrated partners' perceptions of spousal influence toward better health decisions, and against better health decisions. **Conclusions:** Future research should examine how and when spouses choose to exert influence, type of influence, what strategies they use, and to what effect.

Key words: cancer; spousal influence; social support; communication; decision-making

Am J Health Behav.™ 2019;43(3):582-590

DOI: <https://doi.org/10.5993/AJHB.43.3.12>

The American Cancer Society estimates that in 2019 there will be 1,762,450 new cancer cases diagnosed and 606,880 cancer deaths in the United States (US).¹ An important risk factor for many cancers is family history. Having a first-degree relative (FDR; ie, parent, siblings, children) diagnosed with cancer increases the likelihood of developing the disease. For colorectal cancer (CRC) risk, a family history of CRC diagnosis is one of the strongest risk factors for the disease, with estimations indicating inheritance plays a role in up to 25% of CRC cases.² Lifestyle choices (eg, smoking and tobacco use, diet, physical exercise, sun protection behaviors, medication use, obesity) and behavioral choices such as screening adherence (eg,

colonoscopy, guaiac-based fecal occult blood test) are modifiable behavioral factors that may play a critical role in cancer incidence, morbidity, mortality, and disease progression. For individuals with a cancer family history it becomes crucial to adhere to lifestyle and behavior recommendations to lower risk. Nevertheless, many individuals fail to do so, especially those at medium to high-risk.³⁻⁵ For those with a family history, communicating risk information that has greater personal salience should motivate behavior modification.^{6,7}

One factor that may increase the likelihood of engaging in health behaviors is marriage. Marital status is linked to health lifestyle behaviors such as drinking, tobacco use, alcohol use, sleep, weight

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management, and living an orderly lifestyle⁸⁻¹⁰ and predicts likelihood of adherence to cancer screening recommendations.¹¹⁻¹⁴ The marriage protection hypothesis asserts that marriage influences individuals to adopt healthier behaviors.^{15,16} For example, one might be more likely to wear a helmet when riding a motorcycle, or buckle their seatbelt, or drink less when they have someone else to whom they are important. However, can simply being married result in healthier behaviors? Much of the work on marriage and healthier behaviors has focused on the broader concept of marital status^{12,17,18} with less emphasis on the pathways by which marriage is linked to such behaviors. One pathway may be the specific influence spouses exert for health promoting behaviors. Social cognitive theory (SCT) explains how individuals acquire and maintain certain behavioral patterns, and from this viewpoint behavior is a dynamic and reciprocal interaction between aspects of the person, behavior, and the environment.^{19,20} The reciprocal nature of human functioning does not imply that all sources of influence are of equal strength, and spouses could certainly exert greater strength as they are often reported to be the most important relationship for most men and women. Further, because spouses often cohabit, there are opportunities to exert influence through frequent interaction as well as through the environment. This can include discouraging health-compromising behavior or encouraging more health-enhancing behavior.^{9,10,21-27} For example, a spouse could influence maintaining a healthy weight on several levels – serving as an example, not keeping junk food in the house, asking the partner to go for walks together, and watching the children so the partner can have time for exercise.

It is important to note that these behaviors of the spouse to influence or promote healthier partner behaviors may not be discernable to the partner. Whereas a partner may be aware that their spouse prioritizes health, they may not explicitly notice the specific actions in the context of daily life. Bolger et al²⁸ found partners do not always recognize the support provided by their spouses and this actually may be advantageous as it avoids the perception of nagging or being controlling, which can create reactance (eg, ignoring spouses' attempts; deliberately choosing to do the opposite).^{29,30} Bolger et al termed this support "invisible support."²⁸ Partners whose spouses reported providing such support had

reduced levels of anxiety and increased levels of self-efficacy.³¹ Recipients of invisible support also experienced the largest decline in negative emotion and the greatest increase in self-efficacy.³¹ This is important, as increased self-efficacy has been associated with cancer risk-reducing behaviors.^{32,33}

Investigations of behavior modification following risk communication may be most likely aimed at the at-risk individual, but risk communications can affect whether and how spouses exert influence. Individuals in close relationships often monitor and seek to influence each other's health behavior.^{9,34-36} Spouses who are included in risk communications for their partner may be more motivated to see their partner change health-compromising behavior than are the partners themselves, and may attempt to exert influence, or social control, to modify such behavior.¹⁰ Spouses who are included in the communication of disease risk may be a key factor for health behavior engagement or lack of engagement.

Objective

In this study, we used a conceptual framework derived from the SCT, as well as the marriage protection hypothesis, and the relevant literatures on social, marital, and invisible support and applied it to a CRC context. CRC was chosen because of the high incidence of disease in the US for both men and women¹ and the ability to prevent the disease in large part through engaging in protective health behaviors.¹

We expected that: (1) cancer worry will be high among both spouses and FDRs; (2) spouses will report efforts to influence their at-risk partner; and (3) at-risk partners will be less likely to report such efforts as influence (invisible support). We expect observing communication between the partners will lend greater understanding to these hypotheses and the mechanisms at work.

METHODS

This was a mixed-methods pilot study. Quantitative data allowed us to determine worries of cancer, and the perceptions of both spouse and FDRs on spousal influence for cancer risk-reducing behaviors, and general health behaviors. Qualitative data provided an increased breadth and depth of these perceptions of influence (visible or invisible), allow-

ing for details and thoughts not available through questionnaires.

Recruitment

Study and contact information were available via flyers at the receptionist desks in National Cancer Institute designated Cancer Center clinics. Advertisements also were placed in a local newspaper. The flyers and advertisements asked if the patient was interested in recommending a family member for the study. Those who expressed interest provided family member contact information and gave permission to contact the family member. Family members (FDRs) were sent a personalized letter inviting both them and their spouse to participate. The letter gave study telephone and email contact information if the FDR wanted to participate or receive more information. Each invitation letter also contained an addressed stamped envelope requesting no further contact if FDRs desired. FDRs who contacted us and expressed interest were screened for eligibility, and the spouse was then, through a personalized letter, also invited to participate. If both consented to participate, an appointment was set up. Reminder letters were sent one week prior to the appointment.

Participants

Sixteen FDRs of CRC patients and their spouses participated. Eligible participants were married couples where one member of the couples was a FDR of a CRC patient, with the FDR aged 50+, and without a personal history of cancer except non-melanoma skin cancer. Spouses were not restricted by age or family cancer history. Of the 16 spouses, 11 reported own relatives diagnosed with cancer, but none of the relatives had a diagnosis of CRC. Informed consent was obtained from all participants in the study.

Procedures

Following informed consent, participants completed questionnaires (see below), then FDRs and their spouses participated in a genetic counseling session with an American Board of Genetic Counseling certified counselor during which they received a personalized CRC risk evaluation based on the National Cancer Institute Colorectal Cancer Risk Assessment Tool (<https://ccrisktool.cancer.gov/>).

This risk-evaluation was based on family and personal history of polyps, diet, physical activity, and use of non-steroidal anti-inflammatory medications³⁵ and included standardized recommendations for colonoscopy screening and modifiable lifestyle factors. Participants were informed that genetic factors inherited in families can contribute to CRC risk, but no genetic testing was offered during the sessions. Participants with sufficient family history to meet criteria for testing of hereditary cancer predisposition genes (ie, Lynch syndrome, BRCA1/2) were provided with information about clinical genetic counseling services. Immediately following the counseling session, study personnel provided a list of prompts to the couple (see Measures below) which they could use in an audio and video recorded semi-structured discussion task (mean time 7 minutes; range 4-10 minutes). Study personnel withdrew from the room during the discussion task, and returned when the couple indicated they were finished. We then collected follow-up questionnaire data and thanked and paid participants.

Measures

Quantitative. Participants completed a demographic and health questionnaire (eg, age, income, education, exercise habits, smoking habits, and self-reported health status), and questionnaires regarding worry about FDR risk and spousal influence.³⁷

We assessed marital quality with both the Short Marital Adjustment Test (MAT) and the Social Relationship Index (SRI), both validated measures. The MAT discriminates between well-adjusted and maladjusted marriages with reliability .90.³⁸ A score of 100 is the dividing line between distressed and non-distressed individuals, and the SRI examines marital positivity and negativity in support seeking situations and daily interactions with a 2-factor structure (ie, positivity and negativity). Prior work has shown these measures of positivity and negativity were temporally stable with significant 2-week test-retest correlations of $r = .69$ ($p < .001$) for positivity and $r = .51$ ($p < .001$) for negativity (data reported in Uchino et al, 2001).³⁹

We assessed spousal influence with an adapted version of the Social Control Assessment Tactics Scale,⁴⁰ which assesses spousal influence/encouragement to change 14 designated health behaviors (eg, "To drink less alcohol?" "To get more sleep?")

including age-appropriate screening and self-examinations. The SCATS has shown good reliability ($r = .73$).⁴⁰ Overall spousal/family influence was assessed with a single-item scale: “Generally speaking, I want to do what my family or spouse thinks I should do.”

Worry was assessed with a single item from the McCaul Brief Worry Scale,⁴¹ which was modified to assess both FDR and spouse worry, “How *worried* are you about getting colorectal cancer?” “How *worried* are you about your spouse getting colorectal cancer?” The item was scored on a 5-point scale that ranges from *not at all* to *extremely*. No reliability statistics are available for this scale as it has not been tested psychometrically.

To assess genetic understanding for communication we used 3 items: (1) I understand how to assess the role of genes for health; (2) I know how to assess my genetic risk for disease; and (3) I can explain genetic issues to people. We also used a single item to assess understanding of the importance of lifestyle choices: “Health behaviors can reduce the risk of disease for people who have a gene for the disease.”

Qualitative. A discussion prompt guide directed participants to discuss: (1) both FDR and spouse emotions concerning cancer risk following the genetic counseling session; (2) FDR’s current risk reducing behaviors; (3) specific plans of action that would reduce FDR’s risk; (4) both spouse and FDR’s perceptions of spousal influence on risk-reducing health behaviors.

Data Analysis

Quantitative. Descriptive statistics for surveys and demographics were calculated using SPSS (IBM, version 25, 2017).

Qualitative. A directed content analysis approach was used for the qualitative data. Audio recordings of the discussions were transcribed verbatim by one trained research assistant, and then verified by a second. Researchers reviewed all transcripts carefully. Transcripts were then coded by research personnel using predetermined categories, identifying cancer worry, health and prevention behaviors, and spousal influence or control.

RESULTS

Demographics

Half of participating FDRs were male. The mean

age was 57 years ($SD = 7.07$); average number of years married was 22.28 ($SD = 12.28$; range 5 years to 45 years). Fourteen of the 16 spouses rated their health as good or excellent. Table 1 shows additional demographics and self-reported health behaviors. All FDRs were currently adherent to CRC screening guidelines.

Quantitative Data

We first examined participant data reported via their questionnaires. Participants generally reported high quality marriages (81%; $M = 119.5$, $SD = 24.7$, range 59 to 154, $N = 26$) with 62.6% ($N = 20$) reporting high levels of positivity ($M = 4.9$, $SD = .99$) when seeking support from their spouse. Only 2 couples disagreed on levels of negativity in their marriage during daily interactions, but less than half reported high levels of positivity in their daily interactions (46.9%, $N = 15$; $M = 4.37$, $SD = 1.03$). Most participants agreed or strongly agreed that they wanted to do what their spouse/family wanted them to do (56.3%, $N = 18$) with 31.3% ($N = 10$) neither agreeing nor disagreeing. Cancer worry for the FDR was moderate for both FDRs ($M = 2.36$, $SD = 1.22$) and spouses ($M = 2.57$, $SD = 1.08$), with only 18% of spouses and 6% of FDRs reporting not being worried at all about getting a CRC diagnosis.

Genetic efficacy and beliefs. When FDRs and spouses were combined, most (60.7%; $M = 30.07$, $SD = 7.1$, range 8-40) believed genes and environment work in relationship to each other rather than independently. When we examined FDRs and spouses separately, both spouses (64%; $M = 30.5$; $SD = 9.17$) and FDRs (78.5%; $M = 29.57$, $SD = 4.5$) agreed that genes and environment work in relationship to each other. Only 3 participants agreed they could explain genetics to other people, 3 agreed they could assess the role of genes for disease, and 5 agreed they could assess their own or their spouses’ genetic risk for disease. Most (68.8%; $M = 3.74$, $SD = .86$) agreed that health behaviors can reduce the risk of disease for people who have a gene for the disease.

Spousal influence. We specifically recruited first-degree relatives of CRC patients to examine influence of spouses on cancer risk-reducing lifestyle behaviors, but we also examined more general health promoting behaviors such as getting enough

Table 1
Demographic Characteristics and Health Measures (N = 32)

Variable	N	%	Mean (SD)	Min	Max
Age			57.06 (7.07)	39	70
FDR Sex					
Male	8	50			
Female	8	50			
Race/Ethnicity					
White	29	91			
Hispanic/Latino	3	9			
Educational Status					
High school diploma	3	9			
At least some college	29	90			
Income					
Over \$40,000	30	94			
Declined to answer	2	6			
Smoking Status					
Non-smoker	25	77			
Smoker	1	3			
Missing	6	20			
Hormone Replacement Therapy (Women Only)					
No	5	31			
Yes	6	37.5			
N/A; Missing	5	31			
Hours Exercise Per Week			2.36 (4.90)	0	25
BMI			26.82 (4.75)	19.17	36.18
Worry About Cancer (FDR)			6.50 (3.48)	3	13
Worry About Cancer (Spouse)			6.78 (2.46)	3	13
Total Reported Spousal Influence (FDR)			3.81 (2.46)	0	7
Total Reported Spousal Influence (Spouse)			5.75 (3.38)	1	11

sleep or relaxation, or reducing levels of more harmful (but not cancer risk-increasing) diet choices (ie, caffeine). Thus, we found differences in the perceptions of FDRs and spouses in the kind of influence exerted for both cancer risk-reducing behaviors, and for more general healthy behaviors. Couples disagreed most on influence to increase exercise. Nine couples reported differences, such that the spouse

reported they exerted influence for the partner to exercise more, and the partner reported receiving no influence. Couples were more likely to agree on spousal influence to eat healthier (15 couples) and to reduce the amount of caffeine in their diet (14 couples). Eight couples also disagreed on providing/receiving influence for getting enough sleep and to take more time to relax. Marital quality was not cor-

related with any reported influence.

Because cancer-screening adherence and self-examination (eg, skin checks) in an older as well as at-risk population are especially important, we asked about influence from spouse regarding cancer screening and self-examination. No FDRs reported that their partner encouraged them to do self-examinations, but 4 spouses reported encouraging their partner to do self-examination. Of those couples who disagreed on influence to get age appropriate cancer screenings (4 couples), 3 spouses reported exerting influence, and one FDR reported exerting influence on their spouse.

When we looked at more general risk-reducing behaviors, 6 couples disagreed on influence to visit the doctor more often, with 4 FDRs reporting no influence from their spouse, and 2 FDRs reporting they exerted influence for their spouse to visit the doctor more often. Four of the 5 couples who disagreed on exerting influence for better/slower driving showed the spouses attempting to influence their FDR partner. Of the 4 couples who disagreed on exerting influence to take better care of themselves, all FDRs reported receiving influence from their spouse, and all spouses disagreed.

Qualitative Data

To obtain a more complete picture of the influence of spouses on FDRs' health behavior we examined the couples' discussions. We first looked at the worry both spouse and FDR experienced regarding a cancer diagnosis. In the quantitative data worry was fairly low. When we examined how participants spoke of worry, we found that participants' comments sometimes reflected these findings,

FDR: *"Nothing, I'm not really worried about it. Really."*

FDR: *"I don't worry about it, and I answered the questions that way. I don't worry about it."*

However, participants may have reported low worry due to feelings of resignation that a cancer diagnosis is inevitable, a conscious decision not to worry, or denial of the possibility of a diagnosis, rather than actual lack of worry.

FDR: *"If it happens, it happens."*

SPOUSE: *"Yeah, that's right"*

FDR: *"But I like to choose that both my parents' cancers were environmental so that, otherwise*

maybe I would worry way too much – worry a lot."

FDR: *"Well it's not going to happen. I have a positive attitude and I've already decided that I'm not going away."*

Others reported they *did* worry. One FDR noted that their participation in this study showed "my risk caused [me] to take the, do today's thing, so ..." A FDR's spouse also was worried: "I don't know. I'm always worried about it."

In quantitative data, spouses reported encouraging healthy behaviors more than their partners reported being encouraged. However, in discussions, FDRs talked about their spouses *impeding* healthy behaviors, rather than encouraging better behaviors, especially in terms of diet and exercise. For example, some FDRs suggested that lack of cooperation from their spouses, ["but having you not as willing to do it has me, has made it harder..."] and their spouses' own unhealthy choices, ["I just wish I had more salads instead, but you put so much dressing on that it really doesn't make much of a difference!"] were barriers to a healthy diet. Spouses also responded to healthier eating suggestions with negativity, ["But I'm not going to go with the whole wheat bread! I'm sorry."].

Both FDRs and spouses noted a lack of cooperation for increasing exercise. One FDR noted: "Honey, I've suggested this before... You get tired of me moaning and groaning at you." and one spouse informed the FDR "I [exercise] better without you." However, FDRs also justified unhealthy exercise behavior: "Oh, for God's sake, the treadmill can be boring and we can't do it together, ok?!"

But couples also discussed healthy practices they were currently doing together, including eating healthy and exercising.

SPOUSE *"I think that us actively choosing to eat better and be more active than the rest of your family is huge But I think that's us. I mean we choose that together"*

Quantitative data indicated spouses encouraged healthy behavior, yet FDR reports indicate they often seemed unaware of their spouses' efforts to influence their behavior. Qualitative data supported this.

FDR: *So in the future you just have to, uh, make sure that you help me eat better.*

SPOUSE: *Ok, I made a big bowl of salad*

yesterday.

FDR: *You made a bowl of salad?*

SPOUSE: *Yes. And we each had you know, one serving.*

DISCUSSION

Whereas prior research has examined spousal influence on health behaviors, our pilot study examined spousal influence on lifestyle choices, general health behaviors (eg, doctor visits, self-examinations), and cancer screening adherence. Based on the SCT the spouse can be important in shaping beliefs and behaviors. An increased risk of CRC based on family history should make salient the importance of engaging in cancer-specific risk-reducing behaviors. Our study extended previous work by including the perceptions of influence from both the FDR and the spouse, and exploring if the influence was visible or invisible. The couple discussion task provided participants' thoughts, and details not available through questionnaires. We examined participant understanding of familial, lifestyle, and environmental contributions to cancer risk via genetic beliefs, attitudes, and efficacy to ascertain participants' understanding of the cancer risk information presented. We also examined marital quality, as lower marital quality may lead to reactance to spousal influence. This multifaceted study lends insight into the influence of spouses on health-related behaviors, and how this influence (or lack of influence) may be viewed by their partners.

An understanding of illness and disease processes, including an understanding of the role of lifestyle, environment, and genetic factors in predispositions toward cancer has been theorized to have implications for risk-reducing behaviors.⁴² This understanding in spouses of partners with a family history, along with worry about a cancer diagnosis may result in spouses encouraging their partners toward healthier behaviors. Whereas most participants reported only moderate levels of worry, it is informative that these levels were often linked to feelings of denial, or lack of control. Despite a national survey of cancer beliefs that found half of the US population believed that "everything causes cancer" and "there's not much a person can do to prevent cancer,"⁴³ we found both FDRs and spouses to be high in belief of a gene-environment interaction on disease processes and that couples were engaged in at

least some health behaviors to reduce risk of disease.

Both the quantitative questionnaire and discussion task results in our study demonstrated FDRs and spouses perceived spouses to be influencing some behaviors, but spouses reported a higher level of influence overall. One possibility for this discrepancy may be that spouses are encouraging behavior, even if FDRs are not aware. For instance, spouses may be preparing healthier meals, and thus, report influence to "encourage" healthier eating, but the FDR may see this as simply meal preparation and not notice a special effort to be healthy, as described in our qualitative data. Whereas no FDRs reported spousal influence to get age-appropriate cancer screenings (eg, colonoscopies), qualitative data from one spouse reported already making the appointment for the FDR spouse. This may have been seen simply as fulfilling a typical spousal role, rather than providing encouragement. This *invisible* support may have direct effects on behavior adherence as the social support literature has demonstrated that *perceptions* of available support may be the component related to the positive outcomes associated with social support, while the actual *receipt* of support can have negative impacts such as loss of self-esteem, feelings of indebtedness, or incompetence.^{28,44} Invisible influence may act in the same manner as invisible support-giving. In cases where the received support or influence is invisible to the recipient, the individual can benefit while not suffering the diminished self-esteem that may be experienced when having to rely on another.^{28,45}

Health behaviors that do not have an interdependent effect on married couples are fairly uncommon; couples generally have shared groceries and/or meals, impacting diet, and use of shared leisure time may impact a couple's exercise habits (ie, shared hobbies may be active or sedentary). This interdependence was seen in the qualitative data as participants discussed their prior behaviors, current behaviors, and future behaviors. Because of this interdependence, spouses advocating for healthier eating choices, or increasing physical exercise must be willing to change themselves. Whereas family decisions and commitment to improve health behavior may be an important factor in success,^{46,47} there are often barriers to change established patterns including lack of spousal cooperation.⁴⁸ In our qualitative data, we found this to be true, with some FDRs referring not only to a lack of spousal cooperation,

but the spouse impeding the FDRs efforts toward healthier lifestyle choices.

Limitations

The current findings from this small pilot sample may not generalize beyond the largely Caucasian and middle-to-upper-middle-class populations studied here. Individuals in these brackets often have access to insurance and medical care than those in lower socioeconomic circumstances, and thus, there is less influence from the spouse who is aware of the lack of access to medical care. Additionally, spousal and FDR reports of low encouragement for age-appropriate screenings and self-examinations may have been a result of prior guideline adherence. Finally, our couple discussion period was fairly short; allowing for a longer discussion may yield more in-depth data on influence between FDRs and their spouses.

Implications

The results of this study suggest that spouses can and do exert influence on their partner's lifestyle and general health behaviors. However, their at-risk partners may be unaware of their efforts. Additionally, despite spouses reporting support for their partners' healthier diet and exercise behaviors, FDRs saw some behaviors as detrimental. Although spouses can be powerful predictors of one's behavior, the relationship that exists can be much more complex. The challenge of dyadic research on health behavior is that often the whole is different than the sum of its parts. We must consider individual perceptions, attitudes, and decisions, the strategies individuals use to convey these attitudes to each other, and the co-constructed reality that emerges. Whereas spousal influence has the potential to be a profound tool in increasing health behaviors, more research needs to be done to examine the process and impact of spousal influence. Future studies examining health behaviors, spousal influence, and both visible and invisible support should include both qualitative and quantitative methods of assessing both perspectives.

Human Subjects Statement

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national

research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study was approved by the Brigham Young University Institutional Review Board (#130456).

Conflict of Interest Statement

All authors declare they have no conflict of interest.

Acknowledgements

This research was supported in part by a Mentoring Environment Grant, Office of Research & Creative Activities award, Brigham Young University.

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