

The relative importance of cancer-related and general health worries and distress among older adult, long-term cancer survivors

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Abstract

Objective: This research examines the relative importance that cancer-related and non-cancer illness factors play in generating general health worries and/or cancer-related worries. The analysis also examines how these in turn impact anxiety and depression among older adult, long-term cancer survivors.

Methods: Data from a longitudinal study of 245 older-adult (age 60+ years), long-term survivors (5 or more years after diagnosis) of breast, prostate, and colorectal cancer are examined to identify the measurement properties and structure of general health and cancer-related health worries. Based on that measurement analysis, structural equation models (SEM) are used to estimate the relative importance of cancer-related and other illness predictors on cancer-related worry and general health worry and how these two forms of worry affect both anxiety (POMS) and depression (CES-D).

Results: The results from the exploratory and confirmatory factor analysis of health worries identify two relatively independent measures of health worry, one of general health worry and a second of cancer-related worries that includes fears of recurrence, new cancers, and follow-up testing. SEM analyses identified the importance of current cancer-related symptoms and comorbidities on cancer-related worry. It also documents the primacy of non-cancer symptoms and general health worry as predictors of anxiety and depression among older survivors.

Conclusions: The fact that cancer-related symptoms continue to be associated with cancer-related worries years after diagnosis speaks to the significance of these continuing sequelae. While the findings suggest the relative independence of cancer-related worries and general health worries, both are correlated with anxiety and depression. This may be particularly problematic as survivors age and symptoms related to new health problems increase, while cancer-related symptoms persist.

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Introduction

The research presented here examines the relative importance that cancer-related and noncancer-related illness factors have in generating general health worries and/or cancer-related worries and how these potentially distinct types of worry may affect depression and/or anxiety among survivors. Specifically, this research examines these relationships for older adult (age 60+ years), long-term (5+ years) survivors of breast, prostate, and colorectal cancers.

Over the past decade, there has been an increasing interest in the role that cancer plays in generating cancer-related worries and psychological distress among cancer survivors [1–3]. Some of this research focuses on cancer worry in general [4,5] while others examine specific concerns such as fear of recurrence, fear of a new type of cancer, and concerns related to ambiguous symptoms or post-treatment follow-up testing [6–8]. However, there has been little research on the relationship between general health worries and cancer-related worries [1]. No research to date examines the importance of specific

aspects of cancer in comparison with other health problems as predictors of general health and cancer worries and how they in turn may impact anxiety and depression. These issues are especially important for older adult survivors who are experiencing the dual vulnerability of increasing age-linked comorbidities and functional decline along with cancer-linked long-term or late effects, either of which may increase anxiety or depression.

Anxiety, worry, and health worry among older adults

Anxiety has traditionally been defined as a broad construct, which includes both fears and worries [9]. Worry as a component of anxiety can be defined as the possibility of potentially negative but uncertain future events [10]. The relationship between anxiety and worry has been empirically documented by Montorio [11]. However, Nuevo *et al.* [12] indicated that ‘despite the burgeoning body of research on worry it remains an understudied phenomenon in the elderly’ (p. 135) even though excessive worry may seriously impair the quality of life of older adults.

Research on aging and worry suggests that it is less frequent in older adults than younger adults and declines with advancing age (see Basevitz *et al.* [13] for a review on this topic). The important exceptions to this are specific themes such as worries about health [14]. Diefenback *et al.* [15] documented that nearly 25% of older adults expressed worries about health/illness/injury as compared with less than 10% of younger adults. They also found that health-related worry was approximately twice as high among older adults who had general anxiety disorder, further documenting an empirical link between health worries and anxiety in older adults. Other research found that those with chronic health conditions worried more than those with acute health conditions [16]. This is particularly relevant for long-term cancer survivors who may continue to experience chronic effects of cancer or its treatment.

Cancer-related health worry and general health worry

The research cited previously suggests that health concerns play an important role in worry and anxiety among older adults, especially those with chronic illnesses such as cancer. Benyamini *et al.* [1] found that older adults who had cancer or who had a family member who previously had cancer reported greater vigilance in symptom monitoring. That research, however, did not examine the correlation between cancer worries and general health worries, nor did they examine the factors that correlate with either.

Among the first research to examine specific aspects of cancer worry among survivors was that conducted by Mullens *et al.* [3]. They found that survivors worried less about a recurrence of their prior colorectal cancer when compared with the possibility of a new primary cancer. They suggested that this heightened concern might be engendered by beliefs that because of their prior cancer, they are particularly susceptible or predisposed to cancer. That research also suggested that survivors are more aware that with advancing age, the likelihood of having specific types of cancer increases. However, their research did not provide analysis of the correlation between cancer worries and other health worries nor predictors of either types of worry. That research also did not examine the link between these two forms of worry and more global distress outcomes such as depression and anxiety.

Deimling *et al.* [2] did examine the broad range of possible predictors of cancer-related worry, finding that the level of symptoms during treatment and the number of continuing cancer-related symptoms were statistically significant correlates of cancer-related worry and specific worries about recurrence and worries about a new cancer. They also found that cancer-related worries were the strongest predictors of both anxiety and depression among the older adult, long-term survivors in their sample.

However, that research, like other previous studies, did not look at cancer worry in the larger context of health worry in general.

In contrast to those findings, Llewellyn *et al.* [17], in a study of relatively short-term survivors (6–8 months after treatment), did not find cancer illness or treatment factors to be related to one form of cancer worry, fears of recurrence. Mehnert *et al.* [6], in their study of fear of progression among longer term survivors, found that younger age and greater perceived impairment were important predictors of this aspect of cancer-related worry. Also important, they found cancer-related worry to be associated with Post-traumatic Stress Disorder (PTSD) symptoms including intrusiveness, avoidance, and hyperarousal, a PTSD diagnosis and depressive symptoms.

The aforementioned summary indicates that some specific aspects of cancer or its treatment are linked to one or more specific aspects of cancer-related worry or cancer worry defined more generally. While research also documents that health worries are common concerns of older adults, research to date has not systematically examined the key predictors of both cancer-related and general health worries, nor has it identified the role that each of these play in broader aspects of psychological distress such as anxiety and depression. The research reported here fills this gap in our understanding of these relationships that bear on the quality of life of older cancer survivors.

Methods

The research reported in this article is based on data from the *Quality of Life After Cancer Survey*, a longitudinal research project funded by the National Cancer Institute, which was conducted between 1998 and 2008. The total sample was composed of 471 adults who were 60 years of age or older and had survived cancer five or more years. The respondents were randomly selected from 2129 survivors who met the inclusion criteria from the tumor registry of the Seidman Cancer Center (formerly, the Ireland Cancer Center) at the University Hospitals Health System of Cleveland in 1999. The analysis reported here is from data collected during the fifth of six waves of interviews that were conducted beginning in 2005 ($n=245$). Data from this wave of interviews were selected for analysis based on the availability of the variables used to create the general health worry measure, which was only included in wave 5 of this study.

Sample characteristics

Sample participants, at wave 5, included older adult survivors of breast (50%), colorectal (25%), or prostate cancer (25%), the three most common survivable cancers among older adults.

All respondents were 60 years of age or older during the original interview; however, by wave 5, they were, on average, 75.9 years old with an average age at diagnosis of 61.9 years. With regard to gender and race, 63% of the sample was female, and 28% were African-American. Other racial groups were not included because of the small numbers in the tumor registry sampling frame. The number of years that respondents had survived since the diagnosis of the focal cancer was on average 9 years ($SD=6.0$) based on tumor registry information. Additional descriptive information is summarized in Table 1.

Measures used in the analyses

Survivor's age was based on tumor registry information and confirmed during the initial interview. The number of years that they had survived since diagnosis was also based on tumor registry information.

Cancer type

The original study design dictated the inclusion of the three most common survivable cancers among older adults: breast, prostate, and colorectal cancers. Type of cancer information was obtained from tumor registry information. For the analysis, a diagnosis of each cancer type, *breast*, *colorectal*, or *prostate*, was binary coded with the presence of each type of cancer coded as '1'. No respondent had a diagnosis of more than one focal cancer at the time of sample construction or the initial interview, and only 5% of the respondents had some form of cancer other than localized skin cancer prior to the diagnosis of the focal cancer. Less than 6% of the sample had

been treated for a cancer other than the focal cancer in the year prior to the wave 5 interview.

Physical health

A single index of the number of *comorbid health conditions* was derived from the Older Americans Resources Survey [18]. That index was specifically designed for use with older adults. As used here, the index is a sum of the number of *diagnosed* health conditions that the *survivor reported* from a list of 27 possible conditions. These include conditions common in later life such as arthritis, asthma, emphysema, anemia, osteoporosis, joint and back problems, heart disease, hypertension, diabetes, and stomach, urinary, and circulation disorder problems.

Illness symptoms: cancer and noncancer

To assess current illness symptoms, respondents were asked about the presence of 22 possible symptoms that they were experiencing at the time of the interview. It included symptoms that are common among cancer survivors as well as those common in later life among those who have not had cancer. This list included items such as weakness, nausea, hair loss, numbness, loss of balance, vision problems, memory problems, oral problems, urinary and fecal incontinence, painful urination and elimination, and vaginal problems for women. *Separate totals were constructed* for those *symptoms* that the *respondent attributed to cancer* or its treatment and those *symptoms* that they *did not attribute to cancer*. In our research, respondents had a mean of 0.5 cancer-related symptoms ($SD=1.2$) and 1.7 symptoms not attributed to cancer ($SD=1.7$). Because of the observed

Table 1. Sample characteristics ($N=245$)

	Mean	Percentage (%)	SD	Coding
Demographic characteristics				
Female	—	63	—	1 = female; 0 = male
African-American	—	28	—	1 = African-American; 0 = Caucasian
Married	—	52	—	1 = married; 0 = unmarried
Age	75.9	—	6.7	Actual age from 64 to 96 years
Education	14.5	—	3.2	In years
Cancer characteristics				
Breast cancer	—	50	—	1 = breast cancer; 0 = other
Colon cancer	—	25	—	1 = colon cancer; 0 = other
Prostate cancer	—	25	—	1 = prostate cancer; 0 = other
Current cancer-related symptoms	0.5	—	1.2	0 (none) to 22 (high)
Years since diagnosis	9.0	—	6.0	Actual years
Physical health				
Comorbidities	4.3	—	2.6	0 (none) to 27 (high)
Noncancer symptoms	1.7	—	1.7	0 (none) to 22 (high)
Functional difficulties	5.0	—	5.7	0 (none) to 33 (high)
Health worries				
General health worry	5.4	—	2.0	3 (low) to 15 (high)
Cancer-related health worry	6.6	—	1.5	3 (low) to 12 (high)
Psychological distress				
Anxiety	2.3	—	3.0	0 (low) to 36 (high)
Depression	12.0	—	7.3	0 (low) to 80 (high)

skew in the first symptom variable distribution, it was recoded as a 'Windsorized' variable, a transformation that resulted in a mean of 0.39 and a standard deviate of 0.80 resulting in an acceptable level of skew and kurtosis (2.14 and 3.74, respectively). This recoded version of the variable was used in correlation and structural equation modeling (SEM) analyses.

Functional difficulties

The measure of *functional difficulties* used in this research was originally developed by Nagi [19]. This index assessed the problems that survivors reported in performing 11 specific motions or movements such as standing, lifting, or carrying objects, moving limbs, stooping/bending or kneeling, or buttoning a shirt. Scores on the index range from 0 to 33. In this research, the mean score was 5.0 with a standard deviation of 5.7. The distribution of this variable was examined for normality and had acceptable skew and kurtosis coefficients (1.57 and 2.57, respectively).

Health worries

Three items from the Assessment of Survivor Concerns questionnaire developed by Gotay and Muraoka [20] were adopted in our research. These were used in our prior published research on the topic of cancer worry [2]. These items clearly reflect the survivor's worries directly related to cancer: (1) 'I worry about future diagnostic tests'; (2) 'I worry about my cancer coming back'; and (3) 'I worry about another type of cancer'. Responses for each of these three selected items were scored on a four-point continuum from 1 = 'strongly agree' to 4 = 'strongly disagree'.

The general health worry items were selected from more general health worries not necessarily related to cancer based on the work of Benyamini [1]: (1) 'When you feel a new sensation or symptom in your body, how much do you worry about what it might be?'; (2) 'When you notice a new symptom or sensation, do you find it difficult to take your mind off it?'; and (3) 'In general, how much do you worry about your health?' These were scored on a five-item continuum from 1 = 'not at all' to 5 = 'very much'.

All six items were examined using exploratory factor analysis to determine the basic factor structure. That factor analysis suggested that there were two distinct factors that substantiate the distinction between cancer-related and general health worries. Each of the factors identified tapped unique variance (eigenvalues of 3.0 and 1.1, respectively). In terms of the item loadings, the three items proposed as reflecting general health worry had similar high loadings ranging from 0.728 to 0.847. The three items proposed to represent cancer-related health worries demonstrated loadings ranging from 0.778 to 0.865. Importantly, none of the items in either of the two factors produced substantial cross-loading with the other worry

measure with none of the cross-loadings above 0.260 and four of the six under 0.200. Moreover, the two factors were only modestly correlated ($r^2=0.22$), indicating only a little over 20% common variance. With this as a basis, two simple additive indicators were constructed representing cancer-related worry and one general health worry for use in the descriptive and correlation analysis. The cancer-related worry indicator had a potential range of 1–12 with an average score of 6.6 and a standard deviation of 1.5. The general health worry indicator had a potential range of 1–15 with a mean of 5.4 and a standard deviation of 2.0. These simple additive indicators had acceptable reliability/internal consistency ($\alpha=0.84$ and 0.72, respectively).

That exploratory factor analysis was then followed up with confirmatory factor analysis as the first step in the SEM. That confirmatory factor analysis examined the factor structure of the six items proposed as operationalizing cancer-related and general health worries. The model was estimated including both depression and anxiety/tension, and it replicated the initial two-factor structure as described previously (not shown, available upon request). As a result, in the final SEM model, the two three-item constructs, cancer worry and general health worry, are treated as latent variables.

Psychological distress

Two measures were used in this research to operationalize psychological distress: depressive symptoms and anxiety/tension. The first measure was the Center for Epidemiologic Studies-Depression (CES-D), a widely used indicator of *depression* [22]. The potential range is from 0 to 80 on this measure. In this study, the mean score was 12.0 with a standard deviation of 7.3 and had an alpha reliability coefficient of 0.87. The second measure of distress was *anxiety/tension*. The indicator used was the abbreviated nine-item version of the Profile of Mood States (POMS) tension-anxiety subscale originally developed by McNair *et al.* [21]. In this study, the following items are used (tense, shaky, on edge, panicky, relaxed, uneasy, restless, nervous, and anxious) creating a potential range of 0–36. The sample mean in this research on anxiety/tension was 2.3 with a standard deviation of 3.0. The alpha reliability coefficient in this sample was 0.86.

Analytic strategy

The first step in the analysis was an examination of the basic bivariate correlation (Pearson's r) among the model variables. This was performed to identify the basic associations among the personal characteristics, cancer and general health characteristics, worry dimensions (cancer-related and general health worries), and psychological

distress (anxiety and depression) to be considered for inclusion in the model.

This was followed by a series of SEM analyses suggested by the literature and our preliminary correlation analyses. The SEM analysis was conducted using the AMOS software that is incorporated in the Statistical Package for the Social Sciences (Version 22, IBM Corporation, Armonk, NY). The first SEM analysis was used to confirm the measurement model for the two worry constructs. The core of the SEM analysis is based on a comprehensive model (Figure 1) that includes all the variables and potential causal paths suggested by either the literature reviewed or the correlational analysis. In the conceptual model, cancer type (with colon cancer treated as the reference category), survivor's age, duration of time, and past diagnosis of the focal cancer are viewed as predictors of both cancer attributed and noncancer symptoms. Also included are survivors' reports of functional difficulties and diagnosed comorbidities. These in turn are viewed as key predictors of the two latent worry variables, cancer worry and general health worry. Finally, the health and worry variables are examined in terms of their impact on depressive symptoms and anxiety/tension.

This initial model was then refined by including only those variables and paths that had statistically significant bivariate associations in the preliminary correlational analysis or were essential for model fit. Figure 2 displays this final model and includes correlational data derived specifically from the SEM analysis (coefficient on curved

arrows) as well as standardized regression weights for the respective paths (coefficients on straight arrows) along with factor loadings for the two latent worry constructs. Finally, model goodness-of-fit information is provided in the figure legend. The models were assessed for goodness of fit using chi square, comparative fit index, Tucker–Lewis index, and the root mean square error of approximation. Comparative fit index and Tucker–Lewis index scores > 0.90 are considered an acceptable fit, while scores > 0.95 are considered an excellent fit [23]. Scores for the root mean square error of approximation < 0.08 are considered an acceptable fit, while score < 0.05 are considered an excellent fit [24].

Results

Correlation analysis

Prior to the final SEM analysis, the bivariate correlations were examined (Table 2). Looking first at the correlates of the survivor's health characteristics, having had prostate cancer is a relatively strong correlate of current cancer-related symptoms ($r=0.23$) but lower levels of functional difficulties ($r=-0.13$). In contrast, having had breast cancer is weakly but significantly associated with more functional difficulties ($r=0.15$). Both age and years since diagnosis, which are correlated, are associated with more functional difficulties ($r=0.25$ and 0.21 , respectively). Also, a relatively strong correlate of functional difficulties is symptoms not attributed to cancer and the number of comorbid health

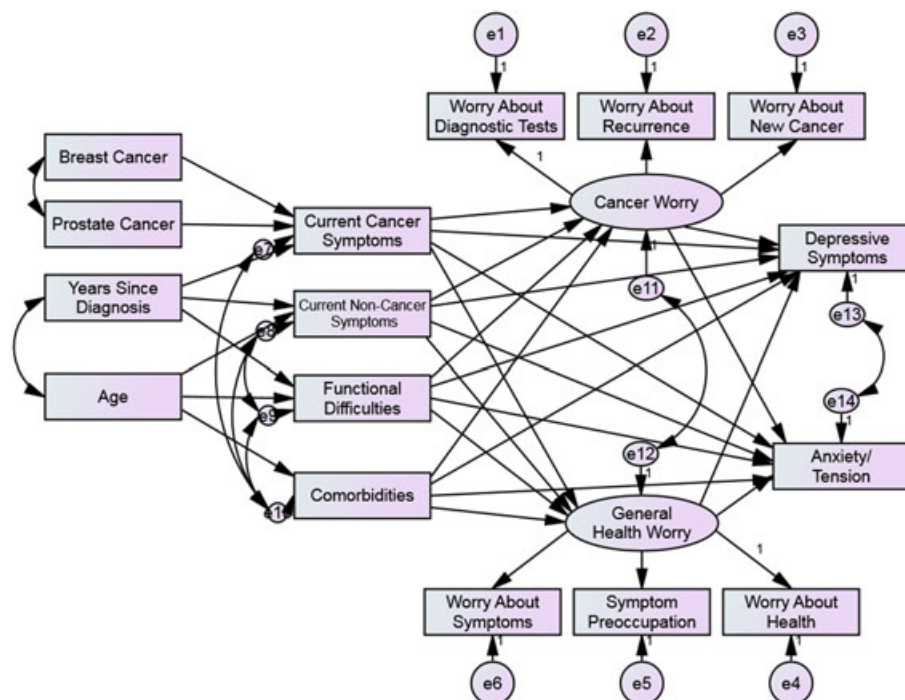


Figure 1. Conceptual model

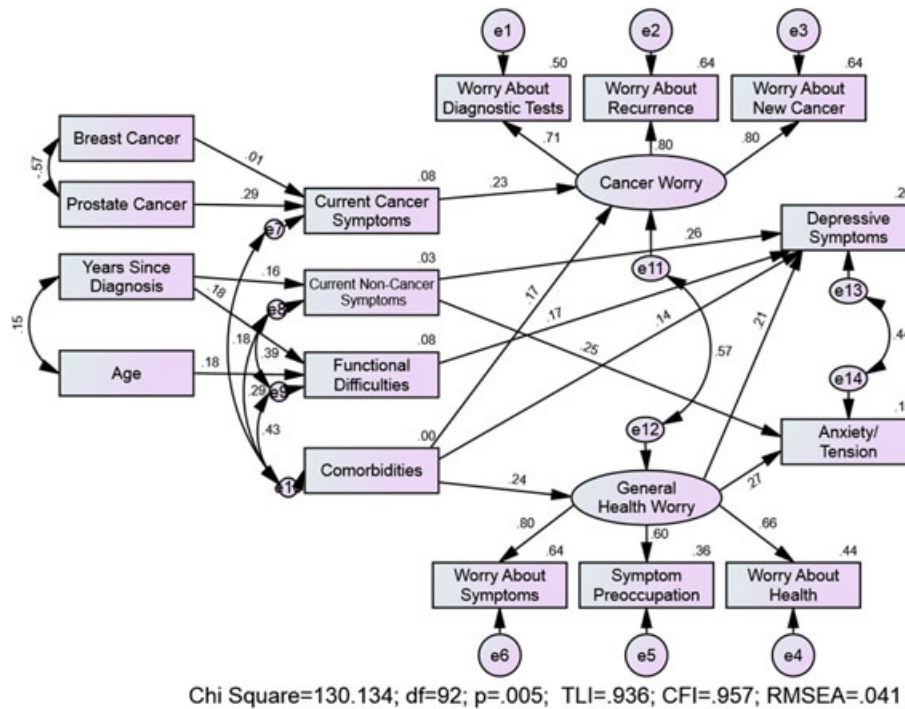


Figure 2. Final model

Table 2. Correlation analysis of model variables (N = 245)

	Current cancer symptoms	Current non cancer symptoms	Functional difficulties	Comorbidities	Cancer-related worry	General health worry	Depressive symptoms	Anxiety/tension
Breast cancer	-0.11*	0.06	0.15*	0.08	0.05	-0.04	0.03	-0.05
Prostate cancer	0.23**	-0.09	-0.13*	-0.06	0.07	0.04	-0.03	0.00
Colorectal cancer	-0.09	0.02	-0.04	-0.03	-0.12	0.01	-0.04	0.05
Years since diagnosis	0.02	0.16	0.21**	0.00	0.00	-0.04	-0.06	0.01
Age	-0.06	0.11	0.25**	0.03	-0.17**	-0.13*	0.08	0.02
Current cancer symptoms	1.00	-0.09	0.13	0.24**	0.25**	0.16*	0.13	0.13
Current noncancer symptoms	-0.09	1.00	0.42**	0.28**	0.09	0.15*	0.40**	0.29**
Functional difficulties	0.13	0.42**	1.00	0.44**	0.16	0.08	0.39**	0.20**
Comorbidities	0.24**	0.28**	0.44**	1.00	0.19**	0.23**	0.38**	0.21**
Cancer-related worry	0.24**	0.09	0.16*	0.19*	1.00	0.47**	0.21**	0.20**
General health worry	0.16*	0.15*	0.08	0.23**	0.47	1.00	0.27**	0.27**

*Correlation is significant at the 0.05 level (two tailed).
 **Correlation is significant at the 0.01 level (two tailed).

conditions ($r=0.42$ and 0.44 , respectively). Interestingly, comorbidities are associated similarly with both the number of symptoms attributed to cancer ($r=0.24$) and also symptoms not attributed to cancer ($r=0.28$).

Turning our attention to the variables associated with cancer-related and general health worries, the correlational data indicate the relative unimportance of cancer type and duration of time since diagnosis. Age is weakly correlated with both worry variables ($r=-0.17$ and -0.13), with worry decreasing with advancing age. The number of current symptoms attributed to cancer is a relatively strong correlate of cancer-related worry ($r=0.25$) and also a

weaker but statistically significant correlate of general health worry ($r=0.16$). Symptoms not attributed to cancer are significantly but weakly correlated to general health worries ($r=0.15$). The number of comorbidities is the single strongest correlate of general health worry ($r=0.23$) and a statistically significant but a somewhat weaker correlate of cancer-related health worry ($r=0.19$).

Finally, looking at the correlates of the two psychological well-being measures, depressive symptoms and anxiety/tension, neither cancer type, years since diagnosis, age nor current symptoms attributed to cancer are statistically significant. However, symptoms not attributed to

cancer, functional difficulties and number of comorbidities are all relatively strong correlates of depression ($r=0.40$, 0.39 , and 0.38 , respectively) and anxiety ($r=0.29$, 0.20 , and 0.21 , respectively). Importantly, both cancer-related worry and general health worry are statistically significant, albeit modest, correlates of both depression ($r=0.21$ and 0.27 , respectively) and anxiety ($r=0.20$ and 0.27 , respectively).

Structural equation model

With the correlational data to guide our model development, a series of structural equation models were estimated based on the original model shown earlier in Figure 1. With each successive model, variables and paths that were not significant or that impaired overall model fit (not shown, available on request) were deleted. Figure 2 is the final model and provides the standardized regression coefficients for paths that continued to be statistically significant.

The correlational data provided within the SEM analysis largely replicate the bivariate analysis reported previously. Comorbidities play a key role as a statistically significant correlate of functional difficulties and noncancer symptoms. Interestingly, it continues to be a significant correlate of current cancer-related symptoms. Importantly, current symptoms not attributed to cancer continue to be a relatively strong correlate of functional difficulties (0.39). The correlation coefficients produced in the SEM analysis also document that cancer worry and general health worry are substantially correlated (0.57) as are depression and anxiety (0.44). The stronger correlation between the worry latent variables in the SEM compared with the simple additive variables used in the bivariate analysis is the likely result of the greater reliability of the latent variables.

Turning our attention to the statistically significant path coefficients (standardized regression weights) in the SEM analysis, prostate cancer has a significant impact on current cancer symptoms (0.29) compared with the reference category colorectal cancer while breast cancer does not. As in the correlation data, duration of survivorship (years since diagnosis) does not have a significant direct effect on the number of cancer-related symptom report by survivors but is a significant predictor of current noncancer symptoms (0.16). Moreover, this effect is independent of the survivor's age, which also is a significant predictor of functional difficulties (0.18).

The central focus of the SEM model is on the impact that the four health factors (symptoms cancer, noncancer, functioning, and comorbidities) have on the cancer worry and general health worry latent variables. Respondents' reports of current symptoms attributed to cancer have a significant impact on cancer-related worry (0.23) but are not a significant predictor of general health worry. Interestingly, the number of diagnosed comorbidities reported is a significant predictor of cancer worry (0.17). Looking at the predictors

of general health worry, only the number of reported diagnosed comorbidities is statistically significant (0.24).

The SEM analysis next examines the variables in the model that have the greatest impact on depressive symptoms (CES-D) and anxiety/tension (POMS). Symptoms not attributed to cancer, functional difficulties, and comorbidities all have significant paths (0.26 , 0.17 , and 0.14 , respectively) linking them to depression. In terms of anxiety/tension, it is clear that noncancer symptoms and general health worries have the strongest impact on this distress outcome (0.25 and 0.27 , respectively). In contrast, cancer worry is not a significant predictor of either depression or anxiety. In terms of overall model fit, the statistics reported in Figure 2 indicate excellent fit (see criteria in Analysis strategy section above).

Summary and discussion

The results of the data analysis described previously in the correlation and SEM analysis provide a very detailed and nuanced story of the ways which cancer-related and broader health factors are associated with or predict cancer-related worry and general health worry. It also portrays the complex ways that these worries either do or do not impact broader psychosocial distress.

The importance of the research reported here begins with the documentation that cancer-related and general health worries are largely empirically independent constructs with somewhat different correlates and predictors. The preliminary exploratory factor analysis indicates that they have separate factor structures, with each having acceptable internal consistency/reliability, and that they are only moderately correlated. The bivariate and SEM analyses further support the importance of treating these as two related but largely independent constructs. In short, worry about cancer is not the same as worry about health in general and vice versa at least for this sample of older, long-term survivors of breast, prostate, and colorectal cancers.

To our knowledge, none of the research on cancer worry considers that it is linked to broader health concerns that are likely in later life. This type of analysis is critical for the study of older, long-term survivors for whom advancing age brings new health problems, some of which are likely to be more prominent over time, while sequelae of cancer or its treatment may subside.

At the same time, it is important not to dismiss the continuing impact of the temporally distant cancer in terms of cancer-specific worries. Interestingly, along with continuing symptoms attributed to cancer or its treatment, the number of comorbidities is also a significant predictor of cancer-related worry. This may be because, as new health problems arise, survivors are concerned about whether these problems and their related symptoms are in some way linked to their prior cancer. Illness symptoms can be ambiguous, and the uncertainty of their link to cancer

may contribute to cancer worry. These same new comorbidities are likely to also increase general health worry.

It is also important to note that few of the survivors in our sample had multiple cancers (other than localized skin cancer), either prior to (about 5%) or since the focal cancer (less than 6% in the year prior to the interview). For those survivors with more complex cancer histories, cancer worries may play a larger role than other health problems.

From the model, it is also clear that depressive symptoms and anxiety/tension are almost exclusively the result of noncancer issues. The associations among cancer factors and cancer worry in the correlational analysis essentially disappear in the more complex multivariate SEM analysis where only the 'net effects' of the predictors persist after controlling for the many prior intercorrelations. The findings from our own prior research [2] showing a link between cancer worry and depression did not examine this relationship in the context of general health worries, which clearly play the larger role. However, we would suggest that the SEM findings here do not invalidate those prior findings but do suggest the need to consider cancer worry in the larger context of the other health difficulties and concerns that present themselves in later life.

Clinical implications

As older survivors assess their health concerns, it is clear that both cancer and noncancer factors each play an important role. While respondents in our research reported relatively few continuing symptoms that they attribute to cancer or its treatment, these are directly linked to their cancer worry. We did not find a link to depression and anxiety once general health worries are statistically. However, prior research [1,2,7] document that these worries have significance for survivors' broader emotional well-being.

Further, the fact that other health problems are empirically linked to cancer worries suggests the possibility that as survivors experience new health problems, some may mirror prior cancer-related symptoms and regenerate cancer-related concerns. This is especially likely to the degree that the symptoms are ambiguous and might be indicative of a recurrence or new cancer.

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Taking all of the aforementioned ideas into consideration, primary care and continuing oncology care physicians and nurses have an opportunity to play important roles in helping older, long-term survivors better understand the sources and consequences of their health concerns. With each new illness and the emergence of new, perhaps ambiguous, symptoms, older survivors may benefit from a comprehensive discussion of the likelihood that they are related to their past cancer or its treatment. The discussion can then address the more likely source of the symptoms and steps that can be taken to resolve any ambiguity about their source.

The fact that neither general health worries nor cancer-related worries explain the bulk of the observed variation in anxiety or depression does not negate the fact that each is substantially correlated with both anxiety and depression. Clinical staff have the opportunity to discuss these worries with their older patients, whatever their source, and perhaps reduce their potential for increasing anxiety and/or depression, thus enhancing the quality of life.

Finally, we note the limitations that the study design imposes on the generalizability of our findings. Our research can only represent the experiences of older adult, long-term survivors of three specific cancers: breast, prostate, or colorectal cancer. Even though most long-term survivors are older adults and the three focal cancers are the three most survivable cancers, our research cannot speak to the experiences of those with less curable cancers or those with cancers that have a more chronic course. Also, the advanced age and long duration of survivorship of the respondents in our sample along with their relatively high functioning may make them a somewhat selective if not normative group. However, with these caveats accepted, the results presented here do speak to the real health and psychosocial vulnerabilities faced by older long-term cancer survivors, which may be ameliorated by exploration of the concerns of survivors in the clinical setting.

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