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Raheem J. Paxton
University of North Texas Health Science Center

Pascal Jean-Pierre

Sae-Hwan Park
University of North Texas Health Science Center at Fort Worth

Yong Gao
Boise State University

Stephen Hermann
Sanford Health

See next page for additional authors

Authors
Raheem J. Paxton, Pascal Jean-Pierre, Sae-Hwan Park, Yong Gao, Stephen Hermann, and Gregory J. Norman

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School of Community Health Sciences
University of Nevada, Las Vegas

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Raheem J. Paxton, University of North Texas Health Science Center
Pascal Jean-Pierre, University of Notre Dame
Sae-Hwan Park, University of North Texas Health Science Center
Yong Gao, Boise State University
Stephen Herrmann, Sanford Health
Gregory J. Norman, University of California – San Diego

ABSTRACT
Background: Many studies have examined the consequences of prolonged television viewing, but few studies have examined the psychological states that contribute to this behavior. In this study, we evaluated the construct and predictive validity of psychosocial correlates of television viewing in a population of African American (AA) breast cancer survivors (BCS).
Methods: AA BCS (N = 342, Mean age = 54 years) completed measures of decisional balance, self-efficacy, family support, and time spent watching television online. Exploratory structural equation modeling (ESEM) was used to examine the construct and predictive validity as well as the differential item functioning of the instruments among population subgroups.
Results: The construct validity of the measures was supported among subgroups. The scales were measuring the construct similarly among the education and body size groups, but not among age groups. Subsequent analysis indicated that pros ($\beta = -0.19$, $P < 0.05$), cons ($\beta = 0.18$, $P < 0.05$), and self-efficacy ($\beta = -0.16$, $P < 0.05$) were significantly associated with time spent watching television.
Conclusions: Minor modifications may be needed to support the validity and reliability of the decisional balance and self-efficacy subscales among older survivors. More studies are needed to modify these measures to establish sufficient levels of construct and predictive validity in this population.
Keywords: African American, breast cancer, cancer survivorship, reliability, sedentary behavior, television viewing, validity

INTRODUCTION

Sedentary behavior (i.e., watching TV, sitting, reclining, or lying down) has emerged as a major risk factor for chronic disease.[1] In particular, prolonged periods of sedentary behavior have been associated with an increased risk for developing colorectal, endometrial, and ovarian cancer.[1] Out of all forms of sedentary behavior, television viewing has been associated with the worst outcomes because it is often linked with increased caloric intake of calorie dense foods[2] and is associated with a lower metabolic rate than other forms of sedentary behavior (e.g., riding or driving in an automobile).[3, 4] Aside from sleeping, television viewing occupies the most time in domestic settings.[5] Sedentary behaviors (e.g., television viewing) may have an even greater or compounding impact in people who are struggling with incapacitating diseases and/or treatment outcomes such as cancer.

Excessive television is a maladaptive lifestyle behavior. Among cancer survivors, prolonged sitting was shown to be associated with diminished quality of life,[6] weight gain,[7] larger waist circumference,[8] ischemic heart disease,[9] and premature mortality.[10] The negative health impact of prolonged sitting along with excessive TV viewing time in survivors underscores the urgent need for the development and testing of effective interventions to mitigate this problem. This may be true especially for African American breast cancer survivors who report excessive sedentary behavior and multiple comorbid conditions. According to a recent study of African American (AA) breast cancer survivors, 43% reported excessive television viewing (i.e., watched television for ≥ 2 hours/day) and approximately 70% reported at least one comorbid condition in addition to cancer.[11] Thus, there is a need for studies to examine the factors that predispose AA BCS to prolonged periods of sedentary behavior overall, but more specifically television viewing given its adverse consequences.

There is a need for systematic studies that assess the underlying psychological and situational reasons why people engage in excessive television viewing. However, limited data exist on the psychosocial correlates of television viewing. Previous studies assessing these correlates have focused almost elusively on adolescents, with one study published in a healthy adult population.[12] Norman et al.[13-15] examined the psychometric properties of several psychosocial correlates (i.e., decisional balance, self-efficacy, social support, and behavior change strategies) for sedentary behavior and found that these items were significantly associated with time spent sitting. Van Dyck et al.[12] applied these instruments to an adult population and observed that similar results. An important caveat that has been overlooked in assessing the predictive validity of instruments previously designed for another population is the assessment of the psychometric properties. Establishing the construct and predictive validity of these instruments is a necessity, especially in vulnerable populations with high rates of sedentary behavior and television viewing. Assessing these measures in a population of African American breast cancer survivors will not only address current gaps in the literature, but also provides new data on a high risk, underrepresented, and vulnerable population.

The aims of the current paper was to assess the construct and predictive validity of instruments that measure the constructs of decisional balance, self-efficacy, and social support using a robust psychometric procedure called Exploratory Structural Equation Modeling.[16-18]. Specifically, we will:

a) Determine the constructs validity of measures of decisional balance (i.e., pros & cons) and self-efficacy for reducing television viewing and social support for sedentary behavior reduction;
b) Determine the measurement equivalence/invariance (or differential item functioning) of the instruments among age groups, body size groups, and educational levels to ensure that the items are being measured similarly among subgroups; and
c) Determine whether the instruments are associated with time spent watching television.

METHODS

A total of 342 AA BCS from the Sisters Network, Inc. were surveyed to assess psychosocial correlates of television viewing. The Sisters Network is the largest AA breast cancer survivorship organization in the United States. The Sisters Network is a national organization that contains 40 affiliate chapters in 19 geographically distinct states. BCS were recruited for the present study between May of 2012 and July of 2012 via multiple email blasts and posting of anonymous survey links on social media blog sites affiliated with the Sisters Network. Detailed information related to our recruitment methods and response rates were described elsewhere.[19] Eligibility criteria included (a) being 18-80 years old at diagnosis, (b) diagnosed with operable invasive breast cancer, (c) not currently undergoing treatment (with the exception of hormone therapy), and (d) have no evidence of recurrent disease. Institutional Review Board approval was obtained at the University of Texas MD Anderson Cancer Center prior to data collection and it was assumed that by reading the consent form on the initial survey web page and answering survey questions, women gave their consent to participate in the current study. The protocol was later approved by the Institutional Review Board at the University of North Texas Health Science Center following the transfer of the primary author. The consenting procedure was approved by the Institutional Review Board at each institution.

Measures

Television-viewing Time. Time spent watching television or videos/movies were reported by participants separately for weekdays and weekend days during the previous week. Total television time was calculated as the sum of the time participants watched television on weekdays and weekend days. This measure has been shown to have reasonable reliability and validity for estimating television-viewing time in adults.[20]

Psychosocial variables. The items used in the current study were adapted from validated questionnaires previous developed for adolescents.[12, 14] The original items were adapted and applied to a population of adults in a previous study.[12] Van Dyck et al.[12] adapted 4 items each that represented pros (e.g., I think watching TV is boring), cons (e.g., I enjoy watching TV for many hours at a time), and self-efficacy (e.g., confidence to turn off the TV even when there is a program on that you enjoy) for reducing television time. Three family support items were adapted from similar items that were initially developed for physical activity.[15] Example of the "my family encourages…," my family discussed…," my family helped me to think of ways…" All items were rated on a 5-point Likert scale. Pro and Con items were rated from strongly disagree (1) to strongly agree (5), self-efficacy items were rated from I'm sure I can't (1) to I'm sure I can (5), and family support items were rates from never (1) to very often (5).

Body size groups. The study participants' self-reported height and weight were used to compute their BMI (weight in kilograms divided by height in meters squared: kg/m^2). Study participants were categorized as obese if their BMI was ≥ 30 kg/m^2 and non-obese ≤ 30 kg/m^2. This cut-off was chosen because ~80% of the population self-reported a BMI > 25 kg/m^2.

Socio-demographic and Medical Data. All socio-demographic and medical data were self-reported by participants. We collected data on the following variables: current age, education, time since diagnosis, disease stage at diagnosis, and comorbid conditions. Comorbid conditions (e.g., cardiovascular disease, blood sugar/diabetes, digestive disorders, arthritis, and osteoporosis) were summed to represent an ordinal number.

Statistical Analysis

Descriptive statistics were computed for the sociodemographic and medical characteristics. Construct validity of the relevant instruments were examined using Exploratory Structural Equation Modeling (ESEM). The measurement equivalence/invariance (ME/I) of these instruments were evaluated among age groups (i.e., 18-49, 50-59, 60+), weight status groups (i.e., non-obese and obese), and educational levels (i.e., < college graduate and college graduate). These specific sub populations were explored given the sample size for each group and the large percentage of women with college educations and self-reporting a BMI ≥ 30 kg/m^2.

Exploratory Structural Equation Modeling

Exploratory Structural Equation Modeling (ESEM) is the integration of exploratory factor analysis (EFA) and structural equation modeling (SEM) in an effort to provide a flexible measurement structure for item indicators.[19] The ESEM has all of the benefits of traditional EFA such as factor rotations, while enabling the inclusion of path coefficients (among covariates and other factors), multi-group analysis, and test measurement equivalence/invariance (ME/I).[19] ESEM also provides fit statistics and modification indices similar to those generated in traditional SEM. We chose ESEM in lieu of traditional Confirmatory Factor Analysis (CFA) to facilitate exploration of the true structure validity of these instruments. CFA prevents cross loading of items, leading to over-estimated factor correlations and distorted relationships.[19] In contrast, ESEM provides flexibility when knowledge of the measurement structure is limited.

All models were examined with the Maximum Likelihood estimator that is robust to non-normal distributions (i.e., ESTIMATOR = MLR) and a Geomin rotation algorithm. ESEM models were calculated with full-information maximum (FIML) estimation in MPlus version 6.0 (Muthen & Muthen, 1998-2008). FIML uses an iterative process and simultaneous estimating equations to account for the presence of missing data.[21] FIML yields accurate fit indices and parameter estimates with up to 25% simulated missing data.[21] The extent of missing data in this study ranged from 0% for sociodemographic characteristics to 24.6% for social support items, which is under the recommended threshold.

Model Fit

Criteria for establishing fit of ESEM models are similar to that of traditional CFA and SEM. All models are evaluated based on how well structural model resembles close, exact, and absolute fit to the data. According to Hu and Bentler,[22] the Comparative Fit Index (CFI) and the Standardized Root Mean Square Residual (SRMR) are optimal for examining structural models with smaller sample sizes. The CFI and SRMR reveal the models closely fitted the data when values are ≥0.95 and ≤0.08, respectively. Hu and Bentler[22] proposed that using cut off values ≥

0.96 for the CFI in combination with values of ≤ 0.10 for the SRMR resulted in lower type I and II error rates. These fit statistics were chose over other criteria (i.e., χ^2 and the Root Mean Square Error Approximation) which are sensitive to sample time and inflate error rates.[22]

Multi-group Factorial Invariance

Assessment of measurement equivalence/invariance is a multistage approach.[23] In the first series of ESEMs we examined the fit of the measurement model for the overall population and individually for each sub-group. We then tested models that sequentially imposed constraints to model parameters to insure equality of the overall measurement structure, factor loadings, and item intercepts among subgroups. Three sequential levels of invariance tests were assessed here. In the first model, we tested the extent to which the same pattern of fixed and free model parameters was equivalent among groups (i.e., configural invariance).[23] In the second model, we tested the extent to which the factor loadings for the items were measured equivalently among groups (i.e., metric invariance).[23] Finally, in the last model, we tested the extent to which the item intercepts were measured equivalently among groups (i.e., scalar invariance).[23] Once the models were computed, we determined ME/I by evaluating the difference in Chi-square in relation to change (Δ) in degrees of freedom of the model with fewer constraints. Change in CFI of less than or equal to 0.01 suggests that the invariance of an instrument should not be rejected.[24] Therefore, if the Chi-Square difference test is significant, but the CFI change is less than 0.01, there is some evidence for the equivalence/invariance of the model structure or parameters among groups.[24]

Differential Item Functioning (DIF) also known as measurement bias was also examined for factors that failed to pass test for ME/I.[25] To assess DIF in this study, we used a multiple-indicator multiple cause (MIMIC) model.[26] MIMIC models can be used to identify subgroup differences in a latent construct.[26] These models are extensions of item-response theory modes but can include simultaneous test of several characteristics.

Lastly, structural models were constructed to assess the relationship between psychosocial constructs and time spent sitting and watching television per day. Structural models were adjusted for the following covariates: body mass index, age, years out from diagnosis, and disease stage of diagnosis. All statistical tests were two-sided and significance was determined at $p < 0.05$.

RESULTS

Sample Characteristics

The study population of 342 surveyed AA BCS has the mean age of 53.5 years. Most (45%) of the participants presented with stage II disease and were on average 7-years post diagnosis. Approximately half (52%) of participants were college graduates, 48% reported a BMI in the obese category, and 43% reported watching television equal to or greater than 2 hours per day. Sample characteristics are reported in Table 1.

Table 1. Demographic Characteristics

Variable	N = 342
Mean Age, (SD)	53.5 (9.9)
Age group, n (%)	
< 50 years	126 (37%)
50 to 59 years	116 (34%)
60+ years	100 (29%)
Mean years out from diagnosis, (SD)	6.9 (6.4)
Education, N (%)	
≤ Some college	151 (48%)
College graduate or more	172 (52%)
Missing (n=19)	
Married, N (%)	162 (48%)
Stage of diagnosis, N (%)	
I	107 (34%)
II	143 (45%)
III+	68 (21%)
Missing (n=24)	
Mean body mass index, SD	30.4 (6.0)
Obesity Status	
Non-obese	177 (52%)
Obese	164 (48%)
Missing (n=1)	
TV hours per week, Median (25%, 75%)	12.2 (7.2, 21.2)
%> 2hrs per day	43%

SD=Standard Deviation

Structural validity and reliability

The measurement model for pros, cons, and self-efficacy for reducing time spent watching television and family support for sedentary behavior reduction was a close fit to the data (CFI ≥ 0.95, RMSEA ≤ 0.08, SRMR ≤ 0.08). Statistically significant correlations were observed between pros and cons (*r* = -0.34, P < 0.01), self-efficacy and cons (*r* = -0.33, P < 0.01), and family support and cons (*r* = 0.13, P = 0.05). All factor loading, intercepts, and factor variances were appropriate sign and magnitude. Several items (i.e., TV is boring, enjoy watching TV, watching TV is relaxing, and confidence to limit TV during) cross-loaded on other factors (See Table 2). The overall fit of the measurement model revealed a close fit to the data for each population sub groups (See Table 3). Internal consistency reliability for pros, cons, self-efficacy, and family support were 0.54, 0.80, 0.80, and 0.87, respectively (data not tabled).

Table 2. Factor structure of psychosocial constructs

Item	Factor 1	Factor 2	Factor 3	Factor 4
I think watching TV is boring	**0.35**	-0.3	0.01	-0.05
Watching TV takes time away from doing more important things	**0.7**	0.08	-0.03	-0.05
I would Feel lazy and sluggish if I watched TV for many hours	**0.91**	-0.08	0.03	0.05
Watching TV sometimes hurts my eyes and gives me a headache	**0.29**	0.12	-0.08	0.08
I enjoy watching TV for many hours at a time	-0.29	**0.8**	-0.02	0.07
I find sitting and watching TV very relaxing	0.32	**0.71**	-0.02	0.04
Watching TV is one of my favorite forms of entertainment	0.06	**1.12**	-0.01	-0.01
Watching TV is my way to escape from the world	-0.03	**0.87**	0.18	-0.06
Turn off the TV even when there is a program on I enjoy	-0.03	0.05	**0.73**	0.05
Limit my TV time to one hour a day	0.22	-0.24	**0.75**	0.03
Leave the room where the TV is on even if others are watching TV	0.02	-0.02	**0.73**	-0.05
Plan ahead of time what TV shows I will watch during the week	-0.07	0.04	**0.67**	0.01
My family encouraged me to spend less time being sedentary	-0.01	0.11	-0.01	**0.93**
My family discussed how sedentary habits can be unhealthy	0.07	-0.1	0.08	**0.94**
My family helped me to think of ways to reduce the time I spend sedentary	-0.04	0.01	-0.03	**1.07**

Factor 1 = Pros, Factor 2 = Cons, Factor 3= Self-efficacy; Factor 4 = Family Support; Items representing a particular subscale were reported in bold font.

Table 3. Population specific fit statistics

Sample	N	χ2	DF	p-value	CFI	RMSEA	SRMR
Total	330	70.4	51	0.04	0.99	0.03 (0.01, 0.05)	0.02
Age group							
18-49 years old	120	71.7	51	0.04	0.96	0.06 (0.02, 0.09)	0.04
50-69 years old	112	48.5	51	0.06	1.00	0.00 (0.00, 0.06)	0.03
60+ years old	98	67.8	51	0.06	0.97	0.06 (0.00, 0.09)	0.04
Weight status group							
Non-obese	170	79.3	51	0.01	0.96	0.06 (0.03, 0.08)	0.04
Obese	160	57.6	51	0.25	0.99	0.03 (0.00, 0.06)	0.03
Educational group							
Some/non college	151	58.2	51	0.23	0.99	0.03 (0.00, 0.06)	0.03
College grad	172	73.1	51	0.02	0.97	0.05 (0.02, 0.08)	0.03

DF = Degrees of freedom; CFI = Comparative fit index; RMSEA = Root mean square error approximation; SRMR = Standardized root mean square residual.

Test for ME/I

Age groups: The measurement model constraining the factor structure revealed a close fit to the data (χ^2 = 186.9, df = 153, p-value = 0.03, CFI = 0.98, SRMR = 0.04) among different age groups. Subsequent nested models of the factor loading and factor means and intercepts yielded a close fit to the data. However, the change (Δ) in CFI was ≥0.01 when constraints were imposed on the factor loadings (See Table 4). No further tests for invariance were performed.

Obesity status: The measurement model constraining the factor structure revealed a close fit to the data (χ^2 = 136.8, df = 102, p-value < 0.01, CFI = 0.98, SRMR = 0.03) among body size groups. Subsequent nested models of the factor loading and factor means and intercepts yielded a close fit to the data and values estimating the Δ in CFI support evidence of ME/I for the measurement model among body size groups (See Table 4).

Education: The measurement model constraining the factor structure revealed a close fit to the data (χ^2 = 131.4, df = 102, p-value = 0.03, CFI = 0.98, SRMR = 0.03) among education levels. Subsequent nested models of the factor loading and factor means and intercepts yielded a close fit to the data and estimates of the Δ in CFI were appropriate in magnitude suggest that the measurement model is ME/I among educational levels (See Table 4).

Post hoc tests for differential item functioning.

The MIMIC model examining the relationship between age group and the measurement model revealed a close fit to the data (χ^2 = 72.9, df = 62, p-value = 0.16, CFI = 0.99, SRMR = 0.02). Statistically significant path coefficients were observed between age group and self-efficacy (β = -0.17, P < 0.05) and age group and pros (β = -0.27, P < 0.01), suggesting age group differences in the measurement of these constructs (See Figure 1).

Table 4. Test for Measurement Equivalence/Invariance

Sub groups	Method	χ2	DF	p-value	CFI	RMSEA	SRMR	Δ in CFI
Age Group	Configural Invariance	186.9	153	0.03	0.98	0.05 (0.01, 0.07)	0.04	-0.03
	Metric Invariance	323.7	241	<0.01	0.95	0.06 (0.04, 0.07)	0.08	0.00
	Scalar Invariance	343.1	263	<0.01	0.95	0.05 (0.04, 0.07)	0.08	
Obesity Status	Configural Invariance	136.8	102	0.01	0.98	0.05 (0.02, 0.06)	0.03	-0.01
	Metric Invariance	193.6	146	<0.01	0.97	0.04 (0.03, 0.06)	0.06	0.00
	Scalar Invariance	198.6	157	0.01	0.97	0.04 (0.01, 0.06)	0.06	
Education	Configural Invariance	131.4	102	0.03	0.98	0.04 (0.02, 0.06)	0.03	0.01
	Metric Invariance	201.6	146	<0.01	0.97	0.05 (0.03, 0.06)	0.06	0.01
	Scalar Invariance	223.9	157	<0.01	0.96	0.05 (0.04, 0.07)	0.07	

DF = Degrees of freedom; CFI = Comparative fit index; RMSEA = Root mean square error approximation; SRMR = Standardized root mean square residual; Δ = Change in.

Structural relationships

The hypothesized structural model examining the relationship between pros, cons, and self-efficacy for reducing television time and family support for reducing sedentary behavior with total hours of television for the week adjusted for covariates revealed a close fit to the data (χ^2 = 137.2, df = 106, p-value = 0.99, CFI = 0.98, SRMR = 0.03). Statistically significant path coefficients were observed between self-efficacy (β = -0.16, P < 0.05), pros (β = -0.19, P < 0.05), and cons (β = -0.18, P < 0.05) for reducing television time and total television time after adjusted for covariates. Cons were significantly correlated with pros (r = -0.31, P < 0.01), self-efficacy (r= -0.33, P < 0.01), and family support (r = 0.13, P = 0.05). No other correlations were observed. The hypothesized structural model accounted for 14% of the total variance in time spent watching television.

Power

A *posthoc* Monte Carlo simulation study was performed to determine the power associated with the fit indices for the final structural model. A total of 500 replications were selected for the procedure. The mean SRMR was 0.022 with a standard deviation of 0.002. All individual factor loadings in the model had power estimates for the appropriate scale that exceeded 0.95. The power estimates of the relationship between the study covariates and the psychosocial factors were all below 0.80. Similarly, the power estimates of the relationship between self-efficacy (0.98), pros (0.97), and cons (1.00) with time spent watching television were appropriate in magnitude, whereas family support was not (0.10).

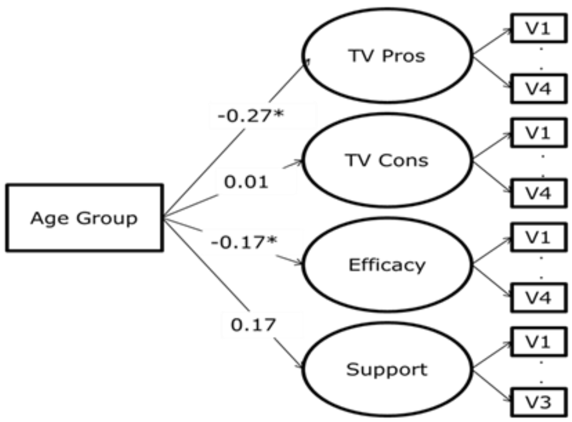

Figure 1a: Multiple indicator Multiple cause (MIMIC) model testing for differential item functioning among the psychosocial correlates.

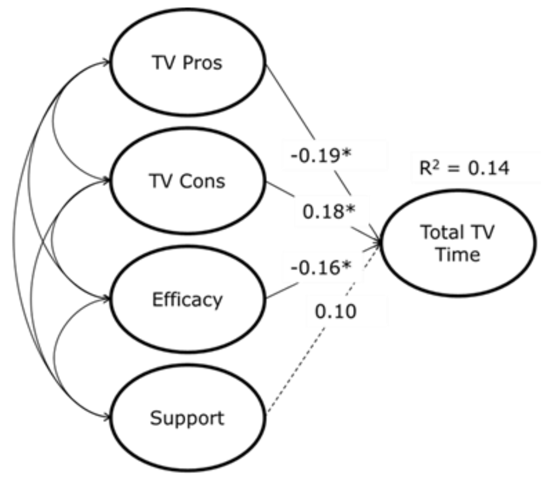

Figure 1b: Structural relationship between psychosocial correlates and total time spent watching television. Solid lines denote significant path coefficients and dashed lines non-significant coefficients. Study covariates and path coefficients were not shown to enhance clarity.

DISCUSSION

In this study, we found that the psychosocial constructs of pros, cons and self-efficacy for reducing television viewing, and family support for sedentary behavior reduction adequately fit the data. Test for ME/I indicated that the overall structure was equivalent/invariant among body size groups and educational levels, but not age groups. MIMIC models suggested measurement differences in the constructs of self-efficacy and pros for reducing television time. Test for predictive validity indicated that constructs of self-efficacy, pros, and cons for reducing television time were significantly associated with television viewing. Overall, these data provide preliminary support for the construct validity of instruments for self-efficacy and decision balance for television in a population of AA BCS, but further work is needed.

To our knowledge, this is the first study to assess the construct and predictive validity of psychosocial measures of time spent watching television in a population of breast cancer survivors. Van Dyke et al.[12] was the only study that we know of to assess the instruments in an adult population. Overall, our analyses indicated that the measurement model adequately fit the data and it provided preliminary support for further testing of these constructs in other populations of cancer survivors. We identified items that may be problematic and may not represent simple structure. In particular, items of 'television viewing is boring,' 'I enjoy watching television,' and 'sitting and watching television is relaxing' cross-loaded on other factors. However, it should be noted that these items were correlated highly with time spent watching television in a sample of healthy adults.[12] The flexible structure of ESEM allows for cross-loadings and enables us to leave the measurement models intact for further exploration.

Test for ME/I provided evidence of model equivalency among different educational levels and body sizes, but not age groups. Test for structural validity in the context of ME/I test are essential to ensure that a questionnaire is measuring constructs consistently among subgroups. Our data indicate that among AA breast cancer survivors, the decisional balance and self-efficacy scales are not measuring the same constructs equally in each age group. Van Dyke et al[12] suggested that a lack of interaction terms among sociodemographic variables in the context of psychosocial and home-environmental variables indicates similar conceptual meaning. However, no prior tests for invariance were conducted in those populations. Generally, the establishment of ME/I is necessary before any meaningful inferences between groups can be drawn about the items of interest.[27, 28] When such tests are not applied, there is a risk of making subgroup comparisons on nonequivalent measures, which may lead to biased interpretation.

Test for DIF indicated that the questionnaire did not measure the constructs of pros and self-efficacy for reducing television viewing equally between age groups, suggesting differential items performance by age group. Subsequent analyses indicated the decisional balance items cross-loaded for all groups; however, most of the items cross-loaded in our oldest survivors. The magnitude of the cross loading resulted in a non-significant correlation between the decisional balance subscales for women aged 60 and older. The correlations between the subscales for younger women were statistically significant and negatively correlated. We are not sure why the subscales were not significantly correlated. It could be that older women are torn between the positive and negative attributes of television time. Being of an older age will likely mean that these individuals are further out from diagnosis. As women move further away from the teachable moment, sedentary behaviors may become habitual. It could be that the ability level differed by age group or that these items were much more relevant to younger survivors than to the older ones.[29] Younger survivors may have demands that may be different from those experienced by older survivors. Characteristics such as having children in the home, full-time employment, and the lack of personal time may contribute to differences in the perception of television viewing in this population. Our results suggest that more work is needed in the development and adaptation of psychosocial instruments for reducing time spent watching television in AA breast cancer survivors.

In our final test examining the relationship between psychosocial constructs for reducing television time, all constructs were significantly associated with total TV time, with the exception of family support. Family support may have not been associated with television time because the item for written exclusively for sedentary behavior reduction and not reductions in television time. Of interest was the magnitude of the beta coefficients for the psychosocial correlates. Van Dyck et al.[12] models accounted for a total of 39% of the variance in total television time, but included also home-environmental items such as television size and number of televisions in the home. Our models only accounted for 14% of the total variance in time spent watching television. Despite the low percentage of variance accounted for, our data are consistent with other studies in adolescent and adult populations suggesting that pros, cons, and self-efficacy for reducing sedentary time are important correlates of behavior.[13, 30]

There were a number of strengths associated with this study including being the first study among cancer survivors to examine psychosocial correlates of television viewing, a robust statistical procedure to examine reliability and validity, a modest sample size, and a high-risk and underrepresented population of cancer survivors. In addition, a posthoc power analysis was conducted and indicated appropriate fit of the model to the data based on mean levels of the SRMR and the fact that power for the factor loading and beta coefficients estimating the relationship between the correlates and outcome all exceeded 0.80. Notwithstanding the strength, there were notable limitations in the present data. First, these data were cross-sectional and limited our ability to make causal inferences on television viewing. We are also surprised that the internal consistency reliabilities were relatively low for some measures. Additionally, family support was not related specifically to reductions in television viewing, but reductions in sedentary behavior. Importantly, use of a web-based survey is associated with some degree of selection bias as reported elsewhere.[19] Further, our analysis pertains to a select group of AA BCS and may not have external validity beyond this population.

CONCLUSION

Research on sedentary behaviors in cancer survivors is in its infancy, and few studies have examined the correlates in these maladaptive behaviors for this population. The present analysis provides preliminary evidence for validity and reliability for psychosocial measures for reducing television time in AA breast cancer patients, albeit more work is needed to ensure that the instruments function well in all age groups. Further adaptations are warranted and we encourage future adaptations of the scales in various cancer survivor population.

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