



Brief Original Report

Correlates of leisure time physical activity compliance in colorectal cancer survivors[☆]

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ABSTRACT

Introduction. Physical inactivity is a risk factor for cancer morbidity and mortality, but its influence in colorectal cancer (CRC) survivors is understudied. We investigated sociodemographic, physically limiting, and behavioral predictors influencing leisure time physical activity (LTPA) among CRC survivors.

Methods. Pooled 1997–2010 National Health Interview Survey data (N = 2378) were used to evaluate LTPA compliance in CRC survivors according to *Healthy People 2010* recommendations. Univariate and multivariable logistic regression analyses were performed to identify predictors of LTPA compliance among CRC survivors. Independent variables included: age, gender, race/ethnicity, education, health insurance, body mass index (BMI), ≥ 2 chronic conditions limiting physical activity, time since cancer diagnosis, and poverty, marital, smoking and alcohol status.

Results. Multivariable regression models reveal that Hispanics, non-Hispanic Blacks, those with ≥ 2 physically limiting chronic conditions, and current smokers were less likely to comply with LTPA recommendations. CRC survivors who were of “other” race, more than one race, those with some college degree or college degree, and current drinkers were more likely to comply.

Discussion. Hispanics, non-Hispanic Blacks, those with >2 physically limiting chronic conditions and current smokers warrant additional efforts to encourage physical activity and to determine the impact of regular physical activity on CRC survivorship.

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Introduction

In 2012, approximately 1.2 million colorectal cancer (CRC) survivors were living in the US (American Cancer Society, 2012). The number of CRC survivors is estimated to increase to 1.5 million by January 2022 (American Cancer Society, 2012). Accumulating evidence indicates that achieving the recommended amounts of leisure time physical activity (LTPA) may reduce the recurrence of CRC, prevent the development of a secondary cancer and improve quality of life (American

Cancer Society, 2012; Blanchard et al., 2008). However, only 30% of survivors are meeting LTPA recommendations and more than 50% are completely sedentary (Blanchard et al., 2008; Speed-Andrews et al., 2012). Although the majority of Americans (32%) do not meet LTPA guidelines (DHHS, 2013), the benefits to CRC survivors are paramount as they are more vulnerable to health complications over the life course. Unfortunately, there is a lack of research examining the correlates of LTPA compliance among CRC survivors. The objective of this study was to identify the sociodemographic, physically limiting, and behavioral predictors of LTPA among US CRC survivors.

Methods

Data were pooled from the 1997–2010 National Health Interview Survey (NHIS), a complex, multistage probability representative sample of approximately 30,000 adults of the US civilian non-institutionalized population annually (CDC, 2010).

Through personal household interviews, NHIS participants were asked about the frequency and intensity of LTPA according to *Healthy People 2010* (HP2010) recommendations, defined as engaging in light to moderate activity for at least 30 min, 5+ times/week, or vigorous activity for at least 20 min,

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3 + times/week (CDC, 2011). Participants were defined as compliant if they met at least one of these definitions; all others were defined as non-compliant. To determine if participants were compliant, they were asked, “How often do you do vigorous LTPA for at least 10 minutes that causes heavy sweating or large increases in breathing or heart rate?” and “How often do you do light or moderate LTPA for at least 10 minutes that cause only light sweating or a slight to moderate increase in breathing or heart rate?” Additional follow-up questions to participants included the number of times/week they engaged in light, moderate, or vigorous activity and the duration in time (minutes or hours). We calculated total hours active using the self-reported level of physical activity, frequency within a time period, and the average number of minutes spent in each session.

Covariates were chosen according to previous literature and theory (Speed-Andrews et al., 2012). Additionally, univariate regression analyses were conducted to confirm associations between the selected covariates and LTPA compliance (see Table 2).

Statistical analyses

Multivariable regression analyses were performed to identify significant predictors of LTPA in CRC survivors. We included several multivariable logistic models including different sets of covariates to better understand the predictors of LTPA in CRC survivors: sociodemographics (Model 1), health care access (Model 2), physical limitations (Model 3), health behaviors (Model 4), and physical limitation/health behaviors (Model 5). Variables that were significant at all levels in the univariate analyses were used in Model 6. Variables that were significant in any of the previous models were retained for Model 7. All regression models included time since diagnosis and survey year as covariates. Statistical significance was defined as $\alpha < .05$. Persons with missing LTPA information were excluded (approximately 3% of respondents/year). All analyses were conducted using SUDAAN v11.0 (2012; RTI International, Research Triangle Park, NC), adjusting for weighted, complex survey data.

Table 1

Demographic characteristics of colorectal cancer survivors in the US by Healthy People 2010 (HP2010) leisure time physical activity status: the 1997–2010 National Health Interview Survey.

	Meets HP2010 recommendations for leisure time physical activity			Does not meet HP2010 recommendations for leisure time physical activity			
	Sample size ^b	Unadjusted% (SE) ^c	Age adjusted % (SE) ^{c,d}	Sample size ^b	Unadjusted% (SE) ^c	Age adjusted % (SE) ^{c,d}	P ^e
Total	220,559	23.6 (1.18)	24.2 (1.51)	715,648	76.4 (1.18)	75.8 (1.51)	
Gender ^a							0.029
Male	121,482	26.3 (1.73)	27.0 (2.37)	340,738	73.7 (1.73)	73.0 (2.37)	
Female	99,117	20.9 (1.69)	21.5 (1.87)	374,910	79.1 (1.69)	78.5 (1.87)	
Age ^a							0.620
18–44 years	8200	21.5 (5.04)	–	29,927	78.5 (5.0)	–	
45–64 years	62,317	25.5 (2.37)	–	181,856	74.5 (2.37)	–	
65+ years	150,082	23.0 (1.43)	–	503,865	77.1 (1.43)	–	
Race/ethnicity ^a							<0.001
Hispanic	5403	15.0 (3.16)	17.0 (3.95)	30,539	85.0 (3.16)	83.0 (3.95)	
Non-Hispanic White	180,846	24.6 (1.37)	26.0 (1.87)	555,720	75.5 (1.37)	74.0 (1.87)	
Non-Hispanic Black	13,578	16.4 (2.37)	16.1 (2.94)	69,487	83.7 (2.37)	83.9 (2.94)	
Other	8979	38.0 (7.69)	36.8 (8.41)	14,662	62.0 (7.69)	63.2 (8.41)	
Education ^a							0.001
<High school	31,946	15.1 (1.79)	15.4 (2.86)	180,193	84.9 (1.79)	84.6 (2.86)	
High sch./GED	68,916	20.9 (1.67)	22.2 (2.54)	261,537	79.2 (1.67)	77.8 (2.54)	
Some coll./degree	119,250	30.8 (2.22)	30.0 (2.48)	267,858	69.2 (2.22)	70.0 (2.48)	
Poverty ^a							0.024
Poor	15,728	28.5 (10.55)	29.3 (9.75)	69,704	71.5 (10.55)	70.7 (9.75)	
Near poor	28,041	17.7 (8.53)	16.3 (5.79)	159,591	82.3 (8.53)	83.7 (5.79)	
Not poor	122,254	27.8 (5.26)	28.3 (4.42)	331,912	72.2 (5.26)	71.7 (4.42)	
Marital status ^a							<0.001
Married/living with a partner	130,217	26.1 (2.16)	27.0 (1.62)	352,289	73.9 (2.16)	73.0 (1.62)	
Not married/single	90,101	21.9 (2.15)	19.9 (1.75)	362,489	78.1 (2.15)	80.1 (1.75)	
Health insurance ^a							0.127
Full year private	53,615	28.8 (2.87)	28.1 (3.12)	184,933	72.9 (2.27)	71.9 (3.12)	
Full year public	156,839	22.2 (1.36)	19.9 (2.45)	548,732	77.8 (1.36)	80.1 (2.45)	
Part year	5240	28.4 (8.37)	27.6 (9.18)	24,199	61.3 (12.24)	72.5 (9.18)	
Uninsured	3594	17.1 (5.36)	17.6 (6.78)	49,262	86.8 (3.71)	82.4 (6.78)	
Smoking status ^a							0.026
Current smoker	21,971	17.3 (2.43)	17.5 (2.65)	104,843	82.7 (2.43)	82.5 (2.65)	
Former smoker	97,867	24.0 (2.03)	24.5 (2.41)	309,755	76.0 (2.03)	75.5 (2.41)	
Never smoker	100,761	25.3 (1.54)	27.1 (2.41)	297,792	74.7 (1.54)	72.9 (2.41)	
Alcohol status ^a							<0.001
Current drinker	131,563	32.2 (2.06)	32.6 (2.25)	276,643	67.8 (2.06)	67.4 (2.25)	
Former drinker	47,328	17.0 (1.64)	17.0 (2.36)	231,922	83.1 (1.64)	83.3 (2.36)	
Never drinker	39,494	16.8 (1.78)	17.9 (3.10)	195,311	83.2 (1.78)	82.1 (3.10)	
Body mass index ^a							0.025
Normal weight (<25)	84,812	24.7 (2.32)	25.2 (3.31)	259,173	75.3 (2.32)	74.8 (3.31)	
Overweight (25–29)	79,734	24.4 (1.82)	27.4 (2.71)	247,741	75.7 (1.82)	72.6 (2.71)	
Obese (>30)	52,061	21.2 (1.90)	20.7 (2.16)	193,261	78.8 (1.90)	79.3 (2.16)	
>2 chronic conditions ^a							0.087
Limits activity	36,801	17.5 (3.38)	15.9 (2.83)	173,791	82.5 (3.38)	84.1 (2.83)	
No activity limitation	55,741	24.2 (2.32)	26.0 (3.39)	174,867	75.8 (2.32)	74.0 (3.39)	

^a Total weighted sample size for each variable may not sum to 936,207 because of missing responses.

^b Analyses are weighted on a sample of 2378 colorectal cancer survivors in the NHIS. Weighted sums are presented.

^c Prevalence rates are adjusted for complex survey design.

^d Based on the 2000 U.S. Standard Population by age grouping 18–44, 45–64, and 65+.

^e P values based on Wald χ^2 test for association.

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