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Comparison of quality of life among long-term melanoma survivors and non-melanoma controls: a cross-sectional study

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Abstract

Purpose—Little is known about specific concerns facing long-term melanoma survivors. The goal of this study was to compare quality of life (QOL) and mental health between long-term melanoma survivors and population controls.

Methods—Participants from a previously conducted case-control study of risk factors for melanoma were recruited for a cross-sectional survey. Generic QOL and emotional health were measured using the SF-36 and Hospital Anxiety and Depression Scale questionnaires. A total of 724 melanoma survivors and 660 controls participated. Most melanoma survivors had stage I disease (85.6%); mean time from diagnosis was 9.6±1.0 years. Comparisons of QOL measures between melanoma survivors and controls were conducted using regression models, adjusting for potential confounders.

Results—Melanoma survivors, compared to controls, reported statistically significant but only slightly higher physical functioning and bodily pain QOL subscale scores than controls and otherwise similar QOL as measured by the remaining six SF-36 subscale scores. Prevalence of anxiety (18.1% vs. 19.3%, adjusted OR=1.00 (0.74, 1.36); p=1.00) and depression (7.2% vs. 9.8%, adjusted OR=0.74 (0.48, 1.16); p=1.00) were similar between melanoma survivors and controls.

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Ethical approval: 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.

Informed consent: Informed consent was obtained from all individual participants included in the study.

Conclusion—Long-term early stage melanoma survivors report similar general QOL and mental health compared to population controls. Further research is needed to identify concerns more specific to melanoma.

Keywords

quality of life; melanoma; cancer survivorship; SF-36

Introduction

The incidence of cutaneous melanoma has been increasing in fair-skinned populations for the past forty years [1], with the World Health Organization estimating that 132,000 people worldwide will be diagnosed with melanoma in 2016.[2] While melanoma is deadly at advanced stages, most people are diagnosed at an early stage disease and have a good prognosis,[3] however little is known about the specific long-term survivorship issues they face. [4]

Change in quality of life (QOL) is a recognized major health outcome of cancer diagnosis and treatment, which may impact a patient's prognosis, including survival. [5; 6] QOL differs by cancer diagnosis, stage of disease, and time from diagnosis.[7; 8] As most melanoma survivors are treated with surgery only, particularly those with early stage disease, it has been postulated that QOL issues in this population are likely psychological in nature. [4] Studies among melanoma survivors have found that approximately 30% have clinically significant levels of distress,[9] which is similar to other cancers.[4] Adjuvant therapy for melanoma, in particular interferon, is associated with increased depression and emotional issues.[10–13] Psychological issues have been found to be associated with survival among those with both early and advanced stage melanoma. [6; 14; 15]

Most studies to date exploring QOL concerns among melanoma survivors did not have a control group with measured potential confounders, thereby limiting the conclusions that can be drawn from them. The objective of this study was to compare QOL and emotional health between long-term melanoma survivors and population controls. This allowed for the determination of which specific dimensions of QOL may be impaired in long-term melanoma survivors and whether psychological support is needed following diagnosis and treatment.

Methods

A cross-sectional survey of long-term melanoma survivors and population controls from a previously conducted case-control study was carried out in 2015; details for the original study are provided elsewhere.[16] Approval for this study was granted by the University of Minnesota Institutional Review Board and the Minnesota Cancer Surveillance System. We recruited participants from the Skin Health Study (SHS), a population-based case-control study conducted from 2004 to 2009 to assess indoor tanning use and risk of melanoma.[17]. Individuals with invasive cutaneous melanoma diagnosed between July 2004 and December 2007, ages 25 to 59, and with a state driver's license or state identification card were identified by the Minnesota Cancer Surveillance System and eligible to participate. Controls

were randomly selected from the Minnesota state driver's license and state identification card list and frequency-matched to cases in a 1:1 ratio on age (in 5-year age groups) and gender. A total of 1167 cases (84.6% among eligible) and 1101 controls (69.2% among eligible) participated in the original study.

All SHS participants who were alive at the time of the survey administration were identified for this cross-sectional survey. A total of 80 (6.9%) cases and 15 (1.4%) controls had died since the original SHS study was completed. Participants were recruited by mail to complete an online or paper survey using methods outlined by Dillman to maximize response [18]. QOL was measured in both melanoma survivors and controls using the Medical Outcomes Study Short Form 36 (SF-36) version 2 [19]. Mental health was measured using the Hospital Anxiety and Depression Survey (HADS), an instrument which includes 14 items [20]. The proportions of individuals with potentially clinically meaningful depression and anxiety were calculated using the established cut-off of 8 (out of 21) for each scale [21]. Updated demographic and information on co-morbidities since their original participation in the SHS was obtained.

Means $\pm$ standard deviations (SD) and the size of the differences (effect size - Cohen's d ; difference in means divided by the standard deviation) are presented for the SF-36 subscales. Effect sizes of 0.35–0.50 have been shown to be clinically relevant for the SF-36 subscales [22]. Comparisons of the SF-36 subscale scores between melanoma survivors and population controls were conducted using multivariate linear regression models. Both gender and age-adjusted and fully-adjusted models were conducted and the difference in least squares means and associated 95% confidence intervals (CI) are presented. Potential confounders, identified a priori, included age at survey, gender, education, income, marital status, body mass index, current smoking status and number of co-morbidities. The proportions of melanoma survivors and population controls with potentially clinically significant depression and/or anxiety based on the HADS were compared using multivariate logistic regression models; odds ratios (OR) and 95% CI are presented. Planned stratified analyses were conducted by age group (30–39, 40–49, 50–59, and 60–72 years) and gender. Due to the number of statistical tests performed, p -values were adjusted to account for multiple comparisons using the Holm method [23]. Data were analyzed using SAS version 9.4 (Cary, NC). Adjusted p -values <0.05 were considered statistically significant.

Results

The final response rate was 61.0%, with 724 (62.0%) melanoma survivors and 660 (59.9%) controls of those who originally participated in the Skin Health Study completing the survey. Those who completed the survey were generally similar to those who did not respond, though they were older, more likely to have completed college, and less likely to have ever used indoor tanning. When examined separately by melanoma survivors and controls, these differences were similar. Melanoma survivors and population controls were not statistically significantly different across the demographic and health characteristics with the exceptions of race and smoking status (Table 1).

Melanoma survivors were diagnosed an average of 9.6 ± 1.0 years prior to completing the survey; the majority (85.6%) had stage I disease and received surgery only. A minority had lymph node dissection (34.8%). Among the respondents, 27 (3.8%) reported a recurrence of their melanoma and 20 (2.8%) reported being diagnosed with metastatic disease since the original diagnosis.

Compared to population controls, melanoma survivors reported similar QOL measures across all SF-36 scales (Table 2). After adjustment for potential confounders, melanoma survivors had statistically significantly higher scores, but only modestly so, for physical functioning (90.5 ± 16.2 vs. 86.9 ± 18.5 , $p=0.003$) and bodily pain (76.9 ± 21.4 vs. 72.3 ± 21.7 , $p=0.01$). These differences, however, did not reach the criterion for clinical significance as no scales had effect sizes exceeding 0.35. No statistically or clinically significant differences in the mental health, vitality, role-emotion or social functioning subscales between melanoma survivors and controls were observed. Finally, no differences were observed in the proportion of melanoma survivors compared to controls with anxiety (18.1% vs. 19.3%, adjusted OR=1.00 (0.74, 1.36); $p=1.00$) or depression (7.2% vs. 9.8%, adjusted OR=0.74 (0.48, 1.16); $p=1.00$).

Few differences in QOL between melanoma survivors and controls were observed by age or gender. Only among persons, ages 50–59 years, did melanoma survivors report statistically and potentially clinically significantly better general health, physical functioning, bodily pain and physical role functioning QOL compared to population controls (effect sizes ranged from 0.27–0.36; data not shown). All other SF-36 subscales were similar between melanoma survivors and controls when stratified by age or gender. None of the differences observed for comparisons of rates of anxiety and depression between melanoma survivors and controls were statistically significant within the separate age or gender groups. A secondary analysis limiting the cases to those with Stage I disease, compared with controls, found similar results; there were too few cases with advanced stage disease to draw conclusions in this subset.

Discussion

Long-term melanoma survivors participating in this cross-sectional study reported similar QOL compared to population controls. This is the largest study of melanoma survivors to date to compare long-term QOL and mental health to similarly recruited controls and that allowed for adjustment of confounding factors.

Results from this investigation are consistent with the growing literature on the effects of cancer on QOL, signifying that survivors of cancers with generally good prognoses return to physical and emotional health levels similar to the general population over time [24]. It has been suggested that the act of surviving a cancer may even be associated with improved perception of QOL [25], which may explain why some outcomes were higher in melanoma survivors compared to controls. In addition, the survivors who participated in this study had primarily early stage melanoma and therefore few received adjuvant therapy, which may also contribute to the lack of differences in QOL. Further, these survivors were almost ten years

post-diagnosis, meaning that any physical or emotional concerns at the time of diagnosis and treatment may have dissipated by the time of the survey.

Limitations of note included the collection of data at a single time point and lack of QOL data at the time of diagnosis, which may be the most salient survivorship phase for melanoma survivors. Though participants were generally similar to those who did not participate, survivors with poorer QOL may have died or not responded to the survey, thereby providing a more optimistic view of QOL for melanoma survivors compared to persons without cancer.

Consistent with data for long-term survivors of other cancers [24], our results suggest that long-term melanoma survivors may not have the need for an intervention focused on general QOL. Further investigation using disease-specific measures of QOL is needed to identify challenges related to a melanoma diagnosis that would not be pertinent to controls. Additional data are also needed to understand the QOL of advanced stage melanoma survivors, outside of a clinical trial. Overall, these data are encouraging for people diagnosed with melanoma, providers, and public health researchers alike, as the number of melanoma survivors will continue to rise over the next few decades.

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Demographic and general health characteristics of melanoma survivors and population controls.

Table 1

Variable	Melanoma Survivors (N=724)		Population Controls (N=639)		p-value
	N	(%)	N	(%)	
Age at survey					0.98
30–39	49	6.8	46	7.2	
40–49	117	16.2	100	15.7	
50–59	263	36.3	234	36.6	
60–72	295	40.8	259	40.5	
Gender					0.91
Female	433	59.8	384	60.1	
Male	291	40.2	255	39.9	
Race					0.0001
White, Non-Hispanic	718	99.2	614	96.1	
Other	6	0.8	25	3.9	
Education					0.34
High school	92	13.2	78	12.4	
Vocational/Associates	127	18.3	141	22.4	
Some college	116	16.7	90	14.3	
College graduate	215	30.9	185	29.3	
Graduate/professional degree	146	21.0	137	21.7	
<i>Missing</i>	28		8		
Marital Status					0.81
Never married	38	5.5	37	5.9	
Married/Partnered	578	83.4	516	81.5	
Widowed	15	2.2	14	2.2	
Divorced	62	9.0	66	10.4	
<i>Missing</i>	31		6		
Income					0.34
<\$50,000	102	14.7	104	16.5	

Variable	Melanoma Survivors (N=724)		Population Controls (N=639)		p-value
	N	(%)	N	(%)	
\$50,000–74,999	126	18.2	118	18.7	
\$75,000–\$149,999	278	40.1	235	37.2	
\$150,000+	129	18.6	104	16.5	
Prefer not to say	59	8.5	70	11.1	
<i>Missing</i>	30		8		
Body Mass Index (BMI)					0.95
Underweight (<18.5 kg/m ²)	4	0.6	3	0.5	
Normal (18.5–24.9 kg/m ²)	267	36.9	242	37.9	
Overweight (25.0–29.9 kg/m ²)	244	33.7	218	34.1	
Obese (30.0+ kg/m ²)	209	28.9	176	27.5	
Current Smoker					0.04
No	680	94.4	582	91.7	
Yes	40	5.6	53	8.4	
<i>Missing</i>	4		4		
Family history of melanoma					0.59
No	506	69.9	438	68.5	
Yes	218	30.1	201	31.5	
Number of Co-morbidities**					0.36
None	141	20.1	118	18.9	
1	140	20.0	134	21.5	
2	158	22.6	129	20.7	
3	105	15.0	87	13.9	
4	69	9.9	54	8.7	
5+	87	12.4	102	16.4	

* sum all comorbidities except non-melanoma skin cancer

Table 2

SF-36 subscale scores and HADS Anxiety and Depression categories compared between melanoma survivors and population controls.

SF-36 Subscale	Melanoma Survivors		Population Controls		Gender and age-adjusted		Full model*			
	N	Mean±SD	N	Mean±SD	Difference - Mean (95% CI)	p-value	Difference - Mean (95% CI)	p-value	Adj. p-value**	Cohen's d [†]
General health	712	75.0±18.7	634	73.1±18.9	2.01 (0.01, 4.02)	0.05	1.60 (-0.12, 3.33)	0.07	1.00	0.10
Physical functioning	719	90.5±16.2	630	86.9±18.5	3.74 (1.92, 5.55)	<0.0001	3.19 (1.67, 4.71)	<0.0001	0.003	0.23
Bodily pain	715	76.9±21.4	634	72.3±21.7	4.67 (2.39, 6.95)	<0.0001	3.89 (1.89, 5.89)	0.0001	0.01	0.21
Role-Physical	718	89.6±18.9	630	86.5±21.0	3.26 (1.17, 5.34)	0.002	2.81 (0.97, 4.64)	0.003	0.17	0.17
Mental Health	712	79.6±15.3	633	78.7±14.9	0.83 (-0.78, 2.44)	0.31	0.37 (-1.16, 1.90)	0.64	1.00	0.03
Vitality	712	66.0±17.8	633	64.2±17.7	1.76 (-0.13, 3.66)	0.07	1.51 (-0.19, 3.22)	0.08	1.00	0.10
Role-Emotion	716	91.3±17.4	630	90.5±18.1	0.81 (-1.09, 2.70)	0.40	0.35 (-1.40, 2.10)	0.69	1.00	0.02
Social Functioning	716	90.6±17.1	635	88.3±19.5	2.25 (0.29, 4.20)	0.02	1.72 (-0.05, 3.48)	0.06	1.00	0.11
	N	%	N	%	OR (95% CI)	p-value	OR (95% CI)	p-value	Adj p-value**	
HADS Anxiety						0.64		0.99	1.00	
Normal (<7)	575	81.9	509	80.7	1.00		1.00			
Borderlin/Abnormal (8 [†])	127	18.1	122	19.3	0.94 (0.71, 1.24)		1.00 (0.74, 1.36)			
HADS Depression						0.09		0.19	1.00	
Normal (<7)	656	92.8	570	90.2	1.00		1.00			
Borderlin/Abnormal (8 [†])	51	7.2	62	9.8	0.72 (0.49, 1.06)		0.74 (0.48, 1.16)			

* adjusted for gender, age, education, income, marital status, BMI category, smoking status and number of comorbidities

** adjusted for multiple statistical tests

[†] Cohen's d; difference in Least Squares means divided by the standard deviation