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Health-related quality of life in cancer survivorship: predictive power of the Social Difficulties Inventory

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Introduction

A significant minority of cancer survivors experience long-term compromised health-related quality of life (HRQoL).¹ As the number of survivors increases, a key challenge is identifying which patients may experience ongoing HRQoL difficulties, in order to effectively target the provision of finite support services, and potentially facilitate a risk-stratified approach to follow-up care.^{2,3} Identifying patients at risk of reduced HRQoL in survivorship requires psychometrically sound screening measures with good predictive power.

The Social Difficulties Inventory (SDI-21) is a measure of everyday social problems (e.g. with activities of daily living, work, relationships) developed for use in routine cancer practice.⁴ It contains 21 items (e.g. have you felt isolated, had any financial difficulties) rated from 0 (no difficulty) to 3 (very much) with respect to the past month. The SDI-21 was highlighted as offering potential as a screening measure in the National Cancer Survivorship Initiative Vision document,⁵ and is being used in a screening program in Canada as part of the Distress Assessment and Response Tool which is completed by patients before oncology

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consultations, and a results summary flagging moderate to high distress responses is sent in real-time to patients' e-records for discussion in the consultation.⁶ However, to be useful in screening the SDI-21 must be able to predict HRQoL at a later time-point. Using secondary data analysis, this paper examines the predictive power of the SDI-21.

Materials and Methods

Participants and procedure

This paper uses data from the electronic Patient-reported Outcomes from Cancer Survivors (ePOCS) study.⁷ The study received National Health Service ethical approval (Leeds(East)REC:10/H1306/65). Patients diagnosed with potentially curable breast, colorectal or prostate cancer, recruited from hospitals in England, completed various HRQoL questionnaires online at three time-points: at study consent within six months of diagnosis (T1), and nine (T2) and fifteen (T3) months post-diagnosis. A subset of these questionnaires are analysed here.

Measures

T1: Sociodemographic and clinical information

Diagnosis, gender, age and postcode (for deriving socioeconomic status using the Index of Multiple Deprivation⁸ (IMD)) were collected from clinical records. Ethnicity, relationship status, and education were self-reported.

T2: Social Difficulties Inventory (SDI-21)

The SDI-21 comprises three subscales (Everyday-living, Money-matters, Self-and-others), which when added together form a 16-item summary score of general social distress (SD-16), and 5 single items.⁹ SD-16 scores range from 0 to 44 (higher scores=greater difficulties),

with a recommended cut-point of ≥ 10 indicating a clinically significant level of social distress warranting discussion with the patient.¹⁰

T3: Medical Outcomes Study 36-item Short-Form Health Survey, version 2 (SF-36v2)

The SF-36v2 is an internationally used, psychometrically sound measure of HRQoL for the general population.¹¹ It yields physical (PCS) and mental (MCS) component summary measures with norm-based scoring (mean=50; SD=10; lower scores indicate lower HRQoL and < 50 =below average).

Analysis

Two hierarchical linear regression analyses were undertaken, with PCS and MCS scores as dependent variables and social distress a binary predictor variable (using the SD-16 ≥ 10 cut-point) (Table 2). Analyses of Relative Risk were undertaken by dichotomising participants into groups of socially distressed and not (using the SD-16 ≥ 10 cut-point) and higher and lower PCS and MCS scores (lower scores being $> 1SD$ below the normative mean score; i.e. < 40). Analyses were performed using IBM-SPSS version-21.

Results

Participants

Of 1,152 invited patients 636 (55.21%) consented to participate in the ePOCS study, and 357 of these provided SD-16 and SF-36v2 data at T2 and T3 respectively. The characteristics of this sample are summarised in Table 1.

SD-16, PCS and MCS scores

SD-16 scores (M=4.12; SD=5.52) were skewed with most participants experiencing little or no social distress; only 46/357 (12.9%) participants scored at or above the SD-16 cut-point. Mean PCS (M=47.60; SD=9.92) and MCS (M=49.54; SD=10.87) scores were just below, but close to, the normative average. The proportion of participants obtaining lower HRQoL scores (i.e. >1SD below the normative average) was 77/357 (21.6%) for the PCS, 70/357 (19.6%) for the MCS, 115/357 (32.2%) for either the PCS or MCS, and 32/357 (9.0%) for both the PCS and MCS.

Predictive value of SD-16 social distress scores on HRQoL six months later

The results of the regression analyses are summarised in Table 2. For physical HRQoL, the overall model at step 1 was significant ($F(5,351)=7.480$, $p<.001$) and explained 9.6% of the variance in PCS scores. Including SD-16 scores at step 2 improved the predictive power of the model ($F(6,350)=19.791$, $p<.001$), which explained an additional 15.7% of the variance in PCS scores (25.3% in total). In the two-step model social distress was the strongest predictor of poorer physical HRQoL, with (older) age being the only other significant predictor. For mental HRQoL, the overall model at step 1 was significant ($F(5,351)=6.829$, $p<.001$) and explained 8.9% of the variance in MCS scores. Including SD-16 scores improved the predictive power of the model ($F(6,350)=17.224$, $p<.001$), which explained an additional 13.9% of the variance (22.8% in total). In the two-step model social distress was the only significant predictor of poorer mental HRQoL.

Relative Risk (RR)

The RR (unadjusted for other variables) of participants in the socially distressed group having poorer HRQoL six months later, compared with those scoring below the SD-16 cut-point,

was 3.45 (95%CI:2.41-4.92) for PCS; 4.78 (95%CI:3.33-6.86) for MCS; 3.21 (95%CI:2.52-4.07) for either PCS or MCS; and 8.69 (95%CI:4.65-16.26) for both PCS and MCS.

Discussion

This paper shows that the SD-16 summary score from the SDI-21 nine months post-diagnosis was a significant independent predictor of HRQoL at fifteen months post-diagnosis. The relative risk of having poorer HRQoL six months after scoring above the SD-16 cut-off was considerable. Where the SDI-21 is being used in Canada as part of an assessment tool in routine cancer care, the Everyday-living subscale has been found to be a significant correlate of suicidal intention.¹² Our novel analyses now indicate that the SD-16 is able to predict longer-term HRQoL among cancer survivors.

These secondary analyses must, however, be considered exploratory and the findings preliminary. Though not inconsiderable, the proportion of variance in HRQoL accounted for by SD-16 scores was modest (approximately 15%), and may have been lower still had we controlled for more other variables (step 1). Administration of the SDI-21 at nine months post-diagnosis was a proxy only for the time of transition from active treatment to follow-up, when survivorship assessment and care planning may take place. Consenting patients in the ePOCS study were younger and living in more affluent areas than those who declined participation.⁷ Furthermore, data for this paper were available for just 56.13% of the total ePOCS sample. Future research should address these sample biases and examine the predictive power of the SDI-16 over longer time periods. It would also be interesting to explore if the predictive power of the SD-16 varies by cancer type.

Our findings are encouraging regarding the usefulness of the SDI-16 to help predict future risk of lower HRQoL. If further work is corroborative, the SDI-16 could prove useful

as a component of screening tools to facilitate risk-stratified follow-up care for cancer survivors.

Key points

- It is important to identify patients at risk of lower HRQoL in survivorship
- We examined the predictive power of the Social Difficulties Inventory (SDI-21) – specifically the SD-16 social distress summary score
- Cancer patients completed the SDI-21 nine months post-diagnosis and a HRQoL measure 6 months later
- SDI-16 scores were a significant predictor of physical and mental HRQoL
- The relative risk of poorer HRQoL six months after scoring above the SDI-16 cut-off was considerable

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Table 1. Sociodemographic and clinical sample characteristics

<i>Gender</i>	
Male	162(45.4%)
Female	195(54.6%)
<i>Age years, M±SD</i>	
	60.82±10.47
<i>Socioeconomic status</i>	
1 (most deprived quintile)	51(14.3%)
2	65(18.2%)
3	55(15.4%)
4	97(27.2%)
5 (least deprived quintile)	89(24.9%)
<i>Ethnicity</i>	
Caucasian	347(97.2%)
Non-Caucasian	1(0.3%)
Non-response	9(2.5%)
<i>Relationship status</i>	
Married	254(71.1%)
Civil partnership	1(0.3%)
In a relationship	32(9.0%)
Divorced/separated	18(5.0%)
Single	17(4.8%)
Widowed	26(7.3%)
Non-response	9(2.5%)
<i>Education</i>	
No formal qualifications	64(17.9%)
High school	70(19.6%)
Further education	68(19.0%)
University	75(21.0%)
Other	64(17.9%)
Non-response	16(4.5%)
<i>Cancer diagnosis</i>	
Breast	163(45.7%)
Colorectal	96(26.9%)
Prostate	98(27.5%)

Table 2. Summary of the regression analyses for HRQoL

	R	R ²	R ² _{adj}	ΔR ²	B (Unstandardised)	Standard Error	β (Standardised)	t
Physical HRQoL								
<i>Step 1</i>	.310	.096	.083	.096				
Age					-.235	.053	-.249	-4.421***
IMD score					.000	.000	.170	3.326**
Gender					-.485	2.013	-.024	-.241
Cancer diagnosis ^a					.749	1.795	.034	.417
Cancer diagnosis ^b					4.686	2.338	.211	2.004*
<i>Step 2</i>	.503	.253	.241	.157				
Age					-.312	.049	-.329	-6.330***
IMD score					9.558E-5	.000	.087	1.819
Gender					-.126	1.833	-.006	-.069
Cancer diagnosis ^a					.576	1.634	.026	.352
Cancer diagnosis ^b					4.097	2.130	.185	1.924
Social distress					-12.275	1.431	-.415	-8.579***
Mental HRQoL								
<i>Step 1</i>	.298	.089	.076	.089				
Age					.156	.059	.150	2.665**
IMD score					.000	.000	.169	3.296**
Gender					-1.504	2.217	-.069	-.678
Cancer diagnosis ^a					3.030	1.977	.124	1.533
Cancer diagnosis ^b					4.497	2.575	.185	1.746
<i>Step 2</i>	.477	.228	.215	.139				
Age					.077	.055	.074	1.405
IMD score					.000	.000	.091	1.873
Gender					-1.133	2.044	-.052	-.554
Cancer diagnosis ^a					2.851	1.822	.116	1.565
Cancer diagnosis ^b					3.888	2.375	.160	1.637
Social distress					-12.677	1.595	-.391	-7.947***

HRQoL=health-related quality of life; IMD=Index of Multiple Deprivation; *p<.05; **p<.01; ***p<.001

Age and IMD score are continuous variables, gender (1=male, 0=female), cancer diagnosis (*a* = 1=colorectal, 0=breast or prostate) (*b* = 1=prostate, 0=breast or colorectal) and social distress (1=socially distressed, 0=not) are nonmetric variables using dummy coding