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Supporting Information

Supplementary methods and results

This appendix was part of the submitted manuscript and has been peer reviewed.
It is posted as supplied by the authors.

Appendix to: Slavova-Azmanova NS, Newton JC, Saunders CM. Marked variation in out-of-pocket costs for cancer care in Western Australia. *Med J Aust* 2020; doi: 10.5694/mja2.50590.

Methods

Participants were recruited through the Western Australian Cancer Registry (WACR). Inclusion criteria were:

(1) pathologically confirmed diagnosis of colorectal cancer (ICD-10, C18), lung cancer (ICD-10, C33–C34), prostate cancer (ICD-10, C61), or breast cancer (ICD-10, C50); and

(2) a residential postcode in four rural (Midwest, South West, Great Southern, Goldfields) and two outer metropolitan (Joondalup/Wanneroo and Rockingham/Peel) regions of WA.

Cancer patients who were younger than 18 years old, who had previously been diagnosed with cancer, or who had no confirmed pathological diagnosis of cancer, were excluded. Participants were recruited between 1 April 2014 and 31 April 2017. Participants were sent an initial survey, followed by a travel and expenses diary if they were still receiving treatment, and a final survey administered once treatment was complete.

Out-of-pocket expenses were defined as amount participants paid — for treatments, doctor's appointments, tests, supportive care, fuel, parking, accommodation, complementary and alternative therapies, household utilities, clothing, and food — after deducting any rebates from Medicare or private health insurance funds and financial assistance from other organisations (eg, patient assistance transport scheme and Cancer Council WA). Costs were adjusted to 2017 Australian dollars. Some participants had no out-of-pocket expenses for some items as they were reimbursed the full amount of their spending. Only participants who had reported cost data for the course of their primary treatment were included in the analyses.

Statistical analysis

Descriptive and univariate analyses were undertaken in IBM SPSS Statistics 25, and the multivariate analyses in Stata 14. The distribution of out-of-pocket expenses by patient characteristic was heavily skewed, but the proportions of items with no net out-of-pocket expenses were small (range, 4–13%). Bootstrapped *t* tests were therefore used for univariate analysis of demographic (sex, age, marital status, region of residence, socioeconomic status (Socioeconomic Indexes For Areas – Index for Relative Social Disadvantage[1]), financial (household income, health insurance, working status prior to diagnosis), and treatment (time since diagnosis, diagnosis, and treatment received) variables. Analysis of variance and Kruskal–Wallis tests were used where appropriate for variables with three or more categories. Variables for which $P < 0.05$ were included in log-linked generalised linear models with gamma distribution to identify predictors of higher out-of-pocket expenses. Factors associated with higher out-of-pocket expenses in the literature,[2-4] including time since diagnosis, health insurance status, and treatment received were also included. Analyses were adjusted for age and sex. Mean out-of-pocket expenses (with 95% confidence intervals) were estimated for variables significantly associated in these analyses with higher out-of-pocket expenses (tables 1 and 2).

References

1. Australian Bureau of Statistics. 2033.0.55.001. Census of population and housing: Socio-Economic Indexes for Areas (SEIFA), Australia, 2011: IRSD. Mar 2013. https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2033.0.55.001~2011~Main%20Features~IRSD~10005 (viewed Sept 2019).
2. Carrera PM, Kantarjian HM, Blinder VS. The financial burden and distress of patients with cancer: understanding and stepping-up action on the financial toxicity of cancer treatment. CA Cancer J Clin 2018; 68: 153-165.
3. Christine L, Fradgley EA, Roach, D, Baird H. Impact of financial costs of cancer on patients: the Australian experience. *Cancer Forum* [online] 2017; 41(2): 4-9. https://search.informit.com.au/documentSummary;dn=112219143923601;res=IELHEA (viewed Sept 2019).
4. Bates N, Callander E, Lindsay D, et al. CancerCostMod: a model of the healthcare expenditure, patient resource use, and patient co-payment costs for Australian cancer patients. Health Econ Rev 2018; 8: 28.

Table 1. Univariate analyses: out-of-pocket expenses for rural participants

Variable		Number	Mean (SD)	Bootstrapped 95% CI	Median (IQR)	*P*
Total number of patients		308				
Sex	Men	155 (50%)	3431 (4188)	2770–4120	1807 (663–4514)	0.008
	Women	151 (49%)	2302 (3113)	1835–2815	1152 (441–2830)	
Region of residence	Great Southern/Midwest/Goldfields	145 (47%)	3319 (4176)	2674–4016	1621 (465–4802)	0.05
	South West	161 (52%)	2473 (3246)	1983–2986	1265 (533–3214)	
Health insurance status	Medicare only	96 (31%)	1333 (1485)	1060–1639	763 (330–1811)	< 0.001
	Private health insurance	205 (67%)	3646 (4240)	3107–4239	1919 (805–4953)	
Age	> 65 years	166 (54%)	1955 (3041)	1518–2452	844 (310–1961)	< 0.001
	< 65 years	140 (46%)	3963 (4172)	3282–4634	2404 (1076–5265)	
Time since diagnosis	> 6 months	213 (69%)	3298 (4033)	2766–3807	1838 (663–4245)	0.001
	< 6 months	71 (23%)	1890 (2876)	1262–2611	728 (310–1807)	
Working prior to diagnosis	Not working	161 (52%)	1812 (2877)	1398–2240	787 (310–1961)	< 0.001
	Working	136 (44%)	4122 (4258)	3441–4894	2451 (1185–5359)	
Marital status	Widowed/separated/divorced/single	65 (21%)	1352 (1482)	1017–1716	962 (359–1838)	< 0.001
	Married/de facto	241 (78%)	3285 (4041)	2779–3830	1693 (578–4337)	
Carer status	No	240 (78%)	2729 (3794)	2257–3204	1378 (443–3256)	0.10
	Yes	56 (18%)	3637 (3527)	2662–4606	2068 (997–5620)	
Highest education level	University/vocational	133 (43%)	3377 (3714)	2734–4023	1954 (819–4245)	0.041
	Year 12 or less	172 (56%)	2496 (3722)	1963–3076	1013 (349–3134)	
Diagnosis	Lung	15 (4.9%)	1557 (1875)	736–2604	856 (489–1451)	0.002*
	Breast	123 (40%)	2491 (3224)	1968–3132	1384 (581–3180)	
	Prostate	119 (39%)	3579 (4040)	2917–4318	1910 (700–4514)	
	Bowel, colon, or rectum	49 (16%)	2528 (4327)	1490–3833	666 61–2480)	
Socio-economic status	Low (0–4)	105 (34%)	3168 (3812)	2424–3926	1573 (485–4141)	0.70†
	Moderate (5–6)	119 (39%)	2737 (3757)	2134–3418	1129 (441–3769)	
	High (7–10)	60 (20%)	2974 (4003)	2095–4079	1564 (536–3240)	
Chemotherapy received	No	212 (69%)	2654 (3658)	2183–3168	1247 (443–3234)	0.12
	Yes	94 (30%)	3370 (3872)	2639–4203	1875 (663–5020)	
Radiotherapy received	No	184 (60%)	2827 (3796)	2330–3371	1252 (400–3559)	
	Yes	122 (40%)	2945 (3652)	2310–3616	1593 (683–3677)	0.79
Surgery received	No	54 (18%)	1855 (2812)	1190–2674	1045 (413–2217)	
	Yes	252 (82%)	3092 (3873)	2569–3626	1567 (519–4215)	0.008
Time since diagnosis	> 6 months	220 (71%)	3254 (3982)	2750–3778	1818 (673–4185)	0.001
	< 6 months	86 (28%)	1903 (2800)	1360–2563	836 (313–1895)	
Weekly household income	< $1028.66 (2015–16 national median)	173 (56%)	2225 (3435)	1752–2736	1070 (429–2319)	< 0.001
	> 1028.66	92 (30%)	4318 (3958)	3526–5170	3135 (1373–5961)	

CI = confidence interval; IQR = interquartile range; SD = standard deviation. * Kruskal–Wallis test. † Analysis of variance.

Table 2. Univariate analyses: out-of-pocket expenses for outer metropolitan participants

Variable		Number	Mean (SD)	Bootstrapped 95% CI	Median (IQR)	*P*
Total number of patients		119				
Sex	Men	48 (40%)	7802 (15574)	4513–13176	3783 (1324–8590)	0.10
	Women	68 (57%)	4005 (4550)	3047–5126	2116 (876–6738)	
Region of residence	Joondalup/Wanneroo	68 (57%)	6911 (12896)	4717–10687	5257 (1515–7888)	0.11
	Rockingham/Peel	51 (43%)	3778 (6414)	2200–5649	1324 (294–3253)	
Health insurance status	Medicare only	35 (29%)	3111 (5324)	1487–5195	1101 (255–3783)	0.10
	Private health insurance	83 (70%)	6656 (12195)	4589–9946	4167 (1291–8024)	
Age	> 65 years	62 (52%)	3612 (4975)	2463–4883	1702 (380–5424)	0.037
	< 65 years	57 (48%)	7697 (14319)	4825–11887	5031 (2118–8080)	
Working prior to diagnosis	> 6 months	71 (60%)	2956 (3914)	2143–3930	1921 (460–3783)	0.007
	< 6 months	45 (38%)	9736 (15884)	6039–15008	6859 (2855–10442)	
Time since diagnosis	Not working	78 (66%)	6360 (12608)	4208–9528	3174 (1235–7173)	0.27
	Working	41 (34%)	4062 (5257)	2549–5754	2046 (514–6859)	
Marital status	Widowed/separated/divorced/single	20 (17%)	5233 (7131)	2441–8510	1612 (508–8106)	0.88
	Married/de facto	99 (83%)	5636 (11302)	3889–8087	3061 (958–7142)	
Carer status	No	94 (79%)	6065 (11712)	4260–8692	3071 (1133–7167)	0.31
	Yes	21 (18%)	3392 (4161)	1851–5295	1254 (460–5644)	
Highest education level	University/vocational	63 (53%)	7204 (13721)	4616–11211	5031 (1178–8590)	0.08
	Year 12 or less	55 (46%)	3780 (5178)	2518–5291	2118 (471–4543)	
Diagnosis	Lung	19 (16%)	2093 (1758)	1338–2909	1803 (673–2530)	0.003*
	Breast	53 (44%)	4562 (4729)	3367–5897	3061 (1101–7167)	
	Prostate	33 (28%)	10474 (18438)	5886–18048	5887 (2528–12080)	
	Bowel, colon, or rectum	14 (12%)	2534 (3757)	984–4887	1522 (136–3080)	
Socio-economic status	Low (0–4)	37 (31%)	1844 (2139)	1185–2673	958 (321–2530)	0.029†
	Moderate (5–6)	19 (16%)	6998 (7655)	3711–10244	3783 (1101–12501)	
	High (7–10)	55 (46%)	7890 (14446)	5093–12482	5644 (1602–9128)	
Chemotherapy received	No	82 (69%)	4726 (5852)	3524–6074	2428 (569–7010)	0.20
	Yes	37 (31%)	7435 (17099)	3756–14739	2855 (2053–7142)	
Radiotherapy received	No	73 (61%)	5951 (13283)	3621–9231	2528 (471–6204)	0.62
	Yes	46 (39%)	4961 (4096)	3779–6128	4412 (1178–7609)	
Surgery received	No	33 (28%)	1933 (1782)	1368–2597	1324 (382–2530)	0
	Yes	86 (72%)	6963 (12263)	4833–10063	4355 (1133–8233)	
Time since diagnosis	> 6 months	78 (65.5%)	6360 (12608)	4208–9528	3174 (1235–7173)	0.27
	< 6 months	41 (34%)	4062 (5257)	2549–5754	2046 (514–6859)	
Weekly household income	< $1028.66 (2015–16 national median)	72 (60%)	3965 (4965)	2881–5211	2475 (662–5707)	0.06
	> 1028.66	39 (33%)	9255 (16889)	5318–14984	7142 (2053–10340)	

CI = confidence interval; IQR = interquartile range; SD = standard deviation. * Kruskal–Wallis test. † Analysis of variance.