

Adverse health behaviours among colorectal cancer survivors: a case study from Iran

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Contributions: (I) Conception and design: All authors; (II) Administrative support: None; (III) Provision of study materials or patients: None; (IV) Collection and assembly of data: HA Nikbakht, N Aminisani, SR Hosseinei; (V) Data analysis and interpretation: All authors; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors.

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Background: Cancer survivors are at greater risk of developing secondary tumours, cardiovascular disease, diabetes, and osteoporosis. A part of this is because they share the similar lifestyle factors. The aim of this study was to examine the prevalence of adverse health behaviours and its determinants among colorectal survivors.

Methods: This cross-sectional study was conducted in Babol city located in North of Iran. The pathologic information and demographic characteristics were collected from the population based-cancer registry. Colorectal cancer (CRC) survivors between 2007–2013 were included in this study. A questionnaire includes socioeconomic status, lifestyle behaviours [smoking, physical activity (PA), fruit & vegetable consumption], and clinical factors were completed via home visit by trained interviewers.

Results: The majority of CRC survivors were male and were more than 50 years of age, more than half of them resided in urban areas. About 67% of survivors had at least one comorbid condition. In general, the majority of them were not meeting the recommendation for PA (89%), about 87% of them consumed less than 5 daily serving of fruit & vegetable and 14.6% of participants were smoke either cigarette or hookah. Female genders, illiteracy, comorbidities, and place of residency were the most important determinants of having adverse health behaviours.

Conclusions: The minority of people with CRC were not meeting the PA or 5-A-day recommendations. It is important to notify the health policy makers and to develop a comprehensive educational program to enhance the adherence to healthy lifestyle recommendation among CRC survivors.

Keywords: Colorectal cancer survivors (CRC survivors); healthy lifestyle; adherence; Babol; Iran

Submitted Dec 11, 2015. Accepted for publication Jan 05, 2016.

doi: 10.21037/jgo.2016.03.01

View this article at: <http://dx.doi.org/10.21037/jgo.2016.03.01>

Introduction

Globally, colorectal cancer (CRC) is ranked as the third most common cancer diagnosed in men and the second in women (1). In recent decades, the number of cancer survivors including CRC survivors, has been increased as a result of advances in early detection and curative

treatment options (2). Cancer survivors have a higher risk of developing secondary tumours, heart disease, type 2 diabetes, and osteoporosis (3,4). Coronary artery disease becomes the leading cause of death in CRC, breast and endometrial cancer survivors approximately ten years after diagnosis (5-7). A part of this is because they share the similar lifestyle factors [diet, body weight,

physical activity (PA), and smoking] (8). There is evidence that cancer-related outcomes such as quality of life, and prognosis are influenced by lifestyle factors. Adverse health behaviours such as smoking, inadequate fruit and vegetable consumption, insufficient PA and obesity have repeatedly been shown to negatively impact outcomes in survivors of different cancer types (9,10).

Results of previous studies showed, despite the lifestyle recommendation, adherence to healthy behaviours is inadequate among cancer survivors, for example, the majority of survivors (80%) in the ACS-SCS II study which examined over 9,000 survivors across six different cancer types, did not meet the 5-A-day dietary recommendation (five serving of fruits and vegetable per day according to current dietary guidelines) (9). Meeting PA recommendation is even much worse among cancer survivors (10,11). Smoking have negative consequences on cancer outcomes, for instance, results of a meta-analysis of different studies of lung cancer survivors showed a lower five year survival rates for smokers in compared to non-smokers or former smokers (33% and 70%, respectively) (12). A history of ever-smoking can also impact outcomes in colon cancer, as a recent study demonstrated a significantly shorter disease-free survival in ever-smokers (12,13). Evidence showed that adherence to lifestyle recommendation in CRC patients may reduce the recurrence, prevent the development of a secondary cancer and improve quality of life (9,14).

CRC is one of the most common cancers in Iran (15), overall, it is the fourth common cancer in Iran and is ranked the third and fifth most common cancer in women and men respectively. The age-standardized incidence rates in men and women were 11.31 and 10.89 in Iran respectively (14). Research examining the adverse health behaviours among CRC survivors in Iran is scarce while this group of patients are more vulnerable to negative health outcomes. The aim of this study was to identify the sociodemographic, and health related predictors of adverse health behaviours among CRC survivors in Babol, North of Iran where CRC is one of the most common cancers and the trend of CRC showed an increase in recent years (16).

Methods

This cross-sectional study was conducted in Babol city located in North of Iran. The Babol cancer registry is the first population-based cancer registry established in 1960s (17). For the purpose of this study the CRC survivors were selected from the registry database. The

pathologic information (using ICD-10 code), demographic characteristics and tumor information including topography code (ICD-0-C) and pathology code (ICD-0-M) were collected. Subjects with C18 (colon), C19 (recto-sigmoid junction), C20 (rectum), and C21 (anus and anal canal) codes recorded between 2007–2013 were included in the study (n=332). The inclusion criteria were as follows: (I) having the listed codes; (II) being alive; (III) currently residing in Babol; and (IV) diagnosis during the specified periods. Lacks of cooperation and incorrect address or phone number were the exclusion criteria. After excluding people who no longer resided in Babol (37 cases), deaths (112 cases), migrate (six cases), non-cooperative (four cases) and incorrect phone and home addresses (16 cases); the questionnaires were completed for all the remaining 157 patients.

Demographic information was collected via self-report including age, education, employment status, place of residency. Age was categorized into two categories; <50 and ≥50 years, education was classified as illiterate, literate, occupation (in-paid work or no-working) and place of residency urban/rural. Patients were also asked whether they experienced various comorbid conditions (including heart disease, hypertension, chronic back pain, arthritis, stroke, osteoporosis, asthma, chronic obstructive pulmonary disease, stomach and/or intestinal problems, and diabetes).

Insufficient PA, inadequate consumption of fruit and vegetables and smoking habits were considered as adverse health behaviours in this study. PA was measured via the validated Godin Leisure-Time Exercise Questionnaire (18,19) and was classified into two categories: insufficient PA; sufficient PA. Adequate consumption of fruit and vegetable; 5-A-day, was measured by asking survivors the question, “How many times do you eat fruits and vegetables a day?” (19). It was subsequently categorised into two categories: inadequate 5-A-day; adequate 5-A-day. Smoking was measured via this question “Do you currently smoke cigarettes on a regular basis” rated on a yes/no scale. Hookah smoking was measured via this question “Do you smoke hookah on a regular basis” (at least one per week) and a dummy variable created based on these two questions (0 not smoking, 1 smoking). Crude and adjusted odds ratios (ORs) were presented. In multiple logistic regression models, adverse health behaviours (smoking, inadequate PA, inadequate 5-A-day) were considered as dependant variable, and age, sex, place of residency, work status, education, time since diagnosis, and comorbidities were considered as covariates.

Table 1 General characteristics among colorectal cancer survivors in Babol, North of Iran, 2014

Characteristics	n	%
Age		
<50	44	28.0
≥50	113	72.0
Sex		
Male	97	61.8
Female	60	38.2
Place of residence		
Urban	87	55.4
Rural	70	44.6
Education		
Illiterate	72	45.9
literate	85	54.1
Occupation		
In-paid work	50	31.8
No-working	107	68.2
Duration of disease		
<3 years	106	67.5
≥3 years	51	32.5
Comorbidities		
Yes	107	68.2
No	50	31.8

This study received Ethics approval from Tabriz University of Medical sciences; Ethics Committee. All patients completed a consent form before the interview.

Results

A total of 157 CRC survivors were included in this study. The majority of them were male, more than 50 years of age, and more than half resided in urban areas. About 46% of them had no education, and about two-third were currently not working. The majority of them (68%) were diagnosed less than 3 years ago and 67% of survivors had at least one comorbid condition (*Table 1*).

Adverse health behaviours, sociodemographic and clinical characteristics of CRC survivors are presented in *Table 2*. In general, the majority of people with CRC were not meeting the recommendation for PA (89%), and 5-A-day recommendation (86.6%), in addition only 14.6% of them were smoke either cigarette or hookah.

Results of multiple logistic regression models showed

relative to survivors ≥50 years of age, younger survivors less likely to report insufficient PA, crude OR =0.29 (95% CI: 0.10–0.82, P=0.02), however the effect was attenuated in fully adjustment model. The number of women who were not meeting the PA recommendation was higher than men (about 98% vs. 84%). Crude OR was 0.08 (95% CI: 0.01–0.66) for men relative to women. Urban residents were more likely report insufficient PA (adjusted OR =5.47, 95% CI: 1.18–25.36, P=0.03). Insufficient PA were lower in those who were currently working compared to survivors who were not working (adjusted OR =0.07, 95% CI: 0.01–0.34, P=0.001). Crude OR was 3.57 (95% CI: 1.27–10.03) for survivors with at least one comorbid condition, adjustment for other variables increased the OR to 6.78 (95% CI: 1.54–29.85).

Younger survivors were more likely to be smoker compared to survivors ≥50 years of age (adjusted OR =3.76, 95% CI: 1.19–11.91). The same was true for men survivors compared to women (adjusted OR =8.75, 95% CI: 1.74–42.96).

The majority of survivors were not meeting 5-A-day recommendation, however survivors from urban areas less likely to report inadequate 5-A-day in comparison to those from rural areas (adjusted OR =0.57, 95% CI: 0.20–1.60). Illiterate survivors were more likely to not meeting recommendations (adjusted OR =1.81, 95% CI: 0.60–5.43). The same was true for survivors who were involved in in-paid working and those with comorbidities (adjusted OR =2.31, 95% CI: 0.68–8.34; and 2.43, 95% CI: 0.88–6.72 respectively).

Discussion

The main aim of this study was to assess the prevalence of adverse health behaviours and its determinants among CRC survivors in Babol, North of Iran. Our results showed that the majority of people with CRC were not meeting the recommendation for PA, and for 5-A-day, whereas most of them were not smoking or using hookah. Poor healthy lifestyle behaviours among CRC survivors and other cancer survivors has been reported previously in other studies (9,10,20,21). However Demark-Wahnefried et al. in a study among breast and prostate cancer survivors reported a higher percentage of healthy behaviours; in their study 42% of survivors reported daily consumption of ≥5 fruits & vegetables, but their results might be subject to bias toward reporting healthy behaviours because of low participation rate (22).

The majority of people with CRC were not meeting the

Table 2 Adverse health behaviours and its determinants among colorectal cancer survivors in Babol, North of Iran, 2014

Characteristics (N=157)	Inadequate physical activity (N=140)			Smoking (N=23)			Inadequate 5-A-day (N=136)		
	N (%)	OR1* (95% CI)	OR2** (95% CI)	N (%)	OR1* (95% CI)	OR2** (95% CI)	N (%)	OR1* (95% CI)	OR2** (95% CI)
Age									
<50	35 (79.5)	0.29 (0.10–0.82)	0.43 (0.09–2.06)	12 (27.3)	3.47 (1.40–8.60)	3.76 (1.19–11.91)	37 (84.1)	0.74 (0.28–1.99)	0.67 (0.22–2.06)
≥50	105 (92.9)	Reference		11 (9.7)			99 (87.6)		
P value		0.020	0.295		0.007	0.024		0.562	0.494
Sex									
Male	81 (83.5)	0.08 (0.01–0.66)	0.19 (0.02–1.84)	21 (21.6)	8.01 (1.80–35.55)	8.75 (1.74–42.96)	85 (87.6)	1.25 (0.49–3.17)	1.59 (0.53–4.76)
Female	59 (98.3)	Reference		2 (3.3)			51 (85.0)		
P value		0.019	0.156		0.006	0.008		0.639	0.408
Place of residence									
Urban	81 (93.1)	2.51 (0.88–7.19)	5.47 (1.18–25.36)	12 (13.8)	0.85 (0.35–2.08)	1.13 (0.40–3.18)	73 (83.9)	0.57 (0.22–1.52)	0.57 (0.20–1.60)
Rural	59 (84.3)	Reference		11 (15.7)			63 (90.0)		
P value		0.085	0.030		0.735	0.813		0.269	0.290
Education									
Illiterate	66 (91.7)	1.63 (0.57–4.66)	0.67 (0.15–3.00)	8 (11.1)	0.58 (0.23–1.46)	1.32 (0.43–4.08)	65 (90.3)	1.83 (0.69–4.81)	1.81 (0.60–5.43)
Literate	74 (87.1)	Reference		15 (17.6)			71 (83.5)		
P value		0.358	0.606		0.252	0.624		0.221	0.284
Occupation									
In-paid work	36 (72.0)	0.07 (0.02–0.27)	0.07 (0.01–0.34)	11 (22.0)	2.23 (0.90–5.48)	1.15 (0.42–3.09)	46 (92.0)	2.17 (0.69–6.83)	2.31 (0.68–8.34)
No-working	104 (97.2)	Reference		12 (11.2)			90 (84.1)		
P value		0.000	0.001		0.080	0.781		0.184	0.172
Duration of disease									
<3 years	97 (91.5)	2.00 (0.72–5.54)	1.14 (0.30–4.37)	13 (12.3)	0.57 (0.23–1.41)	0.75 (0.27–2.06)	92 (86.7)	1.04 (0.39–2.77)	1.21 (0.42–3.48)
≥3 years	43 (84.3)	Reference		10 (19.6)			44 (86.3)		
P value		0.180	0.839		0.227	0.583		0.929	0.722
Comorbidities									
Yes	100 (93.5)	3.57 (1.27–10.03)	6.78 (1.54–29.85)	15 (14.0)	0.85 (0.33–2.17)	1.22 (0.43–3.43)	96 (89.7)	2.18 (0.85–5.54)	2.43 (0.88–6.72)
No	40 (80.0)	Reference		8 (16.0)			40 (80.0)		
P value		0.016	0.011		0.744	0.699		0.101	0.086

*, crude odds ratio; **, fully adjusted odds ratio, adjusted for age, sex, place of residency, education, work status, duration of disease, and comorbid conditions. OR, odds ratio.

recommendation for 5-A-day (86.6%), it was consistent with previous studies that indicated poor adherence to dietary recommendations (5-A-day serving of fruit and vegetables) among people with CRC (9,10,21,23). For instance, Blanchard et al found that only 15.9% colorectal survivors were meeting adequate (5-A-day) fruit and vegetable consumption (9).

The prevalence of sufficient PA was only 11%; women survivors, older patients, not working status, and those with comorbidities had a greater likelihood of not meeting the recommendation. Insufficient PA was much higher than the percentage reporting from other studies; for instance in a study in the US, 35% of colorectal survivors had sufficient PA (9) and based on the results of a study in Korea 26% of cancer survivors were meeting the PA recommendation (24). Evidence from other studies showed that younger cancer survivors (18 to 40 years of age) were more likely to meet the PA recommendations (37.6%) than older survivors (age 40 to 64 years of age and those ≥ 65 years of age which were 33.0% and 24.9% respectively) (25). It has been shown that male cancer survivors were more likely to meet PA recommendations than female, and those with more than two comorbidities have an increased the odds of being sedentary (25). This percentage is below than those found in the healthy population; based on a nationwide survey where 40% of adults belonged to low and 15% had no PA at all (26). However, percentage of 5-A-day consumption (13.4%) is similar to healthy population (12.5%) (27). In general healthy people also are below the recommendation, this suggest a need for a nationwide campaign in order to increase the consumption of fruit and vegetable to an optimal level.

The prevalence of current smoking was about 15% in this study, it was higher than other studies which reported about 10% (9,24). However, the prevalence of smoking cigarette/hookah among CRC survivors was lower than that in general population (14.6% *vs.* 22.7% for only cigarette smoking) (28). National data showed the prevalence of 14.2% for current cigarette smoking (29), in our study we combined cigarette and hookah smoking since both were important and it is recommended to be quitted after diagnosis. The prevalence of only smoking was about 10% which is lower than the national average. The findings of this study showed that younger CRC survivors and male patients had a greater likelihood of being current smoker. Similar finding from another study showed that, younger survivors (18 to 40 years) are at greater risk for continued smoking than controls (25).

A link between smoking after diagnosis of CRC and risk

of death from CRC is about twice (30), this suggests that recommendation for smoking might be more effective or perhaps is more sensitive in this context since it usually comes forward than PA and fruit and vegetable consumption while these two factors are linked to higher recurrence and mortality and following the recommendations by cancer survivors will provide even a greater benefit.

The strengths of this study were registry-identified cancer diagnosis, lifestyle behaviour assessment comparable to similar studies, there are some limitations; firstly, the self-report assessments of adverse health behaviours rather than objective measurements which subject to recall bias. It is recommended using objective indicators in future research to better evaluation of current pattern in the present study. Secondly, pre-diagnosis lifestyle behaviours were not measured. However, it was more subject to recall bias and would not be feasible to asses in such study. Prospective research studies are recommended to examine time trend of changes in lifestyle behaviours among people with cancer.

Conclusions

This study showed that only the minority of CRC survivors were meeting the PA or 5-A-day recommendations. Female gender, illiteracy, comorbidities, place of residency were the important determinants of having adverse health behaviours, it is important to notify the health policy makers and to develop a comprehensive educational program to enhance the adherence to healthy lifestyle recommendations among CRC survivors.

Acknowledgements

A substantial part of this study was supported by Research Council of Tabriz University of Medical Sciences. We gratefully thank Mr. Habib Zadeh, Mr. Mirzad, Mrs. Mousavi, the staff at the Screening and Counselling Centre of Babol, and all patients and their families who participated in this study.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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Cite this article as: Aminisani N, Nikbakht HA, Hosseinei SR, Shamshirgaran SM. Adverse health behaviours among colorectal cancer survivors: a case study from Iran. *J Gastrointest Oncol* 2016;7(3):373-379. doi: 10.21037/jgo.2016.03.01