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Clinical-Bladder cancer

Low awareness, adherence, and practice but positive attitudes regarding lifestyle recommendations among non–muscle-invasive bladder cancer patients

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Abstract

Background: A healthy lifestyle may reduce the risk of non–muscle-invasive bladder cancer (NMIBC) recurrence. The objective of this study was to obtain insight in whether NMIBC patients are aware of possible risk factors for (bladder) cancer, adhere to lifestyle recommendations for cancer prevention, received lifestyle advice from their physician, and what their attitudes are towards physicians giving lifestyle advice.

Methods: Patients with newly diagnosed NMIBC between 2014 and 2017 participating in the UroLife cohort study completed questionnaires at 6 weeks and 3 months after diagnosis about awareness of (bladder) cancer risk factors, adherence to lifestyle recommendations, reception of lifestyle advice, and attitudes towards physicians giving lifestyle advice.

Results: A total of 969 NMIBC patients were included (response rate 46%). Most patients (89%) were aware that smoking is a risk factor for cancer, and knowledge of other risk factors for cancer varied between 29% (low fruit and vegetable consumption) and 67% (overweight). Adherence to cancer prevention recommendations varied between 34% (body weight) and 85% (smoking). Of the smokers, 70% reported they were advised to quit, and 36% quit smoking in the three months before or after diagnosis. Only 21% of all patients indicated they received other lifestyle advice. More than 80% of patients had a positive attitude towards receiving lifestyle advice from their physician.

Conclusions: These findings show that awareness of (bladder) cancer risk factors and adherence to cancer prevention lifestyle recommendations among NMIBC patients is low and that physicians' information provision should be improved. © 2019 The Author(s). Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license. (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Key words: Advice; Attitude; Awareness; Lifestyle recommendations; Non–muscle-invasive bladder cancer

1. Introduction

Patients with non–muscle-invasive bladder cancer (NMIBC) have a high 5-year risk of recurrence [1],

necessitating a burdensome and expensive follow-up program [2]. A healthy lifestyle has been associated with several positive clinical outcomes in patients with various cancer types, that is, reduced cancer risk, better prognosis, and reduced risk of secondary malignancies and lifestyle-related comorbidities [3,4]. In urinary bladder cancer (UBC), cigarette smoking is responsible for about one-third of all diagnoses [5]. There is limited evidence for a positive association with overweight [6], and an inverse association

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with physical activity [7] and fruit and vegetable consumption [8]. Recent meta-analyses suggest that cigarette smoking [9] and overweight [10] are also associated with an increased risk of NMIBC recurrence.

A cancer diagnosis is often seen as a teachable moment at which the patient is highly motivated to change lifestyle behavior [11]. Also, NMIBC patients have been shown to be more likely to accept smoking as a cancer risk factor when this information was provided by their urologist [12]. This highlights the importance of physicians discussing lifestyle with their patients and raising their awareness of known cancer risk factors.

We aimed to obtain more insight in whether NMIBC patients are aware of possible risk factors for (bladder) cancer, adhere to lifestyle recommendations for cancer prevention, received lifestyle advice from their physician, and what their attitudes are towards physicians giving lifestyle advice.

2. Material and methods

2.1. Participants

This analysis is part of the population-based, prospective cohort study UroLife (Urothelial cancer: Lifestyle, prognosis and health-related quality of Life), conducted in 22 hospitals in the Netherlands. Before the start of the study, permission was asked from all participating urologists to identify their eligible NMIBC patients in the Netherlands Cancer Registry (NCR), held by the Netherlands Comprehensive Cancer Organization (IKNL). Patients were identified between 8 May 2014 and 25 April 2017 at approximately 4 weeks after diagnosis and were invited on behalf of their urologist to participate in UroLife. Eligible patients were Dutch speaking men and women between 18 and 80 years old and diagnosed with a histologically confirmed primary Ta, T1, or Tis tumor that was surgically removed with a transurethral resection. Patients with a previous cancer diagnosis in the past 5 years, and those with a positive lymph node or distant metastasis were excluded. Written informed consent was obtained from all participants. UroLife was approved by the Committee for Human Research region Arnhem-Nijmegen (CMO 2013-494).

2.2. Questionnaires

Patients were asked to complete web-based or paper-and-pencil-based questionnaires at approximately 6 weeks (T6wk) and 3 months (T3mo) after diagnosis. Web-based questionnaires were collected using the data collection tool of the Patient Reported Outcomes Following Initial treatment and Long term Evaluation of Survivorship (PROFILES) registry [13]. Patients with incomplete questionnaires were contacted by telephone for data completion. The T6wk questionnaire included questions on sociodemographic characteristics. Educational level was categorized into low (primary,

secondary, and vocational education), medium (intermediate vocational, higher general secondary, and preuniversity education), and high (university of vocational education, university).

2.3. Adherence

At T6wk and T3mo, lifestyle at the time of questionnaire completion was assessed. Patients were asked to report (1) whether they smoked or had smoked in the past and, if applicable, the date/age of smoking cessation before or after diagnosis, (2) their weight and height, (3) their average time and intensity of different activities in a normal week in the past months, assessed using the validated SQUASH questionnaire [14], (4) how many week and weekend days per week they drank alcohol, and their average number of drinks per week and weekend day, and (5) whether they ever used dietary supplements (T6wk) or used these in the previous three months (T3mo).

Smoking status was categorized as never, former (quit >3 months before diagnosis), recent quitter (quit between ≤3 months before diagnosis and time of questionnaire completion at T6wk and T3mo, respectively), and current. Body mass index (BMI, kg/m²) was categorized as underweight (≤18.4 kg/m²), normal weight (18.5–24.9 kg/m²), overweight (25–29.9 kg/m²), and obese (≥30 kg/m²) [15]. Physical activity was categorized as ≥ or <210 minutes/week moderate activity (i.e., commuting activities, sports, and leisure activities of 3–4 Metabolic Equivalent of Task with high intensity, or of ≥4 Metabolic Equivalent of Task with low, moderate, or high intensity). Dietary supplement use was categorized as never, former, and current.

We defined former smokers, recent quitters, and never smokers as adhering to the guideline of not smoking. Patients adhering to the World Cancer Research Fund/American Institute for Cancer Research (WCRF/AICR) recommendations for cancer prevention were defined as (1) having a normal weight, (2) being moderately active for ≥210 minutes/week, (3) consuming ≤2 (men) and ≤1 alcoholic drinks/day (women), (4) former or never using dietary supplements.

2.4. Awareness, practice, and attitudes

Awareness of risk factors for cancer in general was assessed at T3mo with a prompted list of 13 known risk factors on a 4-point Likert scale. An open-ended question was used to ask patients to report which of these 13 or other risk factors were risk factors for UBC. For analysis, responses were categorized into the same categories as for the 13 cancer risk factors, with an additional category for other responses.

Patients were asked if their physician asked about their smoking behavior, and gave them advice about smoking cessation, weight loss, physical activity, and a healthy diet, or other lifestyle advice. Patients who stated that they quit

smoking around diagnosis were asked to indicate if their physician offered help and their main reason for smoking cessation.

Patients' attitudes toward physicians giving advice on smoking cessation, a healthy diet, physical activity, and weight loss after diagnosis were assessed for 4 positive and 4 negative attitudes on a 4-point Likert scale [16].

2.5. Statistical analysis

Standard descriptive statistics were calculated to describe baseline characteristics of the cohort, and results for awareness, advice, and attitudes. McNemar's test was used to determine whether patients' adherence to the lifestyle recommendations changed from T6wk to T3mo. Multivariable logistic regression analyses were used to determine whether age, gender, and educational level were associated with patients' adherence. Also, it was determined whether awareness of smoking, body weight, physical activity, and alcohol consumption being risk factors for cancer was associated with adherence to these lifestyle recommendations. All tests were 2-sided and were considered statistically significant at $P < 0.05$. All data were analyzed using IBM SPSS Statistics, Version 22.

3. Results

The derivation of our study sample is shown in Fig. 1. In total, 969 NMIBC patients completed both the T6wk and T3mo questionnaire at a median of 6 (interquartile range 5–8) and 13 (interquartile range 12–14) weeks after diagnosis, respectively (response rate 46%). The majority of participants were men and lived with a partner (Table 1). Participants did not differ with respect to age and gender compared to nonparticipants. Compared to those not completing the T3mo questionnaire ($n = 132$), participants were

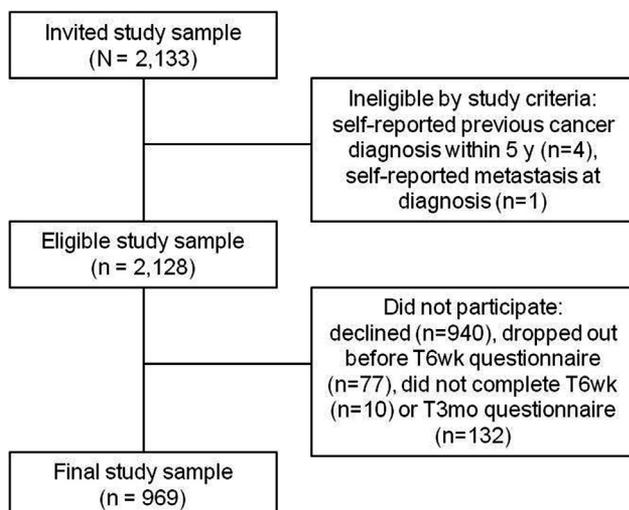


Fig. 1. Derivation of final study sample.

Table 1
Sociodemographic and lifestyle characteristics of 969 Dutch non-muscle-invasive bladder cancer patients at baseline

Variable ^a	
Age at diagnosis (y), median (IQR)	68 (61–73)
Sex, n (%)	
Male	771 (80%)
Female	198 (20%)
Educational level, ² n (%)	
Low	469 (48%)
Medium	257 (27%)
High	242 (25%)
European ancestry, n (%)	953 (98%)
Living situation, n (%)	
Alone	35 (4%)
With partner, with or without children	821 (85%)
Divorced or widow(er)	93 (10%)
Other	20 (2%)
Smoking status	
Never	173 (18%)
Former ^c	556 (57%)
Recent quitters ^d	89 (9%)
Current	150 (16%)
Body mass index (kg/m ²)	
≤18.4	9 (1%)
18.5–24.9	326 (34%)
25.0–29.9	459 (47%)
≥30.0	173 (18%)
Physical activity (min/week moderately active)	
≥210	677 (70%)
<210	286 (30%)
Alcohol consumption (glasses/day)	
≤1 (female) or ≤2 (male)	406 (42%)
>1 (female) or >2 (male)	554 (57%)
Supplement use	
Never	536 (55%)
Former	94 (10%)
Current	329 (34%)

Abbreviations: IQR: interquartile range; y: year.

^a Where scores do not total 100% this is due to missing values

^b Low (primary, secondary, vocational education), medium (intermediate vocational education, higher general secondary education, pre-university education), high (university of vocational education, university).

^c Former smokers who quit >3 months before diagnosis

^d Former smokers who quit between ≤3 months before diagnosis and time of questionnaire completion.

less likely to be lower educated (48 vs. 61%) but did not differ with respect to age, gender, and living situation (data not shown).

Eighty-nine percent of patients recognized smoking as risk factor for cancer, but other lifestyle factors were known by only 29–67% (Table 2). Sixty-one percent of patients reported one or more possible risk factors for UBC, with smoking being most frequently reported (44%) (Table 2, Table A.1).

Adherence to lifestyle recommendations for cancer prevention at T6wk was lowest for body weight (34%) and highest for smoking (85%) (Table 3). At T3mo, adherence remained similar for body weight and smoking, increased for alcohol consumption (from 42% to 62%) and dietary

Table 2

Awareness of risk factors for cancer in general and reported risk factors for bladder cancer among 969 Dutch non–muscle-invasive bladder cancer patients

Risk factors	Cancer in general ^a		Bladder cancer ^b
	Agree or strongly agree n (%)	Disagree or strongly disagree n (%) ^c	Reported by patient as risk factor n (%) ^d
Smoking	866 (89%)	61 (6%)	428 (44%)
Second-hand smoking	802 (83%)	117 (12%)	40 (4%)
>1 glass alcohol a day	394 (41%)	496 (51%)	109 (11%)
<5 servings vegetables and fruit a day	285 (29%)	608 (63%)	13 (1%)
Red or processed meat ≥ once a day	468 (48%)	417 (43%)	46 (5%)
Overweight	646 (67%)	262 (27%)	41 (4%)
Sunburn > once as a child	504 (52%)	370 (38%)	10 (1%)
Age >70 years	464 (48%)	428 (44%)	53 (6%)
First-degree relative with cancer	625 (65%)	268 (28%)	70 (7%)
Infection with Human Papilloma Virus ^e	175 (18%)	115 (12%)	4 (0.4%)
Insufficient physical activity	524 (54%)	373 (39%)	22 (2%)
Using solarium	784 (81%)	133 (14%)	23 (2%)
Exposure to radiation	796 (82%)	94 (10%)	103 (11%)

^a Assessed with the prompted question “Can you indicate for each of these factors to what extent you agree or disagree that they increase the risk of getting cancer?”

^b Assessed with the open-ended question “Which of these or other factors are potential risk factors for the development of bladder cancer?”

^c Where scores do not total 100% this is due to missing values.

^d Sixteen percent reported risk factors other than risk factors listed for cancer in general (Table A.2).

^e For Infection with Human Papilloma Virus the option ‘I don’t know’ was added, which was chosen by 638 patients (66%).

supplement use (from 66% to 71%), and decreased for physical activity (from 70% to 60%) (all $P < 0.001$). Generally, adherence was statistically significantly higher for patients who were older, male, and higher educated (Table A.2). Patients who were aware of overweight, insufficient physical activity, and alcohol consumption as being risk factors for cancer were statistically significantly more likely to meet the corresponding cancer prevention recommendations at T6wk (Table A.3). At T3mo, this difference only remained statistically significant for alcohol consumption.

Around diagnosis, 173 (18%) were never smokers, 556 (57%) were former smokers, and 239 (25%) were current smokers. Of the current smokers, 89 were recent quitters at T6wk, while 15 recent quitters at T6wk were smoking again at T3mo and 12 current smokers at T6wk were recent quitters at T3mo (T3mo cessation rate 36%). The 101 recent quitters at T6wk or T3mo more often reported smoking as UBC risk factor than patients who continued smoking (67% vs. 43% respectively). Their most important reasons for quitting were the NMIBC diagnosis (48%), general health (21%), advice of their physician (13%), or another reason/not applicable/no reason (18%).

Eighty-one percent of patients indicated that their physician asked about their smoking behavior (data not shown). Of the 239 current smokers around diagnosis, 168 (70%) were advised to quit (Table 4). Forty-eight of those (29%) were offered help with smoking cessation. Twenty-one percent of all patients reported to have received advice on one or more other lifestyle behaviors, mostly on physical activity (Table 4). Noteworthy, 34% of the overweight patients reported that weight loss advice was not applicable to them.

At least 80% of the patients thought it would be beneficial, helpful, and encouraging if physicians would give lifestyle advice after diagnosis, and approximately 70% agreed that it was the doctor’s duty (Table 5). Fifteen percent or less believed it was insensitive, interfering, and unnecessary, and around 25% thought it was placing the blame on the patient.

4. Discussion

In this large cohort of NMIBC patients, most patients recognized smoking as risk factor for cancer. Other cancer risk factors were less well known. Adherence to the lifestyle recommendations for cancer prevention varied, with lowest adherence for a healthy body weight and highest adherence for not smoking. From T6wk to T3mo, adherence increased for alcohol consumption and dietary supplement use and decreased for physical activity. Patients indicated that they were not routinely advised about a healthy lifestyle by their physician, except for smoking cessation. However, the majority of patients had a positive attitude towards receiving lifestyle advice from their physician.

Awareness of cancer risk factors in NMIBC patients in our study was fairly comparable with that in the general population [17,18]. Awareness of smoking as a UBC risk factor greatly differs between studies, ranging from 10% to 85% [19]. These differences can be explained by age, educational level, the type of question posed (prompted vs. open), and whether the question referred to UBC in general or to the patients’ own disease. In our recent study in 1,793 Dutch UBC survivors, only 12% of ever smokers reported

Table 3

Cross-tabulation of adherence to lifestyle recommendations at 6 weeks and 3 months after diagnosis of 969 Dutch non-muscle-invasive bladder cancer patients

T6wk	T3mo			Test of change ^a
	Smoking			
	Adherent ^b	Nonadherent ^c	Total	<i>P</i>
Adherent^b	801 (83%)	17 (2%)	818 (85%)	0.46
Nonadherent^c	12 (1%)	138 (14%)	150 (16%)	
Total	813 (84%)	155 (16%)	968 (100%)	
	Body mass index			
	Adherent ^d	Nonadherent ^e	Total	<i>P</i>
Adherent^d	299 (31%)	23 (2%)	322 (34%)	0.09
Nonadherent^e	12 (1%)	625 (65%)	637 (66%)	
Total	311 (32%)	648 (68%)	959 (100%)	
	Physical activity			
	Adherent ^f	Nonadherent ^g	Total	<i>P</i>
Adherent^f	510 (53%)	165 (17%)	675 (70%)	<0.001
Nonadherent^g	65 (7%)	219 (23%)	284 (30%)	
Total	575 (60%)	384 (40%)	959 (100%)	
	Alcohol consumption			
	Adherent ^h	Nonadherent ⁱ	Total	<i>P</i>
Adherent^h	374 (39%)	31 (3%)	405 (42%)	<0.001
Nonadherentⁱ	217 (23%)	335 (35%)	552 (58%)	
Total	591 (62%)	366 (38%)	957 (100%)	
	Dietary supplement use			
	Adherent ^j	Nonadherent ^k	Total	<i>P</i>
Adherent^j	578 (61%)	50 (5%)	628 (66%)	<0.001
Nonadherent^k	101 (11%)	223 (23%)	324 (34%)	
Total	679 (71%)	273 (29%)	952 (100%)	

^a McNemar's test.

^b Never smokers, former smokers, recent quitters.

^c Current smokers.

^d BMI 18.5 to 24.9 kg/m².

^e BMI ≤18.4 or ≥25 kg/m².

^f ≥210 minutes/week moderately active.

^g <210 minutes/week moderately active.

^h ≤1 (female) or ≤2 (male) glasses of alcohol per day.

ⁱ >1 (female) or >2 (male) glasses of alcohol per day.

^j Never and former users.

^k Current users.

smoking as a possible cause of their own UBC [19]. In our previous and current study, patients also reported nonestablished risk factors for UBC. Therefore, it remains important to educate NMIBC patients about established risk factors, to prevent them from focusing on causes or behaviors that do not influence their disease [17].

The majority of our study participants were former smokers, which is similar to other studies in UBC patients [12,20]. The 36% cessation rate observed in our study is comparable to that reported by a historical cohort study of NMIBC patients, where 32% of smokers quit in the year before up to 3 months after diagnosis [21]. A survey among

Table 4
Advice on lifestyle behavior by physicians as reported by 969 Dutch non–muscle-invasive bladder cancer patients

	n (%) ^a
Smoking cessation (smokers around diagnosis, n = 239)	
Yes	168 (70%)
No	66 (27%)
Not applicable	1 (0.4%)
Physical activity	
Yes ^b	150 (15%)
No	799 (82%)
Healthy diet	
Yes ^c	91 (9%)
No	859 (89%)
Weight loss (patients with BMI > 25 kg/m ² at T6wk or T3mo, n = 664)	
Yes	39 (6%)
No	384 (58%)
Not applicable	228 (34%)

^a Where scores do not total 100% this is due to missing values.

^b Including 8 patients reporting not to have received advice on physical activity but to have received other lifestyle advice [more exercise (n = 8)].

^c Including 16 patients reporting not to have received advice on a healthy diet but to have received other lifestyle advice [sufficient fluid intake (n = 9), healthy diet (n = 5), alcohol consumption (n = 2)].

NMIBC patients showed that 48% of smokers at diagnosis reported to have successfully quit in the year after diagnosis, which was considerably higher than the 10% cessation rate in a matched general population [12]. Only 1 study among 586 UBC survivors reported on adherence to other lifestyle recommendations, and found that one-third was adherent to the physical activity recommendation at 2 to 10 years after diagnosis [20]. Due to differences in type and timing of questionnaires used, adherence to lifestyle recommendations cannot be directly compared between studies in UBC cancer survivors, other cancer survivors, or populations without a cancer history. However, adherence observed in our study was generally within the same range as that in other studies [22,23]. Since we assessed lifestyle

only shortly after diagnosis, follow-up measurements are needed to assess whether the observed lifestyle changes are sustainable or only temporary, for example, due to the therapy effects. Interestingly, NMIBC patients who were aware of a cancer risk factor were more likely to adhere to the corresponding lifestyle recommendation, particularly at T6wk. A previous study showed that awareness of how to reduce cancer risk may be important in the motivation to change unhealthy behaviors [24].

Although most study participants indicated they were asked about their smoking behavior and most smokers reported they were advised to quit, still not all physicians seem to follow the EAU guideline for NMIBC which recommends counseling of smoking cessation [25]. Since a cancer diagnosis is seen as a teachable moment [11], and advice from a physician greatly increases the chances of success with smoking cessation [12], all physicians should be encouraged to advise smoking cessation. Patients were not routinely informed about other lifestyle factors, possibly because convincing evidence for an association with UBC prognosis is still lacking [10].

The positive attitudes of NMIBC patients toward lifestyle advice observed in our study are in line with those found in a similar survey in cancer survivors from the United Kingdom [16]. Since patients sometimes agreed with both a positive (e.g., "helpful") and negative attitude (e.g., "placing the blame"), discretion in providing lifestyle advice is required. Training of healthcare professionals in this area may be needed, since physicians have been shown not to feel well equipped to deliver smoking cessation interventions [26], which may also apply to other lifestyle interventions.

To our knowledge, the UroLife study is the first to extensively investigate the combination of awareness, adherence, practice, and attitudes regarding lifestyle recommendations in NMIBC patients. This provides valuable information for physicians and health promotion initiatives. Patients were included shortly after diagnosis and followed up prospectively by sending questionnaires at T6wk and T3mo,

Table 5
Attitudes towards physicians giving advice about lifestyle behaviour after diagnosis among 969 Dutch non–muscle-invasive bladder cancer patients^a

	Smoking cessation		Healthy diet		Physical activity		Weight loss	
	Agree or strongly agree n (%)	Disagree or strongly disagree n (%)	Agree or strongly agree n (%)	Disagree or strongly disagree n (%)	Agree or strongly agree n (%)	Disagree or strongly disagree n (%)	Agree or strongly agree n (%)	Disagree or strongly disagree n (%)
Beneficial	874 (90%)	42 (4%)	867 (90%)	51 (5%)	864 (89%)	53 (6%)	876 (90%)	38 (4%)
Helpful	823 (85%)	59 (6%)	839 (87%)	61 (6%)	820 (85%)	71 (7%)	848 (88%)	46 (5%)
Encouraging	780 (81%)	90 (9%)	790 (82%)	97 (10%)	803 (83%)	82 (9%)	814 (84%)	69 (7%)
The doctor's duty	706 (73%)	173 (18%)	647 (67%)	237 (25%)	624 (64%)	252 (26%)	729 (75%)	149 (15%)
Insensitive	132 (14%)	699 (72%)	108 (11%)	736 (76%)	88 (9%)	753 (78%)	96 (10%)	738 (76%)
Interfering	80 (8%)	782 (81%)	81 (8%)	789 (81%)	76 (8%)	791 (82%)	84 (9%)	775 (80%)
Unnecessary	147 (15%)	721 (74%)	131 (14%)	738 (76%)	115 (12%)	748 (77%)	100 (10%)	758 (78%)
Placing the blame	285 (29%)	584 (60%)	200 (21%)	661 (68%)	198 (20%)	663 (68%)	237 (24%)	618 (64%)

^a Where scores do not total 100% this is due to 'don't know' responses (2–7%) or missing values (3–8%).

minimizing recall errors. Also, much effort was put into complete data retrieval by follow-up telephone calls.

Limitations include the generalisability of our findings to the total NMIBC population. Participants were more likely to be higher educated than nonparticipants, and higher educated participants generally had a higher adherence than lower educated participants. Thus, adherence in the total NMIBC population may be lower. We used self-reported questionnaires that are inherently accompanied by the risk of bias such as over- or underestimation because of social desirability. Furthermore, the lower reported awareness for UBC vs. cancer risk factors may be due to the use of an open vs. prompted question format, respectively [27]. Lastly, follow-up measurements are needed to determine whether the observed lifestyle changes are sustainable.

5. Conclusions

Many cancer risk factors were relatively unknown among NMIBC patients and adherence to cancer prevention recommendations varied widely. Although patients generally have a positive attitude towards receiving lifestyle advice, they indicated not to be routinely informed about risk factors and a healthy lifestyle by their physician. Therefore, information provision on lifestyle recommendations for cancer prevention to NMIBC patients by urologists and other health professionals should be improved.

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Supplementary materials

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