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Illness perceptions and changes in lifestyle following a gynecological cancer diagnosis: A longitudinal analysis

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ABSTRACT

Objective. This study explores patterns of lifestyle change and whether more threatening illness perceptions are associated with lifestyle changes post-treatment for smoking, alcohol consumption and Body Mass Index (BMI) among gynecological cancer patients.

Methods. In total, 395 cancer patients ($N = 221$ endometrial; $N = 174$ ovarian) were included in this secondary analysis of longitudinal data. Lifestyle outcomes were assessed through self-reported questionnaires after initial treatment and 6, 12, and 18 months of follow-up. Illness perceptions were assessed with the Brief Illness Perception Questionnaire (BIPQ). Latent class growth curve analyses were conducted to identify patterns of lifestyle change and linear mixed models using between-subject and within-subject effects to explore the association between BIPQ items and alcohol consumption (glasses/week) and BMI (kg/m^2).

Results. After initial treatment, 15% ($N = 57$) of the patients smoked, 53% ($N = 203$) drank alcohol, and 60% ($N = 236$) were overweight or obese. Overall, smokers made no considerable changes, but one subgroup of low level smokers reported positive decline. A slight decrease was observed for alcohol consumption among low and moderate level alcohol drinker subgroups, whereas BMI remained stable among endometrial cancer patients and increased for ovarian cancer patients. Moreover, patients with lower trust in their treatment to cure the disease drank more alcohol ($\beta = 0.32$ glasses/week [95% CI 0.09; 0.56]).

Conclusions. Change in lifestyle after a gynecological cancer treatment is not self-evident. Moreover, more threatening illness perceptions were not related to a healthier lifestyle. This study underlines the need for lifestyle-promoting activities to facilitate lifestyle improvement among gynecological cancer patients.

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HIGHLIGHTS

- Most endometrial and ovarian cancer patients do not change their smoking, alcohol consumption or BMI following diagnosis.
- However, some subgroups decreased smoking and alcohol intake.
- More threatening illness perceptions were not associated with positive lifestyle changes.

1. Introduction

Endometrial and ovarian cancer are, respectively, the fourth and seventh most frequently diagnosed cancers in women worldwide [1,2]. Nowadays, the five-year survival rate for endometrial cancer patients has increased to 80% and for ovarian cancer patients to 46% [3,4]. The survival rate for ovarian cancer patients is much lower, since this type of cancer is often diagnosed in an advanced stage of the disease [4]. Due to the ageing population, increased incidence, and improved treatment regimens, the number of endometrial and ovarian cancer survivors is growing [4].

Despite the encouraging developments in survival rates, cancer patients are more susceptible to adverse health outcomes compared to the general population, which can primarily be attributed to the

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disease and its treatment [5]. However, lifestyle behaviors also play an important role in the survival of cancer patients [5]. Continued smoking, high alcohol consumption, and high Body Mass Index (BMI) are associated with an increased risk for the development of new primary cancers and cardiovascular disease, higher recurrence and mortality rates, and poorer quality of life [6–11]. It is recommended that cancer patients refrain from smoking, minimize the consumption of alcoholic beverages, and pursue a healthy body weight, but the results of several studies showed that the majority of the cancer patients do not meet these recommendations [5,12]. Smoking has a known protective effect on endometrial cancer risk. However, in cancer survivorship it is more beneficial to abstain from smoking to improve prognosis [13]. A cancer diagnosis is often regarded as a health threat that motivates individuals to adopt risk-reducing lifestyle changes to achieve and preserve improved health outcomes [14,15]. Hence, cancer patients are an important target population for the promotion of healthy lifestyle changes [16].

In recent years, there has been an increasing interest in research focusing on the relationship of illness perceptions and health-related outcomes in chronic disorders [17,18]. Illness perceptions comprise several dimensions through which disease is perceived: the extent to which the disease affects life, the duration of the disease (acute/chronic), the own influence of the patient on the disease, helpfulness of the treatment, experienced symptoms, concern about the disease, understanding of the disease, and experienced emotional consequences [19]. Through both cognitive (threat perception) and emotional (fear arousal) responses, more threatening illness perceptions are expected to increase motivation to improve lifestyle [20]. However, defensive mechanisms to control the fear and inability to cope with the threatening illness perceptions may also result in maladaptive coping, which may then not result in behavioral improvement [21–23].

A better understanding of lifestyle behavioral patterns after a cancer diagnosis may provide new insights into effective prevention of the development of adverse health outcomes among gynecological cancer patients to promote long-term survival. Previous research mostly used cross-sectional designs or did not specifically focus on gynecological cancer patients [15,16,24–29]. Due to differences in prognosis between endometrial and ovarian cancer patients, and the lack of research concerning lifestyle of gynecological cancer patients, this longitudinal study could provide a relevant contribution to current knowledge [11]. The objectives of the current study are: (1) to describe longitudinal change patterns of smoking, alcohol consumption, and BMI post-treatment among endometrial and ovarian cancer patients and (2) to examine the influence of changes in illness perceptions on lifestyle. It is hypothesized that cancer patients that report more threatening illness perceptions are more likely to decrease the amount of smoking, alcohol consumption, and BMI.

2. Methods

2.1. Design

This study is a secondary analysis of the longitudinal data of a pragmatic, cluster randomized controlled trial: the ROGY Care Trial (Registrationsystem Oncological GYnecology) [30]. The purpose of the trial was to assess the effects of providing a Survivorship Care Plan (SCP) to improve the information provision and post-treatment care for cancer patients [30]. We presumed that the intervention did not affect lifestyle, since the SCP in this trial did not provide any information on lifestyle changes. Thus we used the data of both trial arms as a prospective cohort study. Data were collected after initial treatment and at 6, 12, and 18 months of follow-up. The study was approved by the medical research ethics committees of the participating hospitals and was executed in concordance with the Declaration of Helsinki (2008) [30].

2.2. Participants and data collection

The eligibility criteria to participate in this study were: (1) newly diagnosed with either endometrial or ovarian cancer as a primary tumor between April 2011 and October 2012, (2) not undergoing palliative care, (3) aged ≥ 18 years, and (4) able to complete a Dutch questionnaire [30]. A total of 296 endometrial and 248 ovarian cancer patients were eligible to participate ($N = 544$). After initial treatment, the eligible participants were invited for participation by sending them the first questionnaire combined with a letter of invitation and an informed consent form. The first questionnaire was completed and returned by 73% of the participants ($N = 395$). For the subsequent waves, response rates were 52% at 6 months ($N = 282$), 46% at 12 months ($N = 248$), and 42% at 18 months ($N = 230$) of follow-up (Fig. 1).

2.3. Measurements

2.3.1. Socio-demographic and clinical characteristics

Socio-demographic (age, educational level, socio-economic status and marital status, and occupational status) and clinical (type of cancer, tumor stage, and treatment regimen) characteristics have earlier been associated with both illness perceptions as well as lifestyle behaviors and were therefore included as confounders in our analyses [6,12,31,32]. Socio-economic status and clinical characteristics (type of cancer, tumor stage, and treatment regimen) of the participants were obtained from the Netherlands Cancer Registry (NCR). Other socio-demographic information, such as age at time of the questionnaire, level of education (low = no/primary school; intermediate = lower general secondary education/vocational training; high = pre-university education/high vocational training/university), partner status (partner = /living together; no partner = divorced/widowed/never married), and occupational status (employed vs. unemployed) were acquired through the self-administered questionnaires.

2.3.2. Smoking and alcohol consumption

Participants were asked to indicate smoking and alcohol consumption through closed-ended questions: “Do you smoke/consume alcohol?” (never, previous, current smoker/drinker). When the participant answered ‘current smoker’, a subsequent question assessed the number of cigarettes smoked per day and cigars and/or pipes smoked per week. The different types of smoking were summed to generate the overall amount of smoking in grams (g) tobacco per week with conversion measures of 1 g tobacco/cigarette, 4.5 g tobacco/cigar, and 3 g tobacco/pipe [29]. The alcohol consumption of the ‘current drinker’ was assessed in glasses of beer, wine, and/or liquor consumed per week. The amounts of glasses consumed were summed to compute total alcohol consumption per week. Smoking and alcohol consumption were measured at initial treatment, 6, and 18 months of follow-up.

2.3.3. BMI

Length (in centimeters) and weight (in kilograms) were self-assessed after initial treatment as part of the questionnaires. In addition, weight was also assessed at 6, 12, and 18 months of follow-up. BMI was calculated as weight in kilograms divided by length in meters squared and categorized following the standards of the World Health Organization (WHO): *underweight* (BMI: <18.5 kg/m^2), *normal weight* (BMI: 18.5 < and >24.99 kg/m^2), *overweight* (BMI: 25.0 < and >29.99 kg/m^2), and *obese* (BMI: >30.0 kg/m^2).

2.3.4. Illness perceptions

As part of the self-administered questionnaires, participants completed a Dutch version of the Brief Illness Perception Questionnaire (BIPQ) after initial treatment, 6 months, and 12 months of follow-up [19]. The BIPQ is a validated instrument developed to assess illness perceptions using the following eight items: consequences, timeline, personal control, treatment control, identity, concern, illness coherence,

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