

Keywords Lung cancer; Family; Health behavior change; Perceived exercise and eating a healthy diet as a role in decreasing one's risk of developing lung cancer [1,7-14]. However, 15% to 25% of lung cancer-related deaths involve people who have never smoked [6,15,16].

Abbreviations BMI: Body Mass Index; GELCC: Genet c suggests that genet c m rSewnd eof lung cancer-dctl hormonctlg a un
Epidemiology of Lung Cancer Consortium; GLTEQ: God n Le sure
Time Exercise Questionnaire; PA: Physical Activity; SD: Standard Deviation

Introduction

Lung cancer is the leading cause of cancer-related mortality among both men and women in the United States [1]. Despite advances in early detection, the five-year survival rate for all stages combined remains low (17%) [1-3]. Mortality rates of lung cancer are highest in Non-Hispanic Black males (95.4 per 100,000), followed by Non-Hispanic White males (81.3 per 100,000), followed by American Indian and Alaska Native males (68.5 per 100,000), and finally by Non-Hispanic White females (59.3 per 100,000) [1]. Regional differences exist as well, suggesting that lung cancer mortality is higher in the Midwestern and Southern states, especially for women [4]. This form of cancer has been linked to a high level of morbidity, fatigue, pain, and respiratory difficulties [5].

There has not been one causal risk factor identified to explain the origin of lung cancer, suggesting that disease is the result of complex gene-environment interactions [6]. Given this information, research has been focusing on the identification of risk factors and behavioral changes that can influence the development of this disease. The most preventable risk factor for lung cancer is cigarette smoking [1,7]. Given that cigarette smoking causes approximately 80% to 90% of lung cancer incidences [1], smoking cessation is essential for prevention of lung cancer. Recent studies are linking possible benefits from regular

To decrease the incidence of unnecessary lung cancer diagnoses, more research is needed to understand family members' receptiveness, as well as factors associated with engaging in preventative health behaviors.

Behavioral risk factors may play an important role in the development of this cancer for those with a genetic susceptibility. It has been found that those who are identified as at a higher risk for lung cancer via genetic testing would have increased interest in smoking cessation programs; however, those with a lower risk result had neutral attitudes towards smoking cessation [21]. Heightened awareness of an increased risk of cancer due to family history may cause individuals to perceive themselves as being more susceptible to the disease. This heightened awareness, coupled with the fact that cancer risk reduction and promoting behaviors run in families [22], suggests that families with a diagnosis of cancer in a member present a logical target for cancer risk reduction interventions. In prior research [23,24], unselected family members of those with a family history of colon and pancreatic cancer expressed interest in making lifestyle changes in nutrition and weight management to reduce the risk of cancer. Many of these family members preferred to participate in programs with their family or friends, rather than alone. Thus, a diagnosis of lung cancer in the family may serve as a teachable moment [25-27] for families, motivating them to engage in cancer-related health behavior change, either individually or collectively.

Current research is beginning to explore the receptiveness of lung cancer patients and/or family members of lung cancer patients to behavioral health promotion programs to prevent or reduce cancer risk. Bastian et al. [28] found that family members of lung cancer patients who were women, in close geographical location to the patient, and whose patients had late stage disease, were more likely to enroll in smoking cessation programs to reduce their own cancer risk [28]. The enrollment rate into the smoking cessation program within this study, however, remained relatively low; only 38% of those contacted agreed to participate [28]. Witnessing a family member undergo lung cancer treatment may be a motivating factor in smoking cessation for those at increased risk of developing lung cancer. In Butler's study [29], 72% were interested in smoking cessation programs after having cancer treatment. 7 (of 10) family members of patients with advanced stage disease (health promotion during cancer treatment) had only 38% of members present at cessation program.

provided that ranged from “Less than one each month” (1) to “3 or more each day” (6).

Psychosocial characteristics were assessed via a combination of standardized scales with published psychometric properties and investigator-derived items from studies that have proven to be reliable and valid. Perceived cancer risk and degree of cancer worry/concern were single-item questions modified from items originally constructed by Lerman et al. [37]. On a 5-point Likert scale, respondents were asked, “How likely do you think it is that you will get cancer?” from “very likely” (1) to “very unlikely” (5) and on a 4-point Likert scale, “How concerned are you about getting cancer?” from “extremely concerned” (1) to “not at all concerned” (4). Degree of emotional closeness to affected family member(s) was measured by the question “How close is (or was) your relationship with this family member diagnosed with

one with cancer. Among respondents, 38% perceived some risk for developing lung cancer in the relative and 58% perceived some risk for developing cancer in general in the relative. Moderate levels of lung cancer worry/concern and cancer in general were reported by 35% and 40% of respondents. Additionally, general self-efficacy scores indicated fairly high levels (mean=28.3; SD=4.21) of confidence in the ability to handle unforeseen situations. Similar results were seen in nutrition self-efficacy (mean=14.8; SD=3.06), respondents reported fairly high levels of confidence in the ability to overcome barriers to making change in eating habits. Moderate levels to engage in regular exercise during challenging situations were reported for exercise self-efficacy (mean=26.6; SD=10.66).

Receptivity and preferences to a program

Table 2 shows self-reported willingness of respondents to participate in cancer risk reduction lifestyle programs. The majority of respondents (85%) were "Somewhat" or "Definitely" willing to participate in a lifestyle cancer-reduction program. Among those receptive to the programs, over half (56%) preferred to engage in a program with other family members. Preferred programs included weight management (36%) and nutrition (30%). The preferred modes of delivery were Web/Internet (45%) and mail (29%).

of alcohol consumption ($p < 0.001$), and higher levels of exercise self-efficacy ($p = 0.017$). In a multivariable model of “definitely/somewhat willing to participate” versus “not,” the following variables were included in the model as potential predictors: gender, education level, physical activity, alcohol consumption, likelihood of getting cancer, concern of getting cancer, and exercise self-efficacy. From this model, higher exercise self-efficacy ($p = 0.025$) was significantly correlated with interest.

Discussion

This study provided important insight into the feasibility of using lifestyle cancer risk-

would not only help reduce cancer risk, but also reduce the risk of other chronic diseases and improve overall quality of life.

Concurrent with prior research [23,24], 65% of our study participants preferred a risk reduction program in a group-based format with their family members and friends. Typically, research on behavior change in cancer families has been focused either on the at-risk family members or on the cancer survivors. A natural source of support can produce a positive effect on one's self-esteem, which, in turn, can increase motivation and retention to changes in behavior [46]. Moore et al. [47] found that among individuals at risk of diabetes, a group-based lifestyle program had a positive impact on diabetes knowledge, self-efficacy, increased physical exercise, healthier eating, and improvement in overall health. At-risk family members and cancer survivors should be studied as an integrated family unit to better understand and conceptualize a family or group-based cancer prevention program. Future studies could use a multidimensional assessment tool (e.g., Cancer Risk Belief Scale [48]) to explore individuals' ideas about the role of family in cancer risk or employ qualitative methods to achieve a more in-depth understanding.

Family members preferred the delivery format of a program via a web/internet (45%) and mail (29%) over other options. This preference could be attributed to many of the respondents being geographically dispersed. These formats would increase the reach and generalizability of such programs; for example, allowing for ease of information sharing between family members and friends. Internet-based programs could provide health promotion tailored to both the individual along with their family and friends.

On multivariate analysis, the receptive family members expressed greater exercise self-efficacy than those not receptive. Individuals with high/strong self-efficacy tend to persist with a behavior. It is possible that a lifestyle program implies the need to start an exercise program; thus, those receptive may have had greater confidence that this could be carried out. A weight management program would be beneficial to this group, given that 67% of those interested currently meet the criteria for obesity (BMI above 30) and 20% have a waist circumference greater than 40 inches for men and 35 inches for women. These findings suggest that family members who are receptive to lifestyle interventions may have higher self-efficacy and are more likely to engage in health-promoting behaviors.

the

those

ms

abl

Bethesda, MD, based

Citation: Howell LA, Brockman TA, Sinicope PS, Patten CA, Decker PA, et al. (2016) Receptivity and Preferences for Lifestyle Programs to Reduce Cancer Risk among Lung Cancer Family Members. *Adv Cancer Prev* 1: 110. doi: [10.4172/2472-0429.1000110](https://doi.org/10.4172/2472-0429.1000110)
