

RESEARCH ARTICLE

Psychosocial Response and Symptom Burden for Male Smokers with Lung Cancer

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Abstract

Purpose: Cigarette smoking causes many kinds of cancer, and it is more closely related with lung cancer, rather than other cancers. Smoking is the leading cause of lung cancer and ninety percent of the smokers are male in China, but there is little published data concerning the psychological responses in the male smokers with lung cancer and its influence on the symptom burden. The aim of the study was to verify the hypothesis that male smokers with lung cancer have more positive attitude and less symptom burden, comparing to male non-smokers. **Methods:** A total of 194 men with cancer in West China Hospital, Sichuan, China, were assessed by self-administered questionnaire. Psychological response was measured by the Chinese version of Mini-Mental Adjustment to Cancer scale (Mini-MAC), and symptom burden was measured by the physical symptom distress scale from the Rotterdam Symptom Checklist (RSCL). **Results:** We found that smokers with lung cancer got higher scores in positive attitude and a smaller symptom burden than non-smokers. Patients with education lower than high school got higher scores of positive attitude compared to college graduate patients ($p=0.038$). Smokers with lung cancer who knew the potential carcinogenicity of cigarette showed less negative emotions ($p=0.011$). The psychological response was not affected by age, clinical stage, cell type, smoking duration and amount. **Conclusions:** Male smokers with lung cancer have a more positive attitude and fewer symptoms, comparing to male non-smokers. Appropriate psychological intervention for non-smokers with lung cancer deserves more attention.

Keywords: Male Chinese smoker - lung cancer - psychological response - positive attitude - symptom burden - education

Asian Pac J Cancer Prev, 15 (1), 309-314

Introduction

Important aspects of a patient's well-being may be adversely affected by the diagnosis of cancer or its treatment (Richards, 1997; Tiernan, 1998). Yet in the field of cancer, reports of clinical trials are often limited to the impact of toxicity, treatment on survival, or physical symptoms, rather than psychological responses (Hopwood and Stephens, 2000).

Psychological response, including Negative Emotion, Positive Attitude and Cognitive Avoidance may obviously be part of a reaction to the news of diagnosis and the treatments, in many patients it will persist, causing an added burden during treatment and leading to more difficulty with general management and symptom control (Hopwood and Stephens, 2000). Although there has been consistent emphasis on the importance of psychological functioning, it is well documented that doctors and nurses fail to detect patients' mood and patients themselves do not disclose it unless asked. A direct consequence of the underrecognition of that is its undertreatment, particularly when mood disorder can be deemed understandable.

Cigarette smoking causes cancers of the lung,

esophagus, larynx, mouth, throat, pancreas, kidney, bladder and cervix, as well as acute myeloid leukemia, and among these cancers, the relationship between smoking and lung cancer was most closely (Newcomb and Carbone, 1992; Biesalski et al., 1998). Smoking is the leading cause of lung cancer, accounting for over 90% of all lung cancers (Loeb et al., 1984; Sasco et al., 2004; Horn et al., 2012). Nearly 90% of lung cancer deaths are attributed to cigarette smoking and ninety percent of the smokers are male in China (Chen and Kaphingst, 2011). The male smokers compose the greatest part of lung cancers in our country. So our study focused on the male smokers with lung cancer. Studies have given good general evidence that depression is a significant problem in lung cancer patients (Lynch et al., 2010; Sharp et al., 2013). And there have been many suggestions of a role for psychological response in the outcome of cancer (Watson et al., 2005; Messina et al., 2010; Knobf, 2011; Hoogerwerf et al., 2012). Despite a large number of patients with lung cancer who receive treatment, there is little published data concerning the psychological responses in the male smokers with lung cancer and its influence on the symptom burden. In our study, we made the hypothesis that male

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Table 1. Demographic Characteristics

	Lung cancer		Non-lung cancer	
	NS-LC	S-LC	NS-NLC	S-NLC
Total number (%)	36 (67.3%)	74 (32.7%)	29 (65.5%)	55 (34.5%)
Age, mean (SD), y	56.83 (13.341)	56.69 (9.244)	55.60 (14.341)	57.41 (8.589)
Cancer stage:				
II	20 (55.6%)	42 (56.8%)	16 (55.2%)	31 (56.4%)
III	16 (44.4%)	32 (43.2%)	13 (44.8%)	24 (43.6%)
Cancer site:				
Lung	36 (25NSCLCs ^c , 11SCLCs ^d)	74 (51NSCLCs ^c , 23SCLCs ^d)	-	-
Gastrointestinal tract	-	-	25	48
Genitourinary tract	-	-	6	5
Head and neck cancer	-	-	2	2
Education				
<High school graduate	6 (16.7%)	12 (16.2%)	5 (17.2%)	9 (16.4%)
High school graduate	19 (52.8%)	53 (71.6%)	18 (62.1%)	36 (65.5%)
College graduate	11 (30.5%)	9 (12.2%)	7 (20.7%)	10 (18.2%)
Family history				
Negative ^a	30 (83.3%)	67 (90.5%)	25 (86.2%)	48 (87.3%)
positive ^b	6 (16.7%)	7 (9.5%)	4 (13.8%)	7 (12.7%)

No statistically significant differences at baseline between groups relative to mean age, cancer stage, education and family history; ^ano family member has cancer; ^bone or more family members have cancer; ^cnon-small cell lung cancer; ^dsmall cell lung cancer

smokers with lung cancer have more positive attitude and less symptom burden, comparing to male non-smokers. The aim of the study is to verify the hypothesis. We used a Chinese version of Mini-Mental Adjustment to Cancer scale (Mini-MAC) (Ho et al., 2003) data set to test the psychological responses of patients, explored the association between them and age, educational background, smoking duration and amount, and cognition of the potential carcinogenicity of cigarette, and recorded the symptom burden (using the physical symptom distress scale) for each. Our results confirm the hypothesis.

Materials and Methods

Participants The clinical records and psychological data of 194 consecutive patients (including lung and non-lung cancer) were retrieved from March to May in 2012 of department of Medical Oncology and Cancer Center, West China Hospital, Sichuan University, China. Eligibility criteria for our study were: male; age between 20 and 80 years; awareness of their cancer diagnosis; no apparent serious intellectual and functional impairment; diagnosis 1-3 months before the inclusion date; clinical stage II~IIIa; and receiving primary chemotherapy treatment. This study was approved by the Ethical Committee of Sichuan University. Written informed consent was obtained from all participants.

All patients meeting the eligibility criteria were identified from hospital records and most of them approached during their normal hospital in-patient visits, when they were asked if they would be willing to take part in our study assessing the emotional and psychological impact of cancer. Besides lung cancer patients, non-lung cancer patients were also included as a control to reflect the specific influence of smoking on psychological response to lung cancer. Of the eligible, 9 patients (9/213, 4.2%) refused to take part in, and 10 (10/213, 4.7%) did not finish the questionnaire. Finally, 110 lung cancer patients (56.7%

of total) including 74 smokers and 36 non-smokers, and 84 non-lung cancer patients (43.3% of total) including 55 smokers and 29 non-smokers agreed to participate in the psychological assessment. To find out whether the psychological responses and symptom burden of smokers differ from non-smokers in lung cancer patients, and whether that of smokers with lung cancer differ from smokers with non-lung cancer, the 194 patients were divided into four groups: non-smokers with lung cancer (NS-LC) group, smokers with lung cancer (S-LC) group, non-smokers with non-lung cancer (NS-NLC) group, and smokers with non-lung cancer (S-NLC) group. We defined non-smokers as less than 100 cigarettes over a lifetime. Procedure Patients were assessed by self-administered questionnaire. Participants completed the study measures at 1-3 months after diagnosis.

The Chinese version of the Mini-MAC scale was used to measure the psychological response to the news of diagnosis in our study. The scale is a 29-item self-report measurement tool designed for use in patient settings to assess psychological response to cancer. It is a 3-factor structure: Negative Emotion, Positive Attitude and Cognitive Avoidance.

The physical symptom distress scale from the Rotterdam Symptom Checklist (RSCL) (Haes et al., 1990) was used to reflect the number and diversity of symptoms in patients at presentation for lung cancer. This scale was used to evaluate the symptom burden of the lung cancer patients who were receiving their primary chemotherapy treatments.

For patients' symptom experience of both physical and psychological ranges from "not at all" to "very much". Scores given in the physical symptom distress scale and the Chinese version of mini-MAC scale are 0 (not at all), 1 (a little), 2 (quite a bit), and 3 (very much). The higher the score, the higher is the level of symptom burden or psychological response.

Statistical methods T Test was used to compare the

Table 2. Mini-MAC Results of the Comparison Between Groups

	NS-LC (n=36)	S-LC (n=74)	t value	p value	NS-NLC (n=29)	S-NLC (n=55)	t value	p value	S-LC (n=74)	S-NLC (n=55)	t value	p value
NE ¹ (SD)	17.56 (6.398)	17.35 (6.291)	0.159	0.874	17.76 (3.767)	19.44 (5.999)	-1.368	0.175	17.35 (6.291)	19.44 (5.999)	-1.899	0.060
PA ² (SD)	16.28 (4.633)	18.58 (4.107)	-2.956	0.004	17.66 (3.618)	16.38 (4.564)	1.301	0.197	18.58 (4.107)	16.38 (4.564)	3.220	0.002
CA ³ (SD)	7.58 (1.795)	7.53 (1.932)	0.147	0.884	8.17 (2.778)	7.33 (2.261)	1.503	0.137	7.53 (1.932)	7.33 (2.261)	0.540	0.590

¹Negative Emotion; ²Positive Attitude; ³Cognitive Avoidance

Table 3. Comparison of <60 Years Old Group and ≥60 Years Old Group

	<60 years old (SD), n=64	≥60 years old (SD), n=46	t value	p value
NE ¹ (SD)	17.53 (6.299)	17.57 (6.534)	-0.027	0.978
PA ² (SD)	18.08 (4.448)	17.91 (4.461)	0.192	0.848
CA ³ (SD)	7.58 (1.926)	7.50 (1.835)	0.214	0.831

¹Negative Emotion; ²Positive Attitude; ³Cognitive Avoidance

age, psychological response, clinical stage, cell type and symptom burden between groups. For the possible predictor variable education, smoking duration and amount, One-Way AVOVA was used. Crosstabs was used to test the family history and cognition of the potential carcinogenicity of cigarette. The statistical software we used was SPSS13.0. We indicated a significant result with $p < 0.05$.

Results

All participants were divided into four groups, the detailed information is documented in table 1. There were no statistically significant differences at baseline between groups relative to mean age, education, clinical stage, cell type and family history (all the p value were > 0.05).

Psychological response to cancer

Scores of the psychological responses for the 4 groups are listed in Table 2. A significantly higher score of positive attitude was found for S-LC patients than that for NS-LC patients, the p value was 0.004 (Table 2). 110 lung cancer patients expressed various degree of negative emotion or avoidance, but there was no statistically significant between groups. As a control, there was no difference between the two non-lung cancer groups, and the S-LC patients got higher scores of positive attitude than S-NLC patients ($p = 0.002$, $t = 3.220$) Smoking might just play an important role in the psychological responses of lung cancer patients, and it might be a predictor factor leading to more positive attitude when coping with lung cancer for smokers. In order to demonstrate this hypothesis, the influence of some probable factors must be taken into consideration.

Probable factors Associated with psychological response

To better identify at-risk patients in the lung cancer group, a number of factors associated with psychological response have been found in other settings and warrant exploration in lung cancer, such as age, education, clinical stage, cell type. The association of any of these factors with psychological response in a population of male smokers with lung cancer had been explored.

Age All of the 110 lung cancer patients were divided

into <60 years old group and ≥60 years old group. The psychological responses were analyzed between the two groups, and there were no significant differences (Table 3).

Education Educational background was analyzed to reflect its influence on psychology in lung cancer patients. 110 lung cancer patients were divided into three groups: < high school graduate, high school graduate, and college graduate. AVOVA results were as follows: p value and F value were 0.289 and 1.257 for negative emotion, 0.109 and 2.259 for positive attitude, and 0.603 and 0.509 for cognitive avoidance, respectively. There were higher scores of positive attitude in < high school graduate patients ($p = 0.038$) comparing to college graduate patients, as list in table 4. Maybe this is due to “they that know nothing fear nothing”.

Clinical stage The NS-LC group and S-LC group had equal proportions of stage II and stage IIIa patients. The all lung cancer patients were divided into 2 groups: stage II group and stage IIIa group. The psychological responses were compared between the 2 groups. No significant differences were found between them, as list in table 5.

Cell type The whole lung cancer patients were split up into non-small cell lung cancer (NSCLC) group and small cell lung cancer (SCLC) group. The score of Mini-MAC scale was compared between them, and the results were list in table 6. The cell type did not associate with the psychological responses of lung cancer patients.

Smoking duration and amount The hypothesis indicated that smoking behavior had something to do with psychology, and table 2 did show some difference between smokers and non-smokers with lung cancer. We tested 2 factors associated with smoking behavior: smoking duration and amount for the lung cancer patients who smoke. According to the smoking duration (years), we divided the S-LC group into <26 group, 26~36 group and >36 group based on the similar baseline. No significant differences were found from One-Way AVOVA test, the results were as follows: p value and F value of negative emotion were 0.216, 1.565; those of positive attitude were 0.217, 1.562; and those of cognitive avoidance were 0.907, 0.098. According to the smoking amount per day, we divided the S-LC group into <20 group, 20~29 group and >29 group with similar baseline. The all p values were larger than 0.05 (data not shown).

Cognition of the potential carcinogenicity of smoking Since the relationship between smoking and lung cancer, rather than other cancers, is well-known in our country, we included the question, “do you know that smoking can contribute to lung cancer?” in our study. The distribution of the two answers, yes and no, presented the same tendency in the two lung cancer groups ($p = 0.56$). For the smokers with lung cancer, it was expected that those who knew the potential carcinogenicity of cigarette would

Table 4. Results of Post Hoc Test of The Comparison Between the <High School Graduate Group, High School Graduate Group and College Graduate Group

	<High ⁴	High ⁵	<i>p</i> value	<High ⁴	College ⁶	<i>p</i> value	High ⁵	College ⁶	<i>p</i> value
NE ¹ (SD)	19.39 (7.105)	17.25 (6.524)	0.199	19.39 (7.105)	16.25 (4.253)	0.127	17.25 (6.524)	16.25 (4.253)	0.530
PA ² (SD)	19.39 (2.953)	18.11 (4.695)	0.271	19.39 (2.953)	16.40 (4.248)	0.038	18.11 (4.695)	16.40 (4.253)	0.125
CA ³ (SD)	7.44 (1.653)	7.67 (2.049)	0.656	7.44 (1.653)	7.20 (1.399)	0.691	7.67 (2.049)	7.20 (1.399)	0.330

¹Negative Emotion; ²Positive Attitude; ³Cognitive Avoidance; ⁴<High school graduate group; ⁵High school graduate group; ⁶College graduate group

Table 5. Psychological Results of Stage II Group and Stage IIIa Group

	Stage II (n=62)	Stage IIIa (n=48)	t value	<i>p</i> value
NE ¹ (SD)	17.35 (6.850)	17.50 (5.573)	-0.119	0.905
PA ² (SD)	17.60 (4.103)	18.54 (4.820)	-1.110	0.270
CA ³ (SD)	7.26 (1.890)	7.92 (1.820)	-1.842	0.068

¹Negative Emotion; ²Positive Attitude; ³Cognitive Avoidance

Table 6. Psychological Results of NSCLC Group and SCLC Group

	NSCLC (n=76)	SCLC (n=34)	t value	<i>p</i> value
NE ¹ (SD)	17.64 (6.792)	16.91 (5.077)	0.562	0.575
PA ² (SD)	17.63 (4.427)	18.85 (4.398)	-1.340	0.183
CA ³ (SD)	7.53 (1.901)	7.59 (1.861)	-0.159	0.874

¹Negative Emotion; ²Positive Attitude; ³Cognitive Avoidance

present more positive attitude or less negative emotion or avoidance, and this was confirmed. Less negative emotion was found in patients who knew that ($p=0.011$, $t=2.627$), but the positive attitude ($p=0.561$, $t=0.584$) and avoidance ($p=0.476$, $t=0.417$) of them were similar to those did not know. The psychological difference between those who knew that smoking could contribute to lung cancer and those did not know was not been found in non-smokers with lung cancer ($p>0.05$).

Symptom burden The physical symptom distress scale from the RSCL was used to reflect the symptom burden. It was expected that symptom burden of S-LC group would be lesser than that of NS-LC group, and this was confirmed. The mean score of physical symptom distress scale of S-LC group was 12.31 (SD=6.585), and that of NS-LC group was 16.42 (SD=8.230). The *p* value was 0.006 ($t=2.822$).

Summary of the statistical analyses The association of mean age, clinical stage, cell type, and smoking duration and amount were all not significantly associated with the psychological response at presentation. Lung cancer patients with degrees lower than high school got higher scores of positive attitude comparing to college graduate patients ($p=0.038$), and smokers with lung cancer who knew the potential carcinogenicity of cigarette showed less negative emotion ($p=0.011$). And S-LC patients had less symptom burden than NS-LC patients.

Discussion

Psychological response is not routinely assessed in patients who receive cancer treatment and the majority of published results of treatment trials in lung cancer fail to concern patients' psychology on patients' outcome, despite the fact that this has a major impact in determining the quality of life. We found a concerning level of positive attitude when they knew the news of their diagnosis and less symptom burden in lung cancer patients with the behavior of smoking, which indicates that the psychological responses to the news of diagnosis of lung cancer patients need to be systematically addressed in their overall management.

No published evidence had revealed that psychological responses of lung cancer patients who smoke are different from those do not. It was reported that the positive attitude of illness had a positive effect on psychological recovery of patients suffering from chronic diseases (Stanton and Snider, 1993; Brady and Helgeson, 1999; Dalal, 2000; Cohen, 2002), and our study was consistent with it. Our data (table 2) suggested that smokers with lung cancer have a more positive attitude to the news of diagnosis and less symptom burden during the treatments, because the score of positive attitude of S-LC group was higher when compared with NS-LC group and the score of symptom burden of S-LC group was lower than that of NS-LC group. This trend was not found between two non-lung cancer groups. Smoking might be the important factor which affected the psychological responses of smokers with lung cancer. This may partly due to the increasing publicity against smoking recent years. The relationship between smoking and lung cancer is publicized through various ways, such as TV, newspaper and internet. It is well-known by people and forms repeating stimulations to them. Smokers are reminded of the possibility of cancer continually, once it comes true, they may cope with the diagnosis and physical symptoms more positive. Although the attitude of an unfortunate life event to an external and stable causal factor can partly make the misery more bearable, the unfortunate life event still makes one feel down (Ho et al., 2003). We found that the lung cancer and non-lung cancer patients expressed various degree of negative emotion or avoidance, but there was no statistically significant between groups, and clinicians should be more aware of this. This can be explained by more emphasis of the publicity on the relationship of smoking and lung cancer, actually smoking is also associated with other kind of cancer.

Since age, education, clinical stage, cell type, smoking duration and amount, and cognition of the potential carcinogenicity of cigarette may be associated with cancer patients' emotion, we analyzed them respectively in our study. The result revealed that smokers showing more positive attitude to the news of diagnosis was not influenced by those factors expect education and cognition

of the potential carcinogenicity of cigarette.

Although the One-Way AVOVA results showed that the educational background had nothing to do with psychological response, there were significant higher scores of positive attitude in patients who did not go to high school. Maybe this phenomenon is due to “they that know nothing fear nothing”. The higher the education level, the more knowledge they get about the poor prognosis of lung cancer, and more worries and fears they experience.

Another important finding in our study was that smokers who knew the carcinogenicity of cigarette showed less negative emotion than non-smokers in lung cancer patients. The publicity emphasized the relationship between smoking and lung cancer, and this weakened the negative emotional responses of smokers with lung cancer to the news of diagnosis.

The cancer diagnosis brings about an abrupt transition into a new world orbiting around cancer. Throughout the cancer trajectory, including diagnosis, treatment, remission, and end of life, patients face numerous dynamic needs and difficult decisions (Hileman and Lackey, 1990; DuBenske et al. 2008; DuBenske et al., 2010). By becoming more informed about the disease and treatments, patients may have increased confidence, ask providers fewer, more informed questions, manage their disease more effectively, and even monitor and intervene to improve the quality of their own care (DuBenske et al., 2008). The care from physicians and nurses may be overwhelming and the interventions to patient are critical to generating positive health outcomes. Since non-smokers presented less positive attitude when coping with lung cancer and more symptom burden during the treatments, clinicians should pay more attention to them. Providing more information about the disease and treatments, tackling their negative emotion actively, we may see great improvement of the quality of their life. For the smokers with lung cancer, the care from the clinicians may also be important to generating better quality of life.

Some limitations of our study need to be noted. First, the sample size is not very large. But we compared the smokers and non-smokers in lung cancer patients, and also the smokers with lung cancer and smokers with non-lung cancer, the results confirmed the hypothesis we made. An independent study with a larger sample may be more persuasive. The second one is the non-response bias. We tried our best to persuade all eligible participants to take part in our study, but there were still few patients who refused. Although there did exist non-responders, the percentage of them was small (4.2%), and this had little effect on the results.

In conclusion, our study suggested that male smokers with lung cancer have more positive attitude and less symptom burden, comparing to male non-smokers. Appropriate psychological intervention for non-smokers with lung cancer deserves more attention.

Acknowledgements

The all authors indicate no potential conflicts of interest.

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