# Concealment of lung cancer diagnosis: prevalence and correlates

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## Abstract

*Background*: Lung cancer has a commonly understood behavioral etiology. Thus, lung cancer patients are often blamed for their illness and may seek to avoid this blame by concealing their diagnosis from others. This study sought to determine the prevalence of concealment and identify demographic, clinical, and psychosocial correlates of concealment among lung cancer patients.

*Methods*: A sample of 117 lung cancer patients receiving chemotherapy for non-small cell or small cell lung cancer was recruited and completed self-report demographic questionnaires, a measure of diagnosis concealment designed and pilot tested for this study, and standard measures of psychosocial variables. Clinical factors were assessed via a medical chart review.

*Results*: Thirty participants (26%) reported concealing their diagnosis in the previous month, most frequently from casual friends and close friends. Reported reasons for concealment largely reflected concern for others. Univariate analyses indicated that those who concealed their lung cancer diagnosis reported more internalized shame related to their illness and use of positive reappraisal as a coping strategy ($ps \leq 0.02$). In addition, those who concealed were more likely to have used alcohol in the previous month and have a more recent recurrence, among those who had a recurrence ($ps \leq 0.04$). Multivariate analyses indicated that internalized shame and use of positive reappraisal accounted for significant unique variance in concealment above and beyond that accounted for by use of alcohol ($ps < 0.05$).

*Conclusions*: Future research should aim to replicate and extend these findings with longitudinal designs to elucidate the directionality of the associations observed in this study.

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## Background

Unlike many other forms of cancer, lung cancer is associated with a behavioral etiology, and individuals with lung cancer often perceive that they are stigmatized for their illness [1–3]. However, the extent to which patients conceal stigmatizing diseases, such as lung cancer, remains largely unstudied. The current study sought to identify the prevalence and correlates of concealment of lung cancer diagnosis and to determine whether concealment is associated with negative affect, behavior, and self-evaluation.

Studies have shown that lung cancer patients are more likely to be blamed for their illness than patients with other cancers [4]. Moreover, lung cancer patients blame themselves for their illness more than their primary caregivers [5]. Thus, individuals with lung cancer can be considered at higher risk of stigmatization than individuals with many other forms of cancer because of perceptions of blame. Moreover, studies have shown that illness-related perceived stigma is associated with worse social support, dyadic adjustment, depression, anxiety, and quality of life [6–8].

Although the motivation to conceal one's lung cancer diagnosis is widely understood, no published quantitative studies have examined diagnosis concealment or its predictors among individuals with cancer. Several qualitative studies have suggested that men with cancer are particularly resistant to discussing or disclosing their diagnosis, citing gender expectations of them as being stoical men [9] or the need to protect others [10] as a rationale for their concealment. Evidence in non-cancer populations suggests that greater introversion and trait social anxiety are associated with greater tendencies to conceal personal characteristics likely to be perceived as negative [11,12]. In contrast, greater social support may have the opposite effect. Among individuals with HIV, those who reported greater social support were less likely to conceal their serostatus, and among those who disclosed their diagnosis, the desire for support was the most

often endorsed reason for disclosure [13]. Together, these findings suggest that men, more introverted patients, those with greater social anxiety, those with less social support, and those reporting less use of seeking support may be more likely to conceal their stigmatizing diagnoses.

In identifying potential consequences of concealment, the cognitive–affective–behavioral model of concealable stigma is instructive [14]. This model posits that concealment of potentially stigmatizing conditions often has negative self-evaluative, affective, and behavioral consequences. Research in non-cancer populations suggests that individuals who conceal a stigma come to appraise the stigma as more shameful, view themselves more negatively, and experience greater psychological distress than those who disclose the stigma [14]. In addition, individuals concealing a stigma may become more isolated in order to avoid the distress and cognitive demands associated with concealing a stigma from others.

Data from non-cancer populations support this conceptual model. For example, in one study, college students who reported characteristics that might be considered concealable and stigmatizing reported greater anxiety and depression as well as lower self-esteem than students with potentially stigmatizing characteristics that are less concealable [15]. Another study found that in pregnant women who were planning to have an elective abortion, secrecy regarding the abortion at baseline was associated with greater distress 2 years later; this association was mediated by intrusive thoughts and suppression of thoughts about their abortion [16]. These findings suggest that concealment of a lung cancer diagnosis may be associated with negative affective implications and are consistent with current theoretical understanding of the consequences of concealing a concealable stigma [14].

Given the stigmatizing nature of lung cancer and the lack of data on lung cancer concealment, the present study sought to examine the prevalence as well as demographic, clinical, and psychosocial correlates of diagnosis concealment among lung cancer patients. We anticipated that a subset of participants would report concealing their lung cancer diagnosis in the previous month. We also expected that most of those who concealed would endorse concealing their diagnosis for fear of negative consequences, such as stigmatization. Demographic, clinical, and psychosocial correlates were examined for their associations with concealment. We hypothesized that diagnosis concealment would be associated with male gender, greater introversion, greater social anxiety, less social support, and less use of seeking support as a coping strategy, as well as greater anxiety, depression, cancer-specific distress, and perceived stigma.

## Methods

### Participant eligibility and recruitment

Eligible patients for this study were (a) receiving chemotherapy and/or radiotherapy for treatment of non-small cell lung cancer (NSCLC) or small cell lung cancer (SCLC), (b) free of any history of other cancers with the exception of non-melanoma skin cancers, (c) ≥18 years of age, (d) able to read English, and (e) able to provide informed consent. With institutional review board approval, patients were recruited between February and December 2012. Patients were approached by study staff at a routine outpatient visit or via mail for those not scheduled for a routine outpatient visit within the 3 weeks after they were identified as potentially eligible. All patients completed assessments at this time; participants were not compensated for their study participation.

### Measures

Demographics and background information were collected using a self-report form assessing age, sex, race, ethnicity, education, income, marital status, and smoking history, which was used to classify participants as never smokers (<100 cigarettes in lifetime), former smokers, or current smokers.

A review of patients' medical records assessed the following: date of lung cancer diagnosis, disease stage, disease type (small cell vs. non-small cell), previous lung cancer treatment, and Eastern Cooperative Oncology Group performance status (a measure of overall well-being) [17].

Diagnosis concealment was assessed with a brief self-report measure that was designed and pilot tested for this study. Respondents were asked to indicate whether they had chosen to conceal their lung cancer diagnosis (yes/no) from anyone within certain specified groups (i.e., family, friends, and coworkers) within the previous month. Those who indicated they had chosen to conceal their lung cancer diagnosis were asked to indicate their reason(s) for concealing by choosing from a specified list of reasons derived from pilot testing of this questionnaire.

Coping strategies were assessed using the Coping Responses Inventory (CRI; [18]), a 48-item instrument that assesses specific coping responses to their cancer and treatment for cancer via eight subscales. Four subscales assess approach coping styles: seeking guidance and support (attempting to seek support from others), problem solving (taking action to deal with the problem), logical analysis (attempting to understand and prepare for the problem), and positive reappraisal (attempting to construe the problem in a positive way). Four subscales assess avoidant coping styles: seeking alternative rewards (engaging in alternative sources of satisfaction), emotional discharge (reducing tension by expressing negative

feelings), cognitive avoidance (avoiding thinking realistically about the problem), and acceptance or resignation (reacting to the problem by accepting it). Higher scores indicate greater use of each coping style. The eight subscales of the CRI have demonstrated validity and reliability in cancer patients [18,19]. Internal consistency reliability for this scale ranged from 0.44 to 0.70 in the current sample.

Extroversion was assessed using the 12-item extroversion subscale of the Neuroticism–Extraversion–Openness Five-factor Inventory [20]. Higher scores indicate more extroversion. Sample items include 'I like to have a lot of people around me' and 'I really enjoy talking to people'. The Neuroticism–Extraversion–Openness Five-factor Inventory has demonstrated acceptable reliability and validity in the general population as well as in individuals with cancer [20,21] and demonstrated an internal consistency reliability in the current sample of 0.79.

Trait social anxiety and social avoidance were assessed using the Liebowitz Social Anxiety Scale [22], a 24-item measure that asks respondents to rate the fear/anxiety they experience during certain social situations (e.g., speaking up at a meeting). Respondents are then asked to indicate the degree to which they would avoid these social interactions. The trait social anxiety and social avoidance subscales are coded such that higher scores indicate greater social anxiety and avoidance. Both subscales have demonstrated acceptable reliability and validity [22,23] and demonstrated an internal consistency reliability in the current sample of 0.89–0.92.

Social support was assessed using the Enhancing Recovery in Coronary Heart Disease (ENRICHD) Social Support Instrument [24], a five-item instrument designed to assess emotional support. The ENRICHD Social Support Instrument has been shown to have acceptable reliability and validity, and higher scores indicate greater perceived social support [24]. Sample questions include 'Is there someone available to give you good advice about a problem?' and 'Is there someone available to you who shows you love and affection?' [24]. This scale has demonstrated validity and reliability among medically ill populations, including lung cancer patients [8,24,25]. Internal consistency reliability in the current sample was 0.92.

Anxiety and depression were assessed using the Hospital Anxiety and Depression Scale [26]. Higher scores indicate worse symptoms of anxiety and depression. This scale has demonstrated acceptable validity and reliability, has been used extensively in studies of patients with cancer [27,28], and demonstrated an internal consistency reliability in the current sample of 0.78.

Cancer-specific distress was assessed using the 22-item intrusion subscale of the Impact of Events Scale—Revised [29]. Higher scores on this scale indicate worse cancer-specific distress. Sample intrusion subscale items include 'Other things kept making me think about it' and 'Pictures about it popped into my head'. Respondents were instructed to rate items with regard to the diagnosis and treatment of their lung cancer. This scale, which has demonstrated acceptable reliability and validity, has been extensively used in the cancer population as a measure of cancer-specific distress [29,30] and demonstrated an internal consistency reliability in the current sample of 0.87.

Self-esteem was assessed using the Rosenberg Self-esteem Scale [31], a 10-item Likert-type scale. Higher scores on this scale indicate greater self-esteem. This scale has demonstrated adequate reliability and validity and has been used with numerous populations, including individuals with cancer [31,32]. Internal consistency reliability in the current sample was 0.86.

Perceived lung cancer-related stigma was assessed using the Social Impact Scale [33], a 24-item scale that measures the extent to which individuals with an illness believe they are experiencing social rejection, financial insecurity, internalized shame, and social isolation as a result of their illness. Social rejection refers to the feeling of being discriminated against by others. Financial insecurity refers to the financial consequences of one's stigmatizing condition. Internalized shame assesses the degree to which individuals feel ashamed because of their stigmatizing condition. Social isolation refers to the degree to which individuals feel that their stigmatizing condition causes them to feel set apart from others. In addition to a total score, the measure yields subscale scores for the four aspects of experienced stigma described earlier. Higher scores on the total score and each subscale indicate greater perceived lung cancer-related stigma. These four subscales have been shown to have strong internal consistency [33]. The Social Impact Scale has demonstrated validity and reliability among cancer patients [8,33]. The internal consistency reliability in the current sample was 0.92.

## Statistical analyses

The frequencies of participants who concealed from various groups of people and the reported reasons for concealment were calculated. Diagnosis concealment was dichotomized to compare individuals who did not conceal their diagnosis from anyone in the previous month to those who did conceal their diagnosis from anyone in the previous month. Independent-samples *t*-tests and chi-square tests were conducted to identify demographic and clinical correlates of concealment. Effect sizes for differences between those who concealed and those who did not conceal were calculated using Cohen's *d* [34]. Univariate logistic regression analyses were used to determine the association between diagnosis concealment (categorical dependent variable) and potential psychosocial correlates of concealment. The Holm–Bonferroni correction was used to control type I error rate in analyses of psychosocial correlates of concealment [35]. In addition, a

hierarchical logistic regression analysis examined whether psychosocial factors accounted for unique variance in diagnosis concealment above and beyond that contributed by associated demographic and clinical variables.

## Results

### Participants

Participant flow is shown in supplementary Figure 1. One hundred ninety-six patients were approached for participation. A total of 157 (80%) signed consent. The patients who agreed to participate in the study did not differ in terms of age, gender, or race from those who declined to participate, $ps \geq 0.24$. Four participants who agreed to participate were found to be ineligible before consent, three were found to be ineligible after consent, four withdrew from the study, and 29 did not complete the study measures. Analyses are based on the 117 participants who completed the study measures.

### Participant demographic and clinical characteristics

Participants ranged in age from 36 to 85 years (Table 1). The majority of the participants were high school graduates (70%), married (62%), White (82%), and previous
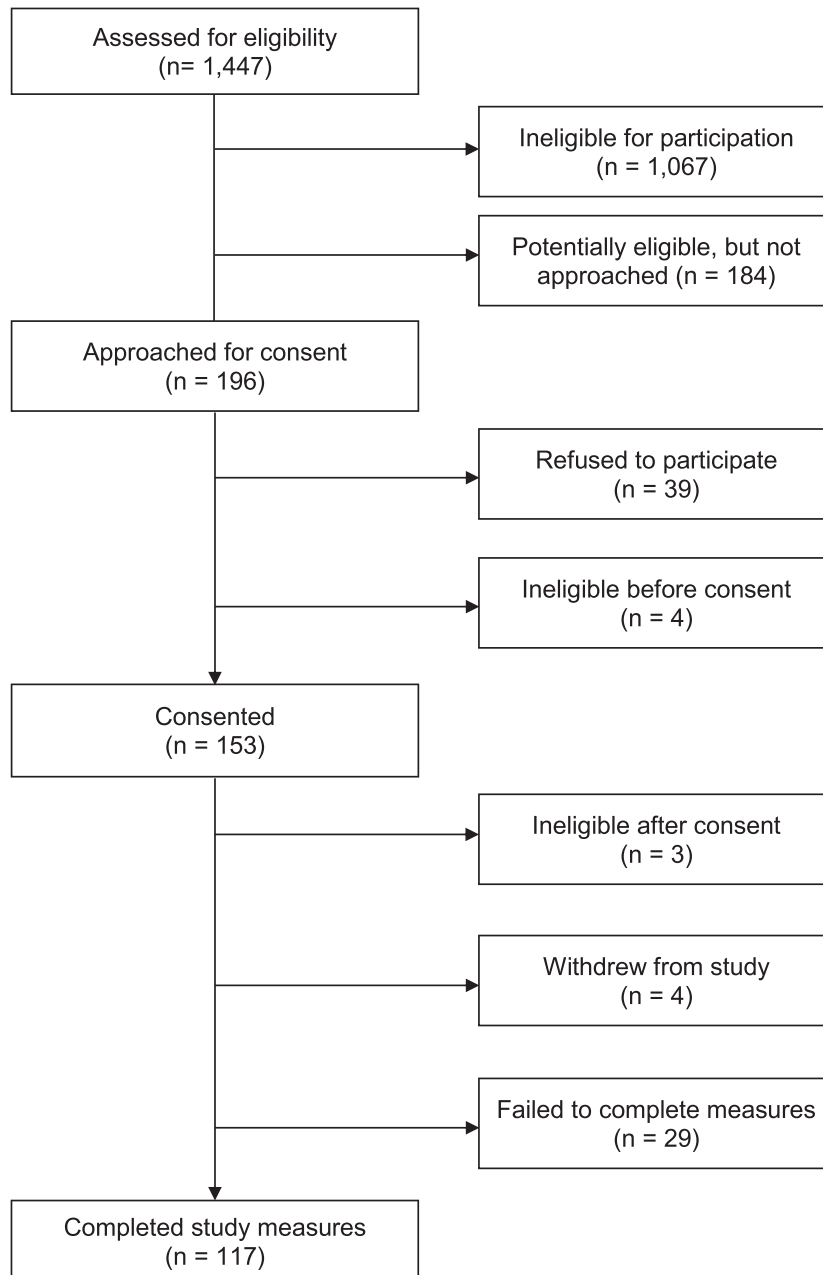


**Figure 1.** Participant flow chart

**Table 1.** Demographic and clinical characteristics of the sample (N = 117)

| Variable | Total sample (N = 117) M (SD) | Did conceal (n = 30) M (SD) | Did not conceal (n = 87) M (SD) | p |
|---|---|---|---|---|
| Age, years | 64.22 (9.66) | 61.47 (9.93) | 65.17 (9.40) | 0.07 |
| Pack-years of tobacco use[a] | 42.52 (29.96) | 46.48 (33.62) | 40.22 (27.67) | 0.39 |
| Body mass index | 26.33 (5.19) | 25.79 (4.97) | 26.52 (5.27) | 0.51 |
| Months since original diagnosis | 20.56 (27.92) | 22.03 (30.94) | 20.05 (26.97) | 0.74 |
| Months since recurrence[b] | 9.74 (9.53) | 4.22 (2.73) | 12.50 (10.55) | 0.03 |
| Months since resection[c] | 26.46 (32.75) | 31.17 (34.51) | 24.20 (32.35) | 0.55 |
| Months since radiation[d] | 13.40 (21.70) | 19.83 (36.35) | 11.37 (15.00) | 0.24 |
| Gender, n (%) | | | | 0.67 |
|   Male | 58 (50) | 17 (57) | 41 (47) | |
|   Female | 59 (50) | 13 (43) | 46 (53) | |
| Education, n (%) | | | | 0.36 |
|   ≤High school graduate | 35 (30) | 7 (23) | 28 (32) | |
|   >High school graduate | 82 (70) | 23 (77) | 59 (68) | |
| Race, n (%) | | | | 0.15 |
|   White | 96 (82) | 22 (73) | 74 (85) | |
|   Non-white | 21 (18) | 8 (27) | 13 (15) | |
| Ethnicity, n (%) | | | | 0.45 |
|   Hispanic | 5 (4) | 2 (7) | 3 (3) | |
|   Non-Hispanic | 112 (96) | 28 (93) | 84 (97) | |
| Marital status, n (%) | | | | 0.90 |
|   Currently married | 73 (62) | 19 (63) | 54 (62) | |
|   Not married | 44 (38) | 11 (37) | 33 (38) | |
| Total household income, n (%) | | | | 0.61 |
|   <$40,000 | 29 (25) | 6 (20) | 23 (27) | |
|   ≥$40,000 | 69 (59) | 20 (67) | 49 (56) | |
|   Declined to answer | 19 (16) | 4 (13) | 15 (17) | |
| Alcohol use in previous month, n (%) | | | | 0.04 |
|   No | 69 (59) | 13 (43) | 56 (64) | |
|   Yes | 48 (41) | 17 (57) | 31 (36) | |
| Cigarette use, n (%) | | | | 0.24 |
|   Never | 26 (22) | 9 (30) | 17 (20) | |
|   Previous and current | 91 (78) | 21 (70) | 70 (80) | |
| Type of lung cancer, n (%) | | | | 0.07 |
|   NSCLC | 104 (89) | 24 (80) | 80 (92) | |
|   SCLC | 13 (11) | 6 (20) | 7 (8) | |
| NSCLC disease stage[e], n (%) | | | | 0.91 |
|   I–II | 14 (12) | 4 (13) | 10 (12) | |
|   III | 17 (15) | 3 (10) | 14 (16) | |
|   IV | 73 (62) | 17 (57) | 56 (64) | |
| SCLC disease stage[f], n (%) | | | | 0.91 |
|   Limited stage SCLC | 2 (2) | 1 (3) | 1 (1) | |
|   Extensive stage SCLC | 11 (9) | 5 (17) | 6 (7) | |
| ECOG performance status, n (%) | | | | 0.39 |
|   0 | 23 (20) | 9 (30) | 14 (16) | |
|   1 | 84 (72) | 19 (63) | 65 (75) | |
|   2–4 | 10 (8) | 2 (7) | 8 (9) | |
| Taking antidepressants, n (%) | | | | 0.76 |
|   No | 92 (79) | 23 (77) | 69 (79) | |
|   Yes | 25 (21) | 7 (23) | 18 (21) | |
| Taking sedative medication, n (%) | | | | 0.23 |
|   No | 67 (57) | 20 (67) | 47 (54) | |
|   Yes | 50 (43) | 10 (33) | 40 (46) | |
| History of lung cancer recurrence, n (%) | | | | 0.30 |
|   No | 90 (77) | 21 (70) | 69 (79) | |
|   Yes | 27 (23) | 9 (30) | 18 (21) | |
| History of resection, n (%) | | | | 0.25 |
|   No | 80 (68) | 18 (60) | 62 (71) | |
|   Yes | 37 (32) | 12 (40) | 25 (29) | |

*(Continues)*

**Table 1.** (Continued)

| Variable | Total sample (N = 117) M (SD) | Did conceal (n = 30) M (SD) | Did not conceal (n = 87) M (SD) | p |
|---|---|---|---|---|
| Treated with radiation, n (%) | | | | 0.94 |
| Never | 67 (57) | 18 (60) | 49 (56) | |
| Finished radiation before consent | 42 (36) | 10 (33) | 32 (37) | |
| Receiving radiation when consented | 8 (7) | 2 (7) | 6 (7) | |
| Received chemotherapy, n (%) | | | | 0.56 |
| Never | 1 (1) | 0 (0) | 1 (1) | |
| Receiving chemotherapy | 116 (99) | 30 (100) | 86 (99) | |

SD, standard deviation; ECOG, Eastern Cooperative Oncology Group; NSCLC, non-small cell lung cancer; SCLC, small cell lung cancer.
[a]Among only past smokers and current smokers (n = 91).
[b]Among only those with a recurrence (n = 27).
[c]Among only those with a resection (n = 37).
[d]Among only those with radiation (n = 50).
[e]Among only those with NSCLC (n = 104).
[f]Among only those with SCLC (n = 13).

smokers or current smokers (78%). On average, participants were 20.56 months (standard deviation = 27.92) from their original lung cancer diagnosis. Twenty-seven participants (23%) had a recurrence of their lung cancer, 37 (32%) had a surgical resection of this cancer, and 50 (43%) had been treated with radiation therapy.

### Prevalence of and reasons for concealment

Thirty participants (26%) reported concealing in the previous month. Frequencies of concealment from various groups, among those who reported concealing their diagnosis, and reasons for concealment are presented in

**Table 2.** Frequencies of concealment from various groups and reasons for concealment for patients who reported concealment (n = 30)

| Concealment from | n (%) | n (%) within category |
|---|---|---|
| Close family | 5 (17) | |
| I didn't want to overburden them | | 2 (40) |
| I didn't want them to worry about me | | 1 (20) |
| Other | | 1 (20) |
| Missing | | 1 (20) |
| Other family | 8 (27) | |
| I didn't want them to worry about me | | 5 (63) |
| I didn't want them to take pity on me | | 2 (25) |
| I didn't want to overburden them | | 1 (13) |
| Work supervisor | 0 (0) | |
| Coworker | 4 (13) | |
| Other | | 3 (75) |
| I was concerned that they might judge me | | 1 (25) |
| Close friend | 12 (40) | |
| I didn't want them to worry about me | | 7 (58) |
| I didn't want them to take pity on me | | 3 (25) |
| I didn't want to overburden them | | 1 (8) |
| Other | | 1 (8) |
| Casual friend | 20 (67) | |
| Other | | 10 (53) |
| I didn't want them to take pity on me | | 6 (32) |
| I didn't want them to worry about me | | 2 (11) |
| I didn't want to overburden them | | 1 (4) |

Table 2. Among those who concealed their diagnosis in the month prior to study participation, they most frequently concealed from casual friends (67%), close friends (40%), and family members they did not consider close relatives (27%). Of those who concealed in the previous month, 10 (33%) concealed from people in more than one category. Within most categories of concealment from groups of people, the majority of participants reported concern for others as a reason for concealment of their lung cancer diagnosis.

### Identifying demographics and clinical correlates of concealment

Comparisons were made between those who concealed and those who did not on demographic measures (Table 1). Contrary to expectations, gender was not associated with concealment (p = 0.67). Exploratory analyses indicated that those who concealed their diagnosis were more likely to report drinking alcohol in the previous month (57%) than those who did not conceal their diagnosis (36%, p = 0.04). There was also a non-significant trend towards an association between age and concealment, such that those who concealed were younger than those who did not conceal, p = 0.07. History of smoking and marital status were not associated with concealment (p ≥ 0.24).

Regarding potential clinical correlates of concealment, exploratory analyses indicated that among patients with a recurrence of lung cancer, those who recurred more recently were more likely to report concealing their diagnosis than others (p = 0.03). There was a non-significant trend towards an association between type of lung cancer (e.g., NSCLC versus SCLC) and concealment, such that patients with SCLC (40%) were more likely to conceal their diagnosis than patients with NSCLC (23%, p = 0.07). Body mass index, time since diagnosis, time since resection, time since radiation, disease stage, Eastern Cooperative Oncology Group performance status, use of antidepressants, and use of sedatives were not associated

with concealment ($p \geq 0.23$). Similarly, no associations were found between concealment and whether participants had a recurrence, a surgical resection of their lung cancer, radiotherapy, or chemotherapy ($p \geq 0.25$).

### Psychosocial correlates of diagnosis concealment

As hypothesized, those who concealed their diagnosis reported greater internalized shame related to the diagnosis of lung cancer than those who did not conceal their diagnosis ($p < 0.01$) (Table 3). Those who reported greater use of positive reappraisal as a coping strategy were also more likely to report concealing their diagnosis in the previous month ($p = 0.02$). Contrary to expectations, extroversion, social anxiety, social support, other coping strategies, anxiety, depression, cancer-specific distress, social avoidance, and self-esteem were not associated with concealment ($p \geq 0.15$). In addition, perceived social rejection, financial insecurity, social isolation, and total perceived stigma were not associated with diagnosis concealment ($p \geq 0.33$).

A hierarchical logistic regression indicated that positive reappraisal and internalized shame together accounted for an additional 16% of the variance in concealment above

**Table 3.** Psychological differences between participants who did conceal ($n = 30$) and those who did not conceal ($n = 87$)

| Variable | Did conceal ($n = 30$) M (SD) | Did not conceal ($n = 87$) M (SD) | $d$ | $t$ |
|---|---|---|---|---|
| Extroversion | 26.59 (6.39) | 28.64 (6.58) | 0.31 | 1.47 |
| Social anxiety | 12.17 (10.72) | 13.74 (12.42) | 0.13 | 0.62 |
| Social avoidance | 17.17 (10.55) | 17.89 (13.06) | 0.06 | 0.27 |
| Social support | 22.14 (3.93) | 22.29 (4.16) | 0.10 | 0.18 |
| Coping responses | | | | |
| Logical analysis | 46.26 (8.14) | 45.09 (15.27) | 0.10 | −0.37 |
| Positive reappraisal | 56.94 (4.64) | 52.70 (8.39) | 0.63 | −3.31* |
| Seeking guidance and support | 53.87 (8.16) | 53.33 (8.50) | 0.06 | −0.29 |
| Problem solving | 52.66 (5.88) | 52.27 (8.72) | 0.05 | −0.20 |
| Cognitive avoidance | 49.97 (8.63) | 50.78 (8.61) | 0.09 | 0.42 |
| Acceptance or resignation | 50.03 (10.34) | 49.64 (8.48) | 0.04 | −0.19 |
| Seeking alternative rewards | 52.35 (9.92) | 53.22 (9.26) | 0.09 | 0.41 |
| Emotional discharge | 53.18 (8.24) | 51.78 (8.55) | 0.17 | −0.73 |
| Anxiety | 7.60 (2.93) | 8.49 (3.42) | 0.28 | 1.28 |
| Depression | 6.90 (3.10) | 6.89 (2.76) | 0.00 | −0.03 |
| Cancer-specific distress | 0.81 (0.76) | 0.89 (0.72) | 0.11 | 0.48 |
| Self-esteem | 23.10 (5.07) | 22.70 (5.37) | 0.08 | −0.35 |
| Perceived stigma | | | | |
| Social rejection | 13.60 (3.32) | 13.28 (4.22) | 0.08 | −0.38 |
| Financial insecurity | 4.50 (2.13) | 4.71 (2.32) | 0.09 | 0.43 |
| Internalized shame | 9.93 (2.59) | 8.34 (2.42) | 0.63 | −3.05* |
| Social isolation | 13.93 (3.37) | 13.47 (4.51) | 0.12 | −0.52 |
| Total perceived stigma | 41.97 (8.42) | 39.79 (11.03) | 0.22 | −0.98 |

*$p < 0.01$.

**Table 4.** Summary of hierarchical regression analysis for variables predicting concealment ($n = 117$)

| Step | Predictor | B (SE) | Odds ratio | 95% CI | $\Delta R^2$ |
|---|---|---|---|---|---|
| 1 | Alcohol use in previous month (yes) | −0.99* (0.49) | 0.37 | (0.14–0.97) | 0.07 |
| 2 | Use of positive reappraisal for coping | 0.10* (0.04) | 1.10 | (1.07–1.62) | 0.16 |
| | Internalized shame | 0.27* (0.11) | 1.31 | (1.02–1.19) | |

SE, standard error; CI, confidence interval.
Step 1 model fit, −2 log likelihood = 117.68, Nagelkerke $R^2$ = 0.07; step 2 model fit, −2 log likelihood = 104.31, Nagelkerke $R^2$ = 0.23.
*$p < 0.05$.

and beyond that accounted for by use of alcohol (Table 4). Controlling for the effect of use of alcohol, one-point increases in the positive reappraisal or internalized shame scales were associated with an increase in the odds of concealing one's diagnosis by 10% and 31%, respectively.

## Conclusions

The present study was the first to examine the prevalence and correlates of diagnosis concealment in lung cancer patients. Of a sample of 117 lung cancer patients, 26% reported concealing their diagnosis in the previous month. Participants predominantly reported concealing from casual friends.

Patients in this study often endorsed reasons for concealing their diagnosis that reflected concern for others, including not wanting to overburden others and concern that they would overburden others with their troubles. These were the most commonly endorsed reasons among those who reported concealing from close family, extended family, and close friends. This is contrary to our expectations that most patients who concealed their diagnosis would report doing so for fear of judgment or social isolation from others. These concerns were only endorsed by one of four patients who concealed from co-workers and 1 of 20 participants who reported concealing from casual friends. In addition, use of alcohol and a more recent lung cancer recurrence (for those whose lung cancer recurred) were associated with diagnosis concealment. Patients who reported greater use of positive reappraisal as a coping strategy and more lung cancer-related internalized shame were also more likely to conceal their diagnosis. These differences reflect medium effect sizes (i.e., $d = 0.63$).

### Theoretical implications

Contrary to the cognitive–affective–behavioral model of concealable stigma [14], hypotheses regarding negative affective, behavioral, and self-evaluative correlates of concealment were largely not supported. Anxiety, depression, cancer-specific distress, social avoidance, and self-esteem were not associated with diagnosis concealment. However, the finding that patients who concealed their lung

cancer diagnoses reported greater internalized shame is consistent with the hypothesized impact of concealment on affective outcomes. This pattern of results raises questions about whether the theorized links between concealment and its consequences apply to lung cancer patients. It is possible that the negative consequences of concealing one's lung cancer diagnosis were not significant enough to impact participants' overall well-being or were not detectable by this study's measures. That is, concealing a stigma such as lung cancer may result in negative consequences, but these negative consequences may be short-lived and go unnoticed in retrospective studies such as the present study.

Previous studies in potentially stigmatizing diseases have focused on the rate of disclosure rather than concealment. For example, in a sample of breast cancer patients, 23% and 30% reported they disclosed their diagnosis 'not at all' or 'a little' to family and friends, respectively [36]. Similarly, a study of HIV-positive individuals referred for psychiatric evaluation reported that 53% were open about their serostatus 'some of the time' or less often [37]. In contrast, the current study focuses on the rate at which and reasons for which lung cancer patients deliberately chose not to share their diagnosis with others. Whereas disclosing requires an active, conscious decision to share one's diagnosis, concealment can be a more passive act.

Another possible explanation for the lack of support for the study's hypotheses involves the patients' reasons for concealment. Many reported concealing for reasons having to do with concern for others (e.g., 'I didn't want them to worry about me'). Thus, it is possible that the potential negative consequence of disclosure (i.e., their loved one's excessive worry about them) may not have been sufficiently negative to elicit the adverse affective, behavioral, and self-evaluative consequences hypothesized. However, the reasons reported for concealment are at odds with the significant relationship between concealment and internalized shame. Patients who reported these reasons for concealment may have been rationalizing shame-based concealment. In addition, patients who experienced greater internalized shame may have been using concealment as an adaptive coping strategy to avoid disclosing to unsupportive members of their social network. Lastly, the greater use of positive reappraisal among patients who concealed their diagnosis may have served to reduce their distress.

## Clinical implications

With regard to clinical implications, these findings suggest that some patients may wish to conceal their illnesses from others, including close family members. Thus, providers should be particularly cautious not to accidentally disclose patients' diagnoses of lung cancer or other potentially stigmatizing conditions. Accordingly, providers may wish to discuss plans for ensuring patients' privacy with their lung cancer patients. In addition, the findings suggest that mental healthcare professionals treating individuals with cancer consider discussing concealment or disclosure of their diagnosis with their patients. Those who experience more internalized shame regarding their lung cancer may be more likely to conceal their illness.

## Limitations and future directions

The cross-sectional nature of this study's data collection limits the conclusions that can be drawn from its findings. Although the data can be interpreted as suggesting that use of positive reappraisal as a coping strategy increases the likelihood that lung cancer patients will conceal their diagnoses and that concealment contributes to greater internalized shame, the possibility of reverse relationships between these measures cannot be ruled out. Future studies should test this theoretical model using *in vivo* studies to examine the impact of concealment versus disclosure of one's diagnosis to confederate strangers. Such longitudinal studies could also clarify the directionality of relationships between concealment and the correlates identified in this study.

The sample's homogeneity with regard to race, ethnicity, and receipt of treatment limits the generalizability of the study's findings to the broader population of individuals with lung cancer. Future studies should aim to recruit more diverse samples of individuals with lung cancer. For example, concerns over the ability to conceal a lung cancer diagnosis may be less salient for patients finished with therapy for lung cancer.

This study used a generic measure of perceived stigma that may not capture the self-blame associated with lung cancer. Future studies in this area should consider stigma measures specific to lung cancer patients, such as the Cataldo Lung Cancer Stigma Scale [38]. This scale may better assess association between smoking and stigma in lung cancer patients, which has been previously demonstrated [39].

Prescription of antidepressant and sedative medications were not related to concealment in this study. However, participants' use of psychotherapy and related services was not assessed. Thus, the potential buffering effect of these services could not be ascertained.

This study dichotomized concealment of one's lung cancer diagnosis, grouping together those who concealed from only one casual friend with those who concealed from close family members. However, concealment may be better conceptualized as a continuous variable to reflect the varying degrees to which individuals conceal their diagnoses from others. Dichotomizing concealment may have artificially increased the error in the measurement of concealment, thereby reducing the study's power to

identify significant effects. Future studies should examine the frequency of concealment or study concealment as a continuous variable by measuring the varying degrees of concealment from others. In addition, this study did not assess the degree to which patients disclosed their diagnoses to others. Concealment and disclosure are complementary constructs; however, disclosure is a more discreet variable that merits examination in future studies.

Another limitation is the low internal consistency reliabilities for some of the CRI subscales. These low internal consistency reliabilities may partially explain the lack of associations between concealment and the coping strategies assessed. Thus, the lack of associations between concealment and some of the coping strategies should be interpreted with caution.

Lastly, this study's limited sample size precluded the examination of the impact of concealing from various groups of individuals, such as close family versus extended family members. Larger studies could also explore the degree to which reasons for concealment vary depending upon the person from whom the diagnosis is concealed (e.g., close family versus close friends).

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## Conflict of interest

The authors have no conflicts of interest to disclose.

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