Original Article

The dyadic relationship of supportive care needs with quality of life in lung cancer survivor and spousal caregiver couples

Yunqin Weng [a,b], Jialing Lin [b], Tianbao Yang [c], Yu-An Lin [b], Huiping Chen [a], Weiti Chen [d], Feifei Huang [b,*]

[a] Mengchao Hepatobiliary Hospital of Fujian Medical University, Fuzhou, China
[b] School of Nursing, Fujian Medical University, Fuzhou, China
[c] Affiliated Hospital of Putian University, Putian, Fujian, China
[d] University of California, Los Angeles, CA, USA

ABSTRACT

Objective: This study aimed to explore the dyadic interrelationships between supportive care needs (SCNs) and quality of life (QOL) among lung cancer (LC) survivors and their spousal caregivers.

Methods: In this cross-sectional study, 443 dyads were recruited from three tertiary hospitals in two cities (Fuzhou and Putian) in Fujian Province, China, between May 2020 and May 2021. The study shows that participants completed a sociodemographic information sheet, the SCNs survey, and answered the Chinese version of the World Health Organization Quality of Life-BREF questionnaire by telephone. The data were analyzed using descriptive statistics and Pearson's correlations. This study used the actor–partner interdependence model (APIM) with dyad analysis to examine the effect of LC survivors and spouses unmet SCNs on QOL.

Results: LC survivor's and spouse's QOL levels were influenced by the level of unmet SCNs (the actor effect). LC survivors unmet SCNs were significantly negatively associated with their spouse's QOL (the partner effect). There were no partner effects between the spouse's unmet SCNs and the LC survivor's QOL. The APIM model produced an acceptable model fit [χ^2/df = 2.84 (147), comparative fit index (CFI) = 0.94, Tucker–Lewis index (TLI) = 0.93, root mean square error of approximation (RMSEA) = 0.07].

Conclusions: The level of unmet SCNs significantly affected QOL in survivor and spouse dyads. Although partner effects were weaker than actor effects, healthcare providers should develop tailored LC dyadic self- and family-management interventions to provide SCN-driven care to LC survivors and their spouses.

Introduction

China has the largest number of diagnosed lung cancer (LC) cases worldwide.[1] From 2019 to 2023, the estimated 5-year relative survival rate for Chinese LC patients was 52.7%.[2] The survival rate was estimated to be 43.0% for men and 73.2% for women, respectively.[2] During the recovery phase, LC survivors experience more health impairments than other cancer patients, including physical complaints (eg, insomnia and dyspnea), psychological challenges (eg, stigma and fear of recurrence), financial difficulties (eg, decreased earnings), and social limitations (eg, decreased ability to engage in leisure activities), all of which negatively impact their quality of life (QOL).[3,4] Many LC survivors are not prepared to cope with new recovery stressors or the 'new normal' way of living. As a result, they perceive lower levels of service or support than is necessary

to achieve their optimal well-being; that is, they experience unmet supportive care needs (SCNs).[5] SCNs may vary according to disease type and severity.[5] In Zhang et al.'s study, LC patients exhibited the highest rate of unmet SCNs when compared to those with other cancers.[6] Several studies reported that 78.0%–93.5% of LC patients present with one or more unmet SCNs,[6,7] which led to a reduction in their overall QOL.[7] Thus, SCN plays a vital role in the QOL of LC survivors, regardless of cancer prognosis.[8]

In China, a growing number of unmet SCNs in LC survivors, combined with an already under-resourced cancer care system, mean cancer symptom management is often left to family members, especially spouses. In the Chinese cultural tradition of collectivism, most care responsibilities are transferred to family members and spousal caregivers, who may prioritize the LC patients' needs above their own.[9,10] Other

studies have shown that caregivers of family members with cancer complained that their own SCNs were largely unmet and had increased before, during, and after the cancer management of their loved one.[11] Close to half (43.6%) of family caregivers responsible for cancer patients reported at least 10 needs that have not been met, ranging from unmet availability of healthcare support to unmet psychological and emotional support needs.[12] Since studies report that family caregivers of LC patients have greater unmet SCNs than those with other cancers,[13] caregivers' QOL is also negatively impacted and affects the health outcomes of LC survivors.[12]

To date, limited studies have addressed LC patients and their spousal caregivers in the context of SCNs. Accumulating evidence shows that unmet SCNs between cancer survivors and their spouses are intricately linked,[14] and examining the unmet needs of cancer survivors and caregivers should be considered at the same time in order to provide optimal care.[15] However, most studies that focus on how unmet SCNs affect QOL are based on individual patients, thereby missing the role of the family caregiver, particularly the spousal caregiver.

The actor–partner interdependence model (APIM) is particularly useful in cross-sectional designs for analyzing dyadic data and differentiating between actor effects and partner effects.[16] Its ability to unpack dyadic effects, explore correlations, and examine mediation and moderation makes it an indispensable tool for understanding the complexities of interpersonal dynamics within a single time point.[16] In the field of cancer research, the majority of studies have utilized APIM to examine the dynamic interplay between patients and caregivers.[17–19] In this study, we used APIM to measure the interdependence of LC patients and their spousal caregivers. Actor effects are defined as the effects of a person's own characteristics on his or her own outcomes, while partner effects are defined as the effects of a partner's characteristics on a person's own outcomes.[16]

The objective of this study was to explore the level of SCNs among LC survivors and their spousal caregivers, as well as how they impact the dyad's QOL. To be specific, we had two working hypotheses. Hypothesis 1: LC survivor and spouse levels of QOL are influenced by their own unmet SCN levels, known as the actor effect. Hypothesis 2: QOL levels are influenced by their partner's unmet SCN levels, known as the partner effect.

Methods

Theoretical framework

In this study, we selected Lyon's Theory of Dyadic Illness Management as our framework model, which emphasizes that cancer management is a dyadic phenomenon rather than solely a response from the individual patient.[20] According to the theory, how dyads appraise cancer as a unit will influence their ability to engage in behaviors to manage cancer together, affecting the health of both members of the dyadic unit.[20]

Participants and setting

Between May 2020 and May 2021, we utilized a convenience sampling method to recruit a sample of LC patients and their spousal caregivers (the dyads) from three large tertiary hospitals located in Fuzhou and Putian City, Fujian Province, China. Study inclusion criteria included: (1) Chinese married couples (> 18 years old) with one partner diagnosed with LC; (2) completion of first-line cancer treatment; (3) Karnofsky performance status score ≥ 60%; (4) under the care of a spouse; (5) being able to communicate in Mandarin; and (6) being willing and able to participate in the study. Participants with cognitive deficits, metastasized LC, or other malignancies were excluded from the study. This study was not registered.

Power analysis

Based on previous research and using the most conservative approach,[21] we estimated the minimum sample size necessary to detect the actor and partner effects for the APIM analysis with distinguishable dyads. We assumed a two-tailed type I error of 5% and a power of 90%. With a standardized regression coefficient to detect an actor or partner effect size of 0.20,[22] the sample estimation yielded 264 dyads.

Measures

Sociodemographic and clinical data

Self-reported sociodemographic variables from patients and spouses were collected and included age, gender, place of residence, working status, education level, type of medical insurance, household income, spousal relationship, and smoking status. Medical characteristics were collected from medical records and included cancer stage, surgical site, and the presence of disease comorbidities.

Supportive care needs

LC survivors' SCNs were evaluated using the Supportive Care Needs Survey-Short Form-34, Chinese version (SCNS-SF-34-C), which was initially designed in English[23] and then translated and adjusted for a Chinese context.[24] It is comprised of 34 items in 5 domains, including health system and information, psychological needs, physical problems, activities of daily living, patient care and support, and sexuality needs. The Cronbach's alpha in this study was 0.96.

The Supportive Care Needs Survey-Partners and Caregivers (SCNS-P&C) was used to evaluate the SCNs of spousal caregivers,[25] which was originally developed in English by Girgis et al.[26] and translated into Chinese by Niu et al.[27] It is comprised of 38 items and 6 domains including, needs related to information, health care professional/health care services, activities of daily living, communication/interpersonal, legal/financial, and psychological/emotional needs. Satisfactory psychometric properties have been shown for the SCNS-P&C in a cancer-related study.[25] In this study, Cronbach's α of the scale was 0.96.

All SCNS-SF-34-C and SCNS-P&C survey items were scored on a 5-point Likert-type scale for need level (1 = no need; 5 = high need). Items that were scored 1–3 indicated that the need was met, and those that were scored 4–5 indicated an unmet need. The sum scores for each domain were transformed from a range of 0 (representing no SCNs) into 100 (representing the highest SCNs). Higher scores indicated higher unmet SCNs.

Quality of life

The World Health Organization Quality of Life assessment questionnaire (WHOQOL-BREF)[28] was utilized to evaluate the QOL of both LC survivors and their caregiver spouses. The WHOQOL-BREF comprises 28 items and 4 domains. Two items relating to general health and overall QOL are examined separately. The remaining 26 items are related to physical, psychological, social relationships, and environmental domains.[29] Each item was rated on a 5-point scale ranging from 1 to 5. Three negatively worded items were reverse-scored. High total scores indicated a high QOL. The Cronbach's alpha coefficient for the scale used in this study was determined to be 0.90.

Data collection

All participants completed measures independently of their spouse via telephonic interviews that lasted approximately 20–30 min in length. Participants who completed the survey were remunerated with a 20 RMB (~$3) gift card.

Data analysis

Data analysis was conducted using IBM SPSS version 26. The means, standard deviations, and ranges of variables were calculated separately for LC survivors and their caregiver spouses. Pearson correlation coefficients were used to estimate the strength of the relationship between unmet SCNs and the QOL of the LC survivor and their spousal caregiver. The APIM through SPSS Amos version 24.0 was used in the study to examine the interdependent associations between the LC survivor and their caregiver spouse's dyadic SCN levels and QOL. During the analysis, potential confounding variables were considered, and necessary adjustments were made to address their effects. To verify the dyadic modeling, the χ^2/df, root mean square error of approximation (RMSEA), comparative fit index (CFI), and Tucker-Lewis index (TLI) were utilized. An adequrate fit criteria was set to χ^2/df < 5, RMSEA < 0.08, CFI and TLI > 0.90, and SRMR < 0.10. The k parameter represented the ratio of the partner effect to the actor effect and was computed separately for each member when studying distinguishable dyads. The k parameter of near 0, 1, and −1 represented the actor-only pattern, the coupling pattern, and the contrast pattern, respectively.[16] All statistical tests were two-sided, and $P < 0.05$ was treated as statistically significant.

Ethical considerations

The study was approved by the human research ethics committee of Fujian Medical University (IRB No. FMU2019012), and all participating LC survivors and their spousal caregivers provided verbal consent before the study started. Study procedures followed the principles set out by the Declaration of Helsinki,[30] and the study adhered to the statement on Strengthening the Reporting of Observational Studies in Epidemiology (STROBE).[31]

Results

Characteristics of participants

A total of 443 dyads were included in the study (a response rate of 90.6%). Most of the LC survivors were diagnosed with non-small cell LC (n = 377, 85.1%) and classified as having stage I disease (n = 299, 67.5%). Nearly half (44.7%) of the survivors had comorbidities. About 83.7% of spousal caregivers had intimate relationships with their spouses, and 16.3% of caregivers had platonic relationships with LC survivors. Table 1 presents the socio-demographic characteristics of the dyads.

Correlations between SCNs and QOL

Table 2 displays the means, standard deviations, and intercorrelations between study variables. The survivor's and the spousal caregiver's SCNs were negatively correlated with their own and their partner's QOL ($r = -0.137$ to 0.811, $P < 0.05$).

Actor–partner interdependence model analysis

As shown in Fig. 1, after controlling for the effects of sociodemographic variables (age, gender, place of residence, educational level, household income, working status, medical insurance type, and smoking status), the final APIM model examining the dyadic effects of SCN on QOL produced an acceptable model fit (χ^2/df = 2.84 (147), CFI = 0.94, TLI = 0.93, RMSEA = 0.07). As shown in Fig. 1, the actor effect was significant for the total mean score of QOL for both LC survivors and spousal caregivers; that is, an individual's SCN level had a strong relationship with their QOL score (actor effects). LC survivor's SCNs were associated with spousal caregiver's QOL (partner effects); however, there were no partner effects from spousal caregiver's SCNs to LC survivor's QOL. In this study, the results showed the LC survivors $k = 0.64$, 95% CI [−0.15, 0.27] and the spousal caregivers $k = 0.31$, 95% CI [0.13, 1.12].

Table 1

Socio-demographic and clinical characteristics of participants (N = 443 dyads).

Characteristics	Lung cancer survivor, n (%)	Spousal caregiver, n (%)
Age, years, mean ± SD (range)	60.53 ± 8.69 (range: 32–79)	60.10 ± 8.67 (range: 30–75)
Gender		
Female	183 (41.3)	260 (58.7)
Male	260 (58.7)	183 (41.3)
Place of residence		
Urban	218 (49.2)	
Suburban	108 (24.4)	
Rural	117 (26.4)	
Educational level		
Elementary school degree or less	216 (48.8)	233 (52.6)
Middle school or high school degree	187 (42.2)	176 (39.7)
Bachelor's degree or above	40 (9.0)	34 (7.7)
Monthly household income (Yuan, RMB)		
1000-1999	5 (1.1)	
2000-2999	19 (4.3)	
3000-3999	115 (26.0)	
4000-4999	169 (38.1)	
5000 and above	135 (30.5)	
Working status		
Yes	78 (17.6)	249 (56.2)
No	365 (82.4)	194 (43.8)
Medical insurance type		
New agricultural cooperative medical insurance	326 (73.6)	–
Urban basic medical insurance	89 (20.1)	–
Provincial basic medical insurance	19 (4.3)	–
Self-paid (uninsured)	9 (2.0)	–
Smoking status		
Former smoker	268 (60.5)	–
Current smoker	127 (28.7)	–
Never smoked	48 (10.8)	–
Cancer stage		
I	299 (67.5)	–
II	54 (12.2)	–
III	82 (18.5)	–
IV	8 (1.8)	–
Comorbidities		
Yes	198 (44.7)	–
No	245 (55.3)	–
Surgical site		
Left	210 (47.4)	–
Right	231 (52.1)	–
Bilateral	2 (0.5)	–
Spousal relationship		
Intimate	–	371 (83.7)
Platonic	–	72 (16.3)

Discussion

This is the first study to utilize the APIM to examine the interdependent relationship between SCNs and QOL of both Chinese LC survivors and their spousal caregivers at the dyadic level. The study revealed several significant findings. First, both LC survivors and their spousal caregivers experienced middle-low levels of unmet SCNs (compared to a standard item score of 3 points). After treatment, the unmet SCNs were associated with the couple's QOL. Second, LC survivors had slightly higher unmet SCNs and lower QOL than their spousal caregivers. Third, there was a partner effect seen on the caregiver spouse's QOL that influenced the LC survivor's unmet SCNs. However, the spousal caregiver's SCNs had no significant association with the LC survivor's QOL.

Both LC survivors and their spousal caregivers had middle-low levels of unmet SCNs

In this study, both LC survivors and their spousal caregivers had middle-to-low levels of unmet SCNs, which was different from the high level of unmet SCNs reported in earlier studies[5,32] Lower levels of unmet

Table 2
Correlation of study variables in survivor-spouse dyads ($N = 443$ dyads).

	Survivor's SCNs	Spouse's SCNs	Survivor's QOL	Spouse's QOL
Survivor's SCNs	1	–	–	–
Spouse's SCNs	0.811*	1	–	–
Survivor's QOL	−0.650*	−0.564*	1	–
Spouse's QOL	−0.202*	−0.137*	0.538*	1
Item means	2.58 ± 0.71	2.49 ± 0.64	2.86 ± 0.61	3.61 ± 0.35

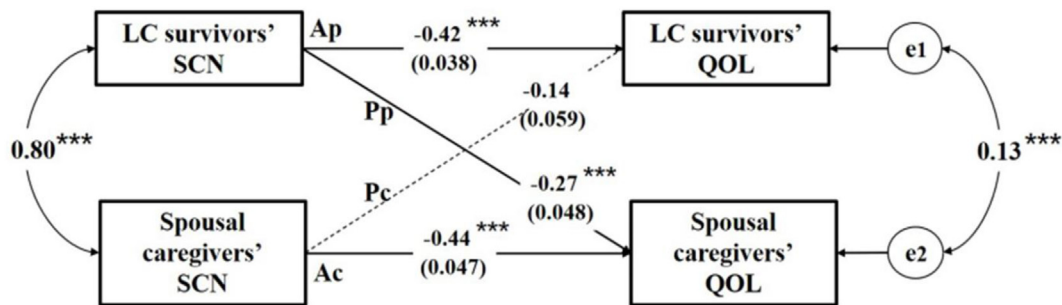SCNs, supportive care needs; QOL, quality of life.
*$P < 0.05$.

Fig. 1. APIM effects on supportive care needs and quality of life. The Bold line indicates a significant path. A dashed line indicates an insignificant path. APIM, actor and partner interdependence model; Ap, actor patient; Ac, actor spousal caregiver; Pp, partner patient; Pc, partner spousal caregiver; LC, lung cancer; SCN, supportive care needs; QOL, quality of life. ***$P < 0.001$.

SCNs observed in this study may be due to the fact that half of LC survivors had stage I disease (67.5%) and had better prognoses, with 83% (stage I$_a$) and 71% (stage I$_b$) five-year survival rates, respectively.[33] In addition, LC survivors with I stage disease also experienced fewer symptom burdens, fewer comorbidities, and fewer psychosocial-spiritual concerns when compared to later-stage patients.[34]

Consistent with findings from previous studies,[7,35] this study indicated an actor effect in both LC survivors and spousal caregivers. Higher levels of unmet SCNs in LC survivors and their spousal caregivers can lower the overall QOL of the dyad. These findings are largely attributable to suboptimal cancer care in China, which creates unmet SCNs in LC survivors or spousal caregivers,[36,37] that manifest as physical (eg, breathlessness, fatigue, interference with daily functioning), psychological (fear of recurrence, uncertainty, anxiety, and depression), social (healthcare system), and governmental (lack of information) needs.[7,13] Furthermore, amidst the coronavirus disease-2019 (COVID-19) outbreak, China implemented a range of restrictive actions on the public to reduce transmission, which may have hampered both receiving effective therapies and the normal lives of cancer patients and their families.[38] Thus, developing and tailoring LC care programs to meet dyads' SCNs is essential for improving the QOL of LC dyads. These care programs may incorporate a comprehensive follow-up plan, personalized psychological assessments, and easy-to-access information about the LC.

Actor effects were more powerful than partner effects

Although our study found that actor effects were more powerful than partner effects, the partial partner effects (LC survivors to the spousal caregiver only) of unmet SCNs on QOL were also noted. In line with prior work,[37] LC survivors' unmet SCNs not only reduce their QOL but also have an adverse impact on the health outcomes of their caregivers. This finding resonates with the collective culture found in most Asian countries, where family members play an important role in caregiving tasks. Within marital relationships, the spouse usually serves as the patients's caregiver and provides most of their care, from eating to other daily activities. While in Chinese culture, spouses serve as primary caregivers, there may be differences in the spousal roles of husband and wife.[2] In the

case of LC, spousal caregivers usually lack knowledge of how to take care of LC patients, as was observed in this study, where a large proportion of survivors and spouses had low levels of education. With a lack of social support from outside sources, spousal caregivers face hardships and burdens that come from LC patients unmet SCNs and thus lead to decreases in their own QOL.[13]

No significant links between spousal caregiver's unmet SCNs and LC survivor's QOL

Furthermore, our study results demonstrated the absence of significant links between spousal caregivers unmet SCNs and LC survivors QOL and were in line with Jang et al.'s (2021)[18] dyadic survey on the unmet needs and QOL among patients and their families. This is in contrast to one previous study,[37] which reported that cancer caregivers unmet needs are associated with patients (care receivers) health outcomes. There are three possible explanations for this study's non-significant partner effects. First, within collective Chinese culture, often spousal caregivers bear the brunt of burdens due to gender role expectations.[39] One study reported that 40% of spousal caregivers experience anxiety and 46% experience depression.[40] Second, because of thousands of years of Confucian patriarchal hegemony and traditional personality characteristics of Chinese women, men occupy more family power, and female spouses tend to be family caregivers who are more sensitive, fragile, and easily influenced by other family members [41]. In this study, women accounted for 59% of spousal caregivers. Third, this study's findings underpin the protective buffering hypothesis,[42] which proposes the spousal caregiver holds back their stressful experiences and unmet SCNs so as not to cause stress to the LC survivor. Research has demonstrated that intimacy plays a crucial role in fostering a strong spousal relationship.[43] A significant majority (83.7%) of spousal caregivers in this study maintain an intimate connection with LC survivors, indicating that these caregivers prioritize the emotional and physical needs of their partners above their own. Thus, to facilitate QOL in LC survivor and spousal caregiver dyads across the treatment continuum, incorporating routine assessments and interventions for SCNs into dyadic LC care programs is strongly encouraged.

Limitations

There are several limitations to this study. First, this study only recruited participants from three hospitals using convenience sampling during the COVID-19 pandemic, both of which may have introduced selection bias and impacted the generalizability of the findings to a broader population in China. Future studies at multiple sites are needed to confirm this study's findings. Second, as the information was self-reported, social desirability and recollection bias could have impacted the results. Future research should work towards strengthening the anonymity of self-reported surveys through a focus on collecting only necessary personal information and blinding investigators. Third, because the model fit of the APIM is only acceptable, our results must be interpreted cautiously, and future studies should employ larger samples in order to generate a better model fit. Finally, due to the cross-sectional study design that was utilized, we must present our findings as exploratory and emphasize the need for additional research to support the implementation of multi-level interventions in the future.

Conclusions

The present study evaluated the correlations between unmet SCNs and QOL in LC patient–spousal caregiver dyads in China. The findings largely affirm the commonly held belief that cancer is a "we-disease",[8] where both LC survivors and spousal caregivers need help and support. Unmet SCNs have a significant adverse effect on QOL in survivor–caregiver dyads. To account for weaker partner effects, healthcare professionals should develop tailored LC dyadic care programs with a greater capacity to deliver individualized SCN-driven care to both LC survivors and their caregiver spouses. Ultimately, by considering the specific needs and challenges of each individual and adopting a more personalized approach to LC dyadic care, healthcare professionals can help improve the overall health outcomes for both LC survivors and their caregiver spouses.

CRediT author statement

All authors contributed to the study's conception and design. Material preparation, data collection, and analyses were performed by Yu-An Lin, Tianbao Yang, and Huiping Chen. The first draft of the manuscript was written by Yunqin Weng and Feifei Huang. The revised manuscript was edited by Weiti Chen and Jialing Lin. All authors read and approved the final manuscript.

Declaration of competing interest

All authors have none to declare. The corresponding author, Professor Feifei Huang, is a member of the editorial board of the Asia-Pacific Journal of Oncology Nursing. The article underwent the journal's standard review procedures, with peer review conducted independently of Professor Huang and their research groups.

Ethics statement

This research was performed following the principles of the Declaration of Helsinki. Approval was granted by the Institutional Review Boards of Fujian Medical University in 2019 (IRB No. FMU 2019012). Informed consent was obtained from all individual participants included in the study.

Data availability statement

The data that support the findings of this study are available from the corresponding author, Feifei Huang, upon reasonable request.

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