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Treatment Decisions in Recurrent Head and Neck Cancer: A Cross-Sectional Study

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ABSTRACT

Background: Decision-making in recurrent or metastatic head and neck cancer (HNC) is challenging, often involving high uncertainty and psychological distress.

Objective: To identify factors contributing to decisional conflict in patients with recurrent or metastatic HNC.

Methods: This cross-sectional study used convenience sampling to recruit participants from the outpatient department of a cancer center in northern Taiwan between August 2021 and July 2024. The Decisional Conflict Scale (DCS) and the University of Washington Quality of Life Scale (UW-QOL) were used to assess decisional conflict, physical function, and social-emotional function.

Results: A total of 140 patients were recruited. Among them, 78.6% experienced decisional conflict. The main areas of concern were lack of support, ineffective decision-making, unclear values, insufficient information, and uncertainty. Patients with lower education, living alone, with lower family income, with private insurance, or with lower physical and social-emotional functioning were more likely to experience decisional conflict.

Conclusions: Lower education, living alone, lower family income, private insurance, or lower physical or social-emotional function contribute significantly to decisional conflict in patients with recurrent or metastatic HNC. Healthcare providers should incorporate targeted interventions addressing these factors into the shared decision-making processes to reduce decisional conflict and enhance patient-centered care.

1 | Introduction

Cancer remains a significant global health challenge, with approximately 19.3 million new cases diagnosed annually and around 10 million cancer-related deaths each year [1]. Head and neck cancer (HNC) risk factors include smoking, alcohol consumption, betel quid chewing [2], and human papilloma virus (HPV) infection [3]. Approximately 800,000 new HNC cases are diagnosed globally each year, with about 57.5% occurring in Asia [4]. In Taiwan, there are an estimated 5,116 annual cases [5], and 55% of patients present with advanced disease (stage III or IV) [5]. Due to the anatomical complexity and dense lymphatic network of the head and neck region, HNC carries a high risk of recurrence [6]. Decision-making regarding treatment for

recurrent or metastatic HNC is particularly critical, often leading to substantial decisional conflict [7, 8].

Decisional conflict is characterized by personal uncertainty when choosing among multiple treatment options, particularly when the choices involve significant risks, potential losses, financial expense, or conflicts with personal values [9]. Patients with HNC often experience substantial decisional conflict due to the complexity of treatment options, anticipated treatment-related adverse effects, and the considerable personal sacrifices required, such as time commitment, disruption of daily routines, and long-term lifestyle adjustments [7]. During the transition from active treatment to supportive care, patients commonly experience heightened uncertainty, emotional distress, and fear regarding treatment outcomes [7]. Heirman et al. [10] reported that 46% of HNC patients with significant decisional conflict (Decisional Conflict Scale [DCS] ≥ 25) had difficulty in treatment decision-making related to preparation, shared decision-making (SDM) roles, information, time pressure, stress of diagnosis, and decision consequences. Lim et al. [11] found that cancer survivors diagnosed with breast, colorectal, or prostate cancer reported a moderate level (39.9–44.4) of DCS (range: 0–100). Survivors experienced conflict across all DCS domains, including Uncertainty, Informed, Values Clarity, Support, and Effective Decision-Making.

Identified risk factors for higher decisional conflict include psychological conditions such as depression and anxiety [12], advanced cancer stages [12], lower educational attainment or limited understanding of treatment information [13], being unmarried or without a partner [14], having private insurance [15], poor prognosis, lower socioeconomic status [16], and poorer physical and psychological outcomes [10, 17]. SDM strategies have been found beneficial in enhancing patient engagement [18], improving post-treatment surveillance [19], and optimizing informational support [20]. Recent innovations such as deep reinforcement learning have shown promise in improving patient decision-making through interactive treatment planning systems [21]. Additionally, recurrent cancer patients and caregivers often benefit from enhanced engagement with SDM [22].

Based on the above literature, we hypothesized that patients with recurrent or metastatic HNC who had lower educational attainment, lower family income, private insurance, were unmarried or did not have a partner, or who had poorer physical and psychological outcomes would report greater decisional conflict. However, previous studies were focused on breast cancer survivors [18, 19], cancer patients with anxiety and depression [12], and ovarian cancer [20]. Few studies have explored decisional conflict in recurrent or metastatic HNC patients. Therefore, the objectives of this study were to (1) assess the levels of decisional conflict, physical function, and social-emotional functioning among recurrent or metastatic HNC patients and (2) identify the factors associated with decisional conflict to better inform clinical practices aimed at reducing decisional conflict and improving patient outcomes.

2 | Methods

2.1 | Study Design and Participants

This study employed a cross-sectional and descriptive design to identify factors associated with decisional conflict among patients diagnosed with recurrent or metastatic HNC. Participants were recruited via convenience sampling from outpatient oncology clinics at a medical center in northern Taiwan between August 2021 and July 2024. Eligibility criteria included (1) aged 18 years or older; (2) confirmed diagnosis of recurrent or metastatic HNC; (3) informed of their treatment options by attending physicians; and (4) ability to communicate in Mandarin or Taiwanese. In the study institution, SDM was routinely offered to newly diagnosed HNC patients. However, patients diagnosed with recurrent or metastatic HNC were not offered SDM.

2.2 | Ethical Considerations

The Institutional Review Board of Chang Gung Medical Foundation approved the study (No. 202002176B0C501), ensuring adherence to the Declaration of Helsinki. Written informed consent was obtained from all participants prior to data collection.

2.3 | Data Collection

Participants completed a structured set of questionnaires administered by research nurses, with an average completion time of approximately 15 min.

2.4 | Measures

2.4.1 | DCS

Decisional conflict was assessed using the DCS, a 16-item measuring tool comprising five subscales: Uncertainty, Informed, Values Clarity, Support, and Effective Decision-Making [23]. Items are scored on a 5-point Likert scale. Scores were transformed to range from 0 to 100, with higher scores indicating greater decisional conflict [24]. According to O'Connor [24], scores below 25 indicate the absence of decisional conflict, and scores above 25 indicate the presence of decisional conflict. The Chinese version of DCS used in this study previously demonstrated robust validity and reliability [25], with a Cronbach's α of 0.92.

2.4.2 | University of Washington Quality of Life Scale (UW-QOL)

The UW-QOL assesses patients' physical and social-emotional functions via two subscales, each consisting of six items scored from 0 to 100 [26]. Higher scores indicate better functional status [27]. This study employed a validated Chinese version, which has satisfactory psychometric properties in recent HNC-related studies [28, 29]. In this study, the Cronbach's α values for the physical function subscale and social-emotional function subscale were 0.90 and 0.88, respectively.

2.4.3 | Karnofsky Performance Status (KPS)

Patient performance status was evaluated using the KPS, with scores ranging from 0 (*death*) to 100 (*normal functioning*) [30]. The KPS is widely utilized in oncology to assess functional

TABLE 1 | Demographic and clinical characteristics ($N = 140$).

Variable	Number (%)	Mean (SD)
Age (years)		57.33 (7.25)
≤ 64	114 (81.4)	
≥ 65	26 (18.6)	
Sex		
Male	137 (97.9)	
Female	3 (2.1)	
Occupation		
Unemployed	94 (67.1)	
Employed	46 (32.9)	
Marital status		
Living with a partner	120 (85.7)	
Living alone	20 (14.3)	
Education level		
Elementary	25 (17.9)	
Junior high	47 (33.5)	
Senior high	57 (40.7)	
College and above	11 (7.9)	
Religion		
None	4 (2.9)	
Buddhism/Taoism	132 (94.2)	
Christianity/Catholicism	4 (2.9)	
Smoking		
Never smoked	0 (0)	
Ex-smoker (quit for more than 1 year)	41 (29.3)	
Ex-smoker (quit for less than 1 year)	87 (62.1)	
Currently smoking	12 (8.6)	
Drinking		
Never drank	26 (18.6)	
Ex-drinker (quit for more than 1 year)	19 (13.6)	
Ex-drinker (quit for less than 1 year)	87 (62.1)	
Currently drinking	8 (5.7)	
Family annual income (NT$) (US$)		
≦ 600,000 (US$18,750)	52 (37.1)	
> 600,000 (US$18,750)	88 (62.9)	
Private insurance		
No	60 (42.9)	
Yes	80 (57.1)	
Tumor site		
Oral cavity	123 (87.9)	
Other	17 (12.1)	
Cancer stage		
I	11 (7.8)	
II	28 (20.0)	
III	19 (13.6)	
IV	82 (58.6)	
Prior medical treatment		
Surgery + RT	34 (24.3)	

(Continues)

TABLE 1 | (Continued)

Variable	Number (%)	Mean (SD)
Surgery + CT	2 (1.4)	
Surgery + CCRT	73 (52.2)	
RT	17 (12.1)	
CCRT	14 (10.0)	
Performance status (level) (KPS)		88.14 (4.08)
90–100	115 (82.2)	
80–90	24 (17.1)	
70–80	1 (0.7)	
Frequency of cancer recurrence since initial diagnosis		
1	94 (67.1)	
2	35 (25.0)	
3	11 (7.9)	
Number of chronic diseases		
0	86 (61.5)	
1∼2	37 (26.4)	
≥ 3	17 (12.1)	
Time since completion of treatment (month)		17.60 (1.62)

Note: CT, chemotherapy; CCRT, combined chemotherapy and radiotherapy; RT, radiotherapy.
Abbreviations: KPS, Karnofsky performance score; SD, standard deviation.

performance [31]. More recently, it has also been applied in studies involving HNC patients [28, 32]. In this study, the KPS was assessed by trained research nurses who were familiar with each patient's clinical condition. The research nurses were certified oncology nurses with more than 10 years of clinical experience in HNC care, including patient recruitment, symptom assessment, and comprehensive clinical management. They received additional training in evaluating patient performance status from the principal investigator, who has extensive expertise in oncology and HNC research. In this study, inter-observer reliability for the KPS was satisfactory, with a Cronbach's alpha of 0.96.

2.4.4 | Demographic and Clinical Data

Patient demographic characteristics included age, sex, employment status, marital status, education, religion, and annual family income. Clinical data included smoking and alcohol use, cancer site and stage, prior treatments, performance status, cancer recurrence frequency, number of chronic diseases, emergency visits, hospital admissions, and duration since treatment completion.

2.5 | Data Analysis

Data were analyzed using SPSS 27.0 (IBM SPSS Statistics 27 software [Armonk, NY: IBM Corp.]). Continuous variables are presented using mean ± standard deviation, while categorical variables are presented as frequency and percentage. Pearson's product–moment correlation analysis was performed to assess the associations between decisional conflict (dependent variable) and the selected independent variables (education level, marital status [living alone or living with a partner], family income [> 600,000 or ≤ 600,000], private insurance [no or yes], frequency of cancer recurrence [1 or ≥ 2], physical function, and social-emotional function). Multiple regression analysis using the enter method was conducted to examine factors associated with decisional conflict. Pearson's product–moment correlation analysis was first conducted to identify significant associations between variables, and variables demonstrating significant correlations were then entered as predictors in the multiple regression analysis. Multicollinearity among independent variables was assessed using the variance inflation factor (VIF) and tolerance values. A VIF value greater than 5 or a tolerance value less than 0.2 was considered indicative of potential multicollinearity. Collinearity diagnostics, including eigenvalues and the condition index, were also examined, with a condition index above 30 suggesting severe multicollinearity. None of the variables in the final regression model exceeded these thresholds, indicating that multicollinearity was not a concern [33]. Marital status (*living alone* = 0 and *living with a partner* = 1), family income (> 600,000 = 0 and ≤ 600,000 = 1), private insurance (*no* = 0 and *yes* = 1), and frequency of cancer recurrence [1 = 0 and ≥ 2 = 1] were coded as dummy variables. The assumptions of the regression model were examined, including linearity, normality of residuals, homoscedasticity, and absence of multicollinearity.

G*Power 3.1.9.7 (Heinrich Heine University, Düsseldorf, Germany) was used to estimate the required sample size for multiple regression [34]. A total of 140 participants was required to achieve a statistical power of 0.80 and an R^2 of 0.15 with seven independent variables.

3 | Results

3.1 | Demographic and Clinical Characteristics

Six of the 146 eligible patients approached declined to participate, leaving 140 patients in the final analysis. The response rate was

TABLE 2 | Scores for decisional conflict, physical function, and social-emotional function ($N = 140$).

Variable	Mean (SD)	N (%)	Range	Theoretical scoring range
Decisional conflict (DCS)	78.43 (10.89)		42.19–100	0–100
Informed	77.44 (11.02)		25.00–100	0–100
Values clarity	78.15 (12.46)		41.67–100	0–100
Support	82.14 (11.72)		58.33–100	0–100
Uncertainty	73.33 (14.90)		33.33–100	0–100
Effective decision	80.40 (12.90)		43.75–100	0–100
Decisional conflict (DCS)				
Presence of decisional conflict (DCS ≥ 25)		110 (78.57)		
Absence of decisional conflict (DCS < 25)		30 (21.43)		
Physical function (UW-QOL)	57.81 (18.55)		16.67–100	0–100
Social-emotional function (UW-QOL)	76.04 (14.95)		28–100	0–100

Note: UW-QOL, University of Washington Quality of Life Scale (UW-QOL).
Abbreviations: DCS, Decisional Conflict Scale.

95.8%, and the mean age was 57.33 (standard deviation [SD] ± 7.25) years. The majority of patients were male ($n = 137$; 97.9%), unemployed ($n = 94$; 67.1%), living with a partner ($n = 120$; 85.7%), had at least a high school education ($n = 57$; 40.7%), held Buddhist or Taoist religious beliefs ($n = 132$; 94.3%), and had a family annual income of at least 600,000 NT$ (US$18,750) ($n = 88$; 62.9%; range, 580,000 NT$∼ 250,000 NT$). A small percentage of patients were currently smoking ($n = 12$; 8.6%) or currently drinking ($n = 8$; 5.7%) during the period between post-treatment and cancer recurrence. The most common cancer site was the oral cavity ($n = 123$; 87.9%); a majority of patients were diagnosed at an advanced stage of cancer, with 58.6% at stage IV ($n = 82$), and received surgery combined with CCRT ($n = 73$; 52.1%). The mean performance status score was 88.14 (±4.08). Most patients had one cancer recurrence since initial diagnosis ($n = 94$; 67.1%) and did not have comorbid chronic diseases ($n = 86$; 61.4%). The mean time since completion of treatment was 17.60 months (±1.62) (Table 1).

3.2 | Scores of Decisional Conflict, Physical Function, and Social-Emotional Function

The mean DCS was 78.43 (±10.89). The mean DCS subscales were: Informed, 77.44 (±11.02); Values Clarity, 78.15 (±12.46); Support, 82.14 (±11.72); Uncertainty, 73.33 (±14.90); and Effective Decision-Making, 80.40 (±12.90). According to the DCS classification system [24], 21.43% ($n = 30$) of patients did not experience decisional conflict and 78.57% ($n = 110$) of patients did experience decisional conflict. Patients' level of perceived mean physical function (UW-QOL) was 57.81 (±18.55) and social-emotional function (UW-QOL) was 76.04 (±14.95) (Table 2).

3.3 | Correlates of Decisional Conflict

The factors that significantly correlated with decisional conflict were education level ($r = -0.238$, $p < 0.05$), marital status ($r = -0.179$, $p < 0.05$), family income ($r = 0.630$, $p < 0.01$), private insurance status ($r = 0.606$, $p < 0.01$), frequency of cancer recurrence ($r = -0.371$, $p < 0.05$), physical function ($r = -0.362$, $p < 0.05$), and social-emotional function ($r = -0.317$, $p < 0.05$). These variables were included as independent variables in the multiple linear regression analysis (Table 3).

3.4 | Factors Associated With Decisional Conflict

Multiple regression analyses revealed that patients with lower education levels ($\beta = -0.161$, $p < 0.01$), living alone ($\beta = -0.211$, $p < 0.01$), with lower family income (≤NT$600,000; $\beta = 0.441$, $p < 0.01$), with private insurance ($\beta = 0.376$, $p < 0.01$), or with lower physical ($\beta = -0.129$, $p < 0.05$) or social-emotional ($\beta = -0.126$, $p < 0.05$) function were more likely to have

TABLE 3 | Correlations among decisional conflict and selected independent variables ($N = 140$).

Variable	1	2	3	4	5	6	7	8
1. Decisional conflict	1.000							
2. Education level (year)	−0.238*	1.000						
3. Marital status (living alone vs. living with a partner)	−0.179*	−0.017	1.000					
4. Family income (> 600,000 vs. ≤ 600,000)	0.630**	0.127	−0.066	1.000				
5. Private insurance (no vs. yes)	0.606**	−0.052	0.059	−0.469**	1.000			
6. Frequency of cancer recurrence (1 vs. ≥ 2)	−0.371*	−0.104	−0.019	−0.034	0.176	1.000		
7. Physical function	−0.362*	−0.153	−0.045	−0.257*	0.337*	0.121	1.000	
8. Social-emotional function	−0.317*	−0.171	−0.117	−0.229	0.220	0.101	0.388*	1.000

*$p < 0.05$.
**$p < 0.01$.

TABLE 4 | Factors significantly associated with decisional conflict based on multiple regression analysis ($N = 140$).

Predictive variable	Adjusted R^2	Beta	F	p	95% CI	
					Lower	Upper
	0.605		31.386			
Education level (year)		−0.161		0.004	−0.207	1.061
Marital status (living alone vs. living with a partner)		−0.211		0.001	−3.228	−9.868
Family income (> 600,000 vs. ≤ 600,000)		0.441		0.001	7.153	12.632
Private insurance (no vs. yes)		0.376		0.001	10.991	5.487
Frequency of cancer recurrence (1 vs. ≥ 2)		−0.066		0.231	−4.021	0.979
Physical function		−0.129		0.036	−0.147	−0.005
Social-emotional function		−0.126		0.036	−0.005	−0.155
Constant				0.001	58.175	74.705

Note: Input independent variable: covariates included education level (year) (continuous score), marital status (living alone vs. living with a partner), family income (> 600,000 vs. ≤ 600,000), private insurance (no vs. yes), frequency of cancer recurrence (1 vs. ≥ 2), physical function (continuous score, using the sum score of the University of Washington Quality of Life Scale—physical function subscale), and social-emotional function (continuous score, using the sum score of the University of Washington Quality of Life Scale—social-emotional function subscale).

decisional conflict. These factors accounted for 60.5% of the variance in decisional conflict scores (Table 4).

4 | Discussion

This study examined HNC patients diagnosed with recurrent or metastatic disease and whose proposed treatment plan by attending physicians was awaiting decision. The rate of decisional conflict among our subjects (78.57%) was higher than the range reported in a previous study [10]. This difference may be due to a difference in cancer diagnosis. Heirman et al. [10] included HNC patients who were newly diagnosed, with 50 patients having carcinoma in situ, and some patients with recurrent or metastatic disease. In our study, all patients were diagnosed with recurrent or metastatic HNC, had received advice on the treatment plan, and were deciding on medical treatment with their families. This higher incidence of decisional conflict may indicate that healthcare providers should assess patients' and their families' concerns and provide available information for difficult decision-making.

Recurrent or metastatic HNC patients in the present study reported that the most important concerns for decisional conflict were "support," "effective decision," "values clarity," "informed," and "uncertainty." These results are different than those from a different study [11], which reported that cancer survivors perceived decisional conflict with descending levels of Uncertainty, Informed, Clarity, Supported, and Effective. Differences between the results of the current study and those of Lim et al. [11] may be due to inclusion criteria. The current study included mostly patients who were stage III and IV at initial diagnosis and were recruited for recurrent or metastatic disease. In Lim et al.'s [11] study, patients had stages I to III breast, colorectal, or prostate cancer and were recruited as disease-free survivors within one to five years of initial diagnosis. Decision-making during the cancer journey is a dynamic process. Accessing available information, enhancing coping strategies, and guiding patients to make the best decisions for the treatment of recurrent or metastatic treatment are all valuable parts of decision-making. In clinical care, healthcare professionals play a crucial role in facilitating SDM by providing evidence-based information, clarifying treatment goals, and addressing patients' values and preferences. Healthcare professionals should assess patients' decision readiness, emotional status, and support systems to ensure decisions are both informed and aligned with their quality of life priorities. Additionally, establishing a multidisciplinary team approach helps patients and families navigate complex treatment choices. Regular follow-up discussions are essential for revisiting prior decisions, especially as the disease progresses or new treatment options emerge. Overall, promoting patient autonomy, empathy, and open communication enhances satisfaction with care and may improve treatment adherence and psychological adjustment.

Results of the present study show that recurrent or metastatic HNC patients who had lower family annual income were more likely to experience more decisional conflict. This is consistent with that of a previous study [35], which found that most OSCC patients had physically demanding, blue-collar jobs and that socioeconomic status and household income levels were within the middle-income range. In Taiwan, patients with lower family income may experience greater decisional conflict when facing cancer treatment choices. Financial constraints can limit access to information, reduce available treatment options, and increase psychological stress, which may hinder patients' confidence in making informed decisions [36, 37]. Healthcare providers should recognize the impact of financial hardship on decision-making and offer additional support, such as counseling, social work services, or financial assistance programs, to help patients and families make well-informed choices that reflect their values.

Our study also found that patients with lower education and who were living alone were more likely to have greater decisional conflict, which is consistent with previous studies [13, 14]. Lower education may limit the patients' ability to understand complex medical information, thereby increasing uncertainty and hesitation during the decision-making process. Similarly, patients who lacked spousal or partner support may experience greater emotional burden and less confidence when facing treatment decisions. These findings highlight the importance of developing and providing tailored support to patients who are more vulnerable to decisional conflict, particularly those with lower educational levels or who live alone. Healthcare providers should

adopt patient-centered communication strategies that enhance understanding of treatment information and facilitate SDM. Simplified educational materials, visual aids, and teach-back methods can help ensure comprehension among patients with limited health literacy.

The findings of this study revealed that lower physical and social-emotional functioning was associated with greater decisional conflict, consistent with earlier studies reporting that functional decline and frailty contribute to decision uncertainty [17, 18]. Patients with poorer functional status may doubt their ability to tolerate aggressive treatment, leading to ambivalence or delayed decision-making. Overall, these findings highlight the importance of early assessment of both psychosocial and physical conditions for patients facing complex treatment decisions. Interventions aimed at improving health literacy, providing supportive counseling, and addressing physical limitations could help reduce decisional conflict and facilitate SDM.

This study has several limitations. First, this study was composed of patients with oral cavity cancer (87.9%), which restricts the representativeness of the findings for the broader HNC cancer population, including those with laryngeal, hypopharyngeal, and nasopharyngeal cancers. In addition, the use of convenience sampling from a single leading medical center in Taiwan may further limit the generalizability of the results to all individuals with recurrent or metastatic HNC. Future studies should employ probability or multicenter sampling methods to enhance the representativeness and external validity of the findings. Considering this study included patients with recurrent or metastatic HNC who did not benefit from SDM interventions, these findings may not be generalizable to HNC patients who are newly diagnosed or who are actively involved in the SDM process. For these patients, structured SDM is essential because treatment choices often involve complex trade-offs between survival, symptom burden, and quality of life. Clinicians should provide clear, individualized information—using plain language and decision aids—to support understanding. Multidisciplinary care teams and early integration of SDM and psychosocial counseling may reduce decisional conflict, enhance confidence, and improve satisfaction with care decisions. Finally, the study's cross-sectional design examined factors associated with decisional conflict in patients who were diagnosed with recurrent or metastatic HNC. Decision-making is a dynamic process, and these findings may have limited utilization in clinical care. We recommended conducting longitudinal studies to examine the changes in decision-making and decisional conflict throughout the cancer journey.

5 | Conclusions

In this survey of recurrent or metastatic HNC patients, the levels of decisional conflict, in descending order of DCS domain, were support, effective decision, values clarity, informed, and uncertainty. Patients who had lower education, lived alone, had lower family income, had private insurance, or had lower physical or social-emotional function were more likely to experience greater decisional conflict. In survivorship care, personalized SDM for recurrent or metastatic HNC patients through discussion and counseling can help overcome barriers and facilitate effective decision-making.

Author Contributions

All authors meet at least one of the following criteria [recommended by the ICMJE (http://www.icmje.org/recommendations/)]: substantial contributions to conception and design, acquisition of data or analysis and interpretation of data, drafting the article, or revising it critically for important intellectual content. Bing-Shen Huang and Shu-Ching Chen designed the study. Bing-Shen Huang, Ya-Lan Chang, Chien-Yu Lin, Ching-Fang Chung, and Shu-Ching Chen were involved in data collection and analysis. Bing-Shen Huang and Shu-Ching Chen prepared the manuscript.

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Declaration on the use of AI and AI-assisted technologies in the manuscript preparation. The authors declare that no artificial intelligence (AI) or AI-assisted technologies were used in the preparation of this manuscript, including data collection, analysis, writing, or editing. All content has been produced and verified solely by the authors.

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Disclosure

This manuscript is original, is not plagiarized, and has not been published elsewhere. This manuscript is not under consideration for publication in another journal and will not be submitted elsewhere until the European Journal of Cancer Care editorial process is completed. All authors have agreed on the final version

Ethics Statement

The study was reviewed and approved by the Institutional Review Board of Chang Gung Medical Foundation in Taiwan (Number: 202002176B0C501), and all methods were performed in accordance with the Declaration of Helsinki. Written informed consent was obtained from all participants before data collection. The authors also thank the copyright owners for their permission to use the questionnaires.

Consent

All authors consent to the publication of the manuscript in the European Journal of Cancer Care, should the article be accepted by the editor-in-chief upon completion.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author. Restrictions apply to the availability of these data, which were used under license for this study. Data are available from the authors with the permission of the Chang Gung Memorial Hospital Research Program (CMRP) and Chang Gung University of Science and Technology Research Program (CGUST).

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