Risk factors for return to work in colorectal cancer survivors

Chung-Mao Yuan¹,²,³ | Chung-Ching Wang³,⁴ | Wei-Te Wu⁵ | Ching-Liang Ho² | Wei-Liang Chen³,⁴,⁶

¹Department of Internal Medicine, Kaohsiung Armed Forces General Hospital, Kaohsiung, Taiwan
²Department of Internal Medicine, Tri-Service General Hospital and School of Medicine, National Defense Medical Center, Taipei, Taiwan
³Division of Environmental Health and Occupational Medicine, Department of Family and Community Medicine, Tri-Service General Hospital, National Defense Medical Center, Taipei, Taiwan
⁴Division of Family Medicine, Department of Family and Community Medicine, Tri-Service General Hospital and School of Medicine, National Defense Medical Center, Taipei, Taiwan
⁵National Institute of Environmental Health Sciences, National Health Research Institutes, Miaoli, Taiwan
⁶Department of Biochemistry, National Defense Medical Center, Taipei, Taiwan

Correspondence
Wei-Liang Chen, Division of Environmental Health and Occupational Medicine, Department of Family and Community Medicine, Tri-Service General Hospital, National Defense Medical Center, Taipei, Taiwan.
Email: weiliang0508@gmail.com

Funding information
Institute of Labor, Occupational Safety and Health and the Ministry of Labor, Taiwan, Grant/Award Number: ILOSH107-M301

Abstract
Background: The increasing incidence of colorectal cancer among individuals in the productive age-group has adversely affected the labor force and increased healthcare expenses in recent years. Return to work (RTW) is an important issue for these patients. In this study, we explored the factors that influence RTW and investigated the influence of RTW on survival outcomes of patients with colorectal cancer.

Methods: Data of individuals (N = 4408) in active employment who were diagnosed with colorectal cancer between 2004 and 2010 were derived from 2 nationwide databases. Subjects were categorized into 2 groups according to their employment status at 5-year follow-up. Logistic regression analysis was performed to identify the factors associated with RTW. Survivors were further followed up for another 8 years. Propensity score matching was applied to ensure comparability between the two groups, and survival analysis was performed using the Kaplan–Meier method.

Results: In multivariable regression analysis for 5-year RTW with different characteristics, older age (OR: 0.57 [95% CI, 0.48–0.69]; p < 0.001), treatment with radiotherapy (OR: 0.69 [95% CI, 0.57–0.83]; p < 0.001), higher income (OR: 0.39 [95% CI, 0.32–0.47]; p < 0.001), medium company size (OR: 0.78 [95% CI, 0.63–0.97]; p = 0.022), and advanced pathological staging (stage I, OR: 16.20 [95% CI, 12.48–21.03]; stage II, OR: 13.12 [95% CI, 10.43–16.50]; stage III, OR: 7.68 [95% CI, 6.17–9.56]; p < 0.001 for all) revealed negative correlations with RTW. In Cox proportional hazard regression for RTW and all-cause mortality, HR was 1.11 (95% CI, 0.80–1.54; p = 0.543) in fully adjusted model.

Conclusion: Older age, treatment with radiotherapy, higher income, medium company size, and advanced pathological stage showed negative correlations with RTW. However, we observed no significant association between employment and all-cause mortality. Further studies should include participants from different countries, ethnic groups, and patients with other cancers.

KEYWORDS
colorectal cancer, prognostic factor, retrospective cohort study, return to work
1 | INTRODUCTION

Progressive population growth and aging have led to increased incidence of cancer and cancer-associated mortality in recent years. Improved cancer screening and developments in therapeutic modalities have advanced the overall survival rate of cancer patients. This has also contributed to increased diagnosis of cancer in younger age-groups and an increasing number of cancer survivors in the productive age-group. The reduced working ability has an adverse effect on these patients as well as the society at large. Thus, there is an increasing interest in maintaining the employment of cancer survivors.

Colorectal cancer (CRC) is the third most common cancer in the world, accounting for 10.2% of all malignancies; an estimated 1.8 million cases of CRC are newly diagnosed every year. The epidemiological patterns of CRC tend to vary in different parts of the world; however, some distinct trends are observed globally, that is, increases incidence and mortality, decreased mortality rate, and increasing younger age at diagnosis.

Studies have shown that more than half of all cancer survivors avail a period of sick leave for receiving cancer therapy and to cope with the associated disability; in addition, most of these patients returned to work after treatment. However, cancer patients were still found to have a higher risk of job loss, less probability of re-employment, and longer time for returning to work. Furthermore, unemployment among cancer survivors was shown to adversely affect their quality of life (QoL); in addition, the reduced household income, declined physical ability and their psychosocial repercussions were shown to influence the prognosis of underlying diseases. Studies have also shown that being employed inculcates a sense of accomplishment, self-esteem, and normalcy. From a societal perspective, the financial implication of resources spent on medical care, welfare, and reduction of the labor force due to absenteeism imposes an extra burden on the government. Therefore, there is increasing awareness of the importance of rehabilitation interventions for cancer survivors to facilitate their return to the workforce. However, to the best of our knowledge, no study has directly investigated the correlation between return to work (RTW) and survival outcomes.

Since maintaining the employment is a key concern for cancer patients, identification of factors that influence employment status is imperative. Several studies have explored the factors that influence the employment status among cancer survivors. Some of these studies have yielded inconsistent results depending on the cancer site or study area. Most studies that have investigated the correlation between employment status and cancer survival outcomes were based on European and American data. There is a paucity of studies conducted in Asia, which is home to 60% of the global population and accounts for approximately half of all cancer cases and cancer deaths.

In this study, we analyzed the data of employees who were diagnosed with CRC in Taiwan. The aim was to identify factors associated with RTW and to investigate the correlation between RTW and survival outcomes in CRC patients.

2 | METHODS

2.1 | Study design

This was a nationwide, retrospective cohort study. Data for this study were derived from two nationwide databases in Taiwan: National Health Insurance Research Database (NHIRD) and Labor Insurance Database (LID). Employees who were diagnosed with CRC between 2004 and 2010 were enrolled initially. Participants were followed up for 5 years after diagnosis of CRC. We analyzed the relationship of various variables with RTW in the 5th year after CRC diagnosis. Subsequently, the surviving patients were divided into RTW and non-RTW groups depending on their employment status and followed up for another 8 years. Lastly, we compared the survival outcomes in the two groups.

2.2 | Database

NHIRD is a nationwide database that contains socio-demographic (e.g., sex, age, residence) and health-service-related information (e.g., health facility, clinical diagnosis, treatment details) of approximately 23 million residents in Taiwan. These data were obtained from National Health Insurance (NHI), an insurance system launched by the Taiwan government in 1995. The NHI had enrolled over 99% of Taiwan’s population. In this study, we obtained health-related information from the NHIRD. Comorbidities and cancer diagnosis were derived according to the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes.

LID is another nationwide database, which was derived from the labor insurance system in Taiwan. The Taiwan government regulations require mandatory enrolment of all full-time employees in labor insurance unless they quit their job. This database provides socio-demographic and labor-related (e.g., industry, company size, income) information. The industrial classification in LID is according to the industry distribution system, 9th revision of Executive Yuan, Taiwan, which is based on the International Standard Industrial Classification of All Economic Activities (ISIC), revision 4.

2.3 | Participants

From the NHIRD, we extracted data pertaining to all people aged ≥20 years who were newly diagnosed with CRC.
between 2004 and 2010. The dataset of CRC was identified according to the International Classification of Diseases for Oncology, third edition (ICD-O-3, code C18-C21). Among these patients, those with other primary malignancies were excluded. Subsequently, we linked the above dataset with LID and selected those individuals whose employment status was “under employment” or “self-employed” at the time of CRC diagnosis. A total of 4408 full-time employees were eligible for inclusion.

### 2.4 Outcome measures

The primary outcome of this study was RTW 5 years after CRC diagnosis. Employment status was recorded and checked according to the data in LID. Each participant was followed up until death or the completion of a 5-year follow-up. These participants were divided into two groups, “RTW” and “non-RTW,” based on the employment status at the 5th year after CRC diagnosis. RTW group included the participants who remained in the workforce with or without sick leave after a cancer diagnosis. Individuals who ceased working and did not RTW were classified as a non-RTW group. The correlates of RTW were analyzed in order to investigate the determinants of RTW in CRC patients.

The secondary outcome was long-term survival. Survival data were acquired through detecting the registration of participants in NHIRD. The surviving participants in the RTW and non-RTW groups at the 5th year were followed up for another 8 years. We applied propensity score matching in a 1:1 ratio before survival analysis. All-cause mortality was compared between the RTW and non-RTW groups to assess the correlation between RTW and survival. The study protocol is shown in Figure 1.
The SAS 9.3 (SAS Institute) statistical package was used for data analysis. Continuous and categorical variables are presented as mean ± standard deviation and frequency (percentage), respectively. Between-group difference with respect to demographic characteristics and comorbid medical disorders.

| Characteristic                          | Number of patient (N = 4408) |
|----------------------------------------|------------------------------|
| **Age (years) ± SD (range)**           |                              |
| ≤45                                    | 825                          | 18.7 |
| 45–52                                  | 1172                         | 26.6 |
| >52                                    | 2411                         | 54.7 |
| **Gender**                             |                              |
| Male                                   | 2405                         | 54.6 |
| Female                                 | 2003                         | 45.4 |
| **Employment status**                  |                              |
| Work in same jobs                      | 1943                         | 44.1 |
| Start with new jobs                    | 312                          | 7.1  |
| Jobless                                | 802                          | 18.2 |
| Death                                  | 1351                         | 30.6 |
| **Comorbidities**                      |                              |
| Disorders of lipoid metabolism         | 445                          | 10.1 |
| Obesity                                | 11                           | 0.2  |
| Alcohol abuse                          | 14                           | 0.3  |
| Hypertension                           | 897                          | 20.3 |
| Myocardial infarction                  | 20                           | 0.5  |
| Congestive heart failure               | 66                           | 1.5  |
| Peripheral vascular disease            | 34                           | 0.8  |
| Cerebrovascular disease                | 99                           | 2.2  |
| Chronic pulmonary disease              | 167                          | 3.8  |
| Rheumatologic disease                  | 33                           | 0.7  |
| Peptic ulcer disease                   | 617                          | 14.0 |
| Hemiplegia or paraplegia               | 14                           | 0.3  |
| Renal disease                          | 67                           | 1.5  |
| Psychoses                              | 19                           | 0.4  |
| Depression                             | 83                           | 1.9  |
| **Treatment**                          |                              |
| Operation                              | 4277                         | 97.7 |
| Radiation therapy                      | 665                          | 15.1 |
| Chemotherapy                           | 2031                         | 46.1 |
| **Living area**                        |                              |
| North                                  | 2090                         | 47.4 |
| Central                                | 824                          | 18.7 |
| South                                  | 1420                         | 32.2 |
| East                                   | 61                           | 1.4  |
| Offshore islands                       | 13                           | 0.3  |

**Income (US dollars)**

| ≤930                                   | 2444                         | 55.4 |
| 930–1230                               | 743                          | 16.9 |
| >1230                                  | 1221                         | 27.7 |

Abbreviation: SD, standard deviation.

*Company size: small (less than 5 people), medium (less than 200 people in manufacturing, construction, mining, and quarrying; or less than 100 people in other industries), large (more than 200 people in manufacturing, construction, mining, and quarrying; or more than 100 people in other industries).

### 2.5 Statistical analysis

The SAS 9.3 (SAS Institute) statistical package was used for data analysis. Continuous and categorical variables are presented as mean ± standard deviation and frequency (percentage), respectively. Between-group difference with respect to demographic characteristics and comorbid medical disorders.
| Characteristic                                      | OR     | 95% CI     | p value  |
|----------------------------------------------------|--------|------------|----------|
| **Age (years)**                                    |        |            |          |
| ≤45a                                               | 0.99   | (0.83, 1.19)| 0.981    |
| 45–52                                              | 0.73   | (0.62, 0.85)| <.001*** |
| >52                                                |        |            |          |
| Gender                                             |        |            |          |
| Male                                               | 0.76   | (0.67, 0.85)| <.001*** |
| Femalea                                            |        |            |          |
| **Comorbidities**                                  |        |            |          |
| Disorders of lipoid metabolism                     | 0.98   | (0.81, 1.20)| 0.869    |
| Obesity                                            | 0.36   | (0.10, 1.35)| 0.129    |
| Alcohol abuse                                      | 0.38   | (0.12, 1.22)| 0.103    |
| Hypertension                                       | 0.82   | (0.71, 0.95)| 0.007**  |
| Myocardial infarction                              | 0.78   | (0.32, 1.89)| 0.582    |
| Congestive heart failure                           | 0.66   | (0.40, 1.08)| 0.096    |
| Peripheral vascular disease                        | 1.08   | (0.55, 2.11)| 0.835    |
| Cerebrovascular disease                            | 0.41   | (0.26, 0.63)| <.001*** |
| Chronic pulmonary disease                          | 0.94   | (0.69, 1.28)| 0.701    |
| Rheumatologic disease                              | 1.02   | (0.51, 2.01)| 0.967    |
| Peptic ulcer disease                               | 0.87   | (0.73, 1.03)| 0.106    |
| Hemiplegia or paraplegia                           | 0.38   | (0.12, 1.22)| 0.103    |
| Renal disease                                      | 0.68   | (0.42, 1.11)| 0.124    |
| Psychoses                                          | 1.06   | (0.43, 2.62)| 0.898    |
| Depression                                         | 1.03   | (0.67, 1.59)| 0.905    |
| **Treatment**                                      |        |            |          |
| Operation                                          | 1.56   | (1.10, 2.23)| 0.014*   |
| Radiation therapy                                  | 0.79   | (0.67, 0.93)| 0.004**  |
| Chemotherapy                                       | 0.62   | (0.55, 0.69)| <.001*** |
| **Living area**                                    |        |            |          |
| North                                              | 0.98   | (0.86, 1.13)| 0.804    |
| Central                                            | 1.23   | (1.03, 1.46)| 0.019*   |
| Southa                                             |        |            |          |
| East + offshore islands                             | 1.33   | (0.83, 2.12)| 0.235    |
| **Income (US dollars)**                            |        |            |          |
| ≤930a                                              |        |            |          |
| 930–1230                                           | 1.08   | (0.92, 1.28)| 0.361    |
| >1230                                              | 0.47   | (0.41, 0.54)| <.001*** |
| **Industrial classification**                      |        |            |          |
| Agriculture, forestry, fishing, animal, husbandry mining and quarrying | 1.14   | (0.62, 2.12)| 0.667    |
| Manufacturing                                      | 1.02   | (0.57, 1.82)| 0.953    |
| Electricity and gas supply                         | 0.35   | (0.13, 0.99)| 0.049*   |
| Water supply and remediation                       | 0.48   | (0.20, 1.15)| 0.100    |
| Construction                                       | 0.95   | (0.52, 1.72)| 0.858    |
| Wholesale and retail trade                         | 1.03   | (0.57, 1.87)| 0.912    |
| Transportation and storage                         | 0.78   | (0.43, 1.48)| 0.473    |

(Continues)
were assessed using the independent sample t-test and Chi-squared test. Univariate and multivariate logistic regression analyses were performed to assess the effect of each demographic characteristic on RTW. Variables that showed a significant association in the univariable model were included in the multivariate model.

In the analysis of all-cause mortality and RTW, propensity score matching was applied at baseline. Survival analysis was performed using the Kaplan–Meier method and differences between the RTW and non-RTW groups were assessed using the log-rank test. Univariate and multivariate Cox proportional hazard regressions were applied. Two-sided \( p \) values less than 0.05 were considered indicative of statistical significance.

### Table 2 (Continued)

| Characteristic                                      | OR   | 95% CI       | \( p \) value |
|-----------------------------------------------------|------|--------------|---------------|
| Accommodation and food service                      | 1.13 | (0.60, 2.14) | 0.706         |
| Information and communication                       | 1.07 | (0.49, 2.36) | 0.860         |
| Financial and insurance activities                  | 0.99 | (0.51, 1.92) | 0.971         |
| Real estate activities                              | 1.15 | (0.50, 2.62) | 0.740         |
| Professional, scientific and technology             | 0.96 | (0.48, 1.93) | 0.905         |
| Support service activities                          | 1.03 | (0.52, 2.05) | 0.928         |
| Public administration and defense                   | 0.96 | (0.45, 2.06) | 0.911         |
| Education                                           | 1.21 | (0.58, 2.49) | 0.614         |
| Human health and social work                         | 0.98 | (0.49, 1.94) | 0.945         |
| Amusement and recreation activities\(^a\)            |      |              |               |
| Other service activities                             | 1.12 | (0.61, 2.07) | 0.701         |

**Company size\(^b\)**

| Category          | OR   | 95% CI       | \( p \) value |
|-------------------|------|--------------|---------------|
| Shut down         | 0.77 | (0.63, 0.94) | 0.009**       |
| Small             | 1.07 | (0.85, 1.35) | 0.554         |
| Medium            | 0.86 | (0.74, 0.99) | 0.037*        |
| Large\(^a\)       |      |              |               |

**Stage**

| Stage | OR   | 95% CI       | \( p \) value |
|-------|------|--------------|---------------|
| I     | 12.80| (10.07, 16.25) | <.001***      |
| II    | 10.86| (8.73, 13.49)  | <.001***      |
| III   | 6.58 | (5.33, 8.13)   | <.001***      |

**IV\(^a\)**

**Abbreviations:** CI, confidence interval; OR, odds ratio; RTW, return to work.

\(^a\)Reference category.

\(^b\)Company size: small (less than 5 people), medium (less than 200 people in manufacturing, construction, mining, and quarrying; or less than 100 people in other industries), large (more than 200 people in manufacturing, construction, mining, and quarrying; or more than 100 people in other industries).

\(^*\)\( p < 0.05\) for comparison between RTW and non-RTW participants.; \(**\)\( p < 0.01\) for comparison between RTW and non-RTW participants.; \(***\)\( p < 0.001\) for comparison between RTW and non-RTW participants.

In the analysis of all-cause mortality and RTW, propensity score matching was applied at baseline. Survival analysis was performed using the Kaplan–Meier method and differences between the RTW and non-RTW groups were assessed using the log-rank test. Univariate and multivariate Cox proportional hazard regressions were applied. Two-sided \( p \) values less than 0.05 were considered indicative of statistical significance.

3 | RESULTS

3.1 | Characteristics of the study population

The study population comprised of 4408 employees who were diagnosed with CRC and underwent a 5-year follow-up of their employment status. The demographic characteristics of the study population are summarized in Table 1. A total of 2255 participants remained in the work force (1943 worked at the same company and 312 changed their jobs) while 2153 had quit their jobs without return to employment (802 unemployed and 1351 died) in the 5th year after diagnosis of CRC.

3.2 | Associations between RTW and different characteristics

Table 2 shows the univariable odds ratios (ORs) for 5-year RTW associated with different characteristics. RTW showed a negative correlation with older age (OR: 0.73 [95% CI, 0.62–0.85]; \( p < 0.001\)), male sex (OR: 0.76 [95% CI, 0.67–0.85]; \( p < 0.001\)), comorbid hypertension (OR: 0.82 [95% CI, 0.71–0.95]; \( p = 0.007\)) and cerebrovascular disease (OR: 0.41 [95% CI, 0.26–0.63]; \( p < 0.001\)), treatment with radiotherapy (OR: 0.79 [95% CI, 0.67–0.93]; \( p = 0.004\)) and chemotherapy (OR: 0.62 [95% CI,
0.55–0.69]; \ p < 0.001), higher income (OR: 0.47 [95% CI, 0.41–0.54]; \ p < 0.001), occupation electricity and gas supply (OR: 0.35 [95% CI, 0.13–0.99]; \ p = 0.049), and shut down (OR: 0.77 [95% CI, 0.63–0.94]; \ p = 0.009) and medium (OR: 0.86 [95% CI, 0.74–0.99]; \ p = 0.037) company size. Conversely, treatment with operation (OR: 1.56 [95% CI, 1.10–2.23]; \ p = 0.014), living in central Taiwan (OR: 1.23 [95% CI, 1.03–1.46]; \ p = 0.019), and lower pathological stage (stage I, OR: 12.80 [95% CI, 10.07–16.25]; stage II, OR: 10.86 [95% CI, 8.73–13.49]; stage III, OR: 6.58 [95% CI, 5.33–8.13]; \ p < 0.001 for all) demonstrated a positive association with RTW.

The statistically significant variables (age, gender, treatment, living area, income, company size, and pathological stage) were included in multivariable regression analysis (Table 3). Age, treatment, living area, income, company size, and pathological stage showed statistically significant difference. Older age (OR: 0.57 [95% CI, 0.48–0.69]; \ p < 0.001), treatment with radiotherapy (OR: 0.69 [95% CI, 0.57–0.83]; \ p < 0.001), higher income (OR: 0.39 [95% CI, 0.32–0.47]; \ p < 0.001), and medium company size (OR: 0.78 [95% CI, 0.63–0.97]; \ p = 0.022) revealed a negative correlation with RTW, whereas living in east and offshore island of Taiwan (OR: 1.85 [95% CI, 1.05–3.25]; \ p < 0.001) and lower pathological staging (stage I, OR: 16.20 [95% CI, 12.48–21.03]; stage II, OR: 13.12 [95% CI, 10.43–16.50]; stage III, OR: 7.68 [95% CI, 6.17–9.56]; \ p < 0.001 for all) indicated a positive correlation with RTW.

3.3 Association of RTW with all-cause mortality

To assess the influence of RTW on survival, we analyzed the correlation between RTW and all-cause mortality. After propensity score matching, there were 775 participants each in the RTW and non-RTW groups. Table 4 shows the demographic characteristics of the propensity score-matched cohort.

The result of Cox proportional hazard regression for RTW and all-cause mortality was presented in hazard ratios (HRs). HR was 0.94 (95% CI, 0.70–1.25; \ p = 0.652) in unadjusted model, and 1.11 (95% CI, 0.80–1.54; \ p = 0.543) in fully adjusted model. Figure 2 showed the result of survival analysis in Kaplan-Meier plot. No statistically significant difference was observed in all-cause mortalities among RTW and non-RTW groups.

4 DISCUSSION

There were two main objectives of this study. The first objective was to assess the impact of demographic characteristics, health-related variables, and labor-related variables on RTW. The second objective was to assess the correlation between RTW and long-term survival of CRC survivors.

Among the characteristics that influenced employment status, age, gender, comorbidity (hypertension and cerebrovascular disease), treatment, living area, income, occupation, company size, and pathological stage showed a significant difference between RTW and non-RTW groups by 5 years after

| Characteristic          | OR   | 95% CI        | \ p value |
|-------------------------|------|---------------|----------|
| Age (years)             |      |               |          |
| ≤45 \ a                 | 0.93 | (0.76, 1.14)  | 0.488    |
| 45–52                   | 0.57 | (0.48, 0.69)  | <.001 ***|
| >52                     |      |               |          |
| Gender                  |      |               |          |
| Male                    | 0.87 | (0.76, 1.01)  | 0.059    |
| Female \ a              |      |               |          |
| Treatment               |      |               |          |
| Operation               | 1.47 | (0.98, 2.19)  | 0.061    |
| Radiation therapy       | 0.69 | (0.57, 0.83)  | <.001 ***|
| Chemotherapy            | 0.92 | (0.80, 1.07)  | 0.277    |
| Living area             |      |               |          |
| North                   | 0.97 | (0.83, 1.13)  | 0.721    |
| Central                 | 1.18 | (0.97, 1.44)  | 0.095    |
| South \ b              |      |               |          |
| East + offshore islands | 1.85 | (1.05, 3.25)  | 0.032 *  |
| Income (US dollars)     |      |               |          |
| ≤930 \ a                | 1.09 | (0.90, 1.32)  | 0.381    |
| 930–1230                | 0.39 | (0.32, 0.47)  | <.001 ***|
| >1230                   |      |               |          |
| Company size \ b        |      |               |          |
| Shut down               | 0.78 | (0.60, 1.03)  | 0.084    |
| Small                   | 0.89 | (0.65, 1.21)  | 0.454    |
| Medium                  | 0.78 | (0.63, 0.97)  | 0.022 *  |
| Large \ a               |      |               |          |
| Stage                   |      |               |          |
| I                       | 16.20| (12.48, 21.03)| <.001 ***|
| II                      | 13.12| (10.43, 16.50)| <.001 ***|
| III                     | 7.68 | (6.17, 9.56)  | <.001 ***|
| IV \ a                  |      |               |          |

Abbreviations: CI, confidence interval; OR, odds ratio; RTW, return to work.

\ aReference category.

\ bCompany size: small (less than 5 people), medium (less than 200 people in manufacturing, construction, mining, and quarrying; or less than 100 people in other industries), large (more than 200 people in manufacturing, construction, mining, and quarrying; or more than 100 people in other industries).

*p < 0.05 for comparison between RTW and non-RTW participants.;

***p < 0.001 for comparison between RTW and non-RTW participants.
### TABLE 4  Demographic characteristics of RTW and non-RTW groups after propensity score matching

| Characteristic                              | Total (N = 1550) | RTW (N = 775) | Non-RTW (N = 775) | p value |
|--------------------------------------------|------------------|---------------|-------------------|---------|
|                                           | n (%)            | n (%)         | n (%)             |         |
| Age (years) ± SD (range)                   | 54.8 ± 8.7 (22–86) | 54.1 ± 8.3 (22–82) | 55.4 ± 9.0 (27–86) | 0.842   |
| ≤45                                        | 198 (12.8)       | 99 (12.8)     | 99 (12.8)         |         |
| 45–52                                      | 305 (19.1)       | 148 (19.1)    | 157 (20.3)        |         |
| >52                                        | 1047 (68.1)      | 528 (68.1)    | 519 (67.0)        |         |

| Gender                                    |                  |               |                   | 1.000   |
|-------------------------------------------|------------------|---------------|-------------------|---------|
| Male                                      | 968 (62.5)       | 484 (62.5)    | 484 (62.5)        |         |
| Female                                    | 582 (37.5)       | 291 (37.5)    | 291 (37.5)        |         |

| Comorbidities                             |                  |               |                   |         |
|-------------------------------------------|------------------|---------------|-------------------|---------|
| Disorders of lipoid metabolism            | 180 (11.5)       | 89 (11.5)     | 91 (11.7)         | 0.874   |
| Obesity + hemiplegia or paraplegia        | 7 (0.4)          | 3 (0.4)       | 4 (0.5)           | 1.000   |
| Alcohol abuse                             | 6 (0.4)          | 3 (0.4)       | 3 (0.4)           | 1.000   |
| Hypertension                              | 353 (22.1)       | 171 (22.1)    | 182 (23.5)        | 0.505   |
| Myocardial infarction                     | 7 (0.4)          | 3 (0.4)       | 4 (0.5)           | 1.000   |
| Congestive heart failure                  | 26 (1.5)         | 12 (1.5)      | 14 (1.8)          | 0.692   |
| Peripheral vascular disease               | 21 (1.4)         | 11 (1.4)      | 10 (1.3)          | 0.826   |
| Cerebrovascular disease                   | 37 (2.2)         | 17 (2.2)      | 20 (2.6)          | 0.618   |
| Chronic pulmonary disease                 | 51 (3.6)         | 28 (3.6)      | 23 (3.0)          | 0.477   |
| Rheumatologic disease                     | 9 (0.6)          | 5 (0.6)       | 4 (0.5)           | 1.000   |
| Peptic ulcer disease                      | 219 (13.7)       | 106 (13.7)    | 113 (14.6)        | 0.610   |
| Renal disease                             | 19 (1.2)         | 9 (1.2)       | 10 (1.3)          | 0.817   |
| Psychoses                                 | 8 (0.5)          | 4 (0.5)       | 4 (0.5)           | 1.000   |
| Depression                                | 24 (1.8)         | 14 (1.8)      | 10 (1.3)          | 0.411   |

| Treatment                                 |                  |               |                   |         |
|-------------------------------------------|------------------|---------------|-------------------|---------|
| Operation                                 |                  |               |                   |         |
| No                                        | 40 (2.3)         | 18 (2.3)      | 22 (2.8)          | 0.522   |
| Yes                                       | 1510 (97.7)      | 757 (97.7)    | 753 (97.1)        |         |
| Radiation therapy                         |                  |               |                   |         |
| No                                        | 1322 (86.5)      | 670 (86.5)    | 652 (84.1)        | 0.197   |
| Yes                                       | 228 (13.5)       | 105 (13.5)    | 123 (15.9)        |         |
| Chemotherapy                              |                  |               |                   | <.001***|
| No                                        | 878 (62.6)       | 485 (62.6)    | 393 (50.7)        |         |
| Yes                                       | 672 (37.4)       | 290 (37.4)    | 382 (49.3)        |         |

| Living area                               |                  |               |                   | 0.419   |
|-------------------------------------------|------------------|---------------|-------------------|---------|
| North                                     | 796 (50.3)       | 390 (50.3)    | 406 (52.4)        |         |
| Central                                   | 242 (17.2)       | 133 (17.2)    | 109 (14.1)        |         |
| South                                     | 492 (31.0)       | 240 (31.0)    | 252 (32.5)        |         |
| East + offshore islands                   | 20 (1.5)         | 12 (1.5)      | 8 (1.0)           |         |

| Income (US dollars)                       |                  |               |                   | 0.757   |
|-------------------------------------------|------------------|---------------|-------------------|---------|
| ≤930                                      | 556 (35.5)       | 275 (35.5)    | 281 (36.3)        |         |
| 930–1230                                  | 212 (14.3)       | 111 (14.3)    | 101 (13.0)        |         |
| >1230                                     | 782 (50.2)       | 389 (50.2)    | 393 (50.7)        |         |

(Continues)
CRC diagnosis in the univariate logistic regressions model. This finding was consistent with previous studies that investigated changes in working status among cancer survivors. However, after adjusting for other variables in multivariate logistic regression, only age, treatment, living area, income, company size, and pathological stage showed a significant correlation with employment status. Many studies have identified factors that influence post-cancer employment change. In a systemic review by Sze Loon Chow et al. (2014), these factors were categorized into personal, health, financial, and environmental factors. To integrate these findings, we can identify some common factors that affect the RTW.

First, financial issue was the primary concern that made patients RTW. Irrespective of the cancer type and demographic characteristics, most cancer survivors indicated financial pressure as their primary consideration while deciding whether to continue and RTW. Apart from income, the role of insurance has also been widely discussed. Adequate health insurance provides financial support, which increases the affordability of medical expenses and allows

| Characteristic                                | Total (N = 1550) | RTW (N = 775) | Non-RTW (N = 775) | p value |
|-----------------------------------------------|------------------|---------------|-------------------|---------|
| Industrial classification                      |                  |               |                   |         |
| Agriculture, forestry, fishing, animal, husbandry mining and quarrying | 88 | 48 | 6.2 | 40 | 5.2 | 0.377 |
| Manufacturing                                 | 519 | 251 | 32.4 | 268 | 34.6 |
| Electricity and gas supply                    | 18 | 6 | 0.8 | 12 | 1.5 |
| Water supply and remediation                  | 16 | 5 | 0.6 | 11 | 1.4 |
| Construction                                  | 148 | 71 | 9.2 | 77 | 9.9 |
| Wholesale and retail trade                    | 212 | 111 | 14.3 | 101 | 13.0 |
| Transportation and storage                   | 130 | 62 | 8.0 | 68 | 8.8 |
| Accommodation and food service                | 52 | 23 | 3.0 | 29 | 3.7 |
| Information and communication                | 26 | 14 | 1.8 | 12 | 1.5 |
| Financial and insurance activities            | 62 | 38 | 4.9 | 24 | 3.1 |
| Real estate activities                        | 17 | 8 | 1.0 | 9 | 1.2 |
| Professional, scientific and technology       | 36 | 14 | 1.8 | 22 | 2.8 |
| Support service activities                    | 24 | 12 | 1.5 | 12 | 1.5 |
| Public administration and defense             | 23 | 10 | 1.3 | 13 | 1.7 |
| Education                                     | 25 | 15 | 1.9 | 10 | 1.3 |
| Human health and social work                  | 42 | 22 | 2.8 | 20 | 2.6 |
| Amusement and recreation activities           | 12 | 5 | 0.6 | 7 | 0.9 |
| Other service activities                      | 100 | 60 | 7.7 | 40 | 5.2 |
| Company size*                                 |                  |               |                   | 0.476   |
| Shut down                                     | 171 | 89 | 11.5 | 82 | 10.6 |
| Small                                         | 127 | 71 | 9.1 | 56 | 7.2 |
| Medium                                       | 385 | 191 | 24.6 | 194 | 25 |
| Large                                        | 867 | 424 | 54.7 | 443 | 57.2 |
| Stage                                         |                  |               |                   | 0.998   |
| I                                            | 363 | 183 | 23.6 | 180 | 23.2 |
| II                                           | 569 | 283 | 36.5 | 286 | 36.5 |
| III                                          | 516 | 258 | 33.3 | 258 | 33.3 |
| IV                                           | 102 | 51 | 6.6 | 51 | 6.6 |

Abbreviations: RTW, return to work; SD, standard deviation.

*Company size: small (less than 5 people), medium (less than 200 people in manufacturing, construction, mining and quarrying; or less than 100 people in other industries), large (more than 200 people in manufacturing, construction, mining and quarrying; or more than 100 people in other industries).

***p < 0.001 for comparison between RTW and non-RTW participants.
patients to take time off for their cancer therapy without the apprehension of being unemployed. Furthermore, some studies revealed the correlation between marital status and change in employment status, which was also attributed to financial considerations. Married persons were shown less likely to RTW than singles as that they may have financial support from their partners. On the contrary, people who were the only or the main source of income in their family are likely to experience greater financial pressure.

Second, RTW is also based on adequate physical condition and working ability. The poorer the physical status, the less is the probability of RTW. Although there were no quantified performance status variables such as Eastern Cooperative Oncology Group (ECOG) or Karnofsky performance score in this study, some previous studies have found that the impact of cancer type, staging, comorbidity, and treatment decision on change in employment may reflect the patients' physical status. Decline in the ability to perform work and activities of daily living are a barrier for patients seeking a return to employment. Some patients chose to retire from their work after cancer diagnosis, while others RTW after perceiving the adequacy of their physical status.

Third, psychosocial factors also have an important influence on the decision to RTW. These factors include family, workplace environment, and the patients' mental status. We did not investigate these aspects in the present study. An exploratory study investigated the RTW experience of cancer patients, by performing patient interviews. The study elicited several considerations of patients. Some patients went back to their work to acquire a sense of normality, while others returned to work due to their perceived sense of responsibility and feeling of loyalty toward their work. Studies have also indicated the importance of support from the employers and colleagues.

Table 5 highlights the facilitators and barriers for employment status identified in studies that included CRC patients. The present study had a distinctly large sample size (N = 4408). Lower income and undergoing surgery were identified as facilitators for employment and RTW, whereas older age, male sex, and advanced pathological stage were identified as barriers to employment and RTW. Income reflected a person's financial ability. Patients with higher income are likely to be more financially secure. In contrast, those with lower income might be forced to RTW as soon as possible due to their financial constraints. Advanced disease represents poorer physical activity, which imposed a burden on cancer survivors returning to their work. The impact of age on RTW is determined by both financial factors and physical ability. In general, aging is associated with the decline in physical condition. Furthermore, elderly tend to have better financial stability than middle-aged and young people. Both these aspects explain the negative correlations between age and RTW.

Of note, the observed influence of “income” on employment status in our study was not consistent with the result of previous studies. In our study, lower income was found to be a facilitator for RTW; however, other studies have yielded opposite findings. This discrepancy is likely attributable to economic factors peculiar to Taiwan. Due to NHI coverage, health care and medical treatment in Taiwan is less expensive than that in most other countries. The financial stress in Taiwan is mainly reflected to the reduced productivity.
| Study                  | Year | Country   | Study Design          | Participants with CRC | Variables                                    | Facilitator for employment & RTW | Barrier of employment & RTW |
|-----------------------|------|-----------|-----------------------|------------------------|---------------------------------------------|---------------------------------|-----------------------------|
| Our study             | 2021 | Taiwan    | Retrospective cohort  | N = 4408 RTW           | Lower pathological stage                    | Older age                      |                              |
| Den Bakker CM et al.  | 2020 | Netherlands | Retrospective cohort | N = 317 RTW (1 year after sick leave) No mentioned | (2 years after sick leave) Small company size (<10) | Metastases Emotional distress Postoperative complications Stoma Adjuvant treatment |                              |
| Den Bakker CM et al.  | 2018 | Worldwide | Systemic Review       | N = 12,800 (8 studies, N ranging from 50 to 4343) RTW | No mentioned | (Neoadjuvant therapy Higher age Co-morbidities Previous unemployment Extensive surgical resection Postoperative complications |                              |
| LJ Chen et al.        | 2016 | Sweden    | Prospective cohort    | N = 3438 Unemployment (Work loss) | Anterior resection | Prediagnostic work loss Neoadjuvant therapy Advanced stage Relapse-free patients Surgical complications Abdominoperineal resection |                              |
| Mehnert A et al.      | 2013 | Germany   | Prospective cohort    | N = 42 RTW Time to RTW | Intention to RTW Perceived employer accommodation High job requirement Sick leave absence | Cancer recurrence Cancer metastasis Problematic social interaction Higher UICC cancer stage |                              |
| Torp S et al.         | 2013 | Norway    | Cross-sectional registry | N = 164 Employment rate | Lower age Higher income Higher education | Sick leave >30 days Cancer (female) Single (male) No children (male) |                              |
| Yarker J et al.       | 2010 | U.K.      | Qualitative study     | N = 1 Experience of RTW | Communication and support from occupational health, line manager, and colleagues | Delayed impact of cancer Decline ability of work Wear-off effect of support |                              |

(Continues)
| Study                  | Year | Country | Study Design            | Participants with CRC | Variables                                      | Facilitator for employment & RTW                                                                 | Barrier of employment & RTW                                                                 |
|-----------------------|------|---------|-------------------------|-----------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Paraponaris A et al.  | 2010 | France  | Cross-sectional survey  | N = 121               | Unemployment (Job tenure) Higher social-professional status Higher Education (male) Higher income (male) | Workplace discrimination Fix-term contrast (female)                                      |                                                                                           |
| Earle CC et al.       | 2010 | U.S.A.  | Prospective cohort study | N = 1610              | Unemployment                                               | Better education                                                              | Advanced stage Married women (lower income) Older age (higher income)                     |
| Park JH et al.        | 2009 | Korea   | Prospective cohort study | 1st baseline N = 585  | Time to job loss                                           | No mentioned                                                               | Cancer                                                                                   |
|                       |      |         |                         | 2nd baseline N = 160  | Time to RTW                                               | No mentioned                                                               | Cancer                                                                                   |
| Gordon L              | 2008 | Australia | Cohort study           | N = 975               | Unemployment (Work cessation)                              | Private health insurance                                                  | Fewer work hours Older age (male) Radiotherapy (male) Chemotherapy (female)               |
| Park JH et al.        | 2007 | Korea   | Retrospective cohort study | 1st baseline N = 585  | Time to job loss                                           | No mentioned                                                               | Female Younger (<30) or older (>50) Company employees Lower income                      |
|                       |      |         |                         | 2nd baseline N = 160  | Time to RTW                                               | No mentioned                                                               | Female Older (>50)                                                                       |
| Short PF et al.       | 2005 | U.S.A.  | Cross-sectional survey  | N = 96                | Unemployment Disability rate                               | Postgraduate education Early stage at diagnosis                                | Women Under initial treatment New cancer or metastasis Advanced stage at diagnosis Chronic health condition |

Abbreviation: RTW, return to work.
due to sick leave or job loss, which increases the need for survivors with lower income to RTW. On the other hand, financial stress in other countries is mainly due to the medical expenses. Patients with higher income are more likely to receive better treatment, which explains the better outcomes and better preserved ability for working. However, there were no standard criteria to define income level in previous studies. Future studies with standardization of income level strata are required to identify correlation between income level and subsequent employment status.

Apart from the factors that affect employment status, very few studies have investigated the influence of RTW on cancer survivors. In this study, we investigated the correlation between RTW and survival of CRC patients in Taiwan. We believe that the better survival of patients who RTW may be attributable to the following reasons. First, work ability is influenced by a combination of individuals’ physical, psychological, and social resources. Patient who RTW are likely to have better physical and mental status, which is liable to contribute to better survival outcomes. Second, RTW may have a positive influence on the physical and mental health of patients. Mahar et al. found that patients who continued working showed better physical and mental functioning, QoL, and lower psychosocial distress than patients who RTW with sick leave and patients who discontinued working after cancer diagnosis.36

However, in this study, we observed no significant difference in all-cause mortality between RTW and non-RTW groups. This may be attributable to minimization of selection bias after the use of statistical techniques such as propensity score matching. The similar baseline characteristics in both groups may have annulled the influence of better physical and mental status on survival in the RTW group. Nevertheless, we did not evaluate other outcomes such as QoL, physical function, or psychosocial status between the RTW and non-RTW groups. The impact of RTW on outcomes among cancer survivors remains uncertain.

A key limitation of this study was that we grouped the participants according to their employment status at the time of follow-up, which means that randomization was unavailable in our study. Other limitations include the lack of quantified performance status data and the absence of tools to evaluate the quality of RTW. Moreover, the outcome measure was confined to survival and we did not measure other indices such as QoL. Lastly, the study population exclusively comprised of CRC patients in Taiwan. Future studies including participants from different countries and ethnic groups, and patients with other cancers are required to elucidate the impact of RTW on cancer survival.

ACKNOWLEDGEMENTS
The authors would like to appreciate Institute of Labor, Occupational Safety and Health and the Ministry of Labor in Taiwan as the sponsors of this study (grant numbers: ILOSH107-M301). No funding bodies had any role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

CONFLICT OF INTEREST
The authors declared that no competing interests exist.

ETHICS APPROVAL
The study protocol was approved by the Institutional Review Board of Tri-Service General Hospital, National Defense Medical Center (IRB no. 1-107-05-129) and performed in accordance with the Declaration of Helsinki.

DATA AVAILABILITY STATEMENT
The data that support the findings of this study are available from Taiwan National Health Insurance Research Database (NHIRD) and Taiwan Labor Insurance Database (LID). 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 NHIRD and LID.

ORCID
Chung-Mao Yuan https://orcid.org/0000-0002-0557-800X
Wei-Liang Chen https://orcid.org/0000-0003-0784-230X

REFERENCES
1. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2018;68(6):394-424.
2. Mehnert A. Employment and work-related issues in cancer survivors. Crit Rev Oncol Hematol. 2011;77(2):109-130.
3. de Boer AGEM, Taskila T, Ojajärvi A, van Dijk FJH, Verbeek JHAM. Cancer survivors and unemployment: a meta-analysis and meta-regression. JAMA. 2009;301(7):753-762.
4. La Vecchia C, Rota M, Malvezzi M, Negri E. Potential for improvement in cancer management: reducing mortality in the European Union. Oncologist. 2015;20(5):495-498.
5. Rick O, Kalusche EM, Daubelsberg T, Konig V, Korsukewitz C, Seifert U. Reintegrating cancer patients into the workplace. Dtsch Arztebl Int. 2012;109(42):702-708.
6. Seifert U, Schmielau J. Return to work of cancer survivors. Oncol Res Treat. 2017;40(12):760-763.
7. Mattiuzzi C, Sanchis-Gomar F, Lippi G. Concise update on colorectal cancer epidemiology. Ann Transl Med. 2019;7(21):609.
8. Arnold M, Sierra MS, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global patterns and trends in colorectal cancer incidence and mortality. Gut. 2017;66(4):683-691.
9. Virostko J, Capasso A, Yankeelov TE, Goodgame B. Recent trends in the age at diagnosis of colorectal cancer in the US National Cancer Data Base, 2004–2015. Cancer. 2019;125(21):3828-3835.
10. Short PF, Vasey JJ, Tunceli K. Employment pathways in a large cohort of adult cancer survivors. Cancer. 2005;103(6):1292-1301.
11. Carlsen K, Dalton SO, Diderichsen F, Johansen C, Danish CS. Risk for unemployment of cancer survivors: a Danish cohort study. *Eur J Cancer*. 2008;44(13):1866-1874.

12. Park JH, Park JH, Kim SG. Effect of cancer diagnosis on patient employment status: a nationwide longitudinal study in Korea. *Psychooncology*. 2009;18(7):691-699.

13. Chow SL, Ting AS, Su TT. Development of conceptual framework to understand factors associated with return to work among cancer survivors - a systematic review. *Iran J Public Health*. 2014;43(4):391-405.

14. Bradley CJ, Neumark D, Luo Z, Schenk M. Employment and cancer: findings from a longitudinal study of breast and prostate cancer survivors. *Cancer Invest*. 2007;25(1):47-54.

15. Pryce J, Munir F, Haslam C. Cancer survivorship and work: symptoms, supervisor response, co-worker disclosure and work adjustment. *J Occup Rehabil*. 2007;17(1):83-92.

16. Wolvers MDJ, Leensen MCJ, Groeneveld IF, Frings-Dresen MHW, De Boer A. Predictors for earlier return to work of cancer patients. *J Cancer Surviv*. 2018;12(2):169-177.

17. Main DS, Nowels CT, Cavender TA, Etschmaier M, Steiner JF. A qualitative study of work and work return in cancer survivors. *Cancer*. 2007;116(1):17-25.

18. Kennedy F, Haslam C, Munir F, Pryce J. Returning to work following cancer: a qualitative exploratory study into the experience of returning to work following cancer. *Eur J Cancer Care*. 2013;23(1):116-122.

19. Rasmussen DM, Elverdam B. The meaning of work and working life after cancer: an interview study. *Psychooncology*. 2008;17(12):1232-1238.

20. Tamminga SJ, Verbeek JHAM, Bos MMEM, et al. Effectiveness of a hospital-based work support intervention for female cancer patients - a multi-centre randomised controlled trial. *PLoS One*. 2013;8(5):e63271.

21. Park JH, Park EC, Park JH, Kim SG, Lee SY. Job loss and re-employment of cancer patients in Korean employees: a nationwide retrospective cohort study. *J Clin Oncol*. 2008;26(8):1302-1309.

22. Mehnert A, Koch U. Predictors of employment among cancer survivors after medical rehabilitation—a prospective study. *Scand J Work Environ Health*. 2013;39(1):76-87.

23. Islam T, Dahlui M, Majid HA, et al. Factors associated with return to work of breast cancer survivors: a systematic review. *BMC Public Health*. 2014;14(Suppl 3):S8.

24. den Bakker CM, Anema JR, Huirne JAF, Twisk J, Bonjer HJ, Schaafsma FG. Predicting return to work among patients with colorectal cancer. *Br J Surg*. 2020;107(1):140-148.

25. den Bakker CM, Anema JR, Zaman AGNM, et al. Prognostic factors for return to work and work disability among colorectal cancer survivors: a systematic review. *PLoS One*. 2018;13(8):e0200720.

26. Nachreiner NM, Dagher RK, McGovern PM, Baker BA, Alexander BH, Gerberich SG. Successful return to work for cancer survivors. *AAOHN J*. 2007;55(7):290-295.

27. Gordon LG, Beesley VL, Mihala G, Koczwar A, Lynch BM. Reduced employment and financial hardship among middle-aged individuals with colorectal cancer. *Eur J Cancer*. 2017;26(5):e12744.

28. Earle CC, Chretien Y, Morris C, et al. Employment among survivors of lung cancer and colorectal cancer. *J Clin Oncol*. 2010;28(10):1700-1705.

29. Bouknight RR, Bradley CJ, Luo Z. Correlates of return to work for breast cancer survivors. *J Clin Oncol*. 2006;24(3):345-353.

30. Gruß I, Hanson G, Bradley C, et al. Colorectal cancer survivors’ challenges to returning to work: a qualitative study. *Eur J Cancer Care*. 2019;28(4):e13044.

31. Chen L, Glimelius I, Neovius M, et al. Work loss duration and predictors following rectal cancer treatment among patients with and without prediagnostic work loss. *Cancer Epidemiol Biomarkers Prev*. 2016;25(6):987-994.

32. Torp S, Nielsen RA, Fossa SD, Gudbergsson SB, Dahl AA. Change in employment status of 5-year cancer survivors. *Eur J Public Health*. 2013;23(1):116-122.

33. Yarker J, Munir F, Bains M, Kalawsky K, Haslam C. The role of communication and support in return to work following cancer-related absence. *Psychooncology*. 2010;19(10):1078-1085.

34. Paraponaris A, Teyssier LS, Ventelou B. Job tenure and self-reported workplace discrimination for cancer survivors 2 years after diagnosis: does employment legislation matter? *Health Policy*. 2010;98(2–3):144-155.

35. Gordon L, Lynch BM, Newman B. Transitions in work participation after a diagnosis of colorectal cancer. *Aust N Z J Public Health*. 2008;32(6):569-574.

36. Mahar KK, BrintzenhofeSzoc K, Shields JJ. The impact of changes in employment status on psychosocial well-being: a study of breast cancer survivors. *J Psychosoc Oncol*. 2008;26(3):1-17.

**How to cite this article:** Yuan C-M, Wang C-C, Wu W-T, Ho C-L, Chen W-L. Risk factors for return to work in colorectal cancer survivors. *Cancer Med*. 2021;10:3938–3951. [https://doi.org/10.1002/cam4.3952](https://doi.org/10.1002/cam4.3952)