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# THE IMPACT OF CANCER DIAGNOSIS ON EMPLOYMENT STATUS IN A WORKING POPULATION

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**Abstract**

**The aim of this study** was to investigate the status of return to work and the influencing factors in patients with common cancers referring to three medical centers during the years 2020 to 2022. **Material and Methods.** In the present study (a retrospective cohort), all patients who visited three medical centers during the years 2020–2022 and were diagnosed with common cancers (non-Hodgkin's lymphoma, Hodgkin's lymphoma, gastrointestinal cancers and sarcoma), were included in the study. Work ability index (WAI) was assessed based on selected questions from the WAI questionnaire. Hospital Anxiety and Depression Scale (HADS) was used to assess depression and anxiety, and Multidimensional Fatigue Inventory (MFI-20) was used to assess the level of fatigue. Then, the data obtained from individuals who returned to work were compared with those who did not return. **Results.** Out of 750 eligible patients, 135 individuals were enrolled in the study. 114 patients were male (84.4 %). The mean age of individuals was 50.2 ± 10.4 years. The most of individuals were diagnosed with gastric cancer (n=66, 48.9 %). After treatment, 36 (26.7 %) individuals returned to work, with the majority (24 individuals: 66.6 %) reporting a decrease in physical ability to do work. Sixty-six (73.3 %) patients did not return to work, with the most common reason being physical inability to work in 60 (66.6 %) individuals. Higher quality of life score was reported in individuals who returned to work. **Conclusion.** The rate of return to work was approximately 27 %. The return to work rate was highest among individuals with non-Hodgkin's lymphoma and lowest among individuals with oesophageal cancer and Hodgkin's lymphoma. The most influential factors affecting the return to work include disease recurrence and quality of life.

**Key words: cancer, quality of life, return to work.**

# ВЛИЯНИЕ ДИАГНОЗА РАК НА СТАТУС ЗАНЯТОСТИ ТРУДОСПОСОБНОГО НАСЕЛЕНИЯ

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**Аннотация**

**Цель исследования –** изучение статуса возвращения к работе и влияющих на это факторов у пациентов с распространенными видами рака, обратившихся в три медицинских центра в период с 2020 по 2022 г. **Материал и методы.** Ретроспективное исследование включало пациентов, которые обращались в 3 медицинских центра в 2020–2022 гг. и у которых диагностированы различные виды злокачественных опухолей (неходжкинская лимфома, лимфома Ходжкина, рак органов желудочно-кишечного тракта и саркома). Оценка трудоспособности проводилась с помощью анкеты WAI (Work Ability Index). Госпитальная шкала тревоги и депрессии (HADS) использовалась для оценки уровня тревоги и депрессии, а субъективная шкала оценки астении (MFI-20) – для оценки уровня усталости. Затем ответы, полученные от лиц, вернувшихся к трудовой деятельности, сравнивались с данными

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тех, кто не вернулся на работу. **Результаты**. Из 750 пациентов, соответствующих критериям для включения в исследование, было выбрано 135 человек. Из них 114 (84,4 %) пациентов мужского пола. Средний возраст составил 50,2 ± 10,4 года. У большинства диагностирован рак желудка (n=66; 48,9 %). После завершения лечения 36 (26,7 %) пациентов вернулись к трудовой деятельности, причем большинство (n=24; 66,6 %) сообщили о снижении физической способности выполнять привычную работу. Не вернулись к работе 66 (73,3 %) пациентов, наиболее частой причиной была физическая нетрудоспособность – у 60 (66,6 %) человек. У людей, вернувшихся к трудовой деятельности, отмечен более высокий показатель качества жизни. **Заключение.** Показатель возвращения к работе составил около 27 %. Он был самым высоким у пациентов с неходжкинской лимфомой и самым низким – у больных раком пищевода и лимфомой Ходжкина. Наиболее значимыми факторами, влияющими на трудовую реабилитацию, являются рецидив заболевания и качество жизни.

**Ключевые слова: рак, качество жизни, трудовая реабилитация.**

## Introduction

Occupational Illness and injuries can create employment difficulties for individuals to the extent that they may not be able to return to their previous jobs. The span of this problem partly relates to the extent of the damage, the type of disease, and the individual's occupation [1, 2]. With the development of societies, new technologies, and equipment in medical science, conditions can be created where individuals can return to work after a period of treatment [3, 4].

Cancer is one of the primary diseases that disrupt the normal lives of individuals, forcing many patients to temporarily leave their jobs during treatment [3, 5]. In severe cases, they may be forced to permanently quit their jobs [6]. Individuals who are unable to return to their workplace impose a burden on their families and society. Losing a job due to illness, regardless of the financial costs, also carries negative psychological consequences for patients, reducing not only their hope for life and motivation but also causing anxiety in their families [7, 8].

In recent years, the number of cancer survivors has increased due to advances in diagnosis and treatment. Returning to society after treatment is a crucial goal for cancer patients following initial therapies, which can help more patients return to work and resume their normal lives [9]. Returning to work after cancer treatment is a complex phenomenon influenced by factors beyond the disease itself [6, 10]. Cancer survivors who were employed at the time of diagnosis may face economic pressure if they lose their jobs, especially if alternative sources of income are not available or if they lose access to job-related health insurance.

Some studies indicate that 26–53 % of cancer survivors lose or leave their jobs during or after treatment [9]. The physical and mental burden of cancer and its treatment, along with side effects such as fatigue, pain and anxiety, can lead to disruptions in patients' ability to work. These patients need help to overcome personal (physical and psychological) and occupational issues to return to work [3]. Employment rates among cancer survivors reported in various studies range from 41 % to 84 % [1]. The results obtained in different studies are not consistent due to the diversity of cancer types. In recent years, several factors related to return to work after cancer treatment have been identified and more evidence has emerged regarding the importance of demographic, occupational and disease-related factors. In our country, few studies have been conducted on the rate of return to work of cancer patients and the factors affecting it. Therefore, in this study, we examined the return-to-work status of patients with common cancers and the factors related to their employment after completing the treatment period.

**The aim of this study** was to investigate the status of return to work and the influencing factors in patients with common cancers referring to three medical centers during the years 2020 to 2022.

## Material and Methods

This observational study was conducted as a retrospective cohort. In this study, 750 individuals who were admitted for the first time with a cancer diagnosis in three medical centres of Iran University of Medical Sciences during the years 2020-2022 and were among common cancers (non-Hodgkin's lymphoma, Hodgkin's lymphoma, gastrointestinal cancers such as oesophageal, gastric, colon, and various sarcomas), were examined. 540 individuals (337 deceased, 79 non-responders to telephone calls, 64 homemakers, 31 unemployed, 16 wrong phone numbers, 10 with less than six months since diagnosis, and 3 without a phone number) were excluded from the study. 210 individuals met the criteria, of which 135 individuals completed the questionnaire (response rate 64.2 %).

The mean age of the participants at the time of diagnosis and treatment completion was 50.2 ± 10.4 and 53.0 ± 10.8 years, respectively. There were 114 (84.4 %) male patients and 21 (15.7 %) female patients. The majority of individuals (82.2 %) were married. Most individuals were diagnosed with gastric cancer (66 individuals: 48.9 %).

The files of these individuals were reviewed for the required variables, including personal factors such as age, gender, marital status, education level, smoking status, and disease-related factors such as date of diagnosis, cancer type, treatment type (surgery, chemotherapy, radiotherapy), cancer stage, treatment duration, time since completion of treatment, disease recurrence, and pre-existing comorbidities that could

affect return to work (including neurological, cardiovascular, respiratory, gastrointestinal, renal, hepatobiliary, endocrine, musculoskeletal, genitourinary, hematologic, dermatologic, and psychiatric disorders). Results were recorded.

Additionally, a checklist containing variables related to work absence days or unemployment, the first day of full-time work, job title at the time of hospitalization and after returning to work, monthly income in the previous and current jobs, spouse's employment status, insurance support, employer support, co-worker support, job satisfaction, employment status, working hours in the previous and current jobs, obstacles to returning to work (including disease and treatment-related symptoms such as fatigue, weight loss, anxiety and stress, cognitive problems, pain, physical appearance changes, or job termination), number of family members, treatment side effects (leukopenia, nausea and vomiting, anemia, tingling, numbness in hands and feet, etc.), medications (anxiolytics, antidepressants), receipt of rehabilitation and psychiatric counselling, availability of sick leave in the current job, was prepared. Then, these items were asked from the patients via telephone contact using the phone number recorded in the medical records.

The work ability index (WAI) was assessed based on selected questions from the WAI questionnaire, which has been shown in previous studies to be a suitable substitute for this questionnaire, including current work ability (0 to 10) and work ability regarding the physical and mental demands of the job (2 to 10) [11]. The Hospital Anxiety and Depression Scale (HADS) was used to assess the depression and anxiety [12]. HADS contains 14 items, 7 items are related to anxiety subscale and 7 items are related to depression. A higher score indicates more severe emotional distress. In this study, a score of 8 or higher in each subscale indicates the presence of anxiety or depression [13]. The Multidimensional Fatigue Inventory (MFI-20) questionnaire was used to assess the level of fatigue. The MFI questionnaire includes 20 items and 5 subscales of general, physical and mental fatigue, decreased activity and decreased motivation. The total score for each domain ranges from 4 to 20, and the total fatigue score, which is determined by summing the scores of the domains, can range from 20 to 100. A higher score indicates more severe fatigue [14]. Quality of life was assessed on a scale of 1 to 100 (1 being the lowest and 100 being the highest quality of life) [15].

Then, all demographic, occupational, and disease related variables mentioned above were compared between individuals who returned to work and those who did not. The results for quantitative variables were expressed as mean and standard deviation, and for qualitative variables, frequency and percentage were reported. Quantitative data were compared using the t-test, and qualitative data were analyzed using the Chi-square test. Non-normally distributed variables were expressed as median with 25$^{th}$ and 75$^{th}$ percentiles, and were compared between the two groups applying the Mann-Whitney U test. Statistical analysis was performed using SPSS software version 22, considering a significance level of less than 0.05.

Participation in this study was voluntary. The patients were not charged for entering the study. Informed consent was obtained from all individual participants included in the study. All patient data remained confidential. This study was approved by the Ethics Committee with the ethics code IR.IUMS.FMD.REC.1400.137.

**Results**

Descriptive analysis of demographic and occupational variables is presented in Table 1. According to the information in Table 2, 120 (89 %) of individuals experienced treatment side effects. 87 (64 %) of individuals had at least one concomitant comorbidity. 27 (20 %) of participants experienced disease recurrence. Only 12 (8.9 %) individuals received psychiatric counselling, with 50 % reporting depression and 50 % reporting stress. None of the study participants received psychiatric medications. Other disease-related information is shown in Table 2.

In Table 3, descriptive analysis of quantitative variables including fatigue, anxiety, depression, and work ability is provided. According to the MFI questionnaire, the mean total fatigue score among the study participants was 62.2 ± 15.3, indicating high levels of fatigue. Additionally, the mean anxiety and depression scores were above 8, indicating emotional distress among the study participants.

The job titles of the study participants before diagnosis and after completing treatment are given in Table 4. The most job title before cancer diagnosis was manual work, while none of the participants were in this job after completing the treatment. Due to the small sample size in each subgroup, it was not possible to perform further analysis on the job title.

After completing the treatment, 36 (26.7 %) of the patients returned to work. The majority of these individuals (n=24, 66.6 %) reported a decrease in physical ability to work. 12 (33.3 %) individuals reported early fatigue, 3 (8.3 %) individuals reported reduced opportunity for promotion, and 3 (8.3 %) individuals reported a reduction in wages. Sixty-six (73.3 %) patients did not return to work, with the most common reason being physical inability to work in 60 individuals (66.6 %). The employment status of those who returned to work and the reasons for not returning to work are shown in Table 5.

About 58 % of individuals who returned to work could not use sick leave. The average weekly working hours among individuals who returned to work were approximately 8 hours less than the average working hours before diagnosis.

Regarding the type of cancer, the highest rate of return to work was observed in individuals with non-Hodgkin's lymphoma (60 %), and the lowest rate

Table 1/Таблица 1

**Descriptive analysis of demographic and occupational variables**
**Анализ демографических и профессиональных показателей**

| Variables/Показатели | | Number of patients/ Число больных |
|---|---|---|
| Gender/Пол | Male/Мужской | 114 (84.4 %) |
| | Female/Женский | 21 (15.7 %) |
| Marital status/Семейный статус | Married/Женат, замужем | 111 (82.2 %) |
| | Single/Не женат, не замужем | 24 (17.8 %) |
| Smoking status/Курение | Yes/Да | 48 (35.6 %) |
| | No/Нет | 87 (64.4 %) |
| Education level/Уровень образования | Low/Низкий | 87 (62.2 %) |
| | Moderate/Средний | 36 (26.7 %) |
| | High/Высокий | 15 (11.1 %) |
| Employment at the time of diagnosis/ Занятость на момент постановки диагноза | Public servant/Государственный служащий | 12 (8.9 %) |
| | Employee/Наемный работник | 27 (20 %) |
| | Self employed/Самозанятый | 36 (26.7 %) |
| | Daily worker/Временный работник | 60 (44.4 %) |
| Income level in previous job/ Уровень дохода на предыдущей работе | Low/Низкий | 81 (60 %) |
| | Moderate/Средний | 45 (33.3 %) |
| | High/Высокий | 9 (6.7 %) |
| Income level in current job/ Уровень дохода на настоящей работе | Low/Низкий | 13 (36.2 %) |
| | Moderate/Средний | 11 (30.5 %) |
| | High/Высокий | 12 (33.3 %) |
| Spouse's employment status/ Статус занятости супруга | Yes/Да | 21 (18.9 %) |
| | No/Нет | 90 (81.1 %) |
| Sick leave feasibility in the current/ Возможность взять больничный на настоящей работе | Yes/Да | 15 (41.6 %) |
| | No/Нет | 21 (58.3 %) |

Note: created by the authors.

Примечание: таблица составлена авторами.

was in individuals with Hodgkin's lymphoma and oesophageal cancer, none of whom returned to work. The return-to-work rate in individuals with gastric, colon, and sarcoma cancers was 31.8 %, 20 %, and 16.7 %, respectively.

The analysis of the association between returning to work and qualitative variables showed a significant association between return to work and disease recurrence (p-value=0.04). None of the individuals who returned to work had disease recurrence. No significant association was found between returning to work and other qualitative variables (Table 6).

The analysis of the relationship between returning to work and quantitative variables showed a significant association between returning to work and quality of life (p-value=0.01). The median (interquartile range) of quality of life score was 45 (28.7–50) in individuals who returned to work and 20 (6.0–35) in those who did not. Additionally, individuals who returned to work had a younger age at the time of diagnosis and treatment completion, longer work experience, fewer weekly working hours, more employer support, co-worker support, and job satisfaction compared to those who did not return to work, but these differences were not statistically significant. No significant association was found between returning to work and other quantitative variables (Table 7).

We further assessed the relationship between return to work with quantitative and qualitative variables for non-Hodgkin lymphoma and gastric cancer, which had the highest return to work rate. We found that in patients with non-Hodgkin lymphoma, a higher rate of return to work was associated with being a non-smoker, no recurrence of the disease, lower income, shorter treatment duration and more time since treatment completion, less insurance support and job satisfaction, higher quality of life, more fatigue (with less restricted activity) and more depression. In patients with gastric cancer, a higher rate of returning to work was associated with the spouse's employment, no recurrence of the disease, receiving rehabilitation, chemotherapy treatment, younger age, fewer working hours per week, more support from the employer, co-workers, and insurance, higher job satisfaction and quality of life, and a lower depression score (Tables 8, 9).

## Discussion

The aim of this study was to investigate the status of return to work and the influencing factors in patients with common cancers referring to three medical centers during the years 2020 to 2022. Our study results showed that 26.7 % of individuals had returned to work. These individuals reported a decrease in physical ability, early fatigue, reduced opportunity for pro-

Table 2/Таблица 2

**Descriptive analysis of the disease-related variables**
**Анализ показателей, связанных с заболеванием**

| Variables/Показатели | | Number of patients/ Число больных |
|---|---|---|
| Type of cancer/ Вид опухоли | Hodgkin's lymphoma/Лимфома Ходжкина | 18 (13.3 %) |
| | Non-Hodgkin's lymphoma/Неходжкинская лимфома | 15 (11.1 %) |
| | Sarcoma/Саркома | 18 (13.3 %) |
| | Stomach/Рак желудка | 66 (48.9 %) |
| | Esophagus/Рак пищевода | 3 (2.2 %) |
| | Colon/Рак толстой кишки | 15 (11.1 %) |
| Treatment side effects/ Побочные эффекты лечения | Yes/Да | 120 (88.9 %) |
| | No/Нет | 15 (11.1 %) |
| Types of treatment side effects/ Типы побочных эффектов лечения* | Decreased WBC/Сниженная работоспособность | 51 (37.8 %) |
| | Nausea/Тошнота | 60 (44.4 %) |
| | Vomiting/Рвота | 39 (28.9 %) |
| | Anemia/Анемия | 51 (37.8 %) |
| | Tingling or numbness in extremities/Парестезии в конечностях | 66 (48.9 %) |
| | Other/Другие | 36 (26.7 %) |
| Comorbidity/ Коморбидность | Yes/Да | 87 (64.4 %) |
| | No/Нет | 48 (35.6 %) |
| Type of comorbidities/ Сопутствующая патология* | Neurologic/Неврологическая | 18 (13.3 %) |
| | Respiratory/Респираторная | 3 (2.2 %) |
| | Cardiac/Кардиологическая | 18 (13.3 %) |
| | Gastrointestinal/Гастроэнтерологическая | 33 (24.4 %) |
| | Renal/Почечная | 6 (4.4 %) |
| | Hepatobiliary/Гепатобилиарная | 9 (6.7 %) |
| | Endocrine/Эндокринная | 9 (6.7 %) |
| | Musculoskeletal/Опорно-двигательный аппарат | 15 (11.1 %) |
| | Urogenital/Урогенитальная | 9 (6.7 %) |
| | Hematologic/Гематологическая | 6 (4.4 %) |
| | Dermatologic/Дерматологическая | 9 (6.7 %) |
| | Psychiatric/Психиатрическая | 6 (4.4 %) |
| | Other/Другие | 15 (11.1 %) |
| Recurrence/ Рецидив | Yes/Да | 27 (20 %) |
| | No/Нет | 108 (80 %) |
| Psychiatric counselling/ Психиатрическая поддержка | Yes/Да | 12 (8.9 %) |
| | No/Нет | 123 (91.1 %) |
| Rehabilitation/Реабилитация | Yes/Да | 12 (8.9 %) |
| | No/Нет | 123 (91.1 %) |
| Treatment plan/Вид лечения | Curative/Радикальное лечение | 129 (95.6 %) |
| | Palliative/Паллиативное лечение | 6 (4.4 %) |
| Type of treatment/Метод лечения | Surgery/Операция | 48 (35.6 %) |
| | Radiation/Лучевая терапия | 21 (15.6 %) |
| | Chemotherapy/Химиотерапия | 66 (48.9 %) |

Notes: * – a person may have reported more than one item; created by the authors.

Примечания: * – у одного больного могло быть несколько признаков; таблица составлена авторами.

motion, and reduced wages after returning to work, respectively. 73.3 % of individuals did not return to work, with the most common reason being physical disability.

In our study, the factors influencing return to work included disease recurrence and quality of life. A study in Taiwan showed that age, gender, income level and treatment method are important factors affecting the return to work of patients with early diagnosis of cancer [16]. However, in our study, there was no significant association between return to work and these factors. The large sample size of the Taiwan study, collected over 7 years, could explain the differences in results.

Fontani et al showed that a large percentage of employed breast cancer patients returned to work within 36 months of treatment. However, in our study, with an average time since treatment of 22 months, only 26.7 % of patients had returned to work [17]. The reason for

Table 3/Таблица 3

**Descriptive analysis of the quantitative variables**
**Описательный анализ количественных переменных**

| Variables/ Переменные | Mean ± SD/Median (interquartile range)/ Среднее ± SD/ Медиана (межквартильный размах) | Variables/ Показатели | Mean ± SD /Median (interquartile range)/ Среднее ± SD/ Медиана (межквартильный размах) |
|---|---|---|---|
| Age at the time of diagnosis/ Возраст на время постановки диагноза | 50.2 ± 10.4 | Job satisfaction/ Удовлетворение работой (1–10) | 2.0 (1.0–8.0) |
| Number of family members/ Количество членов семьи | 2.0 (1.0–2.5) | Quality of life/ Качество жизни (0–100) | 30 (10–40) |
| Duration of treatment (months)/ Продолжительность лечения (мес) | 12 (6.0–24) | General fatigue/ Общая усталость (20–100) | 62.2 ± 15.3 |
| Time since treatment completion (months)/ Время от завершения лечения (мес) | 12 (8.0–24) | Physical fatigue/ Физическая усталость (4–20) | 13.5 ± 3.9 |
| Smoking (pack/year)/ Курение (пачка/год) | 17.5 (5.9–37.5) | Restricted activity/ Ограниченная активность (4–20) | 13.2 ± 4.3 |
| Rehabilitation period (months)/ Период реабилитации (мес) | 3.0 (1.5–32.2) | Restricted motivation/ Ограниченная мотивация (4–20) | 10.8 ± 3.6 |
| Work experience (year)/ Опыт работы (год) | 20.7 ± 13.2 | Mental fatigue/ Умственное утомление (4–20) | 11.6 ± 4.1 |
| Weekly work hours in previous job/ Еженедельные рабочие часы на предыдущей работе | 48 (30–60) | Current work ability/ Текущая трудоспособность (0–10) | 1.0 (1.0–5.0) |
| Weekly work hours in current job/ Еженедельные рабочие часы на настоящей работе | 46 (28.5–66.5) | Current physical work ability/ Текущая физическая работоспособность (2–10) | 2.9 ± 1.4 |
| Employer support/ Поддержка работодателя (1–10) | 1.0 (1.0–4.5) | Current mental work ability/ Текущая умственная работоспособность (2–10) | 2.6 ± 1.1 |
| Co-worker support/ Поддержка коллег (1–10) | 1.0 (1.0–6.5) | HADS anxiety/Тревожность по шкале HADS (0–21) | 9.5 ± 5.9 |
| Insurance support/ Страховая поддержка (1–10) | 2.0 (1.0–5.0) | HADS depression/ Депрессия по шкале HADS (0–21) | 9.0 ± 4.8 |

Note: created by the authors.

Примечание: таблица составлена авторами.

Table 4/Таблица 4

**Job title of participants, before diagnosis and after completion of treatment**
**Вид трудовой деятельность до постановки диагноза и после лечения**

| Job title/Профессия | Frequency before disease diagnosis/ До постановки диагноза | Frequency after treatment/ После лечения |
|---|---|---|
| Carpenter/Плотник | 6 (4.4 %) | 0 (0 %) |
| Farmer/Фермер | 12 (8.9 %) | 9 (6.7 %) |
| Owner, retail/Владелец, розничная торговля | 30 (22.1 %) | 15 (11.1 %) |
| Teacher/Учитель | 4 (2.9 %) | 0 (0 %) |
| Guard/Охранник | 9 (6.7 %) | 0 (0 %) |
| Manual worker/Рабочий | 33 (24.4 %) | 0 (0 %) |
| Engineer/Инженер | 3 (2.2 %) | 0 (0 %) |
| Driver/Водитель | 15 (11.1 %) | 3 (2.2 %) |
| Office worker/Офисный работник | 18 (13.3 %) | 9 (6.7 %) |
| Gardener/Садовник | 3 (2.2 %) | 0 (0 %) |
| General practitioner/Врач общей практики | 2 (1.4 %) | 0 (0 %) |
| Not working/Не работал | 0 (0 %) | 99 (73.3 %) |

Note: created by the authors.

Примечание: таблица составлена авторами.

Table 5/Таблица 5

**The employment status of individual who returned to work and the reason for not returning to work in individual who did not return to work**

**Статус занятости лиц, вернувшихся к трудовой деятельности, и причина невозвращения к работе**

| Work related difficulties experienced by worker*/ Испытываемые трудности, связанные с работой* | | Reasons for non-working*/ Причины нетрудоспособности* | |
|---|---|---|---|
| Lessened work-related ability than before/ Снижение трудоспособности по сравнению с предыдущим периодом | 24 (66.6 %) | Not having been employed after diagnosis/ Не трудоустроен после постановки диагноза | 3 (3.0 %) |
| Reduced opportunity for promotion/ Сокращение возможностей для продвижения по службе | 3 (8.3 %) | Physical limitation/ Физические ограничения | 60 (60.6 %) |
| Reduced working hours/ Сокращение рабочего времени | 0 (0 %) | Emotional distress (depression or anxiety)/ Эмоциональный стресс (депрессия и тревожность) | 12 (12.1 %) |
| Easily fatigued and exhausted/ Быстрая утомляемость | 12 (33.3 %) | Not wanting to work/Нет желания работать | 6 (6.0 %) |
| Decreased wages/Сниженная зарплата | 3 (8.3 %) | Easily fatigued but no physical limitation/ Быстрая утомляемость, но без физических ограничений | 21 (21.2 %) |
| Unchanged/Нет изменений | 18 (50 %) | Treatment side effect/Побочные эффекты лечения | 27 (27.2 %) |
| | | Other/Другое | 33 (33.3 %) |

Notes: * – a person may have reported more than one item; created by the authors.

Примечания: * – у одного больного могло быть несколько признаков; таблица составлена авторами.

Table 6/Таблица 6

**Analysis of the relationship between return to work and qualitative variables**

**Анализ взаимосвязи между возвращением к работе и качественными переменными**

| Variables/Переменные | | Return to work/ Вернулся к работе | Non return to work/ Не вернулся к работе | p-value | Odds ratio/ Отношение шансов (95 % CI) |
|---|---|---|---|---|---|
| Gender/Пол | Male/Муж | 27 (23.7 %) | 87 (76.3 %) | 0.29 | 0.4 (0.0–2.3) |
| | Female/Жен | 9 (42.9 %) | 12 (57.1 %) | | |
| Marital status/ Семейное положение | Married/Женат, замужем | 30 (27 %) | 81 (73 %) | 0.90 | 1.1 (0.1–6.4) |
| | Single/Не женат, не замужем | 6 (25 %) | 18 (75 %) | | |
| Smoking status/ Статус курения | No/Нет | 30 (34.5 %) | 57 (65.5 %) | 0.11 | 0.2 (0.0–1.4) |
| | Yes/Да | 6 (12.5 %) | 42 (87.5 %) | | |
| Spouse's employment status/ Статус занятости супруга | No/Нет | 18 (20 %) | 72 (80 %) | 0.06 | 0.1 (0.0–1.0) |
| | Yes/Да | 12 (57.1 %) | 9 (42.9 %) | | |
| Income level in previous job/ Уровень дохода на предыдущей работе | Low/Низкий | 24 (33.3 %) | 57 (66.7 %) | 0.62 | – |
| | Moderate/Средний | 12 (33.3 %) | 33 (70.7 %) | | |
| | High/Высокий | 0 (0 %) | 9 (100 %) | | |
| Treatment side effects/ Побочные эффекты лечения | No/Нет | 3 (20 %) | 12 (80 %) | 0.72 | 1.5 (0.1–15.1) |
| | Yes/Да | 33 (27.5 %) | 87 (72.5 %) | | |
| Comorbidity/Коморбидность | No/Нет | 15 (31.3 %) | 33 (68.7 %) | 0.63 | 0.7 (0.1–2.7) |
| | Yes/Да | 21 (24.1 %) | 66 (75.9 %) | | |
| Recurrence/Рецидив | No/Нет | 36 (33.3 %) | 72 (66.7 %) | 0.04 | 0.7 (0.5–0.8) |
| | Yes/Да | 0 (0 %) | 27 (100 %) | | |
| Psychiatric counselling/ Психиатрическая поддержка | No/Нет | 33 (26.8 %) | 90 (73.2 %) | 0.93 | 0.9 (0.0–9.6) |
| | Yes/Да | 3 (25 %) | 9 (75 %) | | |
| Rehabilitation/Реабилитация | No/Нет | 30 (24.4 %) | 93 (75.6 %) | 0.26 | 3.1 (0.9–10.3) |
| | Yes/Да | 6 (50 %) | 6 (50 %) | | |
| Stage at diagnosis/ Стадия при постановке диагноза | Early/Ранняя | 36 (28.6 %) | 90 (71.4 %) | 0.06 | 0.9 (0.8–0.9) |
| | Advanced/Распространенная | 0 (0 %) | 9 (100 %) | | |
| Treatment plan/Вид лечения | Curative/Лечебный | 36 (27.9 %) | 93 (72.2 %) | 0.38 | 0.9 (0.8–0.9) |
| | Palliative/Паллиативный | 0 (0 %) | 6 (100 %) | | |
| Type of treatment/ Метод лечения | Surgery/Операция | 9 (18.8 %) | 39 (81.3 %) | 0.66 | – |
| | Radiation/Лучевая терапия | 6 (28.6 %) | 15 (71.4 %) | | |
| | Chemotherapy/Химиотерапия | 21 (31.8 %) | 45 (68.2 %) | | |

Note: created by the authors.

Примечание: таблица составлена авторами.

Table 7/Таблица 7

**Analysis of the relationship between return to work and quantitative variables**

**Анализ взаимосвязи между возвращением к работе и количественными переменными**

| Variables/Переменные | Return to work/ Вернулся к работе | Non return to work/ Не вернулся к работе | p-value |
|---|---|---|---|
| | Mean ± SD/Median (interquartile range)/ Среднее значение ± SD/ Медиана (межквартильный размах) | | |
| Age at the time of diagnosis/Возраст на момент постановки диагноза | 47.9 ± 10.9 | 51.1 ± 10.3 | 0.36 |
| Age at treatment completion/Возраст на момент завершения лечения | 49.1 ± 10.8 | 52.8 ± 10.7 | 0.08 |
| Number of family members/Количество членов семьи | 1.5 (0.2–3.7) | 2.0 (1.0–2.0) | 0.73 |
| Duration of treatment (months)/Длительность лечения (мес) | 12 (6.0–18.7) | 12 (6.5–24) | 0.40 |
| Time since treatment completion (months)/ Время с момента завершения лечения (мес) | 13.5 (9.7–36) | 12 (8–24) | 0.26 |
| Smoking (pack/year)/Курение (пачка/год) | 40 (30–45) | 12.5 (5–32.5) | 0.29 |
| Rehabilitation period (months)/Период реабилитации (мес) | 2.0 (1.0–3.0) | 21.5 (1.0–21.5) | 0.60 |
| Work experience (year)/Стаж работы (год) | 21.8 ± 12.1 | 17.6 ± 16.0 | 0.35 |
| Weekly work hours in previous job/ Недельные рабочие часы на предыдущей работе | 46 (30–54) | 48 (21–63) | 0.42 |
| Employer support/Поддержка работодателя (1–10) | 2.5 (1.0–7.2) | 1.0 (1.0–3.0) | 0.45 |
| Co-worker support/Поддержка коллег (1–10) | 4.0 (1.0–8.0) | 1.0 (1.0–4.5) | 0.40 |
| Insurance support/Страховая поддержка (1–10) | 3.5 (1.2–5.0) | 2.0 (1.0–4.0) | 0.31 |
| Job satisfaction/Удовлетворенность работой (1–10) | 4.0 (1.0–8.0) | 2.0 (1.0–8.5) | 0.77 |
| Quality of life/Качество жизни (0–100) | 45 (28.7–50) | 20 (6.0–35) | 0.01 |
| General fatigue/Общая усталость (20–100) | 12.9 ± 3.4 | 13.1 ± 3.9 | 0.87 |
| Physical fatigue/Физическая усталость (4–20) | 13.1 ± 3.4 | 13.6 ± 4.1 | 0.73 |
| Restricted activity/Ограниченная активность (4–20) | 11.5 ± 3.5 | 13.8 ± 4.4 | 0.10 |
| Restricted motivation/Ограниченная мотивация (4–20) | 11.2 ± 3.4 | 10.6 ± 3.7 | 0.62 |
| Mental fatigue/Умственная усталость (4–20) | 11.0 ± 4.9 | 11.7 ± 3.8 | 0.61 |
| Current work ability/Текущая трудоспособность (0–10) | 5.5 (2.5–7) | 4 (3–6.5) | 0.16 |
| Current physical work ability/Текущая физическая трудоспособность (2–10) | 2.3 ± 1.2 | 3.2 ± 1.4 | 0.06 |
| Current mental work ability/Текущая умственная трудоспособность (2–10) | 2.5 ± 1.3 | 2.6 ± 1.0 | 0.60 |
| HADS anxiety/Тревожность по шкале HADS (0–21) | 9.9 ± 6.8 | 9.4 ± 5.6 | 0.80 |
| HADS depression/Депрессия HADS (0–21) | 7.9 ± 5.5 | 9.4 ± 4.5 | 0.34 |

Note: created by the authors.

Примечание: таблица составлена авторами.

this difference in the rate of return to work can be partly attributed to the difference in the type of cancer investigated and the population studied.

Our study showed that out of 48 individuals undergoing surgery, 9 (18.8 %) returned to work, while out of 87 individuals undergoing chemotherapy and radiotherapy, 27 (31.03 %) returned to work. However, no significant difference was found between these three treatment methods and the rate of return to work. One study found that patients who underwent surgical treatment had a higher rate of returning to work. Patients who received chemotherapy and radiotherapy had a relatively lower rate of returning to work [16]. This could be because patients who are treated only with surgery have their cancer diagnosed at an early stage. Most patients in advanced stages may need chemotherapy and radiotherapy. In addition, chemotherapy and radiotherapy take several months and require multiple visits to the hospital or clinic, making patients prone to side effects or discomfort. A study of breast cancer survivors found that chemotherapy or radiotherapy limited or delayed return to work, possibly because end-stage cancer patients require several treatment strategies [17].

Our study found that people who received palliative care did not return to work, and other studies found that patients who received palliative care had a lower rate of return to work [18].

Regarding the types of cancer, our study showed that the return to work rate was highest in individuals with non-Hodgkin lymphoma and lowest in oesophageal cancer and Hodgkin lymphoma. Previous studies have shown that liver, lung, brain, hematologic, gastrointestinal, and pancreatic cancer are associated with decreased likelihood of employment or increased possibility of job loss [18, 19]. Another study showed that within two years of diagnosis, male and female reproductive, skin, and breast cancer had the highest rates of return to work. [20]. Breast and cervical cancer survivors are more likely to return to work, possibly due to Pap smear screening and early breast cancer screening and detection. Screening programs

Table 8/Таблица 8

**Analysis of the relationship between return to work and qualitative variables in patients with gastric cancer and Non-Hodgkin's lymphoma**

**Анализ взаимосвязи между возвращением к работе и качественными переменными у пациентов с раком желудка и неходжкинской лимфомой**

| Variables/ Переменные | | Gastric cancer/ Рак желудка (n=66) | | | Non-Hodgkin's lymphoma/ Неходжкинская лимфома (n=15) | | |
|---|---|---|---|---|---|---|---|
| | | Return to work/ Вернулся к работе (n=21) | Non return to work/ Не вернулся к работе (n=45) | p- value | Return to work/ Вернулся к работе (n=9) | Non return to work/ Не вернулся к работе (n=6) | p- value |
| Gender/Пол | Male/Муж | 15 (27.8 %) | 39 (72.2 %) | 0.13 | 3 (100 %) | 0 (0 %) | 0.11 |
| | Female/Жен | 6 (50.0 %) | 6 (50.0 %) | | 6 (50.0 %) | 6 (50.0 %) | |
| Marital status/ Семейное положение | Married/Женат | 15 (29.4 %) | 36 (70.6 %) | 0.43 | 9 (60.0 %) | 6 (40.0 %) | – |
| | Single/Холост | 6 (40.0 %) | 9 (60.0 %) | | 0 (0 %) | 0 (0 %) | |
| Smoking status/ Статус курения | No/Нет | 15 (33.3 %) | 30 (66.7 %) | 0.69 | 9 (75.0 %) | 3 (25.0 %) | 0.04 |
| | Yes/Да | 6 (28.6 %) | 15 (71.4 %) | | 0 (0 %) | 3 (100 %) | |
| Spouse's employment status/ Статус занятости супруга | No/Нет | 9 (20.0 %) | 36 (80.0 %) | 0.01 | 6 (50.0 %) | 6 (50.0 %) | 0.11 |
| | Yes/Да | 6 (100 %) | 0 (0 %) | | 3 (100 %) | 0 (0 %) | |
| Income level in previous job/ Уровень дохода на предыдущем месте работы | Low/Низкий | 12 (26.7 %) | 33 (73.3 %) | 0.96 | 6 (100 %) | 0 (0 %) | 0.02 |
| | Moderate/Средний | 9 (50.0 %) | 9 (50.0 %) | | 3 (33.3 %) | 6 (66.7 %) | |
| | High/Высокий | 0 (0 %) | 3 (100 %) | | 0 (0 %) | 0 (0 %) | |
| Treatment side effects/ Побочные эффекты лечения | No/Нет | 3 (50.0 %) | 3 (50.0 %) | 0.31 | 0 (0 %) | 3 (100 %) | 0.05 |
| | Yes/Да | 18 (30.0 %) | 42 (70.0 %) | | 9 (75.0 %) | 3 (25.0 %) | |
| Comorbidity/Коморбидность | No/Нет | 9 (33.3 %) | 18 (66.7 %) | 0.82 | 6 (50.0 %) | 6 (50.0 %) | 0.11 |
| | Yes/Да | 12 (30.8 %) | 27 (69.2 %) | | 3 (100 %) | 0 (0 %) | |
| Recurrence/Рецидив | No/Нет | 21 (43.8 %) | 27 (56.3 %) | 0.01 | 9 (75.0 %) | 3 (25.0 %) | 0.04 |
| | Yes/Да | 0 (0 %) | 18 (100 %) | | 0 (0 %) | 3 (100 %) | |
| Psychiatric counselling/ Психиатрическая поддержка | No/Нет | 18 (30.0 %) | 42 (70.0 %) | 0.93 | 9 (60.0 %) | 6 (40.0 %) | – |
| | Yes/Да | 3 (50.0 %) | 3 (50.0 %) | | 0 (0 %) | 0 (0 %) | |
| Rehabilitation/Реабилитация | No/Нет | 15 (25.0 %) | 45 (75.0 %) | 0.01 | 9 (60.0 %) | 6 (40.0 %) | – |
| | Yes/Да | 6 (100 %) | 0 (0 %) | | 0 (0 %) | 0 (0 %) | |
| Type of treatment/ Метод лечения | Surgery/Операция | 6 (28.6 %) | 15 (71.4 %) | 0.01 | 3 (50.0 %) | 3 (50.0 %) | 0.51 |
| | Radiation/ Лучевая терапия | 0 (0 %) | 12 (100 %) | | 0 (0 %) | 0 (0 %) | |
| | Chemotherapy/ Химиотерапия | 15 (45.5 %) | 18 (54.5 %) | | 6 (66.6 %) | 3 (33.3 %) | |

Примечание: таблица составлена авторами.

Note: created by the authors.

can significantly improve early detection of cancer and thereby reduce work-related disabilities and problems in working population [21–23].

In terms of demographic factors, in our study it was found that the older people are the less likely they are to return to work, although this difference was not statistically significant. The average age of the patients was 50.2 ± 10.4 years. As this average age is close to retirement age, patients may be less motivated to return to work. In one study, the unemployment rate was higher in older patients (50–60 years old). In addition, studies have shown that gender and low socioeconomic levels are among the demographic factors affecting return to work [18]. Another study found that within two years of a cancer diagnosis, older women returned to work earlier than older men, but return to work was delayed for married women compared to married men [24]. In our study, the unemployment rate

Table 9/Таблица 9

**Analysis of the relationship between return to work and quantitative variables in patients with gastric cancer and Non-Hodgkin's lymphoma**

**Анализ взаимосвязи между возвращением к работе и количественными переменными у пациентов с раком желудка и неходжкинской лимфомой**

| Variables/Переменные | Gastric cancer/ Рак желудка (n=66) | | | Non-Hodgkin's lymphoma/ Неходжкинская лимфома (n=15) | | |
|---|---|---|---|---|---|---|
| | Return to work/ Вернулся к работе (n=21) | Non return to work/ Не вернулся к работе (n=45) | p-value | Return to work/ Вернулся к работе (n=9) | Non return to work/ Не вернулся к работе (n=6) | p-value |
| | Mean ± SD/ Median (interquartile range)/ Среднее ± SD/Медиана (межквартильный размах) | | | Mean ± SD/ Median (interquartile range)/ Среднее ± SD/Медиана (межквартильный размах) | | |
| Age at the time of diagnosis/ Возраст на момент постановки диагноза | 45.4 ± 9.9 | 53.5 ± 10.7 | 0.00 | 51.0 ± 11.2 | 55.0 ± 0.0 | 0.31 |
| Number of family members/ Количество членов семьи | 1.0(0.5–4.0) | 2.0 (1.0–2.0) | 0.84 | 1.0 (0.0–2.0) | 1.5 (1.0–2.0) | 0.32 |
| Duration of treatment (months)/ Длительность лечения (мес) | 14.0 (6.0–20) | 12.0 (6.0–24) | 0.99 | 9.0 (6.0–48) | 40.5 (21–60) | 0.03 |
| Time since treatment completion (months)/ Время с момента завершения лечения (мес) | 12.0 (6.0–15) | 12.0 (8.0–30) | 0.13 | 36.0 (36–42) | 10.5 (9.0–12) | 0.00 |
| Work experience (year)/Стаж работы (лет) | 15.1 ± 6.1 | 20.6 ± 8.2 | 0.15 | 22.6 ± 14.7 | 22.5 ± 8.2 | 0.98 |
| Weekly work hours in previous job/ Недельные рабочие часы на предыдущей работе | 30.0 (28–48) | 54.0 (30–72) | 0.01 | 56.0 (36–70) | 52.5 (45–60) | 0.99 |
| Employer support/ Поддержка работодателя (1–10) | 4.0 (1.0–8.0) | 1.0 (1.0–2.0) | 0.00 | 1.0 (1.0–8.0) | 2.0 (1.0–3.0) | 0.99 |
| Co-worker support/Поддержка коллег (1–10) | 5.0 (1.0–8.0) | 1.0 (1.0–5.0) | 0.01 | 1.0 (1.0–8.0) | 3.5 (3.0–4.0) | 0.32 |
| Insurance support/Страховая поддержка (1–10) | 4.0 (1.0–5.0) | 1.0 (1.0–3.0) | 0.03 | 2.0 (1.0–3.0) | 4.0 (3.0–5.0) | 0.00 |
| Job satisfaction/ Удовлетворенность работой (1–10) | 5.0 (2.0–8.0) | 1.0 (1.0–3.0) | 0.00 | 1.0 (1.0–8.0) | 8.0 (7.0–9.0) | 0.03 |
| Quality of life/Качество жизни (0–100) | 40.0 (25–50) | 10.0 (0.0–30) | 0.02 | 50.0 (20–75) | 20.0 (10–30) | 0.03 |
| General fatigue/Общая усталость (20–100) | 13.1 ± 3.8 | 13.4 ± 3.5 | 0.74 | 14.0 ± 2.2 | 10.5 ± 1.6 | 0.00 |
| Physical fatigue/Физическая усталость (4–20) | 14.1 ± 3.3 | 16.6 ± 2.7 | 0.56 | 13.3 ± 2.5 | 13.5 ± 4.9 | 0.94 |
| Restricted activity/ Ограниченная активность (4–20) | 12.1 ± 3.4 | 13.6 ± 4.4 | 0.18 | 11.6 ± 1.8 | 15.5 ± 2.7 | 0.01 |
| Restricted motivation/ Ограниченная мотивация (4–20) | 11.1 ± 3.9 | 11.6 ± 3.6 | 0.59 | 12.6 ± 2.1 | 5.5 ± 0.5 | 0.00 |
| Mental fatigue/Умственная усталость (4–20) | 12.1 ± 5.1 | 11.9 ± 3.7 | 0.85 | 11.3 ± 3.6 | 11.5 ± 7.1 | 0.95 |
| Current work ability/Трудоспособность (0–10) | 5.5 (2.0–6.5) | 4.5 (3.1–7.0) | 0.21 | 5.0 (1.5–5.5) | 4.0 (3.5–6.0) | 0.41 |
| Current physical work ability/ Текущая физическая трудоспособность (2–10) | 2.6 ± 1.1 | 3.4 ± 1.2 | 0.10 | 2.1 ± 1.0 | 2.3 ± 1.1 | 0.18 |
| Current mental work ability/ Текущая умственная трудоспособность (2–10) | 2.1 ± 1.3 | 2.7 ± 1.0 | 0.52 | 2.4 ± 1.2 | 2.5 ± 1.0 | 0.76 |
| HADS anxiety/ Тревожность по шкале HADS (0–21) | 10.4 ± 7.4 | 11.1 ± 5.8 | 0.67 | 11.6 ± 4.7 | 8.0 ± 3.2 | 0.12 |
| HADS depression/Депрессия HADS (0–21) | 7.8 ± 5.6 | 10.6± 4.2 | 0.02 | 9.6 ± 4.3 | 5.5 ± 1.6 | 0.02 |

Примечание: таблица составлена авторами.

Note: created by the authors.

was higher in single people and in men, but it was not statistically significant.

In present study, return to work in patients with non-Hodgkin's lymphoma was associated with smoking status, disease recurrence, lower income, shorter treatment duration and longer time to treatment completion, lower insurance support and job satisfaction, and higher quality of life. Interestingly, in these patients, return to work was associated with more fatigue (but with less restricted activity) and more depression. This finding suggests that the major cause of not returning to work in these patients is physical incapacity rather than psychological factors. However, due to the small sample size in this subgroup of cancers, it is recommended to conduct studies with a larger sample size. As mentioned, according to previous studies, hematological malignancies are among cancers with a low rate of return to work. For instance, in a study to investigate the differences in the rate of partial and full return to work between different types of cancer among cancer survivors, blood cancers were included in the "lower full return to work rate" group [25]. In the study of Horsboel et al., with the aim of determining the rate of returning to work among patients with blood cancers, the use of antidepressants or anxiolytics after diagnosis, gender, age and education level were associated with return to work [26].

In patients with gastric cancer, return to work was associated with disease-related factors (recurrence, receiving rehabilitation, chemotherapy), demographic and psychosocial factors (spouse's employment, younger age, higher quality of life, and a lower depression score), and work-related factors (less working hours per week, more support from the employer and co-workers, and higher job satisfaction). The results of different studies on the factors affecting return to work in patients with stomach cancer are different. In the study of de Boer et al. on survivors of gastrointestinal cancers, it was found that employed patients on sick leave had more fatigue and distress compared to patients who worked [27]. Chen et al. found that in patients with gastric cancer, old age, male gender, comorbidities, chemotherapy, radiotherapy, and manual occupations were associated with less returning to work. Surgery and early stages of cancer were associated with an increased probability of returning to work [28]. In a study to compare the employment status of stomach cancer survivors with the general population, it was found that the survivors were more fatigued in performing housework and gainful work. More cancer survivors reported reduced working hours and work-related abilities compared to the general population [29].

Overall, the return to work rate in our study was approximately 26.7 %, which is lower than the prevalence of return to work in cancer survivors in other studies. The average prevalence of return to work in other studies is 62 % (range 30–93 %) one to two years after diagnosis [30]. This low rate of return to work in our country may indicate the inadequacy of work environments modifications for cancer survivors.

This study is one of the few studies conducted on influencing factors for return to work in cancer survivors in our country. In this study, unlike previous studies that only focused on the return to work rate in one type of cancer, patients with common cancers were included in the study. In addition to demographic, occupational, and disease-related variables, the MFI was used to measure fatigue, and HADS were also used to measure anxiety and depression. One limitation of this study is the problems associated with collecting telephone data. Prospective studies are recommended with larger sample sizes to investigate the factors predicting the return to work rate in cancer survivors.

## Conclusion

Based on the findings of our study, the return to work rate in cancer survivors was approximately 27 %. The return to work rate was highest in individuals with non-Hodgkin lymphoma and lowest in oesophageal cancer and Hodgkin lymphoma. The most important factors influencing the return to work of these individuals include disease recurrence and quality of life. Helping cancer survivors in returning to work after treatment must be a priority to protect their employment rights and maintain the health of the workforce.

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All authors approved the final version of the manuscript prior to publication and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work were appropriately investigated and resolved.

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Все авторы одобрили финальную версию статьи перед публикацией, выразили согласие нести ответственность за все аспекты работы, подразумевающую надлежащее изучение и решение вопросов, связанных с точностью и добросовестностью любой части работы.

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