Preferences and willingness to wait for a work-related medical rehabilitation program amongst participants in cancer rehabilitation

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Abstract

Objectives

To explore the preferences and willingness of cancer patient to wait for work-related components in a medical rehabilitation program.

Methods

The study explored cancer patients' preferences and willingness to wait for work-related components in a medical rehabilitation program using a discrete choice experiment. Participants were asked to indicate preferences regarding social counseling, work-related psychological groups, work-related functional capacity training and waiting time until the start of rehabilitation treatment.

Results

A total of 464 patients participated in the study. Mean age was 50.5 years (SD = 7.6). About two thirds were female. The results indicate that patients anticipated increased utility from all work-related treatment components. Waiting time decreased utility. Willingness to wait was highest for work-related psychological groups. Participants were willing to wait 37 weeks if work-related medical rehabilitation components (45 minutes of intensified social counseling, 240 minutes of work-related psychological groups, and 360 minutes of work-related functional capacity training) would be added to a common rehabilitation program.

Conclusions

The study highlights cancer patients' preferences for therapies that focus on occupational reintegration.

Keywords:

Discrete choice experiment, willingness to wait, patient preferences, work-related medical rehabilitation, cancer rehabilitation

INTRODUCTION

Nearly one half of all those diagnosed with cancer is younger than 65 years. These persons are still working when cancer is detected. For most of them, work is an integral part of their life. Work does not just generate earnings, it also provides a sense in life, enables social contacts and gives room for personal development (1). After cancer diagnosis and treatment, returning to work often means returning into normal life. This can help to cope with the critical life event (2, 3). Overall, nearly eight out of ten cancer survivors return to work (4, 5), though numbers strongly differ by tumor type and localization. Despite high return to work (RTW) rates, cancer survivors have an increased risk for unemployment when compared to healthy controls (6).

Rehabilitation may support cancer survivors in their RTW (7). In Germany, however, work-related issues are rarely addressed by conventional medical rehabilitation programs (8, 9, 10, 11). This shortcoming was tackled by the development of work-related medical rehabilitation programs. As a Cochrane review by de Boer et al. (7) indicated that multidisciplinary interventions including vocational treatment components may also support the likelihood of return to work in cancer, we developed such a program and planned a cluster randomized trial (C-RCT) study to test the effectiveness of this new approach (12, 13). The developed program added intensified social counseling, work-related psychological groups, and work-related functional capacity training to conventional medical rehabilitation (12, 13).

Complementing the C-RCT, we assessed patients' preferences about the supplementary vocational components. A common approach to elicit such preferences is a discrete choice experiment (DCE) (14, 15). A DCE uses the comparison of two or more products (e.g., inpatient programs) that differ in several characteristics (e.g., waiting time, effectiveness, complication rate) to receive attribute-related decisions for one of these products (16). This approach follows the theory of consumer demand by Lancaster (17) which describes the utility of a product as the sum of its attributes. As a product has several attributes, the overall utility then consists of the sum of the product's part-worth utilities. The use of a DCE enables us

to quantify the importance of single attributes when making decisions. A cost component may be included in such experiments.

The aim of the study was to elicit preferences of cancer rehabilitation patients about vocational treatment components in medical rehabilitation. We hypothesized that intensifying the three vocational treatment components would be associated with an increase in utility and an increase in waiting time would be associated with a decrease in utility. Moreover, we explored the willingness to wait for work-related components. Additionally, we wanted to create a ranking of potential program variations based on patient preferences

METHODS

Study participants and recruitment

Patients with cancer as their primary diagnosis, aged 18 to 60 years with a Karnofsky Performance Status ≥70%, and an elevated risk of not returning to work were recruited in four inpatient rehabilitation centers in Germany. An elevated risk of not returning to work was assessed by the Screening Instrument Work and Occupation (German: Screening-Instrument Beruf und Arbeit in der Rehabilitation, SIBAR) which consists of three subscales: 1) risk of health-related early retirement; 2) perceived job strain; 3) subjective need for work-related therapies (18, 19). Patients who met the criteria were informed about the study and their rights and asked to provide informed consent after their entrance examination by study nurses at each center (12).

The study protocol was approved by the ethics committee of the University of Lübeck (14-289) and the data protection commissioner of the Federal German Pension Insurance. The trial is registered in the German Clinical Trials Register, a partner register of the WHO (DRKS00007770).

Data collection

After informed consent was obtained, participants received the baseline questionnaire including the DCE, which is described below. The DCE was introduced to the patients by emphasizing that their choices have no impact on their actual treatment.

Development of the discrete choice experiment

According to Ryan and Farrar (20), the realization of a DCE comprises five steps: 1) selection of relevant attributes; 2) selection of relevant attribute characteristics; 3) selection of choice scenarios; 4) data collection and; and 5) data analysis.

The DCE was developed to assess the preferences for the vocational treatment components. Social counseling was presented as non-present, two 15-minute sessions, or three 15-minute sessions. Work-related psychological groups were presented as non-present, two 60-minute sessions, or four 60-minute sessions. Work-related functional capacity training was presented as non-present, three 60-minute sessions, or six 60-minute sessions. A complete program in our DCE would therefore comprise three 15-minute sessions of social counseling (45 minutes), four 60-minute sessions of work-related psychological groups (240 minutes), and six 60-minutes sessions of

work-related functional capacity training (360 minutes). This was chosen to reflect the program that was developed and implemented for the C-RCT (12). Waiting time was used to represent subjective costs as rehabilitation treatment in Germany is covered by the social security system, and there are usually no direct costs to pay by patients. Waiting time was classified in 5-week steps with 5 weeks as the minimum waiting time and 15 weeks as the maximum waiting time. Included attributes with their characteristics and values are displayed in Table 1. The displayed attributes and characteristics covered $3^4 = 81$ potential rehabilitation program scenarios.

Table 1. Relevant attributes and characteristics

Attribute	Characteristics	Variable	Value
Intensified social counseling	None	SOC	0
	2x 15 minutes		2
	3x 15 minutes		3
Work-related psychological groups	None	WRPG	0
	2x 60 minutes		2
	4x 60 minutes		4
Work-related functional capacity training	None	WRFCT	0
	3x 60 minutes		3
	6x 60 minutes		6
Additional waiting time until the start of rehabilitation treatment	5 weeks	WT	5
	10 weeks		10
	15 weeks		15

In a complete set of potential programs every characteristic of an attribute jointly appears with every characteristic of the other attributes. However, if only main effects of the attribute shall be estimated, a reduced design may be used to satisfy the condition of proportional frequencies (i.e., every characteristic was represented in one third of the hypothetical programs) (21). We used the SPSS procedure Orthoplan to reduce the complete set of programs to nine rehabilitation programs. This set satisfied the condition of proportional frequencies and was suitable for using in a questionnaire. In the final choice sets, these programs were presented as program A. The corresponding program B was developed using shifting, as described by Bunch et al. (22). This resulted in a total of nine choice scenarios for every participant each consisting of a program A and a program B. An example of one choice scenario is displayed in Figure 1.

Figure 1. Example of a used choice scenario

Choice Scenario	Program A	Program B
Intensified social counseling (e.g., work-related and social counseling)	none	2x 15 minutes
Work-related psychological groups (e.g., coping and social conflicts at the work place)	2x 60 minutes	4x 60 minutes
Work-related functional capacity training (e.g., graded exposure to simulated job demands)	3x 60 minutes	6x 60 minutes
Additional waiting time until the start of rehabilitation treatment	10 weeks	15 weeks
Which program would you prefer? Please only tick one box!	☐	☐

Statistical analysis
Model building
In a DCE, the participant continuously makes pairwise decisions in the given choice scenarios. The probability that participant i chooses *program A* in situation j, expecting that he or she strives for a maximum benefit, is reflected by a higher benefit of U_{Aij} compared to the benefit U_{Bij} of the alternative *program B*. Following the theory of random utility models, the utility U can be separated into an observable and a non-observable random component for both programs (16, 23).

$$U_{Aij} = V_{Aij} + \varepsilon_{Aij} \qquad \text{(Eq 1)}$$
$$U_{Bij} = V_{Bij} + \varepsilon_{Bij} \qquad \text{(Eq 2)}$$

The component V can be described by the chosen program characteristics and observable characteristics of the participants. The random component ε describes important non-observable characteristics. This leads to the following probability to choose *program A*:

$$P_{Aij} = P(U_{Aij} > U_{Bij}) = P(V_{Aij} + \varepsilon_{Aij} > V_{Bij} + \varepsilon_{Bij}) = P(V_{Aij} - V_{Bij} > \varepsilon_{Bij} - \varepsilon_{Aij}) \qquad \text{(Eq 3)}$$

The probability to choose *program A* over *program B* represents the probability that the difference between observed utility components is larger than the difference of error components with the expected mean zero. Usually, an additive model is assumed for V, i.e., a program's utility is determined by the sum of attribute- and person-related part-worth utilities:

$$V_{Aij} = \beta_0 + \beta_1 SOC_{Aij} + \beta_2 WRPG_{Aij} + \beta_3 WRFCT_{Aij} + \beta_4 WT_{Aij} + P_i \qquad \text{(Eq 4)}$$

The coefficients β_1 to β_4 represent the program attribute's associated part-worth utilities and represent the change in expected benefits when the attributes change by one unit. For example, coefficient β_2 represents the additional increase ($\beta_2 > 0$) or decrease ($\beta_2 < 0$) in utility that is related to a one-point increase, i.e. an increase in 60 minutes of treatment, in work-related psychological groups. The constant β_0 represents the expected utility of participating in a rehabilitation program related to not participating in a rehabilitation program at all and the vector P represents personal characteristics that have an impact on the expected utility of a certain program.

The difference ΔV_{ij} then is:

$$\Delta V_{ij} = (\beta_0 + \beta_1 SOC_{Aij} + \beta_2 WRPG_{Aij} + \beta_3 WRFCT_{Aij} + \beta_4 WT_{Aij} + P_i) - (\beta_0 + \beta_1 SOC_{Bij} + \beta_2 WRPG_{Bij} + \beta_3 WRFCT_{Bij} + \beta_4 WT_{Bij} + P_i) \qquad \text{(Eq 5)}$$

Terms that are identical to both programs (constant and personal characteristics) drop from the equation. If the difference between the attributes in both programs is represented by ΔSOC, $\Delta WRPG$, $\Delta WRFCT$, and ΔWT the simplified equation is:

$$\Delta V_{ij} = \Delta \beta_1 SOC_{ij} + \Delta \beta_2 WRPG_{ij} + \Delta \beta_3 WRFCT_{ij} + \Delta \beta_4 WT_{ij} \qquad \text{(Eq 6)}$$

On the basis of the probabilistic relationship of utility and decision behavior in equation 2 and the assumption of a logistic distribution of the error term, the parameters β_1 to β_4 can be estimated using a logit model. As every person answered several scenarios, a logistic model with a random intercept was chosen.
Willingness to wait
Another way to compare the importance of the attributes is to calculate the waiting time for program components (i.e.

Table 2. Random effects logit model (n = 464, k = 3,906).
Part-worth utilities relate to the duration of one therapeutic unit in the choice scenario (displayed in brackets)

	Coefficient	95 % CI	p
Intensified social counseling (15 minutes)	0.20	0.17 to 0.23	<0.001
Work-related psychological groups (60 minutes)	0.21	0.19 to 0.24	<0.001
Work-related functional capacity training (60 minutes)	0.10	0.08 to 0.11	<0.001
Waiting time (per week)	-0.05	-0.06 to -0.04	<0.001
Observations per person min/Ø/max	1/8.4/9		
Log likelihood	-2,349.92		
X²	609.28		
McFadden R²	0.13		

additional waiting time that is accepted for four 60-minutes sessions of work-related psychological groups). The waiting time represents the trade-off of two attributes when comparing the utility of two programs. For example, the willingness to wait (WTW) for work-related psychological groups would be WTW = $-\beta_2 {*} 4 / \beta_4$. Confidence intervals for willingness to wait were determined using bias-corrected bootstrap with 2000 repetitions (24, 25).
Rank order of possible rehabilitation programs
The utility weights can also be used to compare possible program alternatives (28). For this purpose, a reference program without intensified social counseling, work-related psychological groups, work-related functional capacity training, and additional waiting time was chosen which represented usual care (fictive 82th rehabilitation program scenario). Equation 7 presents the odds ratio (OR) resulting from calculating the odds of choosing one of the possible 81 programs compared to the odds of choosing the reference program.

$$OR = e^{(\beta_1 SOC_A + \beta_2 WRPG_A + \beta_3 WRFCT_A + \beta_4 WT_A)} \qquad \text{(Eq 7)}$$

All analyses were conducted using STATA/SE 14.2.

RESULTS

A total of 484 persons participated in the study, of which 20 persons provided information on quality of life and work-related questions but not the DCE. The remaining 464 participants completed 3,906 choice scenarios. The participants' mean age was 50.5 years (SD = 7.6), 67.7% were female, 21.5% held a university entrance diploma, 72.4% were living with a partner. The most prominent diagnosis group for women was malignant neoplasm of the breast (ICD-10: C50) with 44.6%, while the most prominent diagnosis groups for men were malignant neoplasm of digestive organs (ICD-10: C15-C26) and malignant neoplasm stated or presumed to be primary, of lymphoid, hematopoietic and related tissue (ICD-10: C81-C96) with 28.7% each.
Part-worth estimates
The mean of the provided choice scenarios was 8.4 out of 9. Table 2 shows the main effects model including estimates of the three intervention components (intensified social counseling, work-related psychological groups, and work-related functional capacity training) and the non-monetary cost component (waiting time). Participants indicated increased utility by all treatment components. An

Figure 2. Rank order of possible work-related medical rehabilitation programs
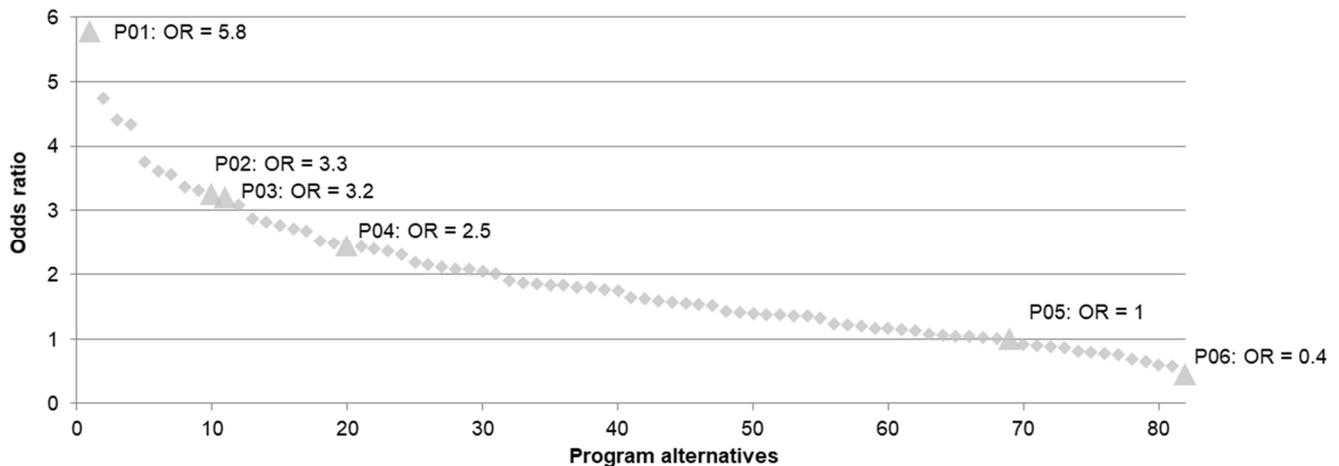
SOC = intensified social counseling, WRPG = work-related psychological groups, WRFCT = work-related functional capacity training, WT = additional waiting time; P01: 45 min SOC, 240 min WRPG, 360 min WRFCT, 5 weeks WT; P02: 45 min SOC, 240 min WRPG, 0 min WRFCT, 5 weeks WT; P03: 0 min SOC, 240 min WRPG, 360 min WRFCT, 5 weeks WT; P04: 45 min SOC, 0 min WRPG, 360 min WRFCT, 5 weeks WT; P05: 0 min SOC, 0 min WRPG, 0 min WRFCT, 0 weeks WT; P06: 0 min SOC, 0 min WRPG, 0 min WRFCT, 15 weeks WT.

increase in waiting time was related to a decrease in utility (Table 2).

Willingness to wait
Participants were willing to wait 15.9 weeks for 240 minutes of work-related psychological groups (95% CI: 12.6; 19.1), 11.0 weeks for 45 minutes of intensified social counseling (95% CI: 8.4; 13.6), and 10.6 weeks for 360 minutes of work-related functional capacity training (95% CI: 8.0; 13.2). In total, participants were willing to wait for 37.4 weeks for the additional work-related components of the new work-related medical rehabilitation program (95% CI: 30.2; 44.6). Only the willingness to wait for 240 minutes of work-related psychological group differed significantly from intensified social counseling (P < 0.001) and work-related functional capacity training (P < 0.001).

Rank order
A ranking of the 81 possible programs and the reference program without intensified social counseling, work-related psychological groups, work-related functional capacity training and additional waiting time (P05 in Figure 2) was developed using the odds ratios calculated as described in equation 7. The reference program represents the current standard in German medical rehabilitation which does not include any additional work-related contents. The first-ranked program, P01 in Figure 2, represents the work-related medical rehabilitation program as described in the study protocol of our C-RCT (12), including 45 minutes of intensified social counseling, 240 minutes of work-related psychological groups, and 360 minutes of work-related functional capacity training with only 5 weeks waiting time. The odds of choosing this alternative were 5.8-times higher than the odds for the reference program P05. Removing the work-related functional capacity training, while keeping all other attributes constant, yielded an odds ratio of 3.3 (P02). Following the same approach led to an odds ratio of 3.2 for a program without intensified social counseling and of 2.5 for a program without work-related psychological groups, respectively (P03 & P04). As expected, increasing waiting time for the reference program decreases the odds of the program being chosen (P06). A complete overview of all ranked program alternatives and their associated odds ratios is provided a supplementary file (Suppl 1).

DISCUSSION

Participants anticipate a benefit from work-related components. Willingness to wait was highest for 240 minutes work-related psychological groups in our DCE. The results indicate that participants favor qualitative improvements over a decrease in waiting time.

The increased preference for work-related psychological groups might be explained by a self-perceived need to talk about work in a psychosocial context with the aim of receiving adequate support for psychosocial adjustments when returning to work, to learn how work can help with disease coping and to regain control over their lives, or how to handle expectations from the employer, colleagues or expectations of oneself (2, 3, 27), regardless of one's work ability. Although intensified social counseling was included in the DCE to a lower extent, the results still indicate a preference nearly equal to work-related psychological groups. This makes sense, as cancer survivors often specify uncertain social and financial situations after treatment (e.g., due to prolonged sick leave) or also need to adjust environmental factors when returning to work (e.g., graded return to work, workplace adjustments) (2, 3, 27). These are topics targeted during intensified social counseling (12).

Despite providing results of potential interest for advancing rehabilitation programs for cancer survivors, several limitations of this study need to be addressed. First, the reported preferences are stated preferences, rather than revealed preferences as they do not represent actual decisions of participants (16). Therefore, we cannot be sure whether participants make the same decisions when faced with real choices, as they did in the DCE. This holds especially true for the estimated willingness to wait which is probably affected by numerous context factors (e.g., cancer site, type of treatment, severity of long-term treatment effects, secured workplace, and partnership)

which were not part of the experiment. This might also be the case for job history and type of job (e.g., manual work or desk work), however, these data were not assessed in our study. Second, the generalizability of the results beyond this study is limited. As part of a cluster-randomized multicenter trial, participants needed to fulfil specific inclusion criteria. The most important aspect to mention here is the presence of an elevated risk of not returning to work, as studies using samples with musculoskeletal disorders suggest that only those with an elevated risk profit from additional WMR components (28, 29). Third, the current study also used no monetary cost attribute as it is questionable whether this would lead to any meaningful results in a health care system where inpatient rehabilitation treatment is covered by social insurance schemes, but might be considered within other health systems. Although using waiting time as a non-monetary replacement seems reasonable, it is possible that waiting time interacts with other attribute characteristics, which cannot be estimated with the current DCE (i.e., the expected utility for intensified social counseling might decrease with increasing waiting time as social circumstances change).

Our results imply that cancer patients with an elevated risk of not returning to work have a clear preference for work-related modules, especially work-related psychological groups. These psychological groups focus on work-related stress and coping, work-related social competencies in communication, and planning the concrete return to work. This indicates that cancer patients might want to talk about such topics during rehabilitation, and that they assume that these therapies might help them in returning to work. As this is highly relevant for many working aged cancer survivors, rehabilitation programs should consider addressing work-related psychological groups more thoroughly.

CONCLUSIONS

In conclusion, the current study indicates that cancer rehabilitation patients have a high preference for work-related therapies, which specifically target return to work. Patients had the highest willingness to wait for work-related psychological groups which issue concrete planning of return to work strategies and the development of coping strategies for psychosocial risk factors that act as return to work barriers.

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