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Effectiveness of an exposure-based return-to-work program for workers on sick leave due to common mental disorders: a cluster-randomized controlled trial [1]

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APPENDIX: Economic Evaluation

Background

Economic evaluation is widely used to help decision making in healthcare (1). One of the objectives of the healthcare system in many developed countries is to maximize health within a budget constraint. Economic evaluations of interventions in an occupational healthcare setting for workers on sick leave due to common mental disorders (CMD) are relatively new. These evaluations are increasingly conducted alongside trials (2–4). van Oostrom et al (2) found no economic benefit of a participatory workplace intervention for workers on sick leave due to distress compared to usual guideline-based care of occupational physicians (OP), from a societal perspective. Rebergen et al (3) found that guideline-based care by an occupational physician compared to care with easy access to a psychologist could be cost-effective for workers on sick leave due to CMD, from a societal and employers perspective, as healthcare utilization costs were significantly lower in the intervention group (mean difference -€520, 95% CI: -€980–59). Schene et al (4) found that an occupational intervention in addition to the clinical care for workers on sick leave due to major depressive disorder compared to usual care solely, was cost-effective, from a societal perspective. In all three economic evaluations mentioned above, the mean costs of productivity losses were estimated to be at least 80% of the mean total costs (2–4). In a national study on the prevalence and cost of nine CMD, it was estimated that a large majority of the total costs were due to loss of productivity (5). When calculating productivity loss costs ,it is recommended to include costs due to absenteeism and presenteeism (1). However, the costs of presenteeism are often not included in economic evaluations of interventions for workers with CMD.

To evaluate the effectiveness of an exposure-based return-to-work (RTW-E) intervention for workers on sick leave due to CMD compared to guideline-based care-as-usual (CAU) by OP, we conducted a cluster randomized controlled trial (RCT) with a 12-months follow-up period. We found that the RTW-E intervention prolonged the median time-to-full RTW significantly by 56 days compared to CAU. So, the RTW-E was not effective in reducing time-to-full RTW compared to CAU.

Alongside the effectiveness analysis of the RTW-E program, we conducted an economic evaluation from a societal perspective. In the protocol study (6), we presented our hypothesis that, from a societal perspective, the RTW-E intervention would be more cost-effective than CAU. However, the effectiveness analysis showed that the RTW-E intervention prolonged the time-to-full RTW, and several previous economic studies in the occupational health field showed that ≥80% of the total costs are due to productivity losses. Based on these findings, we deemed it very unlikely that we would confirm our hypothesis. It may even be that the results of the economic analysis will be located in the north-west part of a cost-effectiveness plane which indicates that the RTW-E program is less effective and more costly than CAU. So, we considered it of little clinical relevance to conduct an extensive economic evaluation as described in the protocol study, however, to prevent publication bias, we still wanted to report about the results.

Methods

Economic evaluation

In our economic evaluation, the total costs are the summation of the costs of consuming healthcare, the out-of-pocket expenses, and the costs of production loss. Consuming healthcare and out-of-pocket expenses were assessed by an adapted version of the Tic-P questionnaire. To gather information about production loss without sick leave (presenteeism), we used the four relevant questions of the Tic-P questionnaire (7). We performed an incremental cost-effectiveness analysis by calculating the differences in costs due to production loss and healtheare, including expenses associated with the intervention program and out-of-pocket expenses.

The costs associated with the production loss included the combined costs of production loss due to sick leave (absenteeism) and the costs of production loss due to a reduced productivity without sick leave (presenteeism). The costs of production loss due to sick leave were calculated by multiplying the net cumulative number of sick leave days converted to sick leave hours and the average price per work hour based on age and gender. The costs of healtheare included the costs of occupational healthcare and the costs of consuming healtheare delivered by regular healthcare professionals or institutions. Alternative healtheare was excluded. The costs of healtheare were calculated by multiplying the number of consultations or days of treatment and the cost price per unit. The costs of the RTW-E and CAU intervention were calculated according to the bottom-up approach. The costs of the RTW-E program were based on the costs of a 2-day training and 3 tutorial follow-up sessions for the OP. The costs of the CAU program were based on the costs of a 1-day OP training. The costs of the intervention programs were calculated by multiplying the mean number of hours of time invested by the trainers and participating OP and the fee per hour plus additional costs for study materials, lunch and refresh-

ments, and the rent for the room. The out-of-pocket costs included the costs of travelling to visit the OP. The costs were calculated by multiplying the number of kilometers from the patients' home to the OP's office by the price per kilometer. We used standard cost prices according to the Dutch Manual for Costing (8) of the Dutch Central Organization of Healthcare Charges. The base year for price indexing was 2007. The conversion of days to equivalent hours was based on a Dutch average of 1540 working hours per year (9). The costs of production loss were calculated according to the Human Capital Approach (HCA) and the Friction Costs Approach (FCA). In the HCA, all days or hours of sick leave are included. In the FCA, it is assumed that every worker can be substituted and the production loss stops after a maximum (friction) period of 154 days of sick leave (10). Both approaches assume that the production loss of each day or hour of sick leave is 80% instead of 100% (ie, the elasticity is 0.8) (8, 10).

Due to the lack of a golden standard, the costs of production loss without sick leave (presenteeism) were calculated first according to the Health Labour Questionnaire (HLQ) method and second according to the Osterhaus method (7). In the HLQ method, we used the number of hours required to compensate for lost working hours due to health-related problems. This method may underestimate costs, as compensation of lost working hours beyond regular working time are not taken into account. In the Osterhaus method, the number of working hours affected by a hindrance due to health-related problems and their efficiency are included. This method may overestimate costs as the compensation of lost working hours within regular working time is not taken into account. The mean cost of production loss without sick leave were calculated as the sum of the costs calculated according to the Osterhaus and HLQ methods, divided by two.

The economic evaluation was performed according to the intention-to-treat principle. To calculate the mean costs of production loss without sick leave, we imputed missing data in two steps. First, last value was carried backward; then first value was carried forward. For all analyses, 95% CI of the difference in mean costs between both groups were computed by bias corrected and accelerated bootstrapping with 1500 replications in STATA 11.1 (StataCorp, College Station, TX, USA). A cost-effectiveness analysis of the RTW-E program was conducted by dividing the incremental sum of all RTW-E program costs compared to CAU, by the incremental mean time-to-full RTW as an effect measure (ie, the incremental cost-effectiveness ratio or ICER).

Results

Cost-effectiveness analysis

Table A shows that the incremental mean costs of using the RTW-E intervention program were €388 per worker compared to CAU. All other mean costs also differed between the RTW-E and CAU groups. However, the incremental mean costs of production loss due to absenteeism (HCA and FCA), presenteeism, and the mean costs of occupational and other healthcare, were not significantly different between workers in the RTW-E and CAU groups. Although the out-off-pocket costs were hardly relevant, the incremental mean out-off-pocket costs were significantly different between intervention groups. According to the HCA and FCA, the sum of all incremental mean costs were €2961 (95% CI -1974–8394) and €1310 (95% CI -2047–5238), respectively. These costs, however, did not differ significantly between the RTW-E and CAU. For both groups, the costs of productivity loss represented approximately 90% of all costs. The mean time-to-full RTW was 277 (95% CI 222–332) days in the RTW-E and 191 (95% CI 151–230) in the CAU group. According to the HCA, an ICER of -34.4 was found for workers in the RTW-E group compared with CAU. In other words, for workers in the RTW-E group, each day of extra time to full RTW an additional €34.4, were needed. According to the FCA, an ICER value of -15.2 was found.

Discussion

The economic analysis showed that the RTW-E intervention, from a societal perspective, was not more cost-effective than CAU. The RTW-E group and the CAU group did not differ significantly on total costs that consists of production loss costs due to absenteeism or presenteesim and costs of healthcare treatment. However, from the effectiveness analysis we know that the RTW-E intervention program was less effective on time-to-full RTW compared to CAU. So, the RTW-E intervention program tends to be less cost-effective compared to CAU, as the ICER we calculated were negative.

The main strengths of our study are (i) we conducted an economic analysis alongside a cluster RCT with a pragmatic design, (ii) the costs were calculated from a societal perspective, and (iii) the costs of production loss were based on both costs of absenteeism and presenteeism. Besides the methodological limitations of the trial itself, our study results are limited by the very wide confidence intervals for the cost differences. Wide confidence intervals are considered a general problem in economic evaluations alongside RCT due to relatively small sample sizes.

Table A. Mean total costs for the exposure-based return-to-work (RTW-E) intervention and care-as-usual (CAU) groups and the incremental costs of production loss (euros) due to absenteeism and presenteeism, healthcare and out-of-pocket costs, and the sum of costs from a societal perspective during the 12-month follow-up. The costs of production loss and the sum of the costs are calculated according to the Human Capital Approach (HCA) and the Friction Cost Approach (FCA). The number of the various types of costs or summation of costs ranges from 47–69 for the RTW-E group and from 61–80 for the CAU group. [HLQ= Health Labour Questionnaire; OP=occupational physician; SD=standard deviation; 95% CI=95% confidence interval; IC=incremental costs.]

Costs	RTW-E			CAU			Incremental costs	
	N	Mean costs	SD	N	Mean costs	SD	IC	95% CI
Costs of production loss								
Absenteeism HCA	51	17380	11610	69	14352	9798	3029	-749–7235
Absenteeism FCA	51	13876	5643	69	12737	5795	1139	-813–3178
Presenteeism (mean HLQ & Osterhaus)	69	3401	4865	79	4226	4488	-825	-2450–629
Sum of cost of production loss HCA	49	21398	14804	67	18665	12255	2733	-2412–7820
Sum of cost of production loss FCA	49	17750	9529	67	17002	8754	748	-2506–4141
Healthcare costs								
Occupational and other health care treatment by professionals and institutions	69	1810	1283	80	1656	1450	154	-283–596
Intervention program	69	583		80	195		388	
Out-off-pocket costs								
Travelling expenses of workers to OP	67	4	5	71	3	3	1	0–3
Sum of costs HCA [a]	47	23889	15315	61	20928	12971	2961	-1974–8394
Sum of costs FCA [b]	47	20412	10007	61	19102	9222	1310	-2047–5238

[a] Sum of costs of production loss according to the HCA, healthcare treatment costs, costs of the intervention program, and out-of-pocket costs.
[b] Sum of costs of production loss according to the FCA, healthcare treatment costs, costs of the intervention program, and out-of-pocket costs.

Overall, the economic analysis showed that the RTW-E intervention was not more cost-effective than CAU. Therefore, we recommend OP to continue using guideline-based CAU to reduce time-to-full RTW for workers on sick leave due to CMD. We advise them against using the RTW-E program if they aim to reduce time-to-full RTW.

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