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Chapter 8

General discussion

Chapter 8

Depression is highly prevalent in the working population and is associated with excessive costs. The largest share of these costs is paid by employers. Therefore, a focus on depression treatment in the workplace is a logical step and has been recommended by many researchers and organizations. One way to get more people with depression into treatment has been to use web-based interventions and there is ample support for the effectiveness of these interventions in the general population, and some support for the effectiveness in the working population (i.e. occupational e-mental health).

The main aim of this dissertation was to examine the clinical and cost-effectiveness of a worker-directed web-based guided self-help intervention for employees with depressive symptoms who were not on sick-leave. Additionally, we looked at cost drivers of mental health problems in a Dutch cohort study. This chapter describes the main findings of the trial and the study about cost drivers of mental health problems. It also discusses barriers and facilitators for implementation of the intervention, the implications for different stakeholders, limitations, and recommendations for future research. This section will end with a final conclusion and the case description of *Sophie*.

Main findings

This dissertation described the necessity to act on two current major societal problems in West European countries; the rising disease burden of depression and the threats of the shrinking working population. In the introduction of this dissertation it was proposed that occupational e-mental health can contribute to reducing the burden of depression in the working population, the low percentage of people who receive professional care for their depressive symptoms, and the shrinking working population. Providing early treatment (before sick-leave) and the use of the Internet could be strategies to decrease depressive symptoms in an early stage of development as well as the excessive economic costs of depression. The clinical trial and the study on the cost drivers of mental health problems showed that this statement is only partially true; depressive symptoms decreased after 8 weeks and this reduction of symptoms sustained over time. This occurred equally in both study groups, and the intervention did not result in lower costs compared to care-as-usual. However, the study on cost drivers of mental health problems showed that the absence, or low severity of symptoms, did predict lower economic costs.

Findings in terms of feasibility

The process evaluation showed that the intervention was conducted according to protocol and was feasible for further implementation into routine care depending on the study being effective in reducing depressive symptoms. The participants were satisfied with the intervention, especially with the feedback from the coach. They further reported that they needed more time to complete the intervention, which was reflected in the low rates of

completion of the intervention; only 57.8% of the participants completed at least half of the intervention within seven weeks, and 26.7% completed the entire intervention within 7 weeks. Two main barriers were identified that could hinder further implementation, treatment adherence and the quality of the feedback. Therefore, we suggested that the training of the coaches and the feedback protocol should be re-evaluated to improve the quality of the written feedback of the coaches before implementation into routine care. Furthermore, we discussed several options to increase treatment adherence, such as increasing the time for completion of lessons and the use of individually-tailored interventions.

Findings in terms of clinical outcomes

The majority of the 231 study participants in the clinical trial were female (62.3%) and their mean age was 43.4 years. Furthermore, most participants were highly educated (63.6%) and the mean working hours per week was 33.9 hours. Overall, the severity level of depressive symptoms, anxiety symptoms and burnout symptoms was moderate at baseline. Of the 231 participants 24.7% were diagnosed with a current major depressive disorder, dysthymic disorder or both at baseline.

Overall, both groups improved substantially (e.g. within group effect sizes around 1) during the eight weeks between baseline and post-treatment assessment, and this improvement sustained over time. However, there were no significant differences between the intervention and care-as-usual (CAU) group on improvements in depressive symptoms during the period of one-year. Immediately after the intervention, clinically relevant improvements in depressive symptoms were also examined. No differences between the groups were found.

When we examined the effects of Happy@Work on other symptoms than depression, small effects in favor of the intervention group on anxiety symptoms ($d = 0.16$) and on emotional exhaustion (one of the dimensions of burnout symptoms; $d = 0.17$) were identified immediately after the intervention, but these did not sustain over time. There were no differences between the groups on the other two dimensions of burnout symptoms (i. e. cynicism and reduced professional efficacy), work performance, and duration of absenteeism. We found improvements in burnout symptoms and work performance immediately after the intervention and these improvements also sustained over time. Based on these results one can conclude that Happy@Work was not more effective than CAU.

In the clinical trial we hypothesized that when we treat employees in an early stage of mental health problems we might be able to prevent worsening of symptoms and sickness absence due to depression. This hypothesis appeared not to be true. Overall, the employees' level of depressive symptoms decreased within eight weeks and stabilized during follow-up, but the intervention did not better reduce depressive symptoms compared to CAU. In the clinical trial we reported on the duration of absenteeism (i.e. how many days an employee reported sick from work during a specific time period) and not on the occurrence of absenteeism

(i.e. did an employee report sick from work during a specific time period) or frequency of absenteeism (i.e. how many times an employee reported sick from work). The duration of absenteeism did not differ between the intervention and CAU group, leading to the conclusion that Happy@Work was not more effective in reducing the duration of sickness absence compared to CAU.

In order to contribute to the knowledge gap in predictors of outcome of web-based interventions, several subgroup analyses on depressive symptoms were conducted in this study. These subgroup analyses regarded: educational level, age, gender, working hours, and baseline depression score. However, there were no subgroups identified that had a significant smaller or higher improvement in depressive symptoms. Furthermore, we also tested whether intervention completers (i.e. participants who completed at least half of the intervention) improved more in depressive symptoms compared to the CAU group. Intervention completers improved more in depressive symptoms compared to CAU, but this difference was not significant.

Findings in terms of costs and savings

The study on cost drivers of mental health problems (Chapter 7) showed that depression and anxiety are associated with excessive costs, which supports the findings of many other studies [1-4]. The results showed that symptom severity and a diagnosis of depression and anxiety were the most important predictors of health care and productivity costs and the absence of depression and anxiety resulted in lower estimated health care and productivity costs. This indicates that early intervention could be an effective strategy to reduce the excessive economic costs of depression.

The intervention's cost-effectiveness with regard to depressive symptoms and clinically relevant improvements depends on the willingness-to-pay of societal and company decision-makers as well as the probability of cost-effectiveness that they consider acceptable. The intervention might not be judged as cost-effective, because high investments are needed to reach a 0.95 probability that the intervention is cost-effective in comparison with care-as-usual. The intervention could not be considered cost-effective in terms of QALYs gained and was not cost-saving to the employer.

The study on cost drivers of mental health problems showed that the average productivity costs in the cost driver study were twice as high as the health care costs. In the economic evaluation, over 60% of the total costs consisted of costs due to loss of work-productivity. These findings indicate that loss of work-productivity is of high importance in employees with depressive symptoms.

Comparison with prior work

Clinical outcomes

The findings of the study in terms of the clinical outcomes are not in line with the overall positive findings of web-based interventions as summarized in a meta-analysis of Richards and Richardson [5], but none of the studies included in that meta-analysis were tested in a workplace context. Three studies on occupational e-mental health that also included long-term effects showed mixed results [6-8]. The study by Ebert et al. [6] showed positive effects of a guided web-based intervention directly after the intervention that sustained up to 6 months follow-up. The study by Grime [7] showed positive short-term effects of an unguided web-based intervention in favor of the intervention group, but these did not sustain over time. The study by Phillips et al. [8] did not show significant positive effects at all of an unguided web-based intervention. Compared to our study, the three studies that were just described were comparable in terms of depression severity. The studies by Grime [7] and Phillips et al. [8] showed the same pattern of improvement in depressive symptoms as our study; overall substantial improvements in depressive symptoms directly after the intervention in both groups which sustained over time. Ebert et al. [6] did not find such a substantial improvement in the control group. These differences in effects could have been related to the guidance during the intervention or to the control groups used in the respective studies. Ebert et al. [6] used a waiting-list control group, while the studies by Grime [7], Phillips et al. [8] and this study used active control groups (i.e. care-as-usual or access to websites with psycho-education about stress and depression). Studies that use a waiting-list control comparator have a tendency to show stronger effect sizes of the intervention, because they are less likely to positively affect the outcome compared to active control groups such as care as usual [9]. However, other factors could also be of influence to the different findings, such as the study sample and recruitment methods.

The findings of this study are also not in line with the other two indicated preventive intervention studies in the workplace context [10-12]. The study by Lexis et al. [10] focused on a study population of employees with mild depressive symptoms that followed a face to face problem solving intervention. The aim of the intervention was to prevent worsening of symptoms and sickness absence. Gartner et al. [11, 12] focused on a study population of employees with mild mental health symptoms and this population could follow different e-mental health interventions or a preventive consult with the occupational physician. The aim of the interventions was to prevent the development of common mental disorders. Both studies found positive results of the interventions on reduction of mental health problems and the study by Lexis et al. [10] also found positive results of the intervention in terms of sickness absence duration.

Comparing the treatment adherence rates between our study and the other two studies on guided web-based interventions [6, 13] reveals a low completion rate in our study, since both studies showed treatment adherence rates of 60-70% compared to the 26.7% in our study. The low completion rate in our study was influenced by the fact that participants only had 7 weeks to complete the intervention due to the study setting. The majority of the participants were simply not able to complete more lessons within 7 weeks and only few participants stopped with the intervention at their own request due to a lack of time or other reasons, as was described in the process evaluation (Chapter 3).

Cost-effectiveness

When we compare the findings of the economic evaluation to the four other studies [14-17] on cost-effectiveness of web-based interventions one can conclude that higher probabilities of cost-effectiveness for improvement in depressive symptoms or clinically relevant improvements at lower willingness-to-pay values were found in the other studies. Two studies [15, 17] also found more positive results of the web-based intervention on QALYs which is in contrast with our study. This difference may be explained by the mild symptoms experienced by participants in our study as previous research has shown that QALYs seem to lack sensitivity to mild conditions [18]. Other factors that might explain the difference in findings are the fact that all of the previous studies were performed in a community or primary care setting, three of the four studies followed participants less than 12 months, and that the participants in the previous studies had more severe depressive symptoms at baseline than our population.

Considerations regarding the findings of the study

To interpret the findings of the clinical trial I will reflect on the findings by discussing the improvements in the care-as-usual (CAU) group, the timing of the intervention, and the program versus theory failure question.

Improvements in the care-as-usual group

The large reduction in depressive symptoms in the CAU group was not foreseen and is not in line with most randomized controlled trials that use CAU as a control group [5]. We have listed several potential reasons for the reduction in depressive symptoms in the control group but stress that we do not know the actual reason and a combination of factors may have played a role.

First, the improvement in depressive symptoms in the CAU group may reflect spontaneous recovery, a phenomenon which is seen frequently in patients with depression [19]. From a previous study by Spijker et al. [20] it is known that around 50% of patients with a major depressive disorder recover without treatment within three months. Furthermore, a

study by Keller et al. [21] among a population of patients with major depressive disorder showed that severity of symptoms was associated with time to recovery. Participants in our study had relatively moderate symptoms and thus were more likely to show spontaneous recovery. According to the study by Keller et al. [21] patients with moderately severe depressive symptoms, minor depression or dysthymia have a greater likelihood of recovery within a few weeks than patients who meet the criteria for major depressive disorder. The study also showed that recovery was characterized by a gradual reduction of symptoms, so patients did not suddenly become well. However, it is still not known when exactly recovery of depressive symptoms occurs, what the natural course of depressive symptoms is, and which determinants, such as work-related factors, might play a role in the recovery.

Second, it is possible that our method of recruitment resulted in a selection of highly motivated employees who were willing to change. Being highly motivated could have led to improvement in itself. Third, being able to function and stay at work while experiencing depressive symptoms might have had a positive influence on recovery of depressive symptoms [22-24]. Social support from colleagues and supervisors, social identity, regular activities, and time structure are all reported as positive effects of work on mental health [25], but it is yet unknown what the exact role of being able to work or work itself has on the recovery of depressive symptoms. Fourth, introducing this study in participating companies may have had beneficial effects. A company's participation in the study is a positive and caring sign to all employees. This may create a more open environment within the company, and it is possible that several participants have discussed their mental health problems with their supervisor (and e.g. received supervisor social support). This may have contributed to the recovery of depressive symptoms. We did not ask participants whether they had discussed their mental health problems with their supervisor and we therefore do not know whether this has occurred.

Fifth, participants in the CAU group received an e-mail with the randomization outcome in which they were also informed about their level of depressive symptoms and they were advised to seek treatment or help for their depressive symptoms. This e-mail could have instigated a behavioral change in such a way that participants in the CAU group moved from the 'Preparation stage' to the 'Action stage', according to the stages-of-change model from Prochaska et al. [26]. Only a small percentage of the participants in the CAU group subsequently sought professional help (see above). However, it could be possible that other participants sought help in a different way, for example via their significant other, through social support from colleagues or supervisors, or via other self-help treatments. Again, since we did not ask participants in the CAU group about their action we do not know whether this has occurred. And finally, in relation to the latter, it is possible that for this specific target group filling in a questionnaire and/or participating in a diagnostic interview about depression during a period of low mood was enough of an intervention by itself. This

methodological reason states that it could be possible that there is a measurement effect. The researchers of the study by Gartner et al. [12] also hypothesized that it could have been possible that there was a measurement effect in their study. Therefore, they performed a post-hoc analysis to study if screening with feedback was effective. They compared the participants who had only completed the screening with feedback part with the participants who had completed the screening and afterwards followed one of the interventions. They found an effect size of the screening with feedback of $d = 0.34$. This means that screening with feedback alone already had a moderate effect on the reduction of mental health problems. Of course, this was an exploratory post-hoc analysis and the study was not designed to measure the possible effect of screening. Future research could study the potential measurement effect. This can be studied in a Solomon four-group design, which has been done by for example van Sluijs et al [27]. In a Solomon four-group design, one also includes two groups that have not been part of the pretest procedures. However, again, we do not know if or which methodological or other reasons, or a combination of factors, can explain the large reduction in depressive symptoms in the CAU group. We can only conclude that the reduction in depressive symptoms is higher than once would expect.

Timing of the intervention

In the introduction of this dissertation we argued that timing is crucial in indicated prevention. The studies by Lexis et al. [10] and Gartner et al. [11, 12] both showed low uptake of the intervention in populations with mild mental health problems and perceived need for care. We considered that it would be better to intervene in a phase in which problems have already become more severe and people (have started to) feel a need for professional care. Therefore, it was chosen to recruit a study population with more severe depressive symptoms and who experienced a need for professional care. Participants in the CAU group were advised to look for professional help for their depressive symptoms. However, only a small group of participants in the CAU group used some form of professional care during the eight weeks of the intervention. This proportion was not significantly higher than the proportion of health care use by the intervention group. This could mean that the preventive intervention was used at the right moment in time. The participants have taken the threshold to apply for participation in a study in order to receive a preventive intervention, which means that they do experience some need for professional care. However, since only a small group of participants in the CAU group used some form of professional care, one could hypothesize that the threshold to visit a professional health care therapist, such as a general practitioner or occupational physician, is still too high. Participants in the CAU group could have thought that their depressive symptoms were not very severe and that visiting an occupational physician or general practitioner was “too intensive” or “too much effort”. Or, perhaps, they could also have thought that they could also wait for the self-help

book of the intervention, which they could receive after completion of the post-treatment assessment, and use it if they still felt depressed after those eight weeks. However, we can only speculate here, since we did not ask about the perceived need for care or why the participant did not look for professional help. But if the threshold to 'regular' professional care would indeed be too high, this would mean that it is indeed necessary to provide easy accessible interventions, such as web-based interventions, to this target group and not more intensive professional care such as visits to an occupational physician or psychologist.

Program or theory failure

In public health research, a process evaluation can provide information on why an intervention does not have the desired effect. Process evaluations distinguish between program failure and theory failure. The distinction between program and theory failure can be explained best by the metaphor of taking a pill to treat a disease [28]; "it does not help that the pill has effect if the patient does not take it (*program failure*)" and "it does not help that the patient takes the pill if it has no effect (*theory failure*)". In the process evaluation (Chapter 3) we described that the intervention was conducted according to protocol but that the uptake of the intervention, i.e. treatment adherence was relatively low. Therefore, the analyses of comparisons between the intervention group and the CAU group in Chapters 4 and 5 actually compared the effects of a low adherence intervention to CAU. The intervention completers (i.e. participants who completed at least half of the intervention) analyses showed higher effect sizes, even though these results were not statistically significant. This may be explained by a lack of power. We can therefore conclude that the lack of a superior effect of the Happy@Work intervention is likely due to program failure. This implicates that the intervention could have a superior effect if participants would adhere to the intervention.

Strengths and limitations

When interpreting the results described in this dissertation, several limitations of both the clinical trial and the study on cost drivers of mental health problems should be kept in mind. First, considering the study of cost drivers of mental health problems, the study sample that was used, the NESDA sample, is not a representative sample of the general Dutch population. Consequently, interpretations of the estimations of the predicted costs should be made with great care. Second, considering the clinical trial, the participants in this study were mainly Dutch white-collar workers with a high educational level. It is therefore unclear whether the results can be generalized to the general working population or employees with a lower educational level. Third, the attrition rates (i.e. not filling in questionnaires during assessments) were high in this study. High attrition rates are often seen in web-based interventions [29, 30] and the attrition rates in this study were equal or lower compared to

the other occupational e-mental health studies with long term follow-up assessments [6-8]. The bias that may have been introduced was accounted for by applying multiple imputation techniques, even though the analysis showed that these multiple imputations might not have been needed. Finally, adherence to the intervention was low. Therefore, the analyses of comparisons between the intervention group and the CAU group compared the effects of a low adherence intervention, with many participants who only followed a small part of the intervention and the intervention completers analyses were underpowered.

This dissertation also has several important strengths. First, we did important pioneer work. We were the first to use a rule based method for the prediction of economic costs and these predictions were based on longitudinal data. Furthermore, we performed the first economic evaluation of an occupational e-mental health intervention and were the first to perform a return-on-investment analysis in a study on a web-based intervention. Second, in the different chapters, we used state-of-the-art statistical methods to report accurate results. For example, in all chapters on effectiveness outcomes, we used multiple imputation techniques to correct for missing data and bootstrapping techniques in the cost-effectiveness analyses. And finally, we used a relatively long period of follow-up (12 months), something which has not been done often in studying web-based interventions for mental health problems [5].

Implications for different stakeholders

Based on the findings of this dissertation, one can not recommend implementation of Happy@Work into routine care in its current form and for this specific target group. Even though we cannot recommend that Happy@Work should be implemented into routine care, the need of employers to have some form of intervention for their (non sick-listed) employees is still there. The question is '(How) can we contribute to this need?'

Happy@Work was designed to be implemented into occupational health care when results of the clinical trial were positive. Independent of the effects, we encountered two important barriers for implementation: most occupational safety and health services did not have the manpower to provide the coaches and employees reported that they were afraid of their privacy if the coaches were related to the employer. This could indicate that an implementation route of a guided web-based intervention through occupational health care might not be optimal. In relation to this, occupational health care is currently highly debated in the Netherlands due to several incidents in the media and a (future) shortage of occupational physicians. Therefore, the Dutch minister of Social Affairs and Employment asked the Social and Economical Council (SER) to write an advisory how the organization of occupational health care should be changed. Several options with high impact are currently considered, for example, an integration of the occupational physician into primary care practices. There is a lot of debate between the SER members on the changes which proves

the complexity of this issue. For now, we cannot say how the system will change, but it is likely that it does. This will probably not apply to the Dutch and international legislations on the employers' responsibility of monitoring and improving the health of their employees, but it is likely that the organization of the care system will change drastically. A recent study by Van Berkel et al. [31] found that different stakeholders in occupational health care (i.e. employers, employees, occupational safety and health services, health insurance companies, etc.) differ in their sense and conceptualization of responsibility in relation to (mental) health and providing treatment. For example, employees reported that responsibility of health and lifestyle behavior meant autonomy; it should be the employee's own free will to take care of his health. Employers reported that the responsibility of health and lifestyle behavior meant duty; employees have the duty to take care of their health and they should be held accountable for it. Considering the possible comprehensive changes into occupational health care, every stakeholder, i.e. employers, employees, health insurance companies, occupational safety and health services, mental health care institutions, and governmental institutions, has a responsibility and role in keeping the working population "on board" by considering and monitoring (mental) health and by providing treatment if there is a threat to this. Some stakeholders might have to change their current role in the near future and should be willing to do so. For example, during the recruitment of companies in the clinical trial, there was one company that reported that they did not want to participate in the study because they believed that treatment of mental health problems was a responsibility of mental health care institutions and not of their occupational safety and health service (data not shown in this dissertation). Such as company might have to change its sense of responsibility and role in the near future.

Recommendations for future research

There are still plenty remaining challenges and even more questions that should be answered. More knowledge is needed considering the following:

- The potentials of occupational e-mental health should be further explored. Considering the overall positive findings of web-based interventions and its potential benefits, researchers should explore these further in the working population. In such research it will be important to involve different stakeholders to develop interventions that are of need to the population and that can easily be implemented after having been tested in a clinical trial. In addition, specific attention should be paid to economic evaluations of these interventions.
- In this dissertation, it was clearly stated that a specific focus on work-related factors is needed in the treatment of employees with mental health problems. However, we do not yet know whether this specific focus on work is really necessary or whether a focus on symptom reduction alone will be sufficient. Therefore, it is

recommendable to compare the (cost-) effectiveness of a worker-directed web-based intervention with a general web-based intervention. If one wants to focus on a target group with symptoms that are in an early stage of development, it would also be important to study how long symptoms have been present and to include a measurement on functioning in daily or working life, such as the Individual Work Performance Questionnaire [32] and/or a GAF-score.

- It might also be a good idea to consider the option of changing the content of the intervention and the aim of the intervention into more positive words, such as vitality or well-being instead of low mood, since the intervention is an indicated preventive intervention and not a real treatment of depression like psychotherapy. Several interested employees and participants reported that they did not feel related to the words "low mood" (data not shown in this dissertation). They reported that they, for example, did not experience low mood but other symptoms or that they did not feel mentally fit. If the content of the intervention would be more aimed at improvement of well-being or vitality this might result in more motivated participants (i.e. content is not negative but positive) and also still have a result on depressive symptoms
- It was hypothesized that by intervening in a target group with more severe depressive symptoms instead of a target group with only mild symptom severity, like previous studies did, one would find better results in terms of effectiveness and prevention of sickness absence. However, we did not find a significant effect of the intervention in this target group. Therefore, more knowledge is needed on which target group(s) could profit from an indicated preventive web-based intervention. In determining the exact target population one might need to consider that effects will be smaller in a target group which is still at work, even though they experience mental health problems. This should be taken into account in power-analyses.
- In the process evaluation we discussed the possible implementation paths of the intervention. Participants reported, overall, that they would prefer a pathway in which the employer facilitates the option to follow a web-based intervention, but that coaching should be provided by someone who is not related to the employer because of privacy issues. In future research implementation pathways via mental health care or occupational health care should be considered or an implementation pathway of a combination, implying collaboration between mental and occupational health care.
- This study showed that our methods to prevent drop-out from the intervention (a target group with a perceived need for care, specific techniques to keep participants motivated, and e-mail reminders) did not lead to the desired effect. Consequently, in future research one needs to consider other techniques to keep participants

motivated to stay in the web-based interventions. There should be a focus on the potential study population (Who needs a web-based intervention? Who needs a preventive intervention?), form of guidance (automatic, in person, blended, etc.), ideal time-length of the intervention, intensity of the treatment, predictors of outcome of web-based interventions, and the options of tailored interventions.

- In relation to the issue mentioned above, it is also important to consider different technological options, such as persuasive technology designs, and other technologies which might make it more “fun” to do something about mental health problems like serious games or mobile applications (or a combination).
- In the clinical trial it was hypothesized that prevention of sickness absence could occur if depressive symptoms would decrease. From the findings of this study we know that the intervention did not result in a shorter duration of absenteeism compared to CAU. The study from Lexis et al. [10] did find positive results on duration of absenteeism, but the results on frequency of absenteeism did not differ between the groups. Researchers should perform studies to answer questions like ‘In which stage of the development of a depression will an employee report sick from work?’ and ‘When is the right time to intervene if one wants to prevent sickness absence?’.
- And finally some methodological considerations for future research. Future studies on web-based interventions should consider the possible negative effects of the intervention. Rozental et al. [33] recently performed a Delphi study with experts in e-mental health to study which possible negative effects should be studied. They recommended, for example, reporting the number of participants who did not respond to the intervention and whether there were participants who were disappointed in the intervention. The outcomes of this study should be used in future studies on web-based interventions.
- Potential benefits of filling in a questionnaire and/or participating in a diagnostic interview during a period of low mood on the reduction of symptoms should be studied in the future. As mentioned before, this potential measurement effect can be studied in a Solomon four-group design. And finally, as was already described in the introduction of this dissertation, it is still not clear whether an intervention in an early phase of development of mental health problems is really necessary and of real benefit to the patient. More research on this topic is necessary.

Conclusions

Many studies have shown the potential benefits of web-based interventions in the treatment of mental health problems. Recent studies on this topic have focused on the working population with depressive symptoms (occupational e-mental health) and the results of

web-based interventions in this population have been inconsistent. Happy@Work was not more effective than care-as-usual in the treatment of employees with depressive symptoms who were not on sick-leave and the intervention was also not cost-effective compared to care-as-usual. This indicates that treatment of employees with mental health problems in occupational health care might be a more difficult process compared to treatment of people with mental health problems in mental health care. Frequently used approaches in mental health care, like a stepped care approach, might not be successful in the treatment of employees with mental health problems due to more frequent spontaneous recovery, positive influences of being able to work etc. Many challenges remain and more research is needed in this emerging field of occupational e-mental health.

Case description

And what happened to Sophie? A couple of days after she acknowledged to herself that she was not doing well, she found a link on the intranet of her company to an online intervention for employees who felt out of balance, called Happy@Work, and she decided to apply for the intervention. She started very enthusiastic and completed the first two lessons within the time limits. After that, she was very busy with other things and therefore did not have time to perform more lessons. After seven weeks, she had completed three lessons of the intervention and was sad that she could not complete the intervention. However, she felt that the intervention had helped her with some issues; she discussed her recent fights with Henrie and her worries about the future of Henrie since his job-loss, and she completed a mood-diary to gain more insight in her mood states during the day and the weeks. After all, she felt quite good about the intervention, she felt better and more in control of her life. She was able again to enjoy little things, laugh more often, and do nice things with Henrie again. After a year, Sophie was transferred to a location of the company in her own city and could cycle to her work.

References

1. Berto P, D'Ilario D, Ruffo P, Di Virgilio RF. Depression: cost-of illness studies in the international literature: a review. *J Ment Health Policy Econ.* 2000;3:3-10.
2. de Graaf R, Tuithof M, van Dorsselaer S, ten Have M. *Absenteeism due to psychological or somatic disorders in workers. Results of the 'Netherlands Mental Health Survey and Incidence Study-2' (NEMESIS-2) - Verzuim door psychische en somatische aandoeningen bij werkenden. Resultaten van de 'Netherlands Mental Health Survey and Incidence Study-2' (NEMESIS-2).* Utrecht: Trimbos-Instituut; 2011. [in Dutch]
3. Smit F, Cuijpers P, Oostenbrink J, Batelaan N, de Graaf R, Beekman A. Costs of nine common mental disorders: implications for curative and preventive psychiatry. *J Ment Health Policy Econ.* 2006;9:193-200.
4. Verow P, Hargreaves C. Healthy workplace indicators: costing reasons for sickness absence within the UK National Health Service. *Occup Med (Lond).* 2000;50:251-257.
5. Richards D, Richardson T. Computer-based psychological treatments for depression: a systematic review and meta-analysis. *Clin Psychol Rev.* 2012;32:329-342.
6. Ebert DD, Lehr D, Doß L, et al. Efficacy of an Internet-based problem-solving training for teachers: results of a randomized controlled trial. *Manuscript under review in Scandinavian Journal of Work, Environment & Health.*
7. Grime PR. Computerized cognitive behavioural therapy at work: a randomized controlled trial in employees with recent stress-related absenteeism. *Occup Med.* 2004;54:353-359.
8. Phillips R, Schneider J, Molosankwe I, et al. Randomized controlled trial of computerized cognitive behavioural therapy for depressive symptoms: effectiveness and costs of a workplace intervention. *Psychol Med.* 2014;44:741-752.
9. Mohr DC, Spring B, Freedland KE, Beckner V, Arean P, Hollon SD, et al. The selection and design of control conditions for randomized controlled trials of psychological interventions. *Psychother Psychosom* 2009;78:275-284.
10. Lexis MAS, Jansen NWH, Huibers MJH, et al. Prevention of long-term sickness absence and major depression in high-risk employees: a randomised controlled trial. *Occup Environ Med.* 2011;68(6):400-407.
11. Gärtner FR, Ketelaar SM, Smeets O, et al. The Mental Vitality @ Work study: design of a randomized controlled trial on the effect of a workers' health surveillance mental module for nurses and allied health professionals. *BMC Public Health.* 2011;11:290.
12. Ketelaar SM, Nieuwenhuijsen K, Gärtner FR, Bolier L, Smeets O, Sluiter J. Mental Vitality@ Work: the effectiveness of a mental module for workers' health surveillance for nurses and allied health professionals, comparing two approaches in a cluster-randomised controlled trial. *Int Arch Occup Environ Health.* 2013:jul 28 (epub ahead of print)
13. Ruwaard J, Lange A, Bouwman M, Broeksteeg J, Schrieken B. E-mailed standardized cognitive behavioural treatment of work-related stress: a randomized controlled trial. *Cogn Behav Ther.* 2007;36:179-192.
14. McCrone P, Knapp M, Proudfoot J, et al. Cost-effectiveness of computerised cognitive-behavioural therapy for anxiety and depression in primary care: randomised controlled trial. *Br J Psychiatry* 2004;185:55-62.
15. Gerhards SAH, de Graaf LE, Jacobs LE, et al. Economic evaluation of online computerised cognitive-behavioural therapy without support for depression in primary care: randomised trial. *Br J Psychiatry* 2010;196:310-318
16. Hollinghurst S, Peters TJ, Kaur S, et al. Cost-effectiveness of therapist-delivered online cognitive-behavioural therapy for depression; randomised controlled trial. *Br J Psychiatry* 2010;197:297-304.

17. Warmerdam, Smit F, van Straten A, et al. Cost-utility and cost-effectiveness of internet-based treatment for adults with depressive symptoms: randomized trial. *J Med Internet Res* 2010;12:e53.
18. van Dongen JM, van Wier MF, Tompa E, et al. Trial-based economic evaluations in occupational health: principles, methods, and recommendations. *J Occup Environ Med* 2014; in press.
19. van Straten A, Cuijpers P, Smits N. Effectiveness of a web-based self-help intervention for symptoms of depression, anxiety, and stress: randomized controlled trial. *J Med Internet Res* 2008;10(1):e7.
20. Spijker J, de Graaf R, Bijl RV, Beekman ATF, Ormel J, Nolen WA. Duration of major depressive episodes in the general population: results from the Netherlands mental health survey and incidence study (NEMESIS). *Br J Psychiatry* 2002;181:208-213.
21. Keller MB, Lavori PW, Mueller TI, et al. Time to recovery, chronicity, and levels of psychopathology in major depression: a 5-year prospective follow-up of 431 subjects. *Arch Gen Psychiatry* 1992;49:809-816.
22. Blonk RWB, Brenninkmeijer V, Lagerveld SE, Houtman ILD. Return to work: a comparison of two cognitive behavioural interventions in cases of work-related psychological complaints among the self-employed. *Work Stress* 2006;20(2):129-144.
23. Zetterqvist K, Maanmies J, Ström L, Andersson G. Randomized controlled trial of Internet-based stress management. *Cogn Behav Ther* 2003;32(3):151-160.
24. Lagerveld SE, Blonk RWB, Brenninkmeijer V, Wijngaards- de Meij L, Schaufeli WB. Work-focused treatment of common mental disorders and return to work: A comparative outcome study. *J Occup Health Psychol* 2012;17(2):220-234.
25. Harnois G, Gabriel P. *Work and Health: impact, issues and good practices*. Geneva: World Health Organization; 2000.
26. Prochaska JO, DiClemente CC, Norcross JC. In search of how people change: applications to addictive behaviors. *Am Psychol* 1992;47(9):1102-1114.
27. van Sluijs EMF, van Poppel MNM, Twisk JWR, van Mechelen W. Physical activity measurements affected participants' behavior in a randomized controlled trial. *J of Clin Epidemiol* 2006;59:401-411.
28. Kristensen, TS. Intervention studies in occupational epidemiology. *Occup Environ Med* 2005;62:205-210.
29. Eysenbach G. The law of attrition. *J Med Internet Res* 2005;7(1):e11.
30. Melville KM, Casey LM, Kavanagh DJ. Dropout from Internet-based treatment for psychological disorders. *Br J Clin Psychol* 2010;49:455-471.
31. van Berkel J, Meershoek A, Janssens RMJPA, et al. Ethical consideration of worksite health promotion: an exploration of stakeholders' views. *BMC Public Health* 2014;14:458.
32. Koopmans L, Bernaards C, Hildebrandt V, et al. Development of an individual work performance questionnaire. *International Journal of Productivity and Performance Management* 2012;62:6-28.
33. Rozental A, Andersson G, Boettcher J, et al. Consensus statement on defining and measuring negative effects of Internet interventions. *Internet Interventions* 2014;1:12-19.