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Summary

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Chapter 1 contains a general introduction to the content of this dissertation. Depression is highly prevalent in the working population and has a major impact on both the private as well as the working life of a person. Depression is associated with excessive costs of which the largest part is paid for by the employer, because most of these costs are due to absenteeism and loss of work productivity. Effective treatments for depression are available. However, less than 50% of those who suffer from depression receive professional care for their symptoms. This undertreatment could be the result of several barriers, such as fear of stigma and perceived ineffectiveness of treatment. Furthermore, the OECD recently suggested increasing research on intervening in an early stage of development of mental health problems and involving work-related factors in the treatment of mental health problems. Providing web-based interventions has been one of the suggestions to overcome undertreatment. Many studies have now shown the effectiveness of such web-based interventions for depression. However, there are almost no studies available which have been tested in a workplace context (occupational e-mental health). Web-based interventions with a specific focus on work related factors in addition to symptom reduction might be a possible solution to contribute to the current burden of depression, undertreatment, and the lack of focus on the working population. Furthermore, intervening in an early stage of development of depression might result in the prevention of sickness absence, if symptoms are reduced. The main aim of this dissertation was to examine the clinical and cost-effectiveness of a worker-directed indicated preventive web-based guided self-help intervention, called Happy@Work, in employees with mild, moderate, or severe depressive symptoms who were not on sick-leave. A second aim of this dissertation was to gain more insight in the main cost drivers of mental health problems. Therefore, we examined how various predictors and subgroups of respondents contributed to the prediction of health care and productivity costs in a cohort of employees.

Chapter 2 gives a detailed description of the design of the randomized controlled trial in which we compared Happy@Work to a care-as-usual (CAU) control group. Participants were recruited via different companies in the Netherlands and were mainly white-collar employees. Different recruitment methods were used such as banners on the intranet and digital pamphlets. Participants had to score at least 16 on the Center for Epidemiologic Studies Depression – scale (CES-D) to be included in the trial. We used stratification at two levels: use of antidepressants (1) and receiving, at study entrance, treatment from a psychologist or psychiatrist (2). Participants were then randomized to either the Happy@Work intervention or the CAU group. Participants in the CAU group did not receive treatment from the researchers but were advised to look for professional care. Participants in the intervention group received the Happy@Work intervention, which took 6 weeks to complete. An additional week was given to the participant in case of delay. Happy@Work is based on Problem Solving Treatment, Cognitive Therapy and a guideline for employees

to help them to prevent work-related stress. Participants received feedback on assignments from a coach via the website. Measurements were taken at baseline, 8 weeks, 6 months and 12 months after baseline. All assessments took place online and a telephonic diagnostic interview was used at baseline and at 6 months follow-up as well. The primary outcome was depressive symptoms as measured with the CES-D. Secondary outcomes were absenteeism, work performance, burnout symptoms and anxiety symptoms. Several other questionnaires were assessed as well to measure mastery, social support, health care utilization, productivity losses, quality of life, and the course evaluation. All analyses were performed according to the intention-to-treat principle.

Chapter 3 discusses the process evaluation, which was conducted alongside the randomized controlled trial, of the worker-directed, indicated preventive web-based guided self-help intervention. This chapter also contains a detailed description of the intervention. The purpose of the process evaluation was to assess the feasibility of the intervention, and to explore barriers and facilitators for further implementation of the intervention. The process evaluation was conducted in accordance with the recommendations by Linnan and Steckler and covered the following components: recruitment, reach, dose delivered, dose received, fidelity, implementation score, and satisfaction. These components were addressed by combining both qualitative and quantitative data that was collected alongside the randomized controlled trial during baseline and post-treatment assessments. Both reach and dose delivered were high, with 93.1% of participants having used the intervention components that were offered to them. However, adherence to the intervention was low; the dose received was 57.8%. The fidelity of the implementation of the intervention was satisfactory. This led to a weighted implementation score of 79.9%. Participants were satisfied with the different aspects of the intervention, especially with the feedback from the coach. Recruitment of companies and participants was difficult, with only five of the 49 approached companies participating in the trial. The results of this process evaluation showed that the intervention was conducted according to protocol and seems feasible for further implementation. Potential barriers to further implementation of the intervention include intervention adherence and the quality of the feedback.

Chapter 4 presents the findings of the short-term effectiveness of Happy@Work compared to CAU. A total of 231 participants, from six different companies in the Netherlands, were randomized to the intervention ($n=116$) or the CAU ($n=115$) group. Of these participants, 24.7% were diagnosed with a current mood disorder. Of the 231 participants, 171 (74%) completed the post-treatment assessment completely, and data on the CES-D was available from 173 participants. Only a small group of all participants used any form of health care between baseline and post-treatment assessment. The difference in health care use was not significant. Both the intervention and the CAU group showed significant improvements on the primary outcome depressive symptoms with within-group effect sizes of 1.03 for the

intervention, and 0.98 for the CAU group. However, no significant difference between the conditions was found. The within-group effect sizes of the secondary outcomes were small to moderate. Significant but small effects in favor of the intervention group were found for anxiety symptoms (between-group effect size 0.16) and emotional exhaustion (between-group effect size 0.17), one of the dimensions of burnout symptoms. Treatment adherence was low, with only 57.8% of the intervention participants who had completed at least half of the intervention. The per-protocol analyses showed a higher between-group effect size for depressive symptoms, but this difference was still not significant. The number of participant that showed a clinically significant improvement on the outcome measures did not differ between groups. More participants in the intervention group showed reliable recovery compared to the CAU group (44.8% versus 39.1%), but this difference was not significant. The results showed that Happy@Work was not more effective in reducing depressive symptoms among employees than care-as-usual directly after treatment.

Chapter 5 reports the findings of the effectiveness of the intervention compared to CAU over time. Since the results on the short-term effectiveness showed a substantial improvement in depressive symptoms in both groups, it was important to examine whether the improvement was sustainable over time or whether there would be an increase of depressive symptoms in one or both groups. Of the 231 participants in the trial, 68% completed the 6 months follow-up assessment, and 54% the 12 months follow-up assessment. The substantial improvements on depressive symptoms sustained over time, but the estimated mean difference between the groups over the period of one year was not significant. For the secondary outcomes the same pattern of results was seen as with the depressive symptoms; the improvements between baseline and post-treatment assessment sustained over time, but there were no significant differences between the groups over time. The duration of absenteeism was also studied in this chapter, but the overall estimated mean difference between the groups over time was not significant. This indicates that there were no differences between the groups on duration of absenteeism. The per-protocol analyses did not reveal significant results over time on depressive symptoms and all secondary outcomes. Several subgroup analyses were performed concerning: educational level, age (age <35 versus age ≥35), gender, working full time (≥36 hours per week) versus part time (< 36 hours per week), and high baseline depression score, but there were no significant differences in depressive symptoms between the groups over time in any of the subgroups. The results showed that Happy@Work was not more effective in reducing depressive symptoms among employees with depressive symptoms who were not on sick-leave compared to care-as-usual over the period of one year.

Chapter 6 presents the economic evaluation of the study in which the cost-effectiveness and return on investment of Happy@Work compared to care-as-usual was evaluated. Cost-effectiveness and cost-utility analyses were conducted from the societal and employer's

perspective. A return-on-investment analysis was conducted from the employer's perspective. The results showed a small significant intervention effect at the 12 months follow-up assessment. The intervention's probabilities of cost-effectiveness were 0.62 (societal perspective) and 0.55 (employer's perspective) if decision-makers are not willing to pay anything for an additional unit of effect in depressive symptoms and clinical significant change. These probability ceiling ratios increased to 0.95 for a willingness-to-pay of €2,000 (societal perspective) and €3,500 (employer's perspective) for a point improvement on depressive symptoms. The majority of cost-effect pairs (62%) were located in the south-eastern quadrant of the Cost-Effectiveness (CE) plane, from both the societal perspective and the employer's perspective. This indicates that the intervention was more effective and less costly than CAU. However, incremental cost-effect pairs were distributed among all four quadrants of the CE plane, indicating considerable uncertainty about the estimated incremental cost effectiveness ratio's (ICERs). The maximum probability of the intervention being cost-effective in terms of QALYs gained was 0.62 (societal perspective) and 0.55 (employer's perspective), irrespective of the willingness-to-pay. Furthermore, only a moderate probability of a positive financial return to the employer was found (i.e. probability of financial return = 0.63). Based on these findings one can conclude that the intervention could not be considered cost-effective in terms of QALYs gained and was not cost-saving to the employer. The intervention's cost-effectiveness with regard to depressive symptoms and clinically significant change depends on the willingness-to-pay of societal and company decision-makers, as well as on the probability of cost-effectiveness that they consider acceptable.

Chapter 7 reports on how various predictors and subgroups of respondents contribute to the prediction of health care and productivity costs in a cohort of employees. In this chapter 1548 employees from a Dutch cohort study in the Netherlands (NESDA) were selected. To identify important predictors of health care and productivity costs, prediction rule ensembles were used. Prediction rules describe the characteristics of subgroups in a sample that have a markedly higher or lower value for the outcome variable (economic costs, in this chapter). Predictor variables were measured at baseline. Health care and productivity costs were measured at one-year follow-up. Symptom severity and diagnosis of depression and anxiety were the most important predictors of health care costs. Conversely, the absence of an anxiety or depressive disorder and mild symptom severity of anxiety and depression predicted lower health care costs. Depressive symptom severity was the most important predictor for productivity costs. Several demographic, social, and work predictors did not predict economic costs. Furthermore, the prediction rules also identified several subgroups of respondents, with markedly higher or lower economic costs. For example, one prediction rule indicated that the estimated health care costs of a person with a net household income lower than €2000 and one or more depressive disorder diagnosis in the past six months

were €211 higher compared to a person who did not meet these conditions. The results of this study suggested that it could be beneficial for employers to facilitate treatment and prevention of depression and anxiety to reduce costs.

Chapter 8 provides the general discussion of this dissertation. 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. Furthermore, other studies on occupational e-mental health showed inconsistent results. 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. Implications for different stakeholders were discussed, as are strengths and limitations of the study, and recommendations for future research. This chapter ends with a final conclusion.