PART II
RESULTS OF THE INTERVENTION

CHAPTER 5
THE EFFECT OF AN E-LEARNING SUPPORTED TRAIN-THE-TRAINER PROGRAM TO IMPLEMENT SUICIDE GUIDELINES IN MENTAL HEALTH CARE

Accepted as:
Background

Randomized studies examining the effect of training of mental health professionals in suicide prevention guidelines are scarce. We assessed whether professionals benefited from an e-learning supported Train-the-Trainer program aimed at the application of the Dutch multidisciplinary suicide prevention guideline.

Methods

45 psychiatric departments from all over the Netherlands were clustered in pairs and randomized. In the experimental condition, full staff of psychiatric departments were trained by peers with an e-learning supported Train-the-Trainer program. Guideline adherence of individual professionals was measured with response to on-line video fragments.

Results

At 3 months follow-up, professionals who received the intervention showed greater guideline adherence, improved self-perceived knowledge and improved provider confidence than professionals who were only exposed to traditional guideline dissemination. Subgroup analyses showed that improved guideline adherence was found among nurses but not among psychiatrists and psychologists.

Conclusions

Our results support the idea that an e-learning supported Train-the-Trainer program is an effective strategy to implement clinical guidelines.

Trial registration

Netherlands Trial Register (NTR3092 www.trialregister.nl)

Introduction

Evidence-based guidelines improve patient care quality. In mental healthcare, guidelines inform professionals of diagnosis and treatment of patients with a mental disorder, particularly those with severe mental illness. Over the last twenty years, a large number of psychiatric guidelines have been published. However, adherence to these guidelines has been unsatisfactory. Structured implementation of guidelines may improve adherence. Only a few studies specifically address the implementation of psychiatric guidelines, and there is a need for more randomized controlled studies. Although (attempted) suicide frequently occurs in Dutch Mental Health Institutions (MHI’s), up until 2012 there was no national evidence-based guideline on the assessment and treatment of suicidal behavior. Local guidelines were available in a limited number of MHI’s and when available, lacked important elements. It was argued that a national evidence-based guideline may result in better assessment and treatment of suicidal behavior. In May 2012, the multidisciplinary practice guideline for the assessment and treatment of suicidal behavior has been issued. An integrated model of stress-diathesis and entrapment is used to explain the onset and maintenance of suicidal behavior. The PGSB-recommendations are based on international guidelines on the assessment and treatment of suicidal behavior and on two empirical reviews of the Scottish government.

To implement the PGSB in Dutch mental health care, we developed an e-learning supported Train-the-Trainer program (TtT-e) to be delivered to the full staff of psychiatric departments. The Train-the-Trainer model is based on the Adult Learning Theory stating that the best resource for learning comes from peers, and on the Diffusion of Innovation Theory stating that people adopt new information better through their trusted social networks. TtT-e combines a one day face-to-face training with an additional e-learning module. This form of blended learning is used extensively in medical education and has been found to be more effective when compared with solely traditional instructor-based trainings.

Suicide prevention training has been shown to improve knowledge, skills, and attitudes towards suicidal behavior of both gatekeepers and mental health professionals. Additionally, professional and gatekeeper training in diagnosis and treatment of depressive disorders, which are associated with suicidal behavior has been shown to result in a reduction of suicide rates. However, except for one study, the effects of suicide prevention training were investigated in non-randomized controlled study designs.
In the current multicenter cluster randomized trial called PITSTOP suicide (Professionals In Training to STOP suicide), we examined the effect of TtT-e in addition to implementation as usual (IAU; that is, dissemination of the PGSB guideline via websites of professional institutions, reviews in clinical journals, presentations at conferences, books and manuals) versus only IAU. Departments were clustered in pairs on basis of patient characteristics to ensure comparability of experience with suicidal patients of professionals in both conditions.

We hypothesized that individual professionals who were trained via TtT-e would show more adherence to the PGSB when compared with professionals who received only IAU. Since a multidisciplinary comparison found that nurses are likely less trained in dealing with suicidal behavior of patients than psychiatrists or psychologists, we hypothesized that nurses would benefit more from TtT-e when compared with psychiatrists and psychologists.

Methods

Design

Multicenter cluster randomized controlled trial. MHIs were invited to provide departments for participation during nationally supported meetings and conferences on suicide prevention in the Netherlands from January 2009 until December 2011. Departments were considered eligible for participation if they treated patients aged ≥18 years, if professionals considered a need for training in suicide prevention skills, if the training was supported by the institutional board and if institutions were willing to accept costs due to loss of production. Eligible departments were matched in pairs based on primary patient diagnoses and average treatment duration.

Randomization

Members of matched pairs were randomly allocated to either IAU (control) or IAU + TtT-e (intervention). Binary randomization was performed by an independent researcher of the Institute for Health and Care Research (EMGO+) who was not involved in the study. Blinding of professionals to the outcome was not possible. Outcomes of matching and randomization are described elsewhere.

Ethics statement

Online informed consent was obtained for all individual participants after the procedures had been fully explained. The study (including digital informed consent) was approved by the Medical ethical commission of the VU Medical Center (2011/151) on 17 May 2011. It was registered in the Netherlands Trial Register (NTR3092 www.trialregister.nl) on 4 October 2011. The authors confirm that all ongoing and related trials for this intervention are registered.

Intervention

In the intervention condition, complete multidisciplinary teams (all registered nurses, psychologists, and psychiatrists) were trained by peers in the application of the PGSB via TtT-e. In TtT-e, three types of professionals were involved: masters, trainers and trainees. Training was applied on two levels: first, trainers were trained by masters. Subsequently, trainees were trained by trainers. The training consisted of a one day, small group face-to-face training and was supported by an additional e-learning module that lasted an hour.

Masters were experts in the field of suicide prevention due to scientific performance and clinical practice. Trainers were mental health professionals of various disciplines (psychiatrists, psychologists or nurses), selected by their management because of their role model in a team, and their excellent training skills. Trainees were health professionals within the team of the trainer.

The PGSB recommendations served as the starting point to set the content of the TtT-e program. The PGSB recommends systematic investigation of the suicidal condition of patients by using the Chronological Assessment of Suicidal Events (CASE) interview. Based on its outcome, risk and protection factors for suicide of individual patients are weighted. Subsequently, structured diagnosis, treatment strategy, and a safety protocol are determined. In the TtT-e program, the CASE interview was the overall framework for each of four role plays in which one trainee acts as a suicidal patient and the other trainee interviews the ‘patient’ via the CASE interview. The intervention is described elsewhere in more detail.

Measurements

In the intervention condition, two weeks before the face-to-face training of the departments’ staff was planned, the baseline assessment (T0) was sent to the trainees by e-mail via a online survey platform. Completing baseline assessment was mandatory to get entrance to the face-to-face training.
and to gain access to the e-learning module. A follow-up assessment (T1) was planned at three months after the training. Professional credits were awarded to professionals if they had completed T0, T1 and attended the training. In the control condition, T0 was carried out as soon as the team was informed and a list of e-mail addresses of professionals was provided to the research team. T1 was scheduled three months after T0. To encourage professionals to complete the assessments, a coupon of 10 Euro per completed questionnaire was provided. Per assessment, three reminders were sent, and team managers were encouraged to motivate their staff to complete the assessments.

Professional recruitment and follow-up

Departments were recruited from January 2009 until December 2011. The first baseline assessments were sent to individual participants at 24 November 2011. Last 3 months follow-up assessments was received at 28 February 2013.

Outcome measures

All outcome measures pertained to the individual level and consent was sought per individual. The primary outcome was guideline adherence, a self-constructed on-line measure. Professionals were asked to respond to 30-second video vignettes (n=5) in which experienced nurses, psychologists and psychiatrists interact with suicidal characters, played by actors. Professionals rated the likelihood of replying to the patient by using 25 different replies. Each reply could be rated on a Visual Analogue Scale, ranging from 1 to 100 (1=very unlikely, 100=very likely). For example: ‘Ask whether the patient thinks about suicide’, ‘Ask how hopeless the patient is feeling’. The replies of professionals to patient behaviors in this measure reflect recommendations according to the PGSB. At T0 and T1, similar vignettes were displayed. Per assessment, all item scores were summed and subsequently divided by the total number of items (n=125), resulting in a mean score ranging from 0 to 100; a higher score represents stronger guideline adherence. A reference score was set twice. First by a panel of masters (n=6) who completed the video vignettes, resulting in a reference score of mean (SD) 75.0 (6.0). Second, by psychology students (n=351) resulting in a score of mean (SD) 59.0 (8.0) and a Cronbach’s alpha of 0.92. A preview in English can be found at http://fpvu.eu.qualtrics.com/SE/?SID=S_v_cw1b80HYfY2k0iQh.

The secondary outcome was measured by the 7-item subscale self-evaluation of knowledge on suicidal behavior of the 14-item Question-Persuade-Refer-questionnaire 45. Another outcome, provider confidence, was calculated by summing the scores of the items ‘I am confident in my ability to successfully assess suicidal patients’ and ‘I am confident in my ability to successfully treat suicidal patients’ 46. Finally, ‘recognition of appropriate response to suicidal behavior’ was measured with the validated 24-item Dutch version 47 of the Suicide-Intervention-Response-Inventory-version 2 (VROS 46/SIRI-2 48). At T1, all professionals were asked if they read the summary of the guideline. In the intervention condition, professionals were also asked whether they used the e-learning module (YES/NO), and if so, for how many minutes and how they would rate the module (1 very bad- 10 very good). To observe adherence to the training program, training sessions were randomly visited by graduate psychology students. Adherence was scored on a 4-point Likert scale (1 = very strong, 4= very low).

Sample size

For the primary outcome (guideline adherence) the sample size was calculated according to Twisk 49. The number of professionals needed to be included was set to 165. This number is sufficient to find a 10% change 50, assuming 0.05 alpha and the statistical power of 1- beta = 80 %. A correction of 20% for clustering of effects within departments was applied.

Deviations from Study Protocol

In our published protocol article 20, we described to have two follow-up assessments, one directly after the training, and one at three month follow-up. Due to ICT difficulties to display the video fragments of our self-constructed guideline adherence scale, which led to several complaints of participants, we decided to skip the assessment directly after the training, and to only offer the 3 months follow-up. This way we hoped to reduce drop-out at 3 months follow-up.

Statistical analyses

First, we conducted a missing values analysis to identify patterns in missing values between the conditions. We found professionals in the intervention condition who were lost to follow up to systematically score lower on guideline adherence at baseline compared to other professionals. Based on this analysis we concluded that missing values were missing not at random. Therefore, we decided not to impute missing values and to conduct an available case analysis.

We analyzed the effect of the intervention on the primary and secondary outcomes by fitting multilevel models. Because multilevel modeling allows for the partition of the total variation in variation from differences in
measurements between professionals (level 1) and variation because of differences between departments (level 2), we could establish the impact of the observed changes on the different levels. The randomization condition was the between-subject factor. The baseline score of the dependent variable was added as covariate to adjust the outcome for baseline differences. The effect of the e-learning module above and beyond the face-to-face training was analyzed by fitting a multilevel model with ‘usage of the e-learning module’ (YES/NO) as between-subject factor and guideline adherence as outcome variable. Next, we separately analyzed the effect of the intervention for nurses, and psychologists/psychiatrists by rerunning all mixed model analyses with the total file split by profession. Differences between intervention and control condition were presented by a regression coefficient (B) and 95% confidence intervals and p-value. Cohen’s d’s represent the effect size of the TtT-e program.

Results

Figure 1: Flow of the study:

<table>
<thead>
<tr>
<th>Enrollment</th>
<th>Assessed for eligibility (45 departments)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Randomized (45 departments)</td>
<td>IAU* + TtT-e**</td>
</tr>
<tr>
<td>Allocated to intervention (22 departments)</td>
<td></td>
</tr>
<tr>
<td>• Received allocated intervention (18 departments, 411 professionals)</td>
<td></td>
</tr>
<tr>
<td>• Did not receive allocated intervention reorganisation, budget constraints (4 departments)</td>
<td></td>
</tr>
<tr>
<td>Allocated to intervention (23 departments)</td>
<td></td>
</tr>
<tr>
<td>• Received allocated intervention (18 departments, 156 professionals)</td>
<td></td>
</tr>
<tr>
<td>• Did not receive allocated intervention reorganisation, budget constraints (7 departments)</td>
<td></td>
</tr>
<tr>
<td>Follow-Up</td>
<td>Loss to follow-up (0 departments)</td>
</tr>
<tr>
<td>212 (52%) did not respond to the follow-up questionnaire</td>
<td></td>
</tr>
<tr>
<td>Analysis</td>
<td>Clusters: Analysed: 18 departments</td>
</tr>
<tr>
<td>Participants: 199 analysed</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Sample features of completers at baseline in n (%) unless otherwise stated

<table>
<thead>
<tr>
<th></th>
<th>Intervention group n=199 18 departments</th>
<th>Control group n=104 16 departments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female gender</td>
<td>139 (70)</td>
<td>67 (64)</td>
</tr>
<tr>
<td>Age mean (SD) yrs</td>
<td>42 (12)</td>
<td>43 (12)</td>
</tr>
<tr>
<td>Professional discipline</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nurse</td>
<td>121 (60)</td>
<td>51 (49)</td>
</tr>
<tr>
<td>psychologists/psychiatrists</td>
<td>52 (28)</td>
<td>32 (31)</td>
</tr>
<tr>
<td>other</td>
<td>26 (13)</td>
<td>21 (20)</td>
</tr>
<tr>
<td>Skills of professionals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>practice experience mean (SD) yrs</td>
<td>18 (11)</td>
<td>17 (12)</td>
</tr>
<tr>
<td>experience with suicidal behavior mean (SD) yrs</td>
<td>14 (10)</td>
<td>13 (10)</td>
</tr>
<tr>
<td>previously trained in discussing suicidal behavior</td>
<td>42 (23)</td>
<td>28 (27)</td>
</tr>
<tr>
<td>time span between T0 and T1 (months) mean (95% CI)</td>
<td>3.7 (3.4-4.1)</td>
<td>4.1 (3.8-4.4)</td>
</tr>
<tr>
<td>guideline adherence mean (SD) min 0 max 100</td>
<td>64.0 (9.5)</td>
<td>65.6 (9.7)</td>
</tr>
<tr>
<td>self-evaluation of knowledge mean (SD) min 7 max 35</td>
<td>23.0 (3.8)</td>
<td>25.1 (4.5)</td>
</tr>
<tr>
<td>provider confidence mean (SD) min 2 max 10</td>
<td>6.8 (1.5)</td>
<td>7.2 (1.5)</td>
</tr>
<tr>
<td>appropriate response mean (SD)</td>
<td>56.1 (1.21)</td>
<td>52.9 (9.7)</td>
</tr>
</tbody>
</table>

Table 1 shows the flow of departments through the trial, showing that 34 departments completed the study. In the intervention condition, 40 trainers from 18 departments were trained by masters. Of the total 567 professionals that started T0, 303 (53%) completed the follow-up assessment. More professionals in the intervention group the study compared to the control group. Adherence to the training program was rated high (n=3) or very high (n=4).

Table 1 shows that relatively more nurses were allocated to the intervention condition. Groups show comparable scores on all outcomes at T0.
Table 2: Results of the multilevel analyses* at T1 for all completers

<table>
<thead>
<tr>
<th></th>
<th>Intervention</th>
<th>Control</th>
<th>Effect size**</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Guideline adherence</strong></td>
<td>70.5(12.5)</td>
<td>66.0(11.2)</td>
<td>0.4</td>
</tr>
<tr>
<td>Range 1-100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Self-evaluation of Knowledge</strong></td>
<td>26.6(3.1)</td>
<td>24.1(2.3)</td>
<td>1.0</td>
</tr>
<tr>
<td>Range 7-35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Provider Confidence</strong></td>
<td>7.7(1.1)</td>
<td>6.9(1.4)</td>
<td>0.7</td>
</tr>
<tr>
<td>Range 2-10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Appropriate Response</strong></td>
<td>55(17.7)</td>
<td>53(11)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Range 12-280</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

* Model with random intercept for department, controlling for baseline. Intracluster correlation coefficient = 6%

** Cohen’s d

Table 2 shows the results of the multilevel analyses. At T1, the intervention condition showed significant higher scores on guideline adherence, self-evaluation of knowledge and provider confidence than the control condition. No difference on the SIRI-2 was found. Significant improvement of outcomes at T1 can be explained by changes between professionals (level 1; p < 0.001) but not by changes between departments (level 2; p = 0.1).

122 professionals (61%) in the intervention condition viewed the e-learning module for an average duration of 40 minutes (SD = 18). The average score of appreciation of the module was 6.9 (SD 1.4) on a scale of 1 to 10. The e-learning had no significant effect on guideline adherence above and beyond the face-to-face training (b = 1.9(1.0-4.5), p = 0.2). In the intervention condition 85% (n=98/115) stated they had read the summary of the guideline at T1, compared to 20% (n=31/149) in the control condition (χ²(1) = 80.5 p < 0.001). In the control condition, 67(46%) professionals were not aware that the guideline had been issued in the previous year.

Table 3: Separate results of the multilevel analyses* at T1 for nurses and psychiatrists/psychologists

<table>
<thead>
<tr>
<th></th>
<th>Nurses N=172</th>
<th>Psychiatrists/psychologists N=84</th>
<th>Effect size**</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Guideline adherence</strong></td>
<td>6.6 (3.2 to 10.0)</td>
<td>-1.2 (-6.1-3.7)</td>
<td>0.6</td>
<td>Ns</td>
</tr>
<tr>
<td><strong>Self-evaluation of Knowledge</strong></td>
<td>2.7 (1.7 to 3.8)</td>
<td>1.9 (0.7 to 3.2)</td>
<td>0.9</td>
<td>0.005</td>
</tr>
<tr>
<td><strong>Provider Confidence</strong></td>
<td>0.7 (0.2 to 1.2)</td>
<td>1.0 (0.3 to 1.6)</td>
<td>0.5</td>
<td>0.007</td>
</tr>
<tr>
<td><strong>Appropriate Response</strong></td>
<td>0.0 (-3.5 to 3.6)</td>
<td>5.5 (-2.7 to 13.9)</td>
<td>Ns</td>
<td>Ns</td>
</tr>
</tbody>
</table>

* Model with random intercept for department, controlling for baseline. Intracluster correlation coefficient = 6%

** Cohen’s d

Table 3 presents the effect of the intervention for nurses versus psychiatrists/psychologists. At T1, nurses but not psychiatrists/psychologists in the intervention group showed more guideline adherence than controls. Both nurses and psychiatrist/psychologists showed more self-evaluation of knowledge and provider confidence. No effect of the intervention was found on the SIRI-2.

Discussion

This study examined the additional effects of an e-learning supported Train-the-Trainer program (TtT-e) on adherence to the multidisciplinary practice guideline on the assessment and treatment of suicidal behavior. At 3 months follow-up, mental health professionals who received TtT-e in addition to traditional guideline dissemination showed stronger guideline adherence, more self-perceived knowledge of suicidal behavior and more provider confidence in dealing with suicidal behavior than professionals who were only exposed to traditional guideline dissemination. However, subgroup analyses showed that improved guideline adherence was found among nurses but not among psychiatrists and psychologists. As practice guidelines reflect everyday practice, professionals already show certain levels of guideline adherence without being trained. Their score on guideline adherence at baseline was close to the score of masters and above the average student score. However, among nurses, we found a 10% improvement on guideline adherence, which is postulated to be the maximum increase to achieve after training professionals in guideline adherence, and resembles the 10% change of educative interventions found in other studies on guideline implementation in general medicine and psychiatry.
No effect was found on the SIRI-2 which is in line with previous findings, indicating a ceiling effect for mental health professionals, who are assumed to already have basic skills and knowledge of dealing with suicidal behaviors at baseline.

Nurses were more likely to improve on guideline adherence than psychologists/psychiatrists. This might be explained by daily practice in which nurses likely ask for psychiatrists’ or psychologists’ consultation in case of a patient’s emerging suicide risks. Consequently, psychiatrists and psychologists are more often and more intrusively involved in systematic diagnosis of suicidal conditions than nurses. Additionally, contrary to nurses, psychiatrists and psychologists are obliged to follow post-doctoral education. Therefore, budgets for that goal fairly exceed budgets for nurses and chances to improve professional skills and knowledge are lower among nurses than among psychiatrists and psychologists.

Limitations and strengths

In the intervention condition, more professionals both started and dropped out of the study, compared to the control condition. This might be due to difference in motivation to participate in the study. For one, the incentive to finish the baseline assessment differed between the two conditions (mandatory for access to the training versus a coupon of 10 euro). We argue that some professionals in the intervention condition that started the study might not have been intrinsically motivated to participate in the study, but felt duty-bound. As completion of the follow-up assessment was not mandatory, but resulted in professional accreditation points, it might be that less motivated professionals dropped out more easily. We hypothesize that professionals in the control condition who completed T0, were more intrinsically motivated to participate in the study, and therefore more likely to complete T1 as well, resulting in a smaller drop-out rate.

One extra barrier for participation in our study was that the ICT environment in MHI’s was often technically insufficient to display the video vignettes of the survey. This may have caused a considerable drop-out and possibly introduced selection bias, as professionals who were strongly affiliated to the theme of the study might have been more likely to finish the study. The technical difficulties might also partly explain why 46% (66) professionals did not use the e-learning module. Still, the overall drop-out rate in our study was comparable or even better when compared to other studies involving professionals.

A strength of this study is its randomized controlled design, which is scarce in this field of research. A randomized controlled study of this size provides a high level of evidence. Also, the included departments well represent the psychiatric departments in the Netherlands. Therefore, the external validity of the findings is considerable. Another strength was the timing of the study; we offered our intervention right after the PGSB had been released and endorsed by the Dutch Health Inspectorate. Therefore, we argue that TtT-e was welcomed by both management and professionals as a well-timed intervention.

Implications and further studies

Our results support the idea that an e-learning supported Train-the-Trainer program is an effective strategy to implement clinical guidelines. We found that TtT-e resulted in improvement of individual professionals, but not in improvement of team performance. As the assessment and treatment of suicidal behavior is a multidisciplinary team effort, more focus should be aimed at the improvement of complete teams. Offering role-plays and feedback that target multidisciplinary collaboration could result in more effect on team level. Our results suggest that the effect of TtT-e is enduring for over at least three months, but we do not know the effect on a longer term. A systematic review found that booster sessions may be necessary to prolong the effect of our educational intervention. Next, we need to know the effect on clinical (patient) outcomes of our intervention and compare the found effects with other studies. In the current study, the relative effectiveness of the different elements of TtT-e (the Train the-Trainer element, the face-to-face training, the e-learning module, the multidisciplinary training) has not been examined separately. Future studies may disentangle the effects of the different elements, so that more targeted programs can be developed.
References


