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Online positive psychology intervention for nursing home staff: A cluster-randomized controlled feasibility trial of effectiveness and acceptability

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ABSTRACT

Background: Nursing staff in nursing homes is at risk for stress-related problems. Positive psychology interventions have been shown to effectively improve well-being and decrease depressive symptoms, and may be beneficial for nursing staff. However, controlled studies with nursing staff are missing.
Objectives and design: This is the first study to test the effectiveness and acceptability of an online multi-component positive psychology intervention in nursing home staff. This study used a cluster-randomized controlled design, with an intervention group and a control group, and measurements at baseline (T0) and following the training period (T1). We hypothesized that the intervention would improve general well-being, job satisfaction and work engagement, especially for people with low initial well-being, satisfaction or engagement. Furthermore, we explored the acceptability of such an intervention for nursing home staff.
Settings and Participants: All nursing staff of the units for physically frail older adults of four Dutch nursing homes belonging to one care organization were invited to participate in this study. A sample of 128 nursing staff completed T0, and 107 nursing staff completed T1, mostly licensed practical nurses with a mean age of 42 years.
Methods: The 8-week online intervention concerned information and evidence-based exercises of six topics of Positive Psychology, which were completed individually at home. General well-being, job satisfaction and work engagement were measured, and participants evaluated the intervention.
Results: No time by group interaction effect was found on general well-being nor on work engagement, but there was a small effect on job satisfaction. No moderation effects of baseline outcome measures were found. The evaluation of the intervention varied: a majority positively valued the intervention, in particular the topics “positive emotions” and “strengths”, but most agreed that there was too much text and too many exercises.
Conclusions: The online multi-component positive psychology intervention had only very limited effectiveness, as the decrease in job satisfaction in the control group may reflect a regression to the mean. The high baseline levels of well-being and engagement, intervention content, obligatory character of the intervention, and individuality are discussed as possible reasons for these results. Opportunities lie in creating a concise, work focused positive psychology intervention for nursing staff, including some form of autonomy support.

What is already known about the topic?

- Nursing home staff is at risk of stress-related problems.
- Positive psychology interventions can improve well-being, which is related to various. positive physical and mental health outcomes, and positive organizational outcomes.
- Acceptability and effectiveness of positive psychology interventions have yet to be tested in nursing home staff.

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What this paper adds

- An online multi-component positive psychology intervention did not improve well-being, but showed a small effect on job satisfaction.
- Nursing staff generally show acceptability of a positive psychology intervention.
- Opportunities lie in creating a positive psychology intervention for nursing staff that is more concise, work focused, and including some form of autonomy support.

1. Introduction

As the population is ageing, it is expected that more older adults will need long-term care (UN, 2015). However, there is a growing shortage of nursing staff (Spetz et al., 2015; WHO, 2013), with nursing homes dealing with high rates of sick leave and turnover (Donoghue, 2010). Providing nursing home care can be a stressful job, as nursing staff is frequently confronted with inadequate staffing, shift work, high workload, professional conflict, resident aggression, and the suffering of residents (e.g., Evers et al., 2001; Harrington et al., 2012; McVicar, 2003; Sanchez et al., 2015). This stress can have negative health consequences for nursing staff (Salvagioni et al., 2017), and is related to lower quality of care, and to lower resident well-being (Cimiotti et al., 2012; Edvardsson et al., 2008). It is thus important to invest in a sustainable nursing home workforce, by fostering the mental health of nursing staff (Collet et al., 2018). The current study examines whether an online intervention based on positive psychology can improve mental well-being, job satisfaction and work engagement, and whether it is an acceptable intervention for nursing staff in nursing homes (i.e., all staff who provide physical care to nursing home residents).

Traditionally, psychology primarily focused on alleviating problems of mental health. Indeed, current mental health interventions for nursing staff are primarily focused on *coping* with stress and reducing burnout (Awa et al., 2010; Romppanen and Häggman-Laitila, 2017; Westermann et al., 2014). However, it is increasingly recognized that a person without mental health problems is not necessarily optimally functioning (e.g., Lamers et al., 2011). A new and growing area of research is now focusing on promoting mental well-being (Rusk and Waters, 2013), fueled by the positive psychology movement (Seligman and Csikszentmihalyi, 2000). Well-being can be defined in terms of *feeling good*: balanced positive and negative affect and satisfaction with life, and *doing well*: a positive perception of optimal functioning of the individual and in the society. The broaden-and-build theory describes that *feeling good* can broaden attention, making people more creative and flexible, which in turn helps to build other positive personal resources like resilience and optimal functioning (Fredrickson, 2001). We propose that optimizing well-being of nursing home staff is an important objective, since well-being is related to reductions in mental illness, improved physical and mental health, sociability, effective conflict resolution skills, and intention to stay with the organization (e.g., Decker et al., 2009; Hone et al., 2015; Keyes et al., 2010; Lyubomirsky et al., 2005a,b).

In the past decades, various interventions have been developed to improve mental well-being, for example imagining your best possible self (King, 2001), performing acts of kindness (Curry et al., 2018), or savoring positive emotions by thinking of three things that went well today (Seligman et al., 2005). Three meta-analyses showed that such positive psychology interventions can produce small to moderate improvements in well-being and depressive symptoms (Bolier et al., 2013b; Sin and Lyubomirsky, 2009; Weiss et al., 2016). The effectiveness may further improve when combining several evidence-based positive psychology activities in one multi-component intervention (Hendriks et al., 2019; Sin and Lyubomirsky, 2009).

Positive psychology interventions may also improve job satisfaction and work engagement: the persistent positive state of fulfilment by one's job, characterized by absorption, vitality and devotion (Schaufeli et al., 2002a,b). The job-demands-resources model (JD-R model; Demerouti et al., 2001) proposes that the personal resources that are targeted by positive psychology interventions (e.g., resilience; optimism), make people better at utilizing job resources (e.g. social support), leading to increased work engagement (e.g., Bakker and Demerouti, 2007; Demerouti and Bakker, 2011). Only a few multi-component positive psychology interventions have been tested in the work context, showing variable results: or not improving general well-being (Abbott et al., 2009), improving general well-being, but not with job satisfaction (Page and Vella-Brodrick, 2013), improving general well-being and improving work engagement for people with low initial work engagement (Ouweneel et al., 2013).

Positive psychology interventions have particularly great potential as a self-care technique for nursing staff (Crane and Ward, 2016). The flexibility provided by the online self-help format of many positive psychology interventions (Bolier and Abello, 2014; Sin and Lyubomirsky, 2009) fits well with shift-working nursing staff, and makes it relatively easy to provide to all employees of the care organization. A handful of studies tested positive psychology interventions for employees in the health-care context. However, these studies were aimed at improving well-being of managers or residents (Grant et al., 2009; Guzmán et al., 2017). Other studies did not include well-being as dependent variable (Xu et al., 2016), did not include a control group (Rippstein-Leuenberger et al., 2017), or had insufficient participation rates (Bolier et al., 2014).

Furthermore, little is known about how employees react to interventions that improve *personal resources* instead of *professional skills* (Gilbert et al., 2018). This may be especially relevant for nursing staff who tend to be primarily focused on others, and generally have difficulties in taking time to administer self-care (Crane and Ward, 2016). On the other hand, compared to a problem-focused intervention, a well-being intervention may be more acceptable for nursing staff who are not experiencing clinically relevant problems (Parks et al., 2013). Indeed, a previous study gave some indication that a mindfulness-based intervention was acceptable for oncology nurses (Duarte and Pinto-Gouveia, 2016), but more research is needed.

The aim of the current study is to test the effectiveness and acceptability of an online multi-component positive psychology intervention for nursing home staff. We used the multi-component *This Is Your Life* intervention, which consists of evidence-based activities from several positive psychology theories (Schotanus-Dijkstra et al., 2015). An email-guided self-help version of this intervention proved to be (cost-)effective in improving well-being and reducing anxiety and depression in a randomized controlled trial in people with suboptimal well-being (Schotanus-Dijkstra et al., 2017, 2018). A gamified online version of this intervention was co-designed for the work context with school teachers (Ludden et al., 2014), which was found to improve involvement, flow, interest and inspiration (Kelders et al., 2018). We use a cluster-randomized controlled trial to study the effectiveness of this online multi-component positive psychology intervention in improving general well-being, job satisfaction and work engagement on individual participant level. We hypothesize that:

1 The positive psychology intervention improves general well-being of nursing staff

2 The positive psychology intervention improves job satisfaction and work engagement of nursing staff
3 The positive psychology intervention is more effective in improving well-being, job satisfaction or work engagement for nursing staff with low initial well-being, satisfaction or engagement respectively.

Furthermore, we analyze the evaluations of participants about the intervention and their motivation to complete the intervention, to explore the acceptability and the strengths and limitations of this intervention in the nursing staff context.

2. Materials and methods

2.1. Research design

A two-armed cluster-randomized controlled design was used, with one group receiving the online multi-component positive psychology intervention and a control group receiving no intervention. The intervention lasted 8–12 weeks. Assessments took place before the intervention (T0), and approximately 12 weeks later, following the intervention (T1). The study was carried out in accordance with the Declaration of Helsinki and approved by the ethics committee of the [blinded for review] (no. [blinded for review]).

2.2. Sample and procedure

The study took place within a large care organization in the Netherlands, counting 17 nursing homes, with about 2000 employees. Taking into account a 25% loss to follow-up, a power-analysis indicated that 86 participants devided over two groups were needed to have 80% power for detecting a small sized effect. We chose for cluster randomization to avoid contamination, because nursing staff in the same nursing home were expected to have close contact with each other. When additionally taking into account an inflation factor for nursing home location clustering of 0.93 (1/(1+(4 locations-1)×ICC 0.0245 (SF-36 mental component; Cosby et al., 2003)), 99 participants were needed. In consultation with interested team leaders, the division director selected four nursing homes that were comparable in location to participate in the study, after which cluster randomization was conducted by the first author at nursing home level using random.org (2 nursing homes per condition, see Fig. 1). The care organization presented the study and intervention to the staff as part of executing their mission statement of developing a positive care environment. All nursing staff (n = 159) of the included units for physically frail older adults in the participating nursing homes were eligible to participate. Staff was informed about the study in writing, and invited by email to complete the online baseline questionnaires (T0). Participation in the questionnaire study was voluntary and informed consent was obtained online with an opt-in method at the start of the study. The study took place between April and July 2015. A total of 128 nursing staff (81%, intervention n = 79, control n = 49) started the questionnaire at baseline. Completing T0 questionnaires was not a prerequisite for participation in the T1 questionnaire. Demographic information was gathered as part of the questionnaires, or retrieved from the care organization (for non-responders; i.e., age, gender, function and hours worked per week). Additionally, participants in the intervention group were asked to complete an evaluation of the intervention and indicate their motivation to complete the intervention. Fig. 1 shows the participant flowchart. Participants received 1 h of works payment for completing both (T0 and T1) measurements.

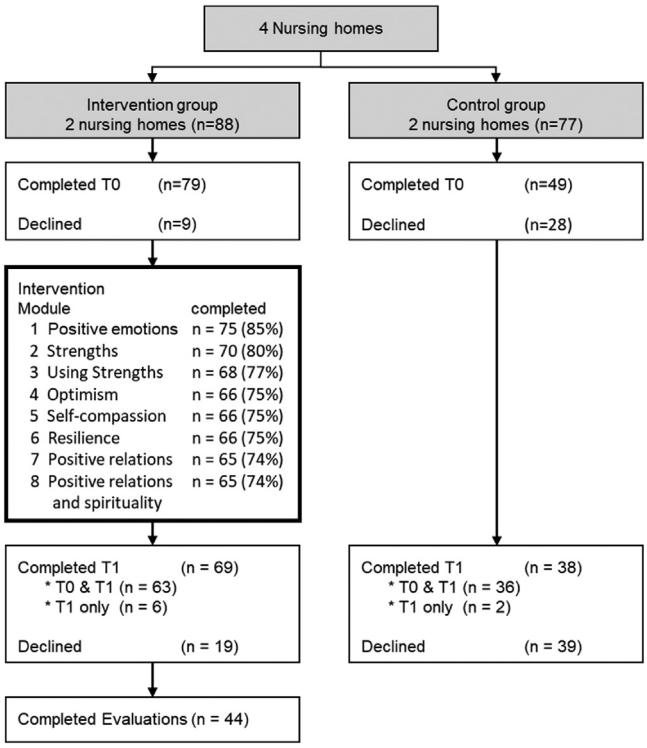

Fig. 1. Flowchart of participants in the study.

2.3. Online gamified multi-component positive psychology intervention

The current intervention was based on an existing multicomponent Positive Psychology intervention "This is Your life" (Bohlmeijer and Hulsbergen, 2013, 2018). We used an online gamified version in the current study (Kelders et al., 2018; Ludden et al., 2014). Based on a small pilot study with three nursing staff and one team leader, the amount of text was reduced and the wording was altered to better suit the lower education level of the current participants.

In the online *This Is Your Life* intervention, eight modules cover six key topics of well-being: (1) positive emotions; (2) discovering and using strengths; (3) optimism; (4) self-compassion; (5) resilience, and (6) positive relations. Each module consists of psycho-education and approximately five evidence-based positive psychology exercises that can be completed multiple times (e.g., positive emotions: "the three good things", Seligman et al., 2005; optimism: "imagine your best possible self", Peters et al., 2010). For a more elaborate description of the intervention components see Schotanus-Dijkstra et al. (2015) and Ludden et al. (2014). Gamified aspects of the intervention include a storyline of following a journey towards a flourishing life (visualized with different places on a map), guidance by an avatar of a professor, and receiving tailored automatic feedback. The online training is completed in chronological order, with participants earning a key to access the next module upon finishing the mandatory activities, and receiving a badge upon finishing each lesson.

The intervention was implemented by the care organization as a mandatory course for all nursing staff in the participating units of the intervention group. The interface of the online training was explained in a face-to-face introduction on site, and with website manuals. Participants followed the intervention individually at home, using a personal login code. Participants were advised to complete one lesson per week, finishing the intervention in eight weeks, but login codes remained valid for twelve weeks. Participants were aware that

researchers and supervisors from the care organization had no access to the content of exercise answers. Completing the intervention was rewarded with both 9 h of works payment and eight Dutch accreditation hours for the nursing specialist's registry.

2.4. Outcome measurements

At both T0 and T1, scales measuring general well-being, job satisfaction, and work engagement at individual participant level were assessed.

2.4.1. General well-being

General well-being was measured using the Dutch version of the Mental Health Continuum-Short Form (MHC-SF; Keyes, 2002). The 14 items assess emotional wellbeing (3 items, e.g., 'In the past month, how often did you feel happy?'), social well-being (5 items, e.g., 'In the past month, how often did you feel that our society is becoming a better place for people?') and psychological well-being (6 items, e.g., 'In the past month, how often did you feel confident to think or express your own ideas and opinions?'). The items were answered on a scale from 0 *never* to 5 *(almost) always*. A total mean score was computed, with higher scores indicating higher levels of wellbeing. The MHC-SF showed excellent psychometric properties (Keyes et al., 2008; Lamers et al., 2011). The total scale had a Cronbach's alpha of .92 at baseline in the current sample.

2.4.2. Job satisfaction

Job satisfaction was measured with 5 items from the Maastricht Job Satisfaction Scale for healthcare (MAS-GZ; Landeweerd et al., 1996; e.g., 'How satisfied are you with the activities you carry out?'). Items were scored on a 5-point scale from 0 *very dissatisfied* to 4 *very satisfied*, and a higher total sum score indicating higher work satisfaction. The scale had a Cronbach's alpha of .80 in the current sample.

2.4.3. Work engagement

Work engagement was measured using the Short version of the Utrecht Work Engagement Scale (UWES-S 9; Schaufeli and Bakker, 2003). This scale contains 9 items, assessing Vigor (3 items, e.g., 'At my work, I feel bursting with energy'), Dedication (3 items, e.g., 'I am enthusiastic about my job') and Absorption (3 items, e.g., 'I feel happy when I am working intensely'). All items were scored on a frequency scale from 0 *never* to 6 *always*, with higher total mean scores indicating more engagement. The scale has good psychometric properties (Schaufeli et al., 2002a,b). The total scale had a Cronbach's alpha of .93 at baseline in the current sample.

2.4.4. Acceptability of the intervention

After the T1 questionnaire, participants in the intervention group were asked to complete an assessment of the intervention on paper, including their motivation to complete the intervention and an evaluation of the online multi-component positive psychology intervention.

Intrinsic motivation to complete the intervention was measured with four subscales of the Intrinsic Motivation Inventory (IMI; SDT, nd; Dutch version Friederichs et al., 2015), adapted to fit the current intervention. The subscales had four items each: enjoyment (e.g., 'I enjoyed following the course very much'), experienced value of the intervention (e.g., *'I believe following this course could be of some value to me'*), competence (e.g., *'I think I was pretty good at following the course'*), and experienced choice (e.g., *'I followed this course because I wanted to'*). Each item was scored from 1 *not at all true* to 7 *very true,* resulting in mean scale scores. The scales had satisfactory reliability in the current sample ($\alpha = .86$, $\alpha = .95$, $\alpha = .74$, and $\alpha = .77$ for enjoyment, value, competence and choice respectively).

Evaluation of the intervention was conducted with several items. Participants were asked to rate the overall intervention on a scale from 1 *very bad* to 10 *very good*. In addition, participants indicated the usefulness of the separate modules in two items (i.e., 'Which modules were most useful for you?', and ' . . . least useful for you?'), with no restriction on the number of modules they could tick. The intervention was further evaluated on quantity (of text, exercises, and modules), and duration (in weeks, and time spend on each module) as either being too little (1 *far too little,* and 2 *too little* combined), precisely right (3), or too much (4 *too much* and 5 *far too much* combined). Finally, participants were asked open-ended questions to deliberate on reasons for usefulness, the most important benefit from the intervention, and to provide tips and additional feedback on improving the intervention.

2.5. Analyses

All analyses were conducted with SPSS 24.0 (IBM SPSS Statistics), with the alpha level set to .05. The intervention and control group were compared on socio-demographics and baseline outcome measures, using independent sample t-tests and χ^2 tests. Variables on which the groups differed significantly would be included as covariates in the main analyses. Independent sample t-tests and χ^2 tests were also used to compare demographics of responders and non-responders, and to compare demographics and main outcome measures of completers and T1 dropouts. There was no missing data on single items, but the data of secondary measures were missing for 2 participants at T0 (control group), and 6 participants at T1 (control group n = 1, intervention group n = 5). Furthermore, all baseline data was missing for 8 respondents, and 29 respondents dropped out at T1. Modified intention-to-treat analyses were conducted with the Linear Mixed Models (LMM) procedure, including all nursing staff who participated in one of the questionnaires. Completers-only analyses did not show different results and are therefore not reported. Demographics and estimated marginal mean scores were provided for all participants.

The LMM analyses included the fixed effects of group (intervention vs. control), and time as repeated measure (T0 vs. T1), and group x time interaction for each well-being outcome measure (i.e., general well-being, job satisfaction or work engagement). Furthermore, to control for clustering, nursing home locations and participants within locations were included as additional random effects in all analyses. To test whether the intervention was more effective for people with low initial well-being, job satisfaction or work engagement, moderation effects of each baseline well-being measure were analyzed by including a group x time x baseline (well-being/job satisfaction/work engagement) interaction as fixed effect in the corresponding model. For this, baseline well-being, job satisfaction and work engagement scores were dichotomized in 'high' and 'low' using a median split. Significant interaction effects would lead to plot inspection. Compound symmetry was adopted as the covariance type, as it best fit the data, with restricted maximum likelihood as the estimation method. The effect size of Cohen's d was calculated by dividing the T1 mean difference of the estimate marginal means of the intervention and control condition by the pooled standard deviations, with Cohen's d < .33 as small, .33–.55 as moderate and > .55 as large effects (Lipsey and Wilson, 1993).

Participants' quantitative evaluations of the intervention were analyzed with descriptive analyses. The content of the answers to the open-ended questions were analyzed conjointly by the first and second author, using Excel. All answers were analyzed together, on level of coherent piece of text. Data was first coded on describing either positive or negative aspects of the intervention, and then coded inductively. Codes were grouped on three

themes: intrinsic motivation, content, and set-up of the intervention.

3. Results

3.1. Participants

Table 1 shows the baseline characteristics of participants. Mean age was 41.8 years (SD = 12.1, range 16–65 years) and all but one were Dutch. A majority of participants were female, most worked as licensed practical nurse, with a contract of 17–24 hours, or 25–32 hours per week. Mean experience of working in a nursing home was 15.1 years (SD = 11.0, range 0–43 years). Nursing staff in the control condition were slightly older and more often married (Table 1). To control for these differences, age and marital status were included as covariates in all main analyses. Furthermore, because participants in the control condition tended to have higher baseline job satisfaction (Table 2), it was included as covariate in the main analyses of general well-being, and work engagement.

3.2. Non-response, drop-out and intervention adherence

At T0, the response was lower in the control group (60%) than in the intervention group (82%, χ^2 (1) = 10.8, p = .001), but no differences on any of the available demographic variables (i.e., age, gender, marital status, work experience, function, and number of hours worked per week) were found between participants and non-responders at T0 (not in table). T1 drop-out (23%) did not differ between conditions (χ^2 (1) = 1.5, p = .28). Completers reported higher baseline job satisfaction (M = 15.9, SD = 2.3) than T1 drop-outs (M = 14.4, SD = 2.6, t(123) = 2.8, p = .006), and higher work engagement (M = 4.9, SD = 0.9) than T1 drop-outs (M = 4.3, SD = 1.1, t (123) = 2.7, p = .009). In the intervention group, 65 nursing staff (74%) completed all modules of the intervention, one participant completed 6 modules, and 9 participants completed 3 or less modules (Fig. 1). The evaluation of the intervention was filled out by 44 intervention participants (50%), most of whom (93%) had completed all modules of the intervention.

3.3. Outcomes

Table 2 shows the estimated marginal mean scores and standard deviations of T0 and T1 measures. At baseline, participants in both the control group and the intervention group scored rather high on general well-being, job satisfaction and work engagement. Mean scores of general well-being and work engagement were comparable to the Dutch national norm-groups (general well-being, M = 3.0, SD = 0.9; Lamers et al., 2011; work engagement M = 3.7, SD = 1.2; Schaufeli and Bakker, 2003).

3.3.1. Main analyses

It was hypothesized that the multi-component positive psychology intervention would improve general well-being, job satisfaction, and work engagement of nursing staff. However, the mean general well-being scores remained stable for both groups (Table 2), and the LMM analysis showed no interaction effects on general well-being. Furthermore, no interaction effects were found on work engagement (Table 2). Only job satisfaction showed a significant interaction effect, with participants in the intervention condition remaining stable on job satisfaction, while participants in the control condition decreased in job satisfaction. For each analysis, the random factors of nursing home locations and participants within locations had a non-significant contribution (p's > .48).

3.3.2. Moderation analyses

It was hypothesized that the intervention would be most effective in improving well-being for people with low initial well-being, job satisfaction or work engagement. The tree-way interaction of condition, time and baseline scores showed no significant effect on general well-being, job satisfaction, or work engagement (Table 2). The intervention was not more effective on general well-being for people with low initial general well-being, nor was the intervention more effective on job satisfaction or work engagement for people with low initial satisfaction or engagement

3.4. Acceptability of the intervention

Overall, participants were moderately positive about the course, although their evaluations varied. The intervention was evaluated with a mean grade of 6.4 (SD = 1.89), which translates to 'adequate' in the Dutch grading system. Quantitative and qualitative evaluation results are jointly discussed below, on themes of intrinsic motivation, content, and set-up of the intervention. Table 3 shows the quantitative evaluation results.

Table 1
Characteristics of participants in the control group, intervention group and total sample.

	Control (n = 49)	Intervention (n = 79)	Total (n = 136)	Baseline difference p
Age, M (SD)	44.7 (10.0)	39.6 (13.0)	41.6 (12.1)	t = 2.5 .01*
Gender, n (%)				χ^2 = 1.1 .29
Female	48 (92)	81 (96)	129 (95)	
Male	4 (8)	3 (4)	7 (5)	
Marital Status, n (%)				χ^2 = 9.2 .003**
Married	41 (79)	44 (52)	85 (63)	
Single	8 (15)	30 (36)	51 (37)	
Work Experience, M (SD)	16.3 (9.6)	13.9 (11.5)	14.8 (10.8)	t = 1.3 .21
Function, n (%)				χ^2 = 3.6 .33
Registered nurse	1 (2)	7 (8)	8 (6)	
Licensed practical nurse	46 (89)	65 (77)	111 (82)	
Nurse assistant	4 (8)	8 (10)	12 (9)	
Student	1 (2)	4 (5)	5 (4)	
Hours working per week, n (%)				χ^2 = 2.3 .70
33–40	5 (10)	6 (7)	11 (8)	
25–32	10 (19)	23 (27)	33 (24)	
17–24	27 (52)	37 (44)	64 (47)	
9–16	9 (17)	13 (16)	22 (16)	
1–8	1 (2)	4 (5)	5 (4)	

* α < .05.
** α < .01.

Table 2
Estimated marginal means of primary and secondary outcome variables and LMM analyses.

		Control *M (SD)*		Intervention *M (SD)*		Baseline difference		Interaction Condition x Time		Effect size		Interaction Condition x Time x Baseline score[1]	
Scale	Range	T0	T1	T0	T1	t	*p*	*F*	*p*	*d*	95% CI	*F*	*p*
General Well-being	0-5	3.5 (0.8)	3.5 (0.7)	3.7 (0.8)	3.6 (0.7)	0.0	.99	0.25	.62	.12	−.53 to .29	0.25	.62
Job Satisfaction	0-20	16.0 (2.3)	15.1 (2.2)	15.2 (2.6)	15.3 (2.2)	2.4	.02*	4.54	.04*	.10	−.50 to .31	0.33	.57
Engagement	0-6	4.7 (0.8)	4.6 (0.7)	4.8 (0.8)	4.8 (0.7)	1.2	.25	0.25	.62	.22	−.65 to .20	2.95	.09

Note: controlled for age and marital status, and the analyses of well-being and engagement are controlled for baseline job satisfaction.
* $\alpha < .05$.
[1] High or low score on the corresponding well-being, job satisfaction or work engagement measure; CI = confidence interval.

Table 3
Evaluations of the intervention: Intrinsic motivation, content and set-up.

Intrinsic motivation	*Scale*	M	SD
Enjoyment	1-7	4.3	1.3
Value	1-7	4.4	1.4
Competence	1-7	4.7	1.1
Choice	1-7	3.8	2.3
Module content	Most useful[a]	Least useful	
1 Positive Emotions	40%	9%	
2 Strengths	38%	9%	
3 Use Strengths	24%	7%	
4 Optimism	20%	13%	
5 Self-compassion	16%	18%	
6 Resilience	31%	13%	
7 Positive relations	18%	11%	
8 Positive relations and spirituality	22%	13%	
Set-up	Too little	Precisely right	Too much
Amount of Text	3%	23%	75%
Number of Exercises	0%	24%	76%
Number of Modules	12%	42%	46%
Time for each module	0%	46%	54%
Number of weeks	10%	55%	35%

[a] There was no restriction on the number of modules to assign most or least useful to.

3.4.1. Intrinsic motivation

Participants scored moderate on the enjoyment scale, with some participants being very enthusiastic: *"I found it great to do, I learned a lot from it and will certainly continue to work on it the future"*. However, several other participants were not positive about the intervention, mentioning that time and money had better been invested in the residents: "*a course like this one should never be implemented again*". Furthermore, participants scored moderate on the subscale measuring value of the intervention. The qualitative analysis showed that most of the participants could name positive outcomes of the course: some concerning some general insight: *"How you can have different views on things and different ways of handling [things]"*, and most concerning some insight about themselves: *"[Because] you do get to know yourself a bit better"*. Additionally, several participants described that they adopted a more positive perspective: "*To see more positive things and to give yourself compliments"; "also to give colleagues positive feedback"*. However, other participants described that they had forgotten the content of the intervention, or that they could not mention any positive outcome of the intervention*: "Have yet to discover the added value it has yielded"*. Only one participant indicated an adverse outcome "*do not give someone a depressive feeling"*, but it seemed like this concerned the questionnaire instead of the intervention. Participants felt rather competent in following the training, although a few participants also described that they found the intervention too difficult. Finally, the subscale scores indicated that participants experienced only moderate choice in following the intervention, but they did not discuss this further in the answers to the open questions.

3.4.2. Content

The content of the intervention was described as personally relevant and at times confronting: "Each part had something useful or something that was appealing"; "I got a good view and impression again, sometimes you repress it and now it came back again". Others stated that the intervention did not fit the workplace: "Little or none of this can be applied to my work practice". Furthermore, some participants indicated that they had no need for the personal character of the course, with some participants indicating it was not the right time: "Because I am not working on this yet, in terms of [my] private [life]". Nursing staff varied in their evaluations of the usefulness of the separate modules, with each module evaluated both as most and as least useful by at least 3 participants. Overall, the two modules covering positive emotions and strengths (module 1 and 2) were evaluated as most useful, and the module on self-compassion (module 5) as least useful. Participants did not elaborate much on the reasons why, other than in terms of "That is what I am most interested in", or "Personally, I am not interested in spirituality".

3.4.3. Set-up

The number of exercises and amount of text were evaluated as 'too much' by a large majority (Table 3), and reducing the amount of text, exercises and repetition in exercises was most often mentioned as point of improvement for the intervention: *"Sometimes it was a lot of reading and assignments were very similar*". Evaluations of the number of modules and time spend on each module varied notably between participants, many indicating it as 'too much', and many others as precisely right (Table 3). A small majority was satisfied with the duration of the intervention in weeks. Only two participants mentioned the gamified aspect of the intervention, one indicated having expected more gamified aspects; one indicated liking the gamified aspect: *"The set-up of the course was fun with the islands/area's"*.

4. Conclusions

To our knowledge, the current feasibility study was the first to analyze the effectiveness and acceptability of an online multicomponent positive psychology intervention to improve well-being of nursing staff in nursing homes. We used an intervention that consisted of evidence-based methods (Seligman et al., 2005), and showed that when the employer presents such an intervention as an obligatory course, the retention is high. Participants were generally positive about the intervention, showing intrinsic motivation to follow the intervention, and evaluating the intervention as personally relevant and experiencing beneficial effects. However, the online multicomponent positive psychology intervention was not effective in improving well-being, even for

people with low initial well-being. This is in line with one study on a positive psychology interventions in the work environment (Abbott et al., 2009), but not with others (Ouweneel et al., 2013; Page and Vella-Brodrick, 2013), nor is it in line with a previous study of the same intervention in a different population (Schotanus-Dijkstra et al., 2017). Furthermore, unlike Ouweneel et al. (2013), we did not find an effect on work engagement for people with low initial work engagement. There was a small effect of the intervention on job satisfaction, although these results should be interpreted with caution as the decline in job satisfaction in the control group may represent regression to the mean. In the following, we will consider the high baseline levels of well-being and work engagement, intervention content, the obligatory character of the intervention, and individuality as possible explanations of the limited effectiveness.

First, the high baseline well-being of our sample left only limited room for improvement. Previous studies often used participants with low initial well-being (e.g., Schotanus-Dijkstra et al., 2017), while the nursing staff in the current study had an initial general well-being and work engagement comparable to the Dutch national norm-groups. This was unexpected, seeing the numerous studies stressing that healthcare providers working with older adults are at increased risk for stress-related problems (e.g., Sanchez et al., 2015). This positive finding is in line with the rather high well-being scores found for nursing staff in nursing homes in Sweden and Spain (Yepes-Baldó et al., 2018). We should also take into account, however, that some participants may have given socially desirable answers, as anecdotal evidence indicated that some questioned their anonymity in this study which was initiated and introduced by the employer. Furthermore, while the increased risk of stress-related problems for nursing staff is quite well-studied, we were unable to find comprehensive international comparisons of current positive well-being states of nursing staff to compare our results to.

Second, the content of the current intervention may not have been satisfactory applicable to the work context of nursing staff. We used a positive psychology intervention that was effective in improving general well-being in previous research (Schotanus-Dijkstra et al., 2017), and nursing staff in a small pilot study showed interest in the content. However, as some participants also noted, the intervention content was not specifically aimed at the work context, which may explain the lack of improvements in job satisfaction and work engagement. Furthermore, the intervention was originally developed for people with a relatively high educational level (Ludden et al., 2014). Although Schotanus-Dijkstra et al. (2017) found no moderating effect of education on effectiveness of the current intervention, they included only about 4% lower educated participants. Others found some initial evidence that higher-educated participants profited more from an online positive psychology intervention than lower-educated people (Bolier et al., 2013a). Otherwise, little is known about the influence of education level on effectiveness of positive psychology interventions. Our qualitative results clearly indicated that nursing staff preferred a more concise positive psychology intervention, which could be realized by including only the modules participants found most useful (e.g. positive emotions and strengths), or for example by including only short pieces of information in video fragments (Ouweneel et al., 2013). However, future studies may also want to include nursing staff in all stages of intervention design, so all components of the positive psychology intervention are tailored specifically to their needs before implementation (Kip and van Gemert-Pijnen, 2018).

Third, it is possible that the mandatory aspect of the training influenced the results. Of course, nursing staff would ideally participate voluntarily in a positive psychology intervention, securing a sense of autonomy and belief in the benefits of the intervention. However, participation and retention rates are known problems of online interventions (Eysenbach, 2005). Especially nursing staff generally have difficulties in taking time to administer self-care (Crane and Ward, 2016). When provided a choice, only 5% of hospital nurses followed an online positive psychology intervention to some extent (Bolier et al., 2014), while we had satisfactory participation and retention rates in the current study with this mandatory aspect. Obligatory courses are commonplace in Dutch nursing homes, but are usually aimed at improving *professional skills*, not at *personal resources*. The acceptability of mandatory participation in well-being interventions, and its influence on the effectiveness in the work context are not well studied (Gilbert et al., 2018). The current study provided some indication that a mandatory positive psychology intervention is acceptable for most nursing staff, although a few participants also clearly disliked it. Concerning effectiveness, the meta-analysis of Sin and Lyubomirsky (2009) showed better well-being improvements in self-selected compared to assigned participants, although the meta-analysis of Bolier et al. (2013a,2013b) showed no such differences. The main assumption here is that self-selection is equal to more intrinsic motivation to follow the intervention (Lyubomirsky et al., 2011). The moderate intrinsic motivation in the current study did leave room for improvement. However, intrinsic motivation could also be supported in alternative ways, for example by offering other meaningful choices in the intervention (e.g., which activities to complete; Deci et al., 1994). Future research should further investigate the retention, acceptability and the effectiveness of mandatory compared to voluntary participation in positive psychology interventions in the work environment, and the usefulness of alternative autonomy supportive methods.

Finally, the intervention may have been too individualistic for nursing staff. The individual online delivery which was used in the current study maximizes the flexibility for nursing staff with shiftwork, and improves easy scalability towards all nursing staff of a care organization (Bolier and Abello, 2014). However, some form of guidance during the intervention seems to improve the adherence to and effectiveness of positive psychology interventions (Sin and Lyubomirsky, 2009). Although team leaders were trained in the current study with this purpose, it proved to be difficult for them to implement what they had learned. A nursing home psychologist may be more equipped to provide such guidance, or alternatively email-guidance by an external coach or psychologist could be included. Furthermore, the potential of peer-support and social sharing were underutilized in the current intervention. Team meetings would be a natural setting in which nursing staff can share positive experiences of the intervention, which can improve effectiveness by enhancing relationships and by cultivating the positive emotions related to these positive experiences (Gable et al., 2004).

There are several limitations to be discussed. We had a limited sample size, which limited the possibility for subgroup analyses. However, a post-hoc power analyses showed that there was no problem with power for the main analyses. Furthermore, although the non-significant random effects indicated that clustering of data within nursing home locations was very small, we reported these results as they best fit the design of the study and the non-hierarchical analysis did not yield substantially different results. We did not include content analyses of the exercises, so we have no knowledge of how serious nursing staff adhered to the exercises. Other research shows that effort may influence the effectiveness of positive psychology interventions (Lyubomirsky et al., 2011). We chose this, however, to assure participants anonymity, which may have been especially important as the course was provided by their employer. Furthermore, long-term effects could not be tested because this online intervention was part of a larger project

including other interventions aimed at improving well-being of residents. Finally, intrinsic motivation and evaluation were only measured at post-test, while continuous evaluation during the intervention would have relied less on recall and may give a better insight in the true feelings of the participants.

Concerning generalizability, the sample consisted solely of Dutch nursing home staff, who were mostly licensed practical nurses with relatively high baseline well-being. The participants in our study were quite familiar with internet facilities: they were expected to regularly read their work email and work with an electronic client report. This limits generalizability of acceptability of such an online positive psychology intervention to other countries, where there may be a higher percentage of nursing aids, and where nursing staff is not as adept with internet facilities.

Studying the effectiveness of online positive psychology interventions is a very new field (Bolier and Abello, 2014), and there is a need for structurally investigating the optimal conditions of online multicomponent positive psychology interventions for various populations and in various contexts. This study showed that implementing an obligatory online multi-component positive psychology intervention is possible and acceptable for most nursing staff, but the intervention was not effective in improving well-being, job satisfaction or work engagement. Opportunities lie in creating an online multi-component positive psychology intervention for nursing staff that is more concise, work focused, and includes some form of autonomy support.

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