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ORIGINAL RESEARCH

A discrete-choice experiment to assess treatment modality preferences of patients with depression

Joran Lokkerbol[a,b*], Amber Geomini[a,c*], Jule van Voorthuijsen[a,c], Annemieke van Straten[d], Bea Tiemens[e,f,g], Filip Smit[a,d,h], Anneriek Risseeuw[i] and Mickaël Hiligsmann[c]

[a]Centre of Economic Evaluation, Trimbos Institute (Netherlands Institute of Mental Health), Utrecht, The Netherlands; [b]Rob Giel Research Center, University Medical Center Groningen, Groningen, The Netherlands; [c]Department of Health Services Research, CAPHRI Care and Public Health Research Institute, Maastricht University, The Netherlands; [d]Department of Clinical- Neuro- and Developmental Psychology, Amsterdam Public Health Research Institute, Vrije Universiteit Amsterdam, The Netherlands; [e]Behavioural Science Institute, Radboud University Nijmegen, The Netherlands; [f]Indigo Service Organisation, Utrecht, The Netherlands; [g]Pro Persona Research, Renkum, The Netherlands; [h]Department of Epidemiology and Biostatistics, Amsterdam Public Health Research Institute, VU University Medical Center, Amsterdam, The Netherlands; [i]Ypsilon, MIND Landelijk Platform GGZ, Amersfoort, The Netherlands

ABSTRACT

Aims: There is an increasing interest in understanding patients' preferences in the area of healthcare decision-making to better match treatment with patients' preferences and improve treatment uptake and adherence. The aim of this study was to elicit the preferences of patients with a depressive disorder regarding treatment modalities.

Materials and methods: In a discrete-choice experiment, patients chose repetitively between two hypothetical depression treatments that varied in four treatment attributes: waiting time until the start of treatment, treatment intensity, level of digitalization, and group size. A Bayesian-efficient design was used to develop 12 choice sets, and patients' preferences and preference variation was estimated using a random parameters logit model.

Results: A total of 165 patients with depression completed the survey. Patients preferred short (over long) waiting times, face-to-face (over digital) treatment, individual (over group) treatment, and one session per week over two sessions per week or one session per 2 weeks. Patients disfavoured digital treatment and treatment in a large group. Waiting time and treatment intensity were substantially less important attributes to patients than face-to-face (vs digital) and group size. Significant variation in preferences was observed for each attribute, and sub-group analyses revealed that these differences were in part related to education.

Limitations: The convenience sample over-represented the female and younger population, limiting generalizability. Limited information on background characteristics limited the possibilities to explore preference heterogeneity.

Conclusion: This study demonstrated how different treatment components for depression affect patients' preferences for those treatments. There is significant variation in treatment preferences, even after accounting for education. Incorporating individual patients' preferences into treatment decisions could potentially lead to improved adherence of treatments for depressive disorders.

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Introduction

Depression represents a major global health concern affecting 350 million people worldwide[1]. The World Health Organization (WHO) states that depression is the leading cause of disability and an important contributor to the global burden of disease[1]. In the Netherlands, almost 20% of the population will ever experience a depressive episode on a lifetime basis[2,3], which is associated with an estimated annual economic cost of €966 million for treatment and €1.8 billion due to reduced productivity[3,4]. Given that healthcare budgets and mental healthcare resources are limited, it is important to facilitate development and optimize the uptake of cost-effective depression treatments[5].

Several effective depression treatments are available, including psychological therapies (e.g. cognitive behaviour therapy)[6,7], medication (e.g. antidepressants)[8,9], and psychosocial interventions (e.g. peer support)[10]. However, epidemiological studies have estimated that only a small portion of the disease burden of depression is averted by treatment, where in practice not all people diagnosed with depression seek and receive evidence-based treatments[11]. These findings suggest that the uptake of effective treatment is sub-optimal. In line with this, research has shown that some patients choose treatments with low evidence of efficacy, whilst other patients may refuse or discontinue treatment[12]. Moreover, only 20% of patients eligible for psychological treatments ever start treatment, and, of these patients, almost half stop before finishing treatment[13,14].

CONTACT Joran Lokkerbol jlokkerbol@trimbos.nl Centre of Economic Evaluation, Trimbos Institute (Netherlands Institute of Mental Health), PO Box 725, 3521 VS Utrecht, The Netherlands
*These authors contributed equally to the paper.

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Table 1. Attributes and levels.

Attributes	Levels	Modelled in the indirect utility function
Waiting time till start of intervention	1 week	As continuous variable WAITTIME
	4 weeks	
	8 weeks	
Intensity of treatment	1 time per week	Omitted category
	2 times per week	As categorical variable TWOWEEK
	1 time per 2 weeks	As categorical variable HALFWEEK
Level of digitalization	Face-to-face	Omitted category
	Digital	As categorical variable DIGITAL
	Combination	As categorical variable COMBI
Group size	Individual	Omitted category
	Small group (3–5 persons)	As categorical variable SMALL
	Large group (6–10 persons)	As categorical variable LARGE

Preferences and attitudes of patients with depression have an impact on the acceptance of and adherence to therapeutic intervention[15,16], and unmet preferences could partly explain the sub-optimal uptake and adherence to treatment.

Assessing patients' preferences for depression treatment characteristics (i.e. treatment attributes) can help health professionals to improve management of treatment programs[17], and might be a step towards improving the uptake of effective treatment and to better be able to match treatment with patients' preferences. Varying attributes of depression treatment can be distinguished, such as the number of sessions and frequency of treatment[18], individual- or group-based treatments[19] or face-to-face contact vs digital contact[5,20]. Involving patients in clinical decision-making by addressing their expectations related to treatment may improve patients' adherence to treatment programs[21,22]. Ultimately, a better understanding of patients' preferences is important when designing and evaluating healthcare programs, since it could help improve the (cost-)effectiveness of treatment[16,23].

Discrete-choice experiments (DCEs) elicit patients' preferences for treatment attributes by using questionnaires with several choice tasks containing two hypothetical treatment alternatives with varying attribute levels[21]. Patients are repeatedly asked to state their preference between two hypothetical treatments. The aim of DCEs is to quantify the relative importance of treatment attributes, conditional on the range of attribute levels, and the trade-offs that respondents make while choosing between them[21]. DCEs are increasingly conducted in healthcare[24].

There is a paucity of research assessing patients' preferences with regards to mental healthcare interventions. We only identified one previous study that investigated women's preferences for perinatal depression and anxiety treatment by using a DCE[25]. This study mainly focused on the importance of costs and efficacy of specific perinatal depression treatments on women's preferences. Other studies on patient preferences exist, but these either used a more qualitative approach[26] or did not focus on mental health specifically[27].

The aim of the current study was, therefore, to evaluate the preferences of patients with depression for treatment modalities in the Netherlands using a DCE.

Methods

Discrete-choice experiment

We used a stated-preference method, i.e. a DCE[21], to assess the preferences of patients with depression for treatment modalities. Patients' preferences were elicited by using a questionnaire consisting of 12 different choice sets. Each choice task comprised two unlabeled treatment alternatives (treatment A and treatment B) with varying levels of the specific treatment attributes (e.g. the treatment attribute "intensity of treatment" with attribute levels "1 time per week", "2 times per week", and "1 time per 2 weeks"). Patients were asked to select the treatment alternative they preferred in each choice set. A description of the various components of the DCE is provided below.

Identifying attributes and levels

The identification, selection, and development of DCE attributes is important for generating valid outcomes[28,29]. We extracted relevant attributes and levels from the health-related DCEs described in the review by Clark *et al.*[24], and selected the sub-set of attributes and levels that were deemed to be most relevant with the help of consulting experts (two clinicians and researchers in the field of mental health, one client representative, and one DCE expert). Based on a pre-test with three patients, the understandability and usefulness of the attributes/levels was judged to be appropriate. Only minor changes in the wording of the questionnaire were made. Table 1 states the four attributes and corresponding levels explored in this study. As we were interested in treatment modalities, attributes such as efficacy and cost were not considered.

Experimental design and sample size

We presented only a sub-set of the full factorial design (i.e. all possible combinations of attributes and levels), using the Ngene (v1.1.1) software[30]. Specifically, we used a Bayesian efficient design, which maximizes the precision of the estimated parameters, by maximizing the D-efficiency, a summary measure of the variance covariance matrix, for a given number of choice questions. The experimental design used *a priori* information about patients' preferences based on expected results (e.g. that a shorter waiting time is preferred over a longer waiting time) and consultation with experts.

Out of the different sources available for determining minimum sample size[31–33], we started off with the rule of thumb as suggested by Orme[31], defined as 500 * (the maximum number of levels (3))/(the number of choice tasks (12) * the number of alternatives (2)), indicating that a minimum sample size of 63 respondents was needed to estimate main effects.

Attribute	Treatment A	Treatment B
Waiting time till start of intervention	1 week	4 weeks
Intensity of treatment	1 time per week	1 time per 2 weeks
Face-to-face versus digital	Digital	Face-to-face
Group size	Small group (3-5 persons)	Individual
Which treatment would you choose? *(Tick one box only)*	☐	☐

Figure 1. Example of choice task.

As this rule of thumb is sometimes insufficient, and to allow for sub-group analyses, we then doubled this sample size, resulting in a targeted sample size of 126 respondents.

Participants, measures and procedures

Respondents were recruited via social media channels of the Trimbos Institute and other mental health organizations. Participants were included if they were currently, or in the previous 12 months, under any kind of treatment for depression, and excluded if they were younger than 18. Prior to entering the study, participants were informed about the aim and procedure of the study, after which they needed to provide consent in order to enter the study.

The main outcome measure of the study was the relative preference for the attributes and levels defined in the DCE, which was elicited using 13 choice sets, including one duplicate choice set to assess test–re-test reliability, see Figure 1 for a choice task example. This number of choice sets is commonly used in DCEs[24] and was further checked when pre-testing the DCE. The questionnaire elicited self-reported information on demographics, level of education, and depression treatment, and measured patients' level of perceived impairment during daily activities (i.e. household, work, and social relationships) on a 1–10 scale, using the Sheehan Disability Scale (SDS)[34].

The questionnaire was administered online via LimeSurvey. Patients providing consent to participate and satisfying eligibility criteria entered the questionnaire. The questionnaire started with the DCE, which was preceded by a thorough description of each attribute-level and an example of a choice task, to promote consistency in participants' understanding of the choice sets. After completion of the choice sets, respondents were asked to scale the difficulty of the choice tasks on a five-point Likert scale. The questionnaire ended with a section on patients' characteristics, socio-demographics, treatment history, and perceived level of impairment.

Ethical approval for this study was obtained from the Trimbos Ethische Toetsing (TET) Committee. The study was conducted in the Netherlands, with data being collected in May and June, 2017.

Statistical analysis

NLogit software, version 5.0[35], was used for data analysis. A random parameters logit model was fitted on the data to evaluate the strength of preferences for attributes and attribute-levels among patients. The model allowed for evaluating preference heterogeneity.

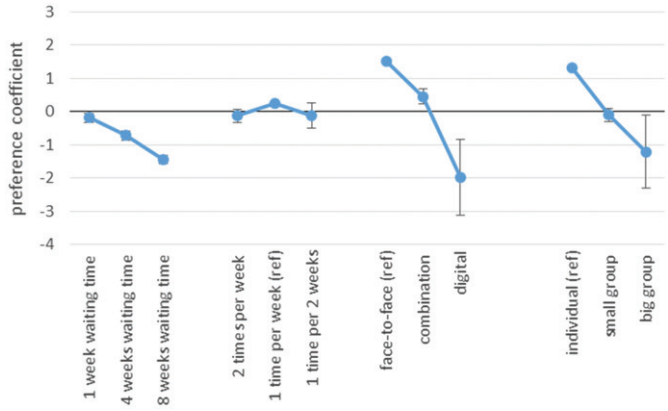

Figure 2. Conditional relative importance of attribute-levels.

The choice responses were analysed based on random utility theory[36]. This theory assumes that the utility that a respondent *i* assigns to a depression treatment *j* (V_{ij}) is modelled as the sum of two parts: a systematic component based on included attributes, and an error part (ε_{ij}):

$$V_{ij} = \beta_0 + (\beta_1 + \eta_{1i})\text{WAITTIME}_j + (\beta_2 + \eta_{2i})\text{TWOWEEK}_j + (\beta_3 + \eta_{3i})\text{HALFWEEK}_j + (\beta_4 + \eta_{4i})\text{DIGITAL}_j + (\beta_5 + \eta_{5i})\text{COMBI}_j + (\beta_6 + \eta_{6i})\text{SMALL}_j + (\beta_7 + \eta_{7i})\text{LARGE}_j + \varepsilon_{ij}$$

In this model, waiting time is a continuous variable, while the other variables represent levels of categorical attributes, with "once a week", "face-to-face", and "individual" omitted. Waiting time was modelled as a continuous linear variable, as the fit of the model (pseudo-*R*-squared) was better than when modelling waiting time as a categorical variable, suggesting that a linear relationship was most appropriate. The constant β_0 was included in the model to test for a systematic preference for either treatment A or B. β_1–β_7 are the mean attribute utility weights for each of the corresponding attribute levels, and η_1–η_7 are error components that represent non-systematic variation in individual-specific utility weights.

Effect coding was used to model the categorical variables (intensity of treatment, level of digitalization, and group size). Mean attribute utility weights are normalized to zero and preference weights of different attribute-levels are relative to the mean attribute utility weight. A negative value represents a negative influence of an attribute-level on treatment utility, and vice versa. Differences in preference between attribute-levels were tested for statistical significance using the 5% significance level.

The random parameters logit model also allowed the researchers to identify attributes for which there was a significant preference variation. The random parameters for all attributes were drawn from a normal distribution. The estimation was carried out using 1,000 Halton draws. The model does not offer insight into the reason of preference variation. In order to gain insight into the sources of preference variation, additional sub-group analyses were conducted between patients with different age categories, education

level, and level of perceived impairment, taking scale heterogeneity into account.

All sub-group analyses were performed by splitting samples across the median (age, level of education, and level of perceived impairment). To assess whether preferences were significantly different between sub-groups, joint models were estimated using interaction terms to investigate potential preference heterogeneity amongst people from different sub-groups. Preferences were considered to differ between sub-groups if the interaction term parameters were statistically different from zero at the 5% significance level.

Results

Patient characteristics

A total of 310 respondents started the questionnaire, while 165 respondents completed the questionnaire. Completers and non-completers could not be compared due to the unavailability of data on the non-completers. Characteristics of the 165 included respondents are presented in Table 2. The difficulty of the choice tasks was rated at an average of 2.78 on a five point Likert scale (1 = extremely easy, 5 = extremely difficult); 74.5% of respondents rated the task as not difficult (score $\leq$ 3 on a five-point Likert scale). In total, 135 respondents (81.8%) chose the same answer during the test–re-test questions, which can be considered as sufficient for a DCE[37].

Patients' preferences

The main results of the random parameters logit model are presented in Table 3 and Figure 2. Unsurprisingly, patients prefer a short waiting time before the start of treatment, as indicated by the statistically significant negative coefficient. Further, patients prefer a treatment intensity of one session per week over two sessions per week. Regardless of the intensity, patients do not prefer a fully digital treatment compared with face-to-face treatment. However, compared to full digital treatment, a combination of face-to-face treatment and digital treatment is more preferred by the patient. Patients prefer individual treatment compared to group treatment, and treatment in a small group (3–5 persons) is preferred over treatment in a large group (6–10 persons). The non-significant constant indicated there was no systematic preference for either treatment A or B.

The conditional relative importance for the attributes face-to-face vs digital (45.7%) and group size (32.9%) was substantially larger than the conditional relative importance for waiting time (16.4%) and treatment intensity (5.0%), indicating that the first two attributes were more important to respondents when choosing between alternative treatment options. Moreover, the results indicate that patients are willing to accept a combination of face-to-face and digital treatment instead of face-to-face treatment alone, if it is accompanied by a 6-week reduction in waiting time (as the loss in utility of 1.52–0.46 = 1.06 is then offset by a gain in utility of 6*0.18 = 1.08).

Table 2. Respondent characteristics.

Characteristic	*n*	%
Gender		
Male	17	10
Female	148	90
Age group		
18–24	67	41
25–30	26	16
31–40	27	16
41–50	17	10
51–60	21	13
61+	7	4
Education level		
Low	7	4
Middle	52	32
High	106	64
Mean Sheehan disability score		
1	0	0
2	1	1
3	1	1
4	8	5
5	15	9
6	20	12
7	43	26
8	46	28
9	31	19
10	0	0
Medication use		
Yes	98	59
No	67	41
Treatment history*		
Yes	138	84
No	27	16
Difficulty of questionnaire		
1	16	10
2	50	30
3	57	35
4	41	25
5	2	1

*"Besides your current treatment, have you been treated for symptoms of depression before?"

The standard deviations were statistically significant for all attribute-levels except for a combination of face-to-face and digital treatment and treatment in a small group. A significant standard deviation suggests the presence of variation in the preference weights for attribute-levels across respondents.

Sub-group analysis comparing age groups

The results of the sub-group analysis comparing younger respondents (i.e. respondents aged between 18 and 30 year) and older respondents (i.e. respondents aged 31 and older) are presented in Table 4. The conditional relative importance of each attribute, indicated by the range in the preference coefficients for each attribute, is shown in Figure 3. No significant differences were found, although the analysis suggests that older respondents might be more inclined to accept a treatment intensity of once per 2 weeks than lower-aged respondents ($p = 0.08$).

Sub-group analysis comparing education levels

The results of the joint model comparing lower-educated and higher-educated respondents are presented in Table 5. The conditional relative importance of each attribute, as indicated

Table 3. Main results random parameters logit model.

Attributes and levels	Coefficient	*p*-value	SD	Conditional relative importance
constant	0.08 (–0.08, 0.25)	0.31		
Waiting time				16.4%
1 week	–0.18*** (–0.23, –0.12)	0.00	0.14*** (0.08, 0.20)	
Intensity of treatment				
Reference level: 1 time per week	0.25** (0.09, 0.41)			5.0%
2 times per week	–0.13* (–0.27, 0.08)	0.06	0.21* (–0.04, 0.46)	
1 time per 2 weeks	–0.12 (–0.27, 0.03)	0.10	0.39*** (0.18, 0.61)	
Face-to-face vs digital				
Reference level: face-to-face	1.52*** (1.07, 1.97)			45.7%
Digital	–1.98*** (–2.34, –1.61)	0.00	1.14*** (0.86, 1.42)	
Combination	0.46*** (0.32, 0.61)	0.00	0.23 (–0.10, 0.55)	
Group size				
Reference level: individual	1.31*** (1.02, 1.60)			32.9%
Small group (3–5 persons)	–0.10 (–0.22, 0.03)	0.15	0.20 (–0.11, 0.51)	
Large group (6–10 persons)	–1.21*** (–1.49, –0.94)	0.00	1.1*** (0.82, 1.39)	

Data presented as estimate preference coefficient (95% CI). Number of observations = 1,980 (165 respondents × 12 choices). Pseudo-R^2 = 0.39; log-likelihood = –838.42; SD, standard deviation of the log-normal distribution (95% CI).
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 4. Differences in preferences between lower-aged and higher-aged respondents.

Attributes and levels	Lower age	Higher age	*p*-value[a]
Number of patients	93	72	
Pseudo-R^2	0.40	0.39	
Log-likelihood	–466.03	–598.88	
constant	0.17 (–0.07, 0.39)	0.00	
Waiting time			
1 week	–0.17*** (–0.24, –0.09) SD: 0.14***	–0.18***(–0.26, –0.10) SD: 0.16***	0.42
Intensity of treatment Reference level: 1 time per week	–0.27* (–0.48, 0.05)	–0.21* (–0.44, 0.02)	
2 times per week	–0.02 (–0.21, 0.17) SD: NS	–0.24** (–0.45, –0.04) SD: NS	0.10
1 time per 2 weeks	–0.25** (–0.46, –0.04) SD: 0.42***	0.03 (–0.18, 0.24) SD: 0.32*	0.08
Face-to-face vs digital Reference level: face-to-face	1.56*** (0.90, 2.22)	1.43*** (0.77, 2.09)	
Digital	–2.03*** (–2.57, –1.49) SD: 1.18***	–1.90*** (–2.42, –1.38) SD: 1.11***	0.94
Combination	0.47*** (0.27, 0.68) SD: NS	0.47*** (0.24, 0.69) SD: 0.29	0.94
Group size Reference level: individual	1.44*** (0.95, 1.93)	1.26*** (0.83, 1.69)	
Small group (3-5 persons)	–0.08 (–0.26, 0.09) SD: NS	–0.10 (–0.29, 0.09) SD: 0.09	0.87
Large group (6-10 persons)	–1.36*** (–1.83, –0.89) SD: 1.20***	–1.16*** (–1.56, –0.75) SD: 0.85***	0.84

Data presented as estimate preference coefficient (95% CI). SD, standard deviation; NS, not significant.
[a]*p*-value was estimated in a joint model with interaction terms.
* $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$.

by the range in the preference coefficients for each attribute, is shown in Figure 4. Significant differences in preferences were found between these patient groups for the waiting time until the start of treatment and the digital format of the treatment, specifically for fully digital treatment. Higher-educated respondents had a stronger preference against longer waiting times than lower-educated respondents ($p = 0.02$). In addition, higher-educated respondents had stronger preference against fully digital treatment ($p = 0.02$), but they might be more accepting of a combination treatment consisting of face-to-face and digital treatment ($p = 0.09$).

Sub-group analysis comparing levels of impairment

The joint model results of the comparison between patients with lower and higher impairment levels are presented in Table 6. The conditional relative importance of each attribute, indicated by the range in the preference coefficients for each attribute, is shown in Figure 5. There are no significant differences between the groups, although it is suggested that digital depression treatment could be more acceptable to patients with lesser impairment ($p = 0.06$).

Discussion

This study assessed the conditional relative importance of patients' preferences for depression treatment modalities. Patients prefer a short (over long) waiting time until the start of treatment, a treatment intensity of once a week instead of twice per week or once per 2 weeks, and individual (instead of group), face-to-face (instead of digital) treatment. The choice between face-to-face vs digital treatment was the

most important for respondents, followed by individual vs group treatment, waiting time, and treatment intensity, with the first two attributes being substantially more important to patients than the latter two.

For several attribute-levels, in particular for digital treatment and group treatment, there was significant preference variation among respondents. Sub-group analyses showed that higher-educated patients had a stronger preference against longer waiting times and against fully digital treatment compared to lower-educated patients. Instead, higher-educated patients might be more willing to accept a combination of face-to-face and digital treatment compared to lower-educated patients.

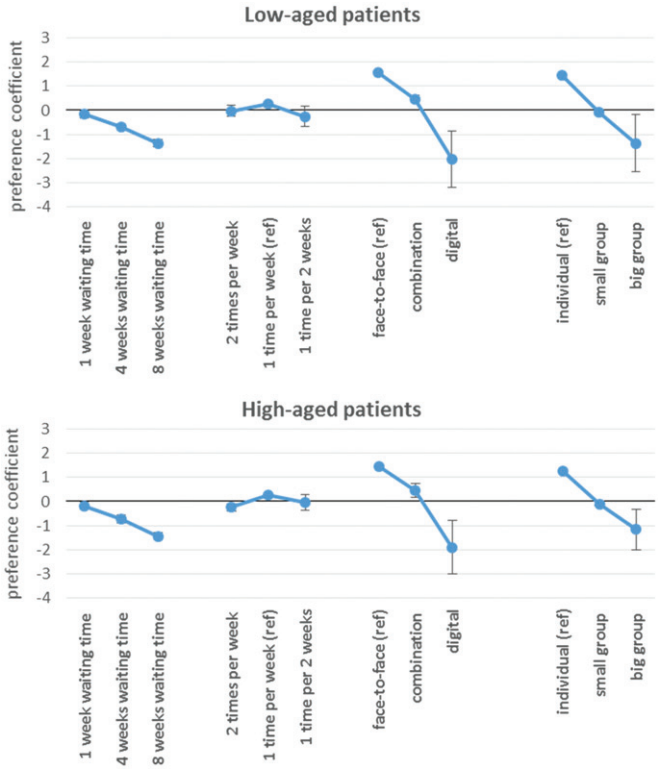

Figure 3. Conditional relative importance of attribute-levels per age group.

This study is one of the first studies that assessed the preferences of patients for treatment modalities. A previous DCE study investigated women's preferences specifically for perinatal depression and anxiety treatment[25]. Our results are not in line with their findings that digitalization of treatment has no impact on patients' preferences[25]; however, this could be due to the fact that Ride and Lancsar[25] mainly focussed on the influence of cost and efficacy of treatment on women's preferences. In our study, patients disfavoured fully digital treatment. As we did not incorporate effectiveness in our design, respondents might have had the perception that digital treatment is less effective compared to face-to-face treatment. Explicitly framing digital treatment and face-to-face treatment as having comparable effectiveness might have made our results more comparable to the results found by Ride and Lancsar. In another example, a treatment intensity of two times per week was found to be more effective than once a week when treating depression[18]. However, in our study patients prefer a treatment intensity of once a week over a treatment intensity of two times per week. It is important to interpret our results as patients' preferences for treatment characteristics based on patients' perception of effective treatment. Educating patients about the fact that a treatment intensity of two times per week might be more effective might increase the patients' acceptance of higher treatment intensity. In addition, although difficult to compare due to the use of different methods, Dwight-Johnson *et al.*[38]

Table 5. Differences in preferences between lower-educated and higher-educated respondents.

Attributes and levels	Lower-education	Higher-education	*p*-value[a]
Number of patients	59	106	
Pseudo-R^2	0.38	0.42	
Log-likelihood	−304.17	−515.16	
Constant	0.16 (−0.11, 0.43)	0.05 (−0.16, 0.26)	
Waiting time			
1 week	−0.11*** (−0.18, −0.03) SD: 0.11***	−0.20*** (−0.28, −0.13) SD: 0.16***	0.02
Intensity of treatment	0.23* (−0.01, 0.46)	0.25** (0.04, 0.46)	
Reference level: 1 time per week			
2 times per week	0.03 (−0.19, 0.26) SD: NS	−0.23** (−0.41, −0.04) SD: NS	0.12
1 time per 2 weeks	−0.26** (−0.20, 0.17) SD: 0.28	−0.02 (−0.21, 0.17) SD: 0.44***	0.28
Face-to-face vs digital	1.75*** (1.04, 2.46)	1.52*** (0.94, 2.09)	
Reference level: face-to-face			
Digital	−1.80*** (−2.40, −1.21) SD: 1.37***	−2.05*** (−2.51, −1.59) SD: 0.95***	0.02
Combination	0.05*** (0.10, 0.57) SD: NS	0.53*** (0.34, 0.72) SD: NS	0.09
Group size	1.36*** (0.75, 1.97)	1.32*** (0.96, 1.68)	
Reference level: individual			
Small group (3–5 persons)	−0.06 (−0.27, 0.16) SD: NS	−0.11 (−0.29, 0.06) SD: 0.36**	0.78
Large group (6–10 persons)	−1.30*** (−1.89, −0.70) SD: 1.57***	−1.21*** (−1.55, −0.87) SD: 0.76***	0.29

Data presented as estimate preference coefficient (95% CI).
SD, standard deviation; NS, not significant.
[a]*p*-value was estimated in a joint model with interaction terms.
** $p < 0.05$; *** $p < 0.01$.

revealed a great variation in preferences among respondents for group treatment. These findings are in line with our observation that preferences for group treatment vary significantly among respondents, while having an overall negative impact on patient preferences.

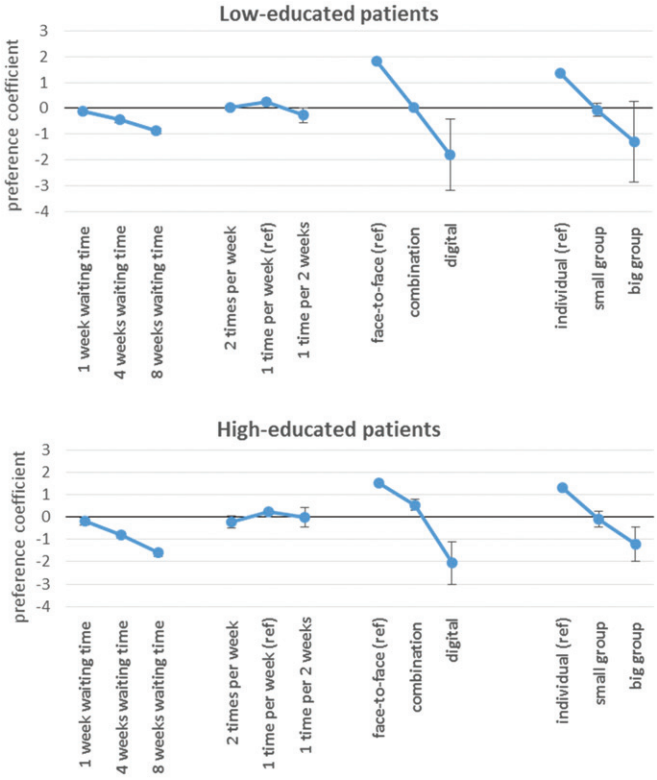

Figure 4. Conditional relative importance of attribute-levels per education group.

This study has shown that there is significant individual variation in depression treatment preferences, even within the selected sub-groups. This highlights the importance of taking individual rather than average preferences into account when making treatment decisions. Such a process of shared decision-making, especially when used to inform the patient about the effectiveness of combined face-to-face and digital treatment and the effectiveness of higher treatment intensity could improve both patient satisfaction and the uptake of effective depression treatment.

Overall, it is an open question whether offering patients the treatments they prefer will result in improved (cost-) effectiveness of treatment. Ideally, a randomized controlled trial comparing treatment effectiveness and cost-effectiveness with and without shared decision-making and with and without explicitly informing patients on the effectiveness of specific treatment components would inform us on what it would mean for patients to get the treatment they want and be more informed about effective treatment components.

Limitations and future perspectives

Our study has a number of limitations. First, the use of online channels for patient recruitment limited the generalization of our findings, as it resulted in a non-representative sample of relatively young, e-literate, and mostly female respondents. The bias towards e-literate respondents is likely to have impacted preference outcomes regarding digital treatment. Moreover, our inability to compare completers with non-completers further limited the generalizability of our findings. Future studies should include more men and older people, and ensure the possibility of comparing completers with non-completers to allow for the preference

Table 6. Differences in preferences between respondents with lower and higher impairment.

Attributes and levels	Lower impairment	Higher impairment	*p*-value[a]
Number of patients	88	77	
Pseudo-R^2	0.37	0.42	
Log-likelihood	−550.38	−371.60	
Constant	0.04 (−0.15, 0.24)	−0.19 (−0.47, 0.10)	
Waiting time			
1 week	−0.16*** (−0.23, −0,10) SD: 0.14***	−0.21*** (−0.31, −0.11) SD: 0.19***	0.50
Intensity of treatment Reference level: 1 time per week	0.19** (0.00, 0.38)	0.36** (0.08, 0.64)	
2 times per week	−0.14* (−0.30, 0.02) SD: NS	−0.08 (−0.32, 0.17) SD: 0.32*	0.36
1 time per 2 weeks	−0.05 (−0.23, 0.13) SD: 0.39***	−0.28** (−0.53, −0.03) SD: 0.47***	0.14
Face-to-face vs digital Reference level: face-to-face	1.31*** (0.81, 1.81)	1.92*** (1.06, 2.78)	
Digital	−1.76*** (−2.16, −1.35) SD: 1.16***	−2.48*** (−3.17, −1.78) SD: 1.27***	0.06
Combination	0.45*** (0.28, 0.63) SD: NS	0.56*** (0.29, 0.83) SD: 0.46**	0.69
Group size Reference level: individual	1.30*** (0.93, 1.67)	1.55*** (0.99, 2.11)	
Small group (3–5 persons)	−0.10 (−0.25, 0.05) SD: NS	−0.03 (−0.26, 0.20) SD: 0.45**	0.42
Large group (6–10 persons)	−1.20*** (−1.57, −0.85) SD: 1.06***	−1.52*** (−2.06, −0.98) SD: 1.26***	0.41

Data presented as estimate preference coefficient (95% CI).
SD, standard deviation; NS, not significant.
[a]p-value was estimated in a joint model with interaction terms.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

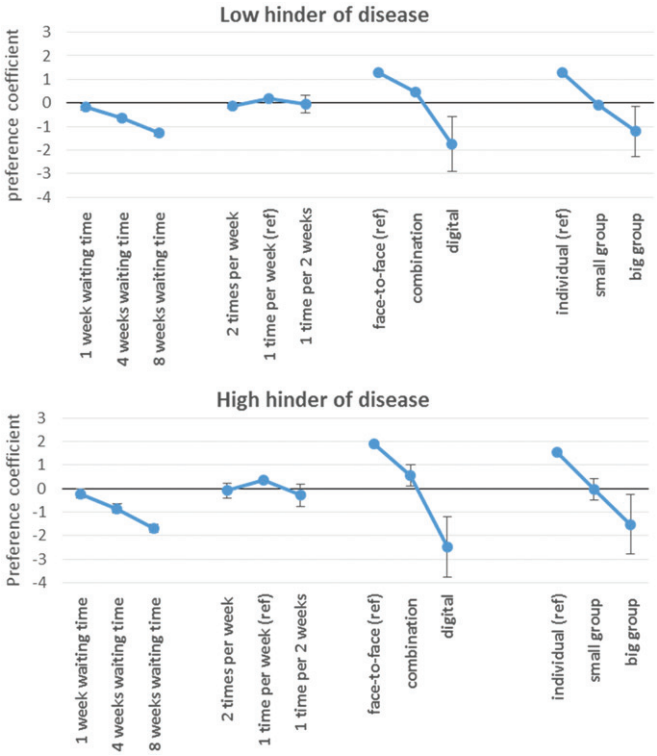

Figure 5. Conditional relative importance of attribute-levels per level of impairment group.

assessment of a more representative and generalizable sample. Given the considerations regarding generalizability, it should be noted that an identical study targeting patients with anxiety resulted in very similar results[39].

Second, limited background information was available on respondents. Importantly, no information was known about the previous treatment received, while a positive or negative experience with a specific treatment can be expected to have a substantial impact on the stated treatment preferences. In addition, due to the online data collection method, information was self-reported, including information on diagnosis, which could have resulted in bias. Additional background information might have helped in explaining more of the person-level variation in preferences, as still present in the sub-groups in the study. Future studies should try to include additional background information.

Third, the information given prior to the choice tasks can impact respondents' choices. Although the test–re-test question suggested that respondents mostly made consistent preference choices, it is not clear to what extent respondents had a clear and uniform understanding of what digital treatment or a combination of face-to-face and digital treatment comprised. Moreover, our choice to not describe what is known about the effectiveness of specific treatment components has important implications for how to interpret our results.

Fourth, our results on patients' preferences are limited to the attributes considered in our choice tasks. Other attributes, such as the nature of the treatment itself (e.g. pharmacological treatment, cognitive behavioural therapy), can be expected to be very important to patients. As our study focused on treatment modalities, future studies should also investigate preferences with regard to treatment cost, treatment effectiveness, or the nature of the treatment. In addition, the selection of attributes in our study could have benefitted from a more formal qualitative research approach to selecting a sub-set of the most relevant attributes with client experts, where ideally a larger number of experts would be consulted.

Fifth, the use of a self-reported measure on patients' level of impairment rather than assessment by a clinician might have resulted in less distinct sub-groups, which could be a possible explanation for why no significant differences were found between the groups with a relatively high and relatively low (self-reported) level of impairment. Furthermore, non-significant findings could have been the result of a limited sample size, especially so in sub-group analyses.

Conclusion

This study suggests that patients with depression prefer individual and face-to-face treatment with a treatment intensity of once a week and a short waiting time before the start of treatment. Overall, patients had a preference against fully digital treatment. Combined face-to-face and digital treatment could be acceptable when waiting times are short. Individual and face-to-face treatment is substantially more important to patients than waiting time and treatment intensity. Variation in patient preferences highlights the importance of taking individual preferences into account when matching treatments to patients.

Transparency

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Previous presentations

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ORCID

Joran Lokkerbol http://orcid.org/0000-0001-9949-5442
Mickaël Hiligsmann http://orcid.org/0000-0003-4274-9258

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