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Up-to-date Treatment? Evaluation of the Effectiveness of the Dutch Mindfit Intervention

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Abstract

Background and Purpose: Currently the Dutch mental health care system was restructured, which resulted in more patients being treated within the primary health care, who previously were treated within the secondary health care. These changes were done to bring treatment closer to the patient's normal environment and to make treatment more cost efficient. Up to date, no studies investigated whether this shift jeopardized effectiveness and what implication it has on the factor of gender and educational level which previously have been found to influence mental health. The current study aims to shed light on this question by investigating the Mindfit intervention, which treats light to severe mental illness within primary health care.

Methods: OQ 45.2 and MHC-SF were used to assess the mental health of participants (N = 2928). The study had a single-group pretest-posttest design, which data was analyzed by T Test to investigate effectiveness, and ANOVA as well as ANCOVA to analyze the effect of gender and educational level on treatment outcome.

Results: It was found that the Mindfit intervention is effective in the treatment of patients suffering from PTSD as well as SSD, regardless of the patient's gender. Further, symptom were decreased equally for PTSD and SSD patients regardless of their gender and for various mental disease patents regardless of the educational level. However, women suffering from PTSD and high-educated individual seemed to benefit more in terms of their positive mental health as their counterparts.

Conclusion and Discussion: The current findings indicate that shifting mental disease treatment towards primary health care did not jeopardized treatment outcome. However, differences in secondary treatment benefits experienced by female PTSD patients and highly-educated individuals seem to persist within the new way of delivering treatment. Future research, should concentrate on gender and educational level differences in term of secondary treatment outcomes and their effect on the long-term effectiveness of treatment to further adapt treatment and achieving its goal of being close to the patients normal environment and cost efficient.

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1. Introduction

Adequate treatment of mental illness is important for the individual as well as society in general, to lower the burden of mental diseases. To ensure treatment to be as effective as possible and thereby restoring mental health, mental health care is regularly changed and adapted.

Mental disorders strongly affect the individual as well as society in general. It was found that mental disorders negatively influence the Quality of Life; resulting in a less fulfilling life experience, lower academic success, self-esteem, social functioning, and life expectancy (Alonso et al., 2004; Laursen, Musliner, Benros, Vestergaard, & Munk-Olsen, 2016; Trompenaars, Masthoff, Vries, & Hodiamont, 2007). Further it was found that mental disorders lower productivity by a loss of work force, and increase health care consumption, which in turn results in higher costs for the public health care system (Kessler et al., 2009).

In the case of most mental illnesses, however, effective treatment is available. Cognitive Behavioral Therapy (CBT) has proven itself effective in the treatment of a wide range of mental diseases (Butler, Chapman, Forman, & Beck, 2006), as well as many other therapy forms like psychodynamic therapy (Leichsenring & Rabung, 2008). However, prevalence of mental illness is on the raise since the late 1960s (Sweeting, West, Young, & Der, 2010). In order to conquer this trend, increasing the accessibility of mental health care, thus offering treatment to a broader part of society, seems to be one problem-focused approach.

Recently there has been a change in the mental health care system of the Netherlands. The Dutch mental health care system used to be divided in the two categories of Primary Health Care (Dutch *Eerstelijnszorg*) and Secondary Health Care (Dutch *Tweedelijnszorg*). The Primary Health Care consisted out of the general practitioner who treated light forms of mental illness, or referred patient's forwards to the Secondary Health Care. Secondary Health care consisted out of the Specialized Mental Health Care (Dutch *Gespecialiseerde GGZ*), which included outpatient as well as inpatient treatment. In this mental health care category, registered

clinical psychologists, psychiatrist et al. treated mild to severe forms of mental illness (Rijksoverheid, 2017).

The recent changes consists of a shift of the area of responsibility on each level of the Dutch mental health care system. This means that patients, if possible, are treated by an instance that is closer to their own environment. Patients previous treated in a clinical setting will be treated by outpatient care, patients of the Secondary Health Care will become patients of the Primary Health Care. Primary health care patients will be treated by their general practitioner or a trained nurse (Rijksoverheid, 2017). As a new aspect of the Primary Health Care, the General Basic Mental Health Care (Dutch *Generalistische Basis GGZ*) was created. Within the General Basic Mental Health Care individuals with light to mild mental illness are treated. By this, individuals with more complex mental health problems are treated within the Primary Health Care, which was not the case within the old system. This changes is hoped to offer treatment that is closer to the patients known environment and thereby inexpensive (Rijksoverheid, 2017). Whether these changes result in an effective treatment of mentally ill, and do not jeopardize treatment effectiveness, is the aim of the current study, thereby effectiveness of treatment as well as issues faced by the old system are discussed and evaluated in the light of the new structured system.

One form of treatment under the restructured health care system is the Dutch Mindfit intervention. Mindfit is a stepped care approach, which includes a range of low to high intensity treatment for which patients can register themselves online. Sufferers of light to mild mental disease can register on the Mindfit website for online self-help. If online self-help is not sufficient, Mindfit also offers the opportunity to register for courses and information meetings where questions and worries can be addressed. These meetings help individuals to find their appropriate mean of treatment. Additionally, Mindfit offers the opportunity to register for treatment given by caregivers like psychologists, which offer cognitive behavioral therapy

based treatment by the means of individual sessions, online treatment or group therapy, whereby also a combination of the three is possible (Dimence Groep, 2017).

This new form of treatment, although evidence based, has not yet been tested for its effectiveness. In addition, it is unknown whether Mindfit can account for the effect of individual factors that in the past have been found to have an impact on treatment outcome. From these factors, the current study will take gender and educational level into consideration, as studies have shown that men are less likely to access mental health care as well as lower educated individuals (Bertakis, Azari, Helms, Callahan, & Robbins, 2000; Steele, Dewa, Lin, & Lee, 2007).

Testing the effectiveness of the Mindfit intervention and thereby the effectiveness of the restructuring of the Dutch mental health care system, it is important to investigate whether delivering mental health care treatment by the primary care has disadvantages on the treatment outcome of patients. In the case of the Somatic Symptom Disorder, it is especially worth to investigate the effectiveness of Mindfit. Sufferers of SSD experience physical symptoms arising from psychological or emotional distress, which cannot be explained by a biological cause (Kurlansik & Maffei, 2016). Because of their physical symptoms, sufferers from SSD are most likely to consult their general practitioner instead of looking for psychological help. When visiting a psychologist and being treated for SSD, a meta-analysis of various studies found Cognitive Behavioral Therapy to be highly effective (Butler et al., 2006). Further CBT was found to be more effective in the treatment of SSD, than other forms of treatment as psychoeducation or behavioral stress management (Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012). However, it has not been investigated yet, if the positive treatment outcome of CBT in the case of SSD is still apparent in primary health care.

Contrary to SSD, for sufferers of the Post-traumatic Stress Disorder (PTSD) there are no indicators that sufferers are unaware of the psychological condition. Patients diagnosed with PTSD are re-experiencing the traumatic event, avoiding stimulus that reminds them of it and

encounter themselves in a state of constant hyper alertness towards current threats (Matheson, 2016). In the past CBT was shown to be effective in the treatment of PTSD, similar to SSD (Butler et al., 2006). It is therefore also interesting if this effectiveness is still apparent within treatment of PTSD that takes place within the restructured health care system. Testing this can rule out a possible jeopardizing of treatment effect in the case of PTSD patients.

A disadvantage found to be apparent within the old system is the factor of gender. Gender has been found by various studies to have implications not only on the prevalence of specific disorder but also on the course of treatment and the restoring of mental health. Although the prevalence of mental disorders seems to be the same among men and women (De Graaf, Ten Have, Van Gool, & Van Dorsselaer, 2012), gender differences have been found in the patterns of mental disease. In the case of PTSD, it was found that although men and women experience a similar amount of traumatic events throughout their lives, women are at greater risk of developing PTSD (Greene, Neria, & Gross, 2016). A study from 2007 argued that the gender difference in prevalence stems, from women being exposed to experiences that entail higher risks of developing PTSD as rape or domestic violence (Olff, Langeland, Draijer, & Gersons, 2007). Apart from differences in prevalence a recent study found that women benefit more from therapy as their male counterparts. Although, PTSD symptoms in men and women were found to decrease equally, secondary benefit as an elevated quality of life were only found in females (Békés, Beaulieu-prévost, Guay, & Belleville, 2016). Further, the study investigated whether gender differences in dropout rates or context/type of trauma could explain the variance in treatment benefit. However, the study failed to show any significance of these factors and stressed the importance of multiple measurements in the evaluation of therapy benefits in PTSD (Békés et al., 2016).

Likewise, gender has been shown to be an important factor in the prevalence of the Somatic Symptom disorder (SSD). The prevalence of SSD in the general population is estimated to be between 5 and 6 percent, with women outnumbering men by ten to one

(Kurlansik & Maffei, 2016). Sufferers of SSD experience physical symptoms arising from psychological or emotional distress, which cannot be explained by a biological cause (Kurlansik & Maffei, 2016). In the case of SSD however, it is unknown whether men and women benefit differently from therapy.

Apart from gender, educational level has been shown to have an influence on mental illness. This makes educational level worthy to consider when looking at the effectiveness of treatment for mental illness. Previously, studies found income to have an great impact on mental illness (Belsky & Pluess, 2009; Duong & Bradshaw, 2016; Kessler, 1979), however, other studies found that the effect of income on mental illness diminishes when correcting for educational level (Araya, Lewis, Rojas, & Fritsch, 2003; Muller, 2002). Further, it was found that lower educated individuals have a worse mental health as the higher educated counterparts (Ross & Wu, 1995). Araya et al. (2003) hypothesize that the effect of educational level on mental health might come from people with less education having the feeling of being socially detained. Also research indicated that a lower educational level affects health conditions by less access to resources, a higher risk of occupational injury and acquired risky behavior (Muller, 2002).

1.1. Research questions

Does the restructuring of the Dutch mental health care system resulted in a treatment of mental health care patients of equal effectiveness?

I. Do SSD patients, receiving treatment by Mindfit, show a clinically relevant improvement in their mental health?

II. Do PTSD patients, receiving treatment by Mindfit, show a clinically relevant improvement in their mental health?

III. Do men and women suffering from PTSD benefit equally from treatment given by the Mindfit intervention?

IV. Do men and women suffering from SSD benefit equally from treatment given by the Mindfit intervention?

V. Do individuals with a non-high and high educational level benefit equally from treatment given by the Mindfit intervention?

1.2. Hypothesis

I. The Mindfit intervention has a statistically significant large effect size in the treatment of SSD patients.

II. The Mindfit intervention has a statistically significant large effect size in the treatment of PTSD patients.

III. There is no statistically significant difference in the treatment outcome between men and women, who suffer from PTSD and underwent treatment by the means of the Mindfit intervention, correcting for the effect of age, educational level and time of treatment.

IV. There is no statistically significant difference in the treatment outcome between men and women, who suffer from SSD and underwent treatment by the means of the Mindfit intervention, correcting for the effect of age, educational level and time of treatment.

V. There is no statistically significant difference in the treatment outcome between non-high and high-educated individuals with mental illness, treated by the Mindfit intervention, correcting for age, gender and time of treatment.

2. Methods

2.1. Participants

The used data was gathered by the Dimence Groep foundation, as a mean of evaluation of their Mindfit intervention. For the current study, a convenient sample was used; further information on the sampling of the participants can be retrieved at info@mindfit.nl.

Sub-question I (*N* = 261) and IV (*N* = 223) studied the population of SSD patients, sub-question II (*N* = 298) and III (*N* = 242) the population of PTSD patients and sub-question V (*N* = 1884) studied the population of individuals with all kind of mental diseases. Group statistics are shown in Table 1. Mindfit patients were excluded from following analyses because of the following exclusion criteria: either their DSM-illness was not revalidated at the beginning of treatment, their treatment was prematurely terminated by either the patient him/herself or the treating doctor, the patient profile was too severe for the primary health care and thereby they did not receive treatment by the Mindfit intervention, the patient was referred to another practitioner, the patient died or an unknown reason accounted for the prematurely termination of treatment. Further, patients which age or educational level was unknown were excluded from the analyses concerning sub-question III-V.

Table 1.

Group Statistics (Gender, Mean age and Standard Deviation, Educational Level).

Sub-question	*N Total*	*N* Excluded	Male	Female	Mean Age (*SD*)	Age Range	Educational Level	
							Non-high	High
I	852	591	83	178	40.0 (11.7)	17-77		
II	1,181	883	86	212	38.3 (11.7)	18-80		
III	1,181	939	70	172	37.7 (14.8)	18-80		
IV	852	629	73	150	39.4 (11.4)	17-68		
V	11,306	9,422	717	1167	36.8 (13.6)	17-81	1,396	488

Note. Information on gender, age and educational level after exclusion of participants

2.2. Materials

The current study used the following two scales to answer the sub-questions. First, the Dutch version of the Outcome Questionnaire 45.2 (OQ 45.2) (Jong, Nugter, Lambert, & Burlingame, 2009), which is a 45 item checklist designed to measure patient progress during and following therapy, focusing on the experienced symptoms of sufferers of mental illness. Individuals filling in the OQ 45.2 are asked to rate how often they experience a specific situation

and/or mindset in the last couple of weeks up until the current day. Items are scored on a 5-point scale of “never”, “seldom”, “sometimes”, “regularly” and “almost always”. Sample items include “I have thoughts of ending my life” and “After heavy drinking, I need a drink the next morning to get going”. The items are scored by calculating a total score by three domain scores that can also be looked at individually. The total score can vary from 0 until 180 with a higher score indicating more problems and symptoms of the individual. The publisher of the OQ 45.2 assessed the scales reliability through Cronbach’s alpha among a sample of $N = 247$ with the result of $\alpha = .92$. Cronbach’s alpha of the OQ 45.2 scores of the data gathered by the Mindfit intervention was $\alpha = .78$. Its publishers assessed the validity of the OQ 45.2 by a factor analysis supporting the three-factor solution measured by the three sub scales. Factor analysis on the data of the current study, reassured the three factors of ‘Symptom Distress’, ‘Interpersonal Relationships’ and ‘Social Role’, by which the OQ 45.2 aims to measure mental health. Further, the OQ 45.2’ criterion validity was assessed by its publishers by comparing scores of clinical and various other populations’ scores on the OQ 45.2. Finally, by investigating correlations between individuals scores on the OQ 45.2 and the same individuals scores on other scales, which aim to measure same constructs as the OQ 45.2, the concurrent validity of the OQ 45.2 was supported (Jong et al., 2009).

Next to the OQ 45.2 the Dutch Mental Health Continuum Short Form (MHC-SF) (Lamers, Westerhof, Bohlmeijer, Ten Klooster, & Keyes, 2011) was used. The MHC-SF is 14 items scale that measures three dimensions of positive mental health (emotional, social and psychological well-being). The items were to be answered on a 6-point scale from “never”, “once or twice”, “about once a week”, “about 2 or 3 times a week”, “almost every day” to “every day” according to the last month. Items included statements as “During the past month, how often did you feel that your life has a sense of direction or meaning to it” or “During the past month, how often did you feel happy”. The level of positive mental health was determined by calculating the mean of all items, however also the three dimensions of positive mental

health can be looked at individually. The total score can vary from 0 to 70 with a higher score indicating a higher level of positive mental health. The publisher of the MHC-SF assessed the scales reliability through Cronbach's alpha with the result of $\alpha > .80$. Further, Cronbach's alpha for the Dutch form of the MHC-SF was $\alpha = .89$ (Lamers et al., 2011). Cronbach's alpha of the MHC-SF scores of the data gathered by the Mindfit intervention was $\alpha = .78$. Moreover, an exploratory factor analysis supported the three factors measured by the scale. Further, the criterion validity of the MHC-SF was investigated and assured by comparing scores of different populations (Lamers et al., 2011)

Moreover, the patient's demographics age, gender and educational level were asked.

2.3. Procedure and Design

The study had a single-group pretest-posttest design, with patients suffering from different mental diseases being treated for different periods (Mean time of treatment = 18.5 weeks, *SD* = 9.8 weeks). At the intake session, the participants demographics were assessed as well as their pre-treatment scores on the MHC-SF and the OQ 45.2. Subsequently, participants received treatment for their mental disease by the means of the Mindfit intervention. Thus, the participants received treatment consisting out of CBT based therapy techniques. After every month of treatment, the participant's progress of mental health recovery was re-assessed through the two questionnaires. In the later statistical analyses the pre-treatment measure of the OQ 45.2 and MHC-SF from the intake session, and the post-treatment scores of the two measures from the last session of therapy were used.

2.4. Analyses

Sub-question I was studied by a Paired-Samples T Test to compare mental health of SSD patients at the moment of the pre-treatment measures of the OQ 45.2, respectively MHC-SF, and the post-treatment measure. A Paired-Samples T Test was used for the analysis, which generally, results in lower degrees of freedom, which makes its harder to reject the null hypothesis, compared to an Independent T Test. In the current case however, this concern could

be neglected due to the large sample size (N = 261). Further Cohen's d was calculated. The significance level of the Paired-Samples T Test was set at 5 percent. Moreover, the Reliable Change Index (RCI) investigated whether treatment achieved a clinically relevant change in the case of the OQ 45.2. In the case of the MHC-SF, this option was not available.

Sub-question II used the same analysis techniques as sub-question I and hereby the population of PTSD patients was studied.

In order to investigate sub-question III a repeated measures ANOVA was conducted to determine whether there is a statistically significant difference between men and women suffering from PTSD between their pre- and post- measures (OQ 45.2, respectively MHC-SF). A repeated measures ANOVA with just two measurements, was applied to simplify later comparisons between the uncontrolled effect of gender on treatment outcome, and the effect of gender on treatment outcome accounting for possible confounding variables. Thereafter an ANCOVA was conducted to determine whether there is a statistically significant difference between men and women, controlling for age (continuous variable), educational level (categorical variable, with the groups of non-high and high education level) and treatment time (in weeks). Further, Fisher's least significant difference post hoc test was applied to further investigate the differences between the independent variable, thus male vs. female.

Investigating sub-question IV whether men and women suffering from SSD benefit equally from treatment given by the Mindfit intervention, the analyses from sub-question III were repeated among the population of SSD patients.

To investigate sub-question V a repeated measures ANOVA was executed investigating a possible statistically significant difference between the two educational groups on their pre- and post-treatment measures. Thereafter, a repeated measures ANCOVA was conducted to determine a statistically significant difference between the two educational groups, between the pre- and post-treatment measures of the OQ 45.2, respectively the MHC-SF, controlling for the covariates of age, gender and time of treatment. Afterwards, Fisher's Least Significant

Differences Post hoc test investigated how the two educational groups differ in their scores on the OQ 45.2, respectively MHC-SF.

3. Results

3.1. Sub-question I

In order to test hypothesis I a paired-samples t-test was conducted to compare mental health of SSD patients before and after treatment through Mindfit as measured by the OQ 45.2. Further, the Reliable Change Index (RCI) assessed the clinical effectiveness of Mindfit in the treatment of SSD. Table 2. shows the mean scores and standard deviations of those measures.

Table 2.

SSD patients means and standard deviation of OQ 45.2 scores before and after treatment.

Time of measure	*N*	*M*	*SD*
Pre-treatment	261	84.48	13.17
Post-treatment	261	71.42	13.90

Further, the normal distribution of the measures was assessed by a histogram of the difference scores of the OQ 45.2 pre- and post-treatment measures cf. Appendix (Figure 1.).

There was a significant difference between the scores of the OQ 45.2 before and after treatment (M = -13.06, SD = 12.84) $t(260) = -16.43$, $p < .001$; d = -1.01. Further, investigating the Reliable Change Index, the OQ 45.2 authors stated that a patient has to improve by 14 points on the OQ 45.2 between pre- and post-measure, in order to speak of a reliable improvement in mental health. In the current study, 44.8 percent of SSD patients had an improvement of 14 or more points in their mental health as measured by the OQ 45.2. These results suggest that the Mindfit intervention has a large effect in decreasing symptoms of SSD patients.

The same analysis with the before and after treatment measure of the MHC-SF, showed a significant difference between the scores of the MHC-SF before and after treatment (Means

and standard deviation shown in Table 3.), (M = 9.77, SD = 12.89) $t(260) = 12.24$, $p < .0001$; $d = 0.76$.

Table 3.

SSD patients means and standard deviation of MHC-SF scores before and after treatment.

Time of measure	*N*	*M*	*SD*
Pre-treatment	261	35.73	12.40
Post-treatment	261	45.50	12.35

Further, analyses of the mean differences between the MHC-SF scores showed that the data is almost normally distributed, cf. Appendix (Figure 2.), against what the paired-samples T Test is rather robust. Taken together, these findings suggest that the Mindfit intervention has a large effect in increasing positive mental health in SSD patients.

3.2. Sub-question II

In order to test hypothesis II a paired-samples T-Test was conducted to compare mental health of PTSD patients before and after treatment through Mindfit as measured by the OQ 45.2. Further, the Reliable Change Index (RCI) assessed the clinical effectiveness of Mindfit in the treatment of PTSD patients by the means of the OQ 45.2 scores. Table 4. shows the mean scores and standard deviations of those measures.

Table 4.

PTSD patients means and standard deviation of OQ 45.2 scores before and after treatment.

Time of measure	*N*	*M*	*SD*
Pre-treatment	298	84.40	14.30
Post-treatment	298	69.99	16.74

The normal distribution of the mean differences between pre- and post-measurement was supported by a histogram, see Appendix (Figure 3.).

There was a significant difference between the scores of the OQ 45.2 before and after treatment (M = 14.41, SD = 14.83) $t(297) = -16.76$, $p < .001$; $d = -0.97$. In the current study, 47.3 percent of PTSD patients had an improvement of 14 or more points (RCI) in their mental health as measured by the OQ 45.2. This suggest that Mindfit has a large effect in decreasing symptoms in PTSD patients.

The same analysis with the before and after treatment measure of the MHC-SF, showed a significant difference between the scores of the MHC-SF before and after treatment (Means and standard deviation shown in Table 5.), (M = 10.18, SD = 12.94) $t(297) = 13.58$, $p < .0001$; $d = 0.79$.

Table 5.

PTSD patients means and standard deviation of MHC-SF scores before and after treatment.

Time of measure	*N*	*M*	*SD*
Pre-treatment	298	35.56	14.01
Post-treatment	298	45.74	14.00

Further, analyses of the mean differences between the MHC-SF scores showed that the data is almost normally distributed, see Appendix (Figure 4), which is no issue for the analyses, since the paired-samples T-Test is rather robust, in terms of small deviations from the normal distribution. Taken together, these results suggest that the Mindfit intervention has a large effect in elevating the positive mental health of PTSD patients.

3.3. Sub-question III

Sub-question III investigates whether men and women suffering from PTSD benefit equally from treatment given by the Mindfit intervention. Table 6. shows the means, standard deviation and mean difference score of the OQ 45.2 and MHC-SF per gender.

Table 6.

Means and standard deviations pre-treatment and post-treatment and difference score of the OQ 45.2 and MHC-SF per gender

Gender	*N*	T0 *M* (*SD*) OQ 45.2	T1 *M* (*SD*) OQ 45.2	*d* (*SD*) OQ 45.2	T0 *M* (*SD*) MHC-SF	T1 *M* (*SD*) MHC-SF	*d* (*SD*) MHC-SF
Men	70	83.24 (14.31)	71.34 (16.36)	-11.90 (15.38)	36.72 (15.37)	43.53 (13.50)	6.80 (13.49)
Women	172	84.73 (13.88)	69.60 (16.14)	-15.13 (14.06)	34.98 (13.19)	46.74 (13.62)	11.76 (12.96)

Note. T0 being the pre-treatment measurement, T1 the post-treatment measurement. '*d*' being the difference score of the pre- and post- treatment measurement.

Inspection of the pre- and post-treatment scores showed that the mean scores of the OQ 45.2 and MHC-SF were normally distributed, see Appendix (Figure 5), and that there was homogeneity of variances, shown in Table 7.

Table 7.

Results Levene's Test of Homogeneity of Variances of the OQ 45.2 and MHC-SF scores.

Measure	*N*	*F*	df	*p*
OQ 45.2	240	0.15	1	.696
MHC-SF	240	0.17	1	.678
Error			240	

Note. $p < 0.05$

Testing hypothesis III a repeated measures ANOVA was calculated among the population of PTSD patients, to compare the effect of gender on mental health (OQ 45.2) measured before and after treatment by Mindfit. There was no significant effect of gender on mental health as measured by the OQ 45.2, shown in Table 8. Moreover, a repeated measures ANCOVA was calculated among the population of PTSD patients, to examine the effect of gender on the pre- and post-treatment scores of the OQ 45.2, controlling for the effect of age, educational level and treatment time in weeks. Gender did not show significant differences in terms of mental

health, controlling for the effect of age, educational level and treatment time. Moreover, age, educational level and treatment time were no significant covariates (Table 8.).

Table 8.

Results of the ANOVA and ANCOVA comparing the effect of gender on mental health, respectively controlling for age, educational level and treatment time

Analysis	*N*	Wilks' λ	*F*	df	*p*	η^2/η_p^2
ANOVA	242	.99	2.48	1	.117	.000
ANCOVA	242	.99	1.10	1	.293	.000
Covariate Age	242		0.14	1	.713	
Covariate Educational Level	242		0.51	1	.821	
Covariate Treatment Time	242		2.11	1	.148	
Error				242		

Note. η^2 states the effect size of the ANOVA, η_p^2 shows the effect size of the ANCOVA. $p < 0.05$

These results support hypothesis III that women and men suffering from PTSD benefit equally from treatment given by the Mindfit intervention, accounting for their age, educational level and treatment time.

Investigating the effect of gender on the mental health measured by the MHC-SF of PTSD patients, controlling for the effect of age, educational level and treatment time, a repeated measures ANOVA showed a significant effect of gender on mental health, shown in Table 9. Post hoc comparison using Fisher's least significant difference test indicated that the mean MHC-SF difference score of men ($M = 8.81$, $SD = 1.85$) was significantly lower than the MHC-SF difference score of women ($M = 11.76$, $SD = 1.20$). A following repeated measures ANCOVA showed significant differences of gender in terms of the pre- and post-treatment scores of the MHC-SF, after controlling for the effect of age, educational level and treatment time. Age, educational level and treatment time were no significant covariates, Table 9. Post hoc comparison using Fisher's least significant difference test indicated that the mean MHC-

SF difference score of men (*M* = 9.93, *SD* = 1.90) was significantly lower than score of women (*M* = 14.05, *SD* = 1.44).

Table 9.

Results of the ANOVA and ANCOVA comparing the effect of gender on mental health, respectively controlling for age, educational level and treatment time

Analysis	*N*	Wilks' λ	*F*	df	*P*	η^2/η_p^2
ANOVA	242	.97	7.14	1	.008	.029
ANCOVA	242	.95	4.79	1	.030	.020
Covariate Age	242		0.83	1	.363	
Covariate Educational Level	242		1.98	1	.161	
Covariate Treatment Time	242		0.37	1	.543	
Error				237		

Note. η^2 states the effect size of the ANOVA, η_p^2 shows the effect size of the ANCOVA. $p < 0.05$

Taken together, these results suggest that gender does have an effect on treatment outcome of the Mindfit intervention among sufferers of PTSD. Specifically, the results suggest that, when correcting for educational level, age and treatment time, women suffering from PTSD benefit more from the Mindfit intervention than their male counterparts.

3.4. Sub-question IV

Sub-question IV investigates whether men and women suffering from SSD benefit equally from treatment given by the Mindfit intervention. Table 10. shows the means and standard deviation for the difference score of the OQ 45.2 and MHC-SF per gender.

Table 10.

Means and standard deviations pre-treatment and post-treatment and difference score of the OQ 45.2 and MHC-SF per gender

Gender	*N*	T0 *M* (*SD*) OQ 45.2	T1 *M* (*SD*) OQ 45.2	*d* (*SD*) OQ 45.2	T0 *M* (*SD*) MHC-SF	T1 *M* (*SD*) MHC-SF	*d* (*SD*) MHC-SF

Men	73	81.63 (13.05)	69.55 (13.08)	-12.08 (12.11)	35.25 (12.21)	44.44 (12.00)	9.19 (12.65)
Women	150	85.65 (13.02)	72.17 (14.11)	-13.48 (12.50)	36.33 (13.04)	46.14 (12.22)	9.82 (12.38)

Note. T0 being the pre-treatment measurement, T1 the post-treatment measurement. '*d*' being the difference score of the pre- and post- treatment measurement.

Further, inspection of the pre- and post-treatment scores showed that the mean scores of the OQ 45.2 and MHC-SF were normally distributed, see Appendix (Figure 6), and that there was homogeneity of variances, shown in Table 11.

Table 11.

Results Levene's Test of Homogeneity of Variances of the OQ 45.2 and MHC-SF scores.

Measure	*N*	*F*	df	*P*
OQ 45.2	223	0.14	1	.707
MHC-SF	223	0.134	1	.714
Error			221	

Note. $p < 0.05$

Testing hypothesis IV a repeated measures ANOVA was calculated among the population of SSD patients, to compare the effect of gender on mental health (OQ 45.2) measured before and after treatment by Mindfit. There was not a significant effect of gender on mental health as measured by the OQ 45.2, see Table 12. Thereafter, a repeated measures ANCOVA was calculated among the population of SSD patients, to examine the effect of gender on the pre- and post-treatment scores of the OQ 45.2, controlling for the effect of age, educational level and treatment time in weeks. Gender did not show significant differences in terms of mental health, controlling for the effect of age, educational level and treatment time. Age, educational level and treatment time were no significant covariates, shown in Table 12.

Table 12.

Results of the ANOVA and ANCOVA comparing the effect of gender on mental health, respectively controlling for age, educational level and treatment time

Analysis	*N*	Wilks' λ	*F*	df	*p*	η^2/η_p^2
ANOVA	223	.99	0.63	1	.430	.003
ANCOVA	223	.94	0.54	1	.463	.002
Covariate Age	223		4.14	1	.350	
Covariate Educational Level	223		0.89	1	.955	
Covariate Treatment Time	223		0.01	1	.968	
Error				221		

Note. η^2 states the effect size of the ANOVA, η_p^2 shows the effect size of the ANCOVA. $p < 0.05$

These results support hypothesis IV that women and men suffering from SSD benefit equally of treatment given by the Mindfit intervention, accounting for their age, educational level and treatment time.

Investigating the effect of gender on the mental health measured by the MHC-SF of SSD patients, controlling for the effect of age, educational level and treatment time, a repeated measures ANOVA showed no significant effect of gender on mental health, shown in Table 13. A follow-up repeated measures ANCOVA showed no significant differences of gender in terms of the pre- and post-treatment scores of the MHC-SF after controlling for the effect of age, educational level and treatment time. Age, educational level and treatment time were no significant covariates, shown in Table 13.

Table 13.

Results of the ANOVA and ANCOVA comparing the effect of gender on mental health, respectively controlling for age, educational level and treatment time

Analysis	*N*	Wilks' λ	*F*	df	*p*	η^2/η_p^2
ANOVA	223	.99	0.13	1	.724	.000
ANCOVA	223	.94	0.11	1	.741	.000
Covariate Age	223		0.01	1	.915	
Covariate Educational Level	223		0.32	1	.570	

Covariate Treatment Time	223	1.02	1	.311
Error			221	

Note. η^2 states the effect size of the ANOVA, η_p^2 shows the effect size of the ANCOVA. $p < 0.05$

Taken together, these results suggest that gender does not have an effect, when correcting for educational level, age and treatment time, on treatment outcome of the Mindfit intervention among sufferers of SSD.

3.5. Sub-question V

Sub-question V investigates whether individuals with a non-high or high educational level improve equally in their mental health through the Mindfit intervention. Table 14. shows the means and standard deviation for the pre- and post-treatment scores of the OQ 45.2 and MHC-SF per educational level.

Table 14.

Means and standard deviations pre-treatment and post-treatment and difference score of the OQ 45.2 and MHC-SF per educational level

Educational level	*N*	T0 *M* (*SD*) OQ 45.2	T1 *M* (*SD*) OQ 45.2	*d* (*SD*) OQ 45.2	T0 *M* (*SD*) MHC-SF	T1 *M* (*SD*) MHC-SF	*d* (*SD*) MHC-SF
Non-high	1396	82.80 (13.42)	70.30 (14.77)	-12.68 (13.60)	32.98 (13.81)	43.56 (13.85)	10.58 (13.40)
High	488	81.92 (12.92)	70.23 (13.38)	-11.69 (12.38)	35.74 (13.11)	44.69 (12.32)	9.00 (12.37)

Note. T0 being the pre-treatment measurement, T1 the post-treatment measurement. '*d*' being the difference score of the pre- and post- treatment measurement.

Further, inspection of the pre- and post-treatment scores showed that the mean scores of the OQ 45.2 and MHC-SF were normally distributed, see Appendix (Figure 7.), and that there was homogeneity of variances, shown in Table 15.

Table 15.

Results Levene's Test of Homogeneity of Variances of the OQ 45.2 and MHC-SF scores.

Measure	*N*	*F*	df1	*p*
OQ 45.2	1884	1.473	1	.225
MHC-SF	1884	2.462	1	.225
Error			1881	

Note. $p < 0.05$

Investigating hypothesis V a repeated measures ANOVA was calculated to examine the effect of educational level on mental health measure by the OQ 45.2 before and after treatment by the Mindfit intervention. The analysis showed no significant effect of educational level on mental health measured by the OQ 45.2, shown in Table 16. Furthermore, a repeated measures ANCOVA was conducted to compare the effect of educational level on treatment outcome i.e. pre- treatment measure subtracted from the post-treatment measured by the OQ 45.2, controlling for the effect of treatment time, gender and age. There was not a significant effect of educational level on treatment outcome measured by the OQ 45.2. Further, age, gender and treatment time were not found to be significant covariates as shown in Table 16.

Table 16.

Results of the ANOVA and ANCOVA comparing the effect of educational level on mental health, respectively controlling for age, gender and treatment time

Analysis	*N*	Wilks' λ	*F*	df	*p*	η^2/η_p^2
ANOVA	1884	.99	1.97	1	.160	.001
ANCOVA	1884	.99	1.28	1	.256	.000
Covariate Age	1884		1.02	1	.140	
Covariate Gender	1884		2.76	1	.097	
Covariate Treatment Time	1884		1.50	1	.220	
Error				1882		

Note. η^2 states the effect size of the ANOVA, η_p^2 shows the effect size of the ANCOVA. $p < 0.05$

These results indicate that there is no difference in effectiveness of the Mindfit intervention between individuals of different educational groups, accounting for age, gender and treatment time.

A repeated measures ANOVA was calculated to examine the effect of educational level on mental health measure by the MHC-SF before and after treatment by the Mindfit intervention. The analysis showed that there is an effect of educational level on mental health as shown in Table 17. Subsequently, a repeated measures ANCOVA was conducted to investigate differences between educational level groups by the pre- and post-treatment measure (MHC-SF), after controlling for treatment time. There was a significant effect of educational level on treatment outcome measured by the MHC-SF. Further, treatment time as well as gender were found to be significant covariates, age however was not found to be a significant covariate (Table 17.).

Table 17.

Results of the ANOVA and ANCOVA comparing the effect of educational level on mental health, respectively controlling for age, gender and treatment time

Analysis	*N*	Wilks' λ	*F*	df	*p*	η^2/η_p^2
ANOVA	1884	.99	5.33	1	.021	.030
ANCOVA	1884	.99	4.58	1	.032	.020
Covariate Age	1884		3.05	1	.081	
Covariate Gender	1884		7.11	1	.008	.003
Covariate Treatment Time	1884		7.31	1	.007	.007
Error				1882		

Note. η^2 states the effect size of the ANOVA, η_p^2 shows the effect size of the ANCOVA. $p < 0.05$

Post hoc comparison using Fisher's least significant difference test indicated that the post-treatment MHC-SF scores of non-high educated individuals were significant lower than score of high educated individuals $F(1,1878) = 10.179$, $p = .001$. These results indicate that

individuals with a high educational level increase more in their mental health by the means of the Mindfit intervention than individuals with a non-high educational level.

4. Conclusion and Discussion

The current study investigated the effectiveness of the Dutch Mindfit intervention (Dimence Groep, 2017). Currently, the Dutch mental health care system underwent changes that targeted the structure of mental health care, in order to offer treatment that is closer to the patient and more cost-efficient (Rijksoverheid, 2017). The study was executed with a single-group pretest-posttest design. The sample of PTSD, SSD and various mental diseases patients was investigated by the mean of their pre- and post-treatment scores on the OQ 45.2 and MHC-SF. Further, the effect of gender on treatment outcome of PTSD and SSD patients, and the effect of educational level on treatment outcome of patients suffering from various mental diseases, was investigated.

4.1. Main Findings

It was found that Mindfit is largely effective in the treatment of both PTSD and SSD patients in general, and equally effective for men and women on the primary clinically outcome. However, women suffering from PTSD seem to benefit slightly more in terms of their positive mental health outcomes, than men suffering from PTSD. Moreover, it was found that Mindfit is equally effective in decreasing symptoms of mental health care patients that have different educational levels, however patients with a high educational level seem to benefit slightly more from Mindfit in terms of their positive mental health. This small benefit of high-educated individuals over non-high educated individuals was further found to be influenced by the factor of gender and the duration of treatment, although the influence of these factors was rather small (< 1 percent).

4.2. Is Mindfit effective for SSD and PTSD patients?

The analysis of the effectiveness of Mindfit in the treatment of SSD and PTSD patients showed that Mindfit has a large effect in decreasing symptoms and heightening positive mental health among SSD and PTSD patients.

The found effect sizes in heightening the positive mental health and decreasing symptoms of SSD patients, d = -1.01 (Symptom decrease) and d = 0,75 (Increase in positive mental health), match the previous found effect size of CBT in the treatment of SSD d = 0.94 (Yoshino et al., 2015). The same was the case for PTSD patients, where d = -0.97 (Symptom decrease) and d = 0.79 (Increase in positive mental health), support previous findings of CBT in the treatment of PTSD d = 1.13 (Barrera, Mott, Hofstein, & Teng, 2013). Further, in the case of symptom decrease the Reliable Change Index gave an estimation of the clinically effectiveness of Mindfit. It was found that Mindfit achieved a reliable symptom decrease in 44.8 percent of SSD patients and 47.3 percent of PTSD patients. These findings are in line with previous studies on the clinical efficacy of CBT that found a clinically significant change in 45.0 percent of SSD patients and 44.0 of PTSD patients (Allen & Woolfolk, 2010; Bradley et al., 2005).

Taken together these findings suggest that Mindfit has maintained effectiveness in the treatment of PTSD and SSD as a CBT based intervention, although patients of both diseases, which previously might have been treated by secondary health care were now treated by primary health care, thus receiving less specialized treatment. However, the current findings have to be seen with some caution, since the current study did not apply the intention-to-treat principle, thus dropouts were excluded from the analyses, which altered found effect sizes and estimations of clinically significant changes artificially. Future studies on the effectiveness of Mindfit or similar interventions that investigate mental health care treatment as part of primary health care, should consider applying the intention-to-treat principle to protect findings from possible selection biases.

4.3. The effect of gender and educational level on symptom decrease

Investigation of the effect of gender on treatment outcome of the Mindfit intervention in the treatment of PTSD and SSD patients, and the effect of educational level on the treatment outcome of sufferers of various diseases, showed that Mindfit decreases symptoms equally for individuals of different genders and educational levels. The equal symptom reduction in PTSD patients, for men and women is in accordance with the previous findings of Békés et al. (2013), who found psychotherapy lowering symptoms equally in men and women suffering from PTSD. In the case of educational level and its effect on symptom reduction, previous studies found no effect of educational level in terms of treatment outcome, which supports the current findings (Costa, Mululo, Menezes, Vigne, & Fontenelle, 2012; Halpern-Manners, Schnabel, Hernandez, Silberg, & Eaves, 2016). In the case of SSD patients up to date, there are no studies on whether gender influences symptom reduction. This might indicate that gender difference in symptom reduction are absent. Alternatively, the concepts of social support and diversity of one's supportive network might made gender differences in symptom decrease diminish in SSD patients, as previous studies found social support and diversity of one's supportive network key elements for successful treatment of mental illness (Platt, Keyes, & Koenen, 2014). Possibly, the Mindfit intervention, by its three treatment options of online help, one to one sessions and group therapy that also can be combined, give rise to a highly diverse network. Moreover, the offered online help, which can be assessed at any given moment, might increase the experience of social support of SSD patients.

Taken together these results suggest that shifting treatment from secondary to primary health care has had no negative influence on symptom reduction for individuals of different genders or educational backgrounds.

4.4. The effect of gender and educational level on positive mental health

Research on the effect of gender and educational level on positive mental health of PTSD/SSD patients, respectively patients suffering from various mental diseases, showed that Mindfit heightened positive mental health equally for SSD patients of both gender, in the case of PTSD patients women were found to increase more in their mental health as male PTSD patients, and moreover high-educated individuals suffering from various diseases also were found to increase more in their mental health as non-high educated individuals.

An effect of gender on the positive mental health of SSD patients was not found by the current study. Previously, to the researcher's knowledge, no study investigated whether gender influences the treatment efficacy of SSD patients. Although, gender was shown to be an important factor in the prevalence of SSD (Kurlansik & Maffei, 2016), results of the current study suggest that gender is not an important factor in the treatment outcome of SSD patients. Possibly the positive effect of social support and diversity of one's supportive network that might result from the Mindfit intervention are as well apparent in the case positive mental health of SSD patients.

The found effect of gender in the treatment of PTSD confirm previous findings, which stated that women achieve more secondary benefits in their PTSD treatment (Békés et al., 2016). However, the proportion of explained variance of differences in positive mental health in the current study (2 percent) was smaller than the previous found R^2 = 6 percent (Békés et al., 2016). The found gender difference in secondary benefits might also explain previous found gender differences in the long-term effectiveness of PTSD treatments. A study from 2013 found similar changes of PTSD and depressive symptoms among men and women during and at the termination of treatment, however at the three month follow-up assessment women had lower scores on both symptom categories (Galovski, Blain, Chappuis, & Fletcher, 2013). The higher levels of quality of life found by Békés et al. (2013), or the higher levels of positive mental health of women found in the current study might protect women after therapy against recurring

mental health struggles (Lam et al., 2003). Also it was shown that quality of life correlates with social functioning, which in itself acts as a bumper for mental distress (Trompenaars et al. 2007).

Further, high-educated sufferers of various mental illness were found to benefit more in terms of their positive mental health than their non-high educated counterparts. It was found that the variance in positive mental health explained by educational level was 3 percent. This slight effect decreased to 2 percent when correcting for gender and treatment duration, which both were found to further influence the effect of educational level on positive mental health. In the case of educational level's effect on positive mental health no previous findings are available, however the finding that gender partially explains (<1 percent) the effect of educational level on positive mental health supports the found effect of gender on positive mental health among PTSD patients. As stated before the Mindfit intervention might increase the individual's experience of social support, which would explain the absence of education related differences in the decrease of symptoms in the current study. On the other hand the feeling of being socially detained, experienced by individuals with an lower and middle educational level (Araya et al., 2003), might not be changed through the Mindfit intervention, which could come up for higher educated individuals scoring higher in terms of positive mental health than non-high educated individuals. Unfortunately, no studies are available on the long-term effectiveness of CBT based interventions that consider educational level, thereby the question remains whether a higher positive mental health protects high-educated individuals from future mental health struggles.

4.5. Limitations and strengths of the Current Study

Although the current study confirmed most of the stated hypothesis, there are certain limitations to the current study.

Concerning the design of the study, no control group or alternative treatment group was included. Thereby it was not possible to directly test the effectiveness of Mindfit. Further,

sampling might have biased findings, especially when investigating the effectiveness of Mindfit in the treatment of SSD, and the effect of gender on treatment outcome of SSD patients. Previously it was found that women suffering from SSD outnumber male SSD sufferers by ten-to-one, in the current analyses however, a ratio of three-to-one was present. Investigation of the original data, before excluding patients, showed that man made up 32.9 percent of SSD patients. Possibly women were under- or misrepresented, which could have included a bias in the analyses. Possibly only women who had lower distress of SSD choose Mindfit as there mean of treatment which could have erased gender differences in treatment outcome, if women suffering from PTSD generally experience more distress through SSD than their male counterparts.

Further, the patients filling out the questionnaire themselves might have biased the scores of the OQ 45.2 and MHC-SF. Because of the mental disease patients may were not able to respond adequately to the questions, which therefore would not represent their actual mental health (Haberer, Trabin, & Klinkman, 2013).

Finally, investigating the effect of educational level on treatment outcome might has overlooked differences, because all different kind of diseases were studied together. By this, trends between mental disorders in terms of significance of educational level might have been overlooked. A possible importance of educational level for treatment outcome of specific mental diseases could not have been found by the current study design.

However, the current study had some strengths worth mentioning. The current study used large sample sizes in the different analysis, which previous studies lack. By this the populations of PTSD, SSD or mental ill in general could have been good represented in terms of gender, age or other personal characteristics. Further, data on treatment outcome indicated by the scores of the MHC-SF and OQ 45.2 was systematically collected, which reduced possible bias in the scores. Finally, Mindfit was studied as an intervention that is already in practice. This naturalistic setting of the study, instead of an artificially Randomize Control Trial (RCT)

study, increases the ecological validity of the current findings. In the case of a RCT study, the question would need to be addressed whether findings still hold true for non-RCT settings.

4.6. Summary Conclusion and Discussion

Taking all the results into account it seems that shifting treatment of mental diseases from secondary health care towards primary health care has not jeopardized treatment outcome as far as it concerns symptom decrease, or resulted into therapy that is more suited for individuals of a specific gender or educational level. Further, differences have been found in terms of increased positive mental health and the factors of gender and educational level, previous research on these however are almost not existing, which made it not possible to make judgements concerning the effect of shifting mental health care to the primary health care sector. Future studies are needed to further evaluate this shift. These studies thereby should include a control group, which was lacking in the current study, and pay attention towards the sampling of participants to fully reflect the population of sufferers.

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Appendix

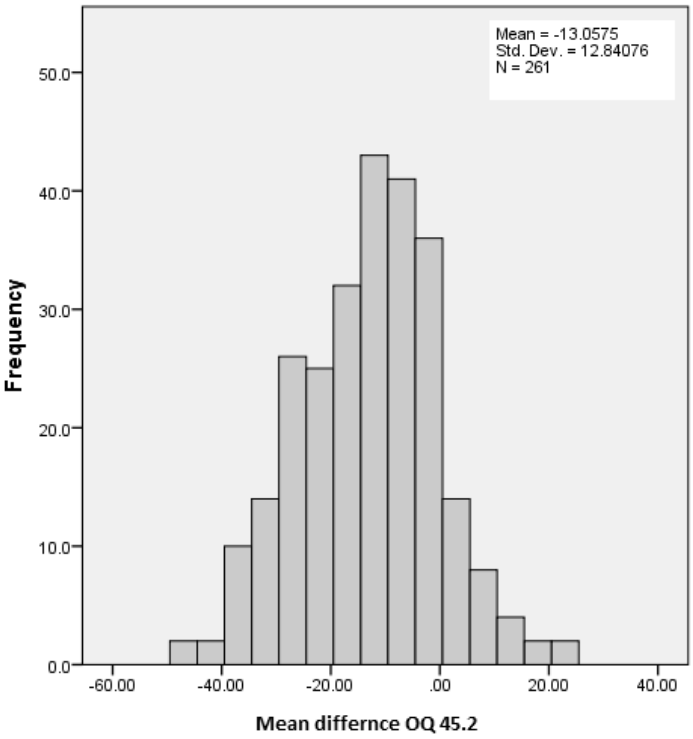

Figure 1. Mean differences OQ 45.2.

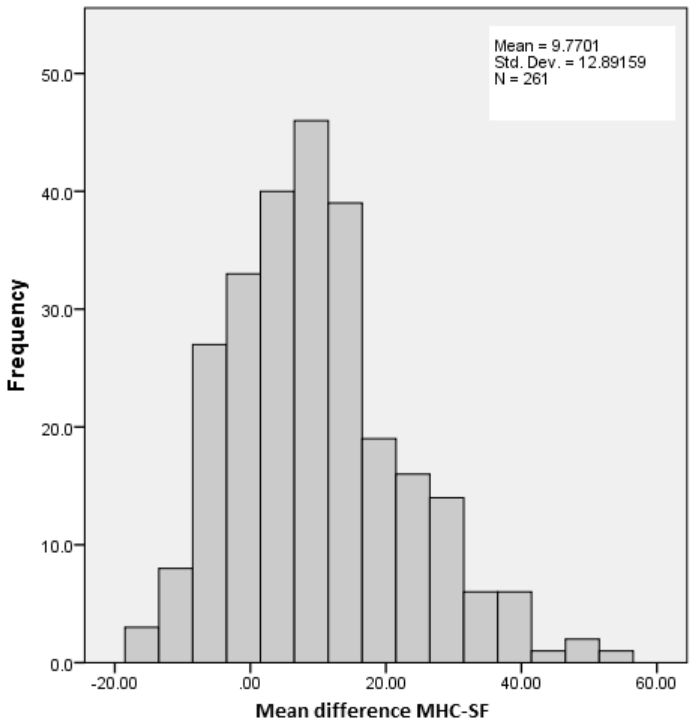

Figure 2. Mean differences MHC-SF.

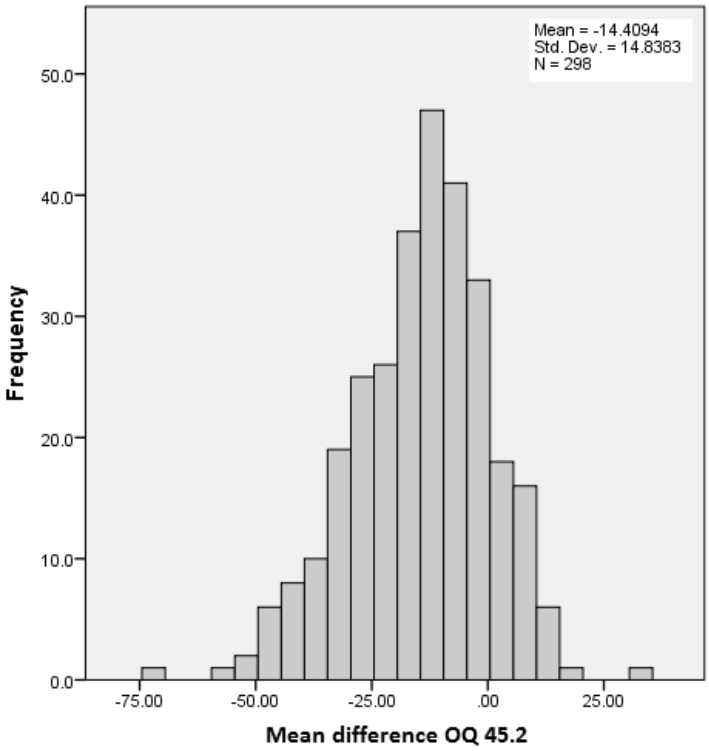

Figure 3. Mean differences OQ 45.2.

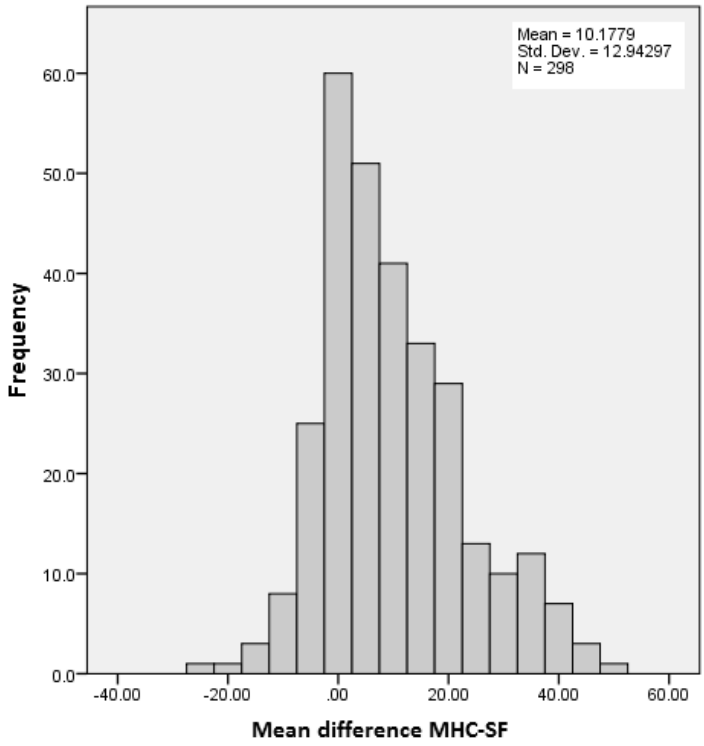

Figure 4. Mean differences MHC-SF.

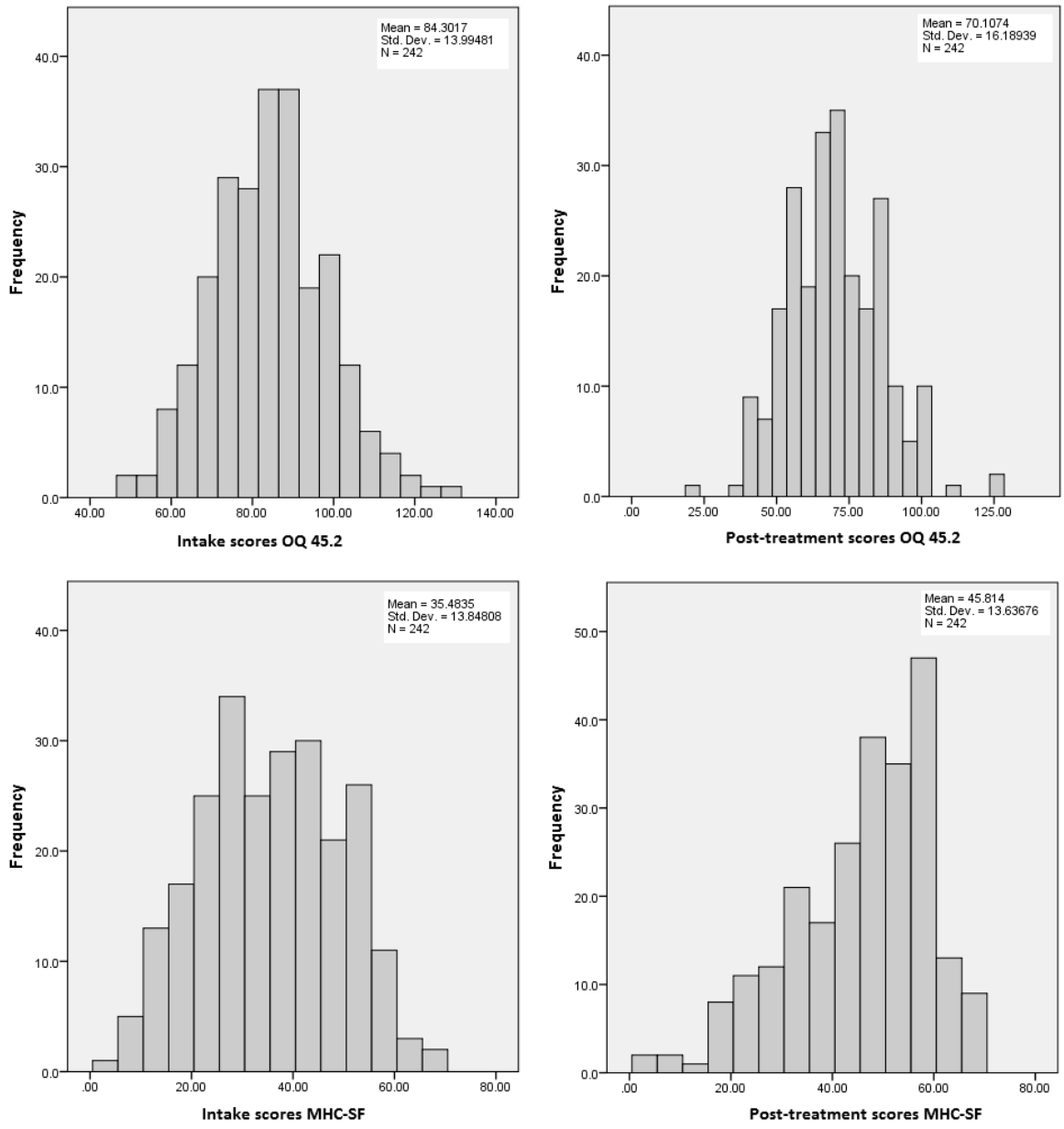

Figure 5. Pre- and post-treatment scores OQ 45.2 and MHC-SF among PTSD population.

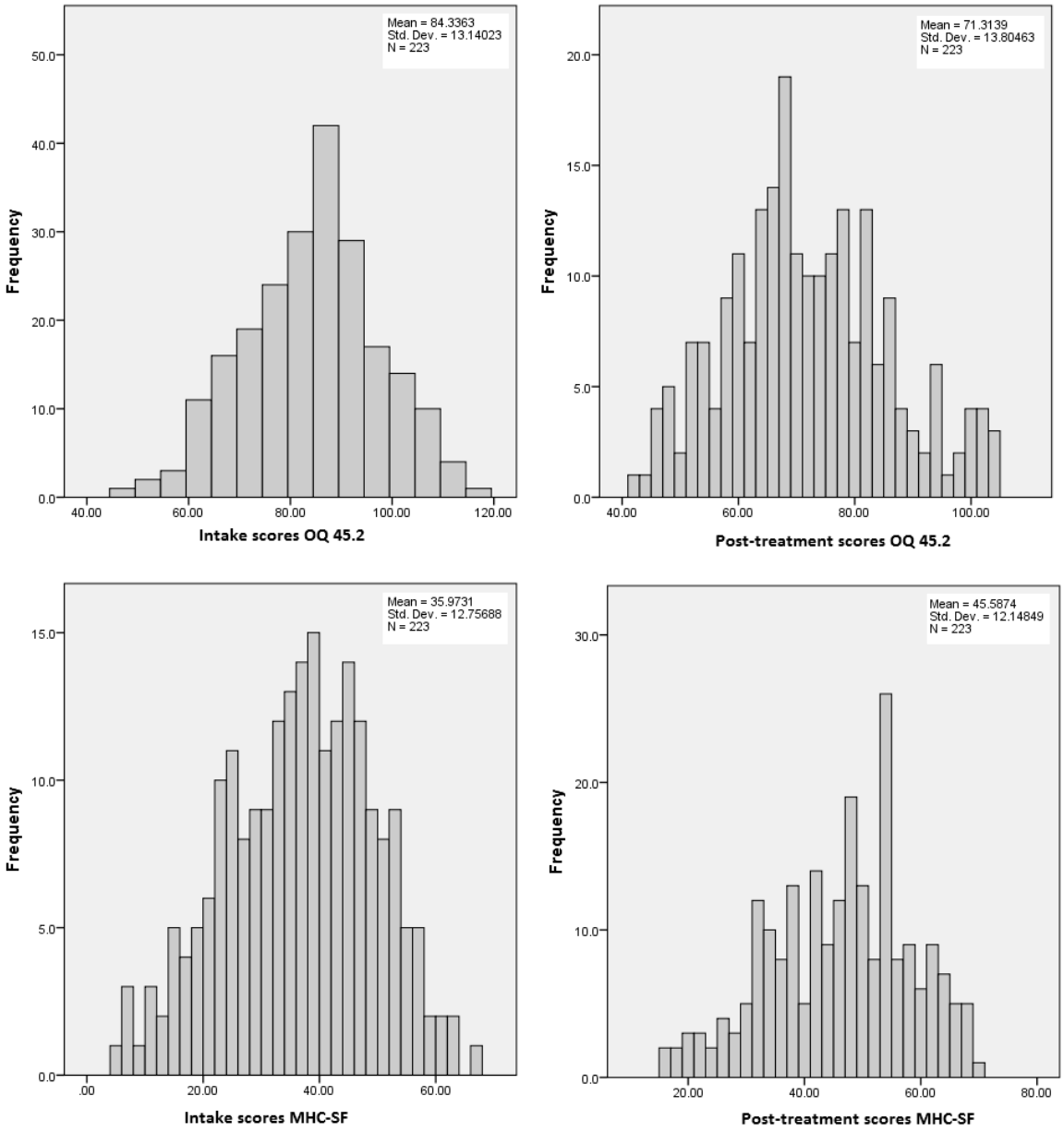

Figure 6. Pre- and post-treatment scores OQ 45.2 and MHC-SF among SSD population.

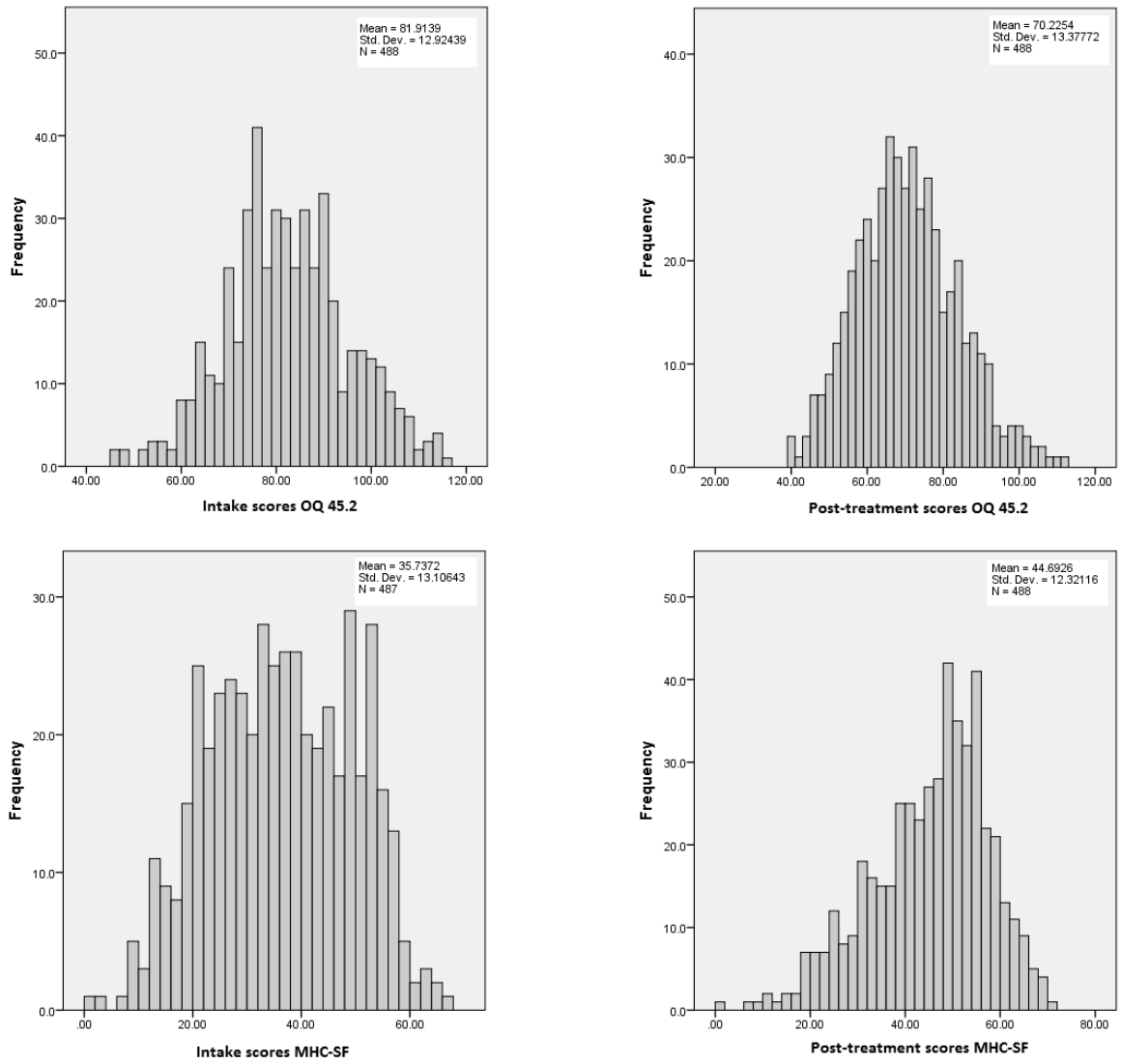

Figure 7. Pre- and post-treatment scores OQ 45.2 and MHC-SF.