Schizophrenia Research 185 (2017) 167–172

Contents lists available at ScienceDirect

Schizophrenia Research

journal homepage: www.elsevier.com/locate/schres

Psychological well-being and mental health recovery in the NIMH RAISE early treatment program

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ARTICLE INFO

Article history:
Received 11 August 2016
Received in revised form 17 November 2016
Accepted 22 November 2016
Available online 29 November 2016

Keywords:
First episode psychosis
Psychological well-being
Coordinated specialty care

ABSTRACT

Recovery-oriented practices that promote client-centered care, collaboration, and functional outcome have been recommended to improve treatment engagement, especially for individuals with serious mental illness (SMI). Psychological well-being (PWB) is related to recovery and refers to experiencing purpose and meaning in life through realizing one's potential. The recently completed Recovery After an Initial Schizophrenia Episode Early Treatment Program (RAISE ETP) study sought to improve quality of life, functional outcome, and well-being in individuals with first episode psychosis (FEP). Therefore, the primary aims of the present analysis were: 1) to examine the impact of treatment on PWB and mental health recovery trajectories, 2) to examine the impact of duration of untreated psychosis (DUP) on these outcomes, and 3) to examine the relationships among these outcomes and quality of life. Multilevel modeling was used given the nested data structure. Results revealed that PWB and mental health recovery improved over the course of the 2-year treatment; there were no significant treatment differences. In addition, DUP was associated with the Positive Relationships and Environmental Mastery dimensions of PWB. Finally, PWB, mental health recovery, and quality of life were all significantly correlated at baseline while controlling for depressive symptoms. Overall, the findings indicate that PWB and mental health recovery can improve in FEP, are related to yet distinct from quality of life, and that DUP may play a role in certain facets of these constructs.

1. Introduction

The concept of recovery has evolved from once denoting a disease-free existence to more recently, a life with purpose and meaning that can endure even in the presence of illness (Roe et al., 2011; Slade et al., 2008). In line with this definition, recovery-oriented and client-centered approaches to mental health treatment promote the importance of finding purpose and meaning in life through realizing one's potential, a concept referred to as psychological well-being (PWB; McMahan and Estes, 2011; Ryan and Deci, 2001; Ryan et al., 2008; Ryff, 1989). PWB, based upon the eudaimonic view of happiness, is thought to comprise six important facets of one's life: Self-Acceptance, Positive Relationships, Autonomy, Environmental Mastery, Purpose in Life, and Personal

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http://dx.doi.org/10.1016/j.schres.2016.11.032
0920-9964/

Growth (Ryff, 1989). PWB is related to but distinct from subjective well-being (Huta and Ryan, 2010), which draws upon the hedonic view of happiness in its emphasis on maximizing pleasure and minimizing pain (Ryan and Deci, 2001). Though both aspects of well-being are valuable, PWB may be most relevant to recovery from mental illness, given its principal focus on regaining optimal functioning and striving to find Purpose in Life (Ryan and Deci, 2001; Ryff, 2014).

PWB has been shown to increase over the course of psychological treatment in the general population and in clinical groups (e.g., affective disorders; Weiss et al., 2016). With regard to those with schizophrenia, two pilot studies have demonstrated the capacity for PWB to improve with participation in loving-kindness meditation (Johnson et al., 2011) and positive psychology psychotherapy (Meyer et al., 2012). Yet, larger treatment trials (with a comparison condition) examining PWB in this population are scant. Schrank et al. (2013) identified 28 studies that have explored well-being in individuals with psychosis; however, the majority measured quality of life or subjective well-being (Schrank et al., 2013). PWB was examined in only two studies, both of which tested different interventions for individuals with psychosis (Ban et al., 2001; Penn et al., 2011), thus limiting any rigorous comparison of treatment effects. In addition to the paucity of studies examining PWB in psychosis, only one study utilized a first episode psychosis (FEP) sample (Penn et al., 2011), highlighting that this area of research has been largely unexplored. Uzenoff et al. (2010) examined data from the Penn et al. (2011) study and found that individuals with FEP reported lower PWB than controls and that less depression and greater social support were associated with higher PWB. Furthermore, they found that PWB is distinct from quality of life, which suggests that this construct deserves unique consideration in treatment research (Uzenoff et al., 2010).

The Recovery After an Initial Schizophrenia Episode Early Treatment Program (RAISE ETP) developed and tested the NAVIGATE program, a multi-component treatment for individuals with FEP aimed primarily at promoting recovery. Akin to recent models of recovery that no longer prioritize symptom remission (Roe et al., 2011; Slade et al., 2008), NAVIGATE sought to improve quality of life, role functioning, and well-being among FEP individuals (Kane et al., 2015; Mueser et al., 2015). The primary results demonstrated that NAVIGATE was more effective at improving quality of life and functioning (e.g., school and/or work involvement) than Community Care (CC) over the two year study period (Kane et al., 2016). Furthermore, duration of untreated psychosis (DUP) was found to moderate response to treatment such that individuals with shorter DUP were found to experience greater improvements in quality of life and symptoms than individuals with longer DUP (Kane et al., 2016). Given the overall success of NAVIGATE in improving client outcomes, examination of recovery outcomes in RAISE ETP is warranted.

The present study had three aims: 1) to examine the impact of treatment on PWB and mental health recovery trajectories, 2) to examine the impact of DUP on these outcomes, and 3) to examine the relationships among PWB, mental health recovery, and quality of life. We hypothesized that PWB and mental health recovery would improve more over time in NAVIGATE than in CC given the recovery-oriented principles upon which NAVIGATE was based (Kane et al., 2015; Mueser et al., 2015). Consistent with existing literature on DUP (Marshall et al., 2005; Perkins et al., 2005) and the primary findings of RAISE ETP (Kane et al., 2016), we hypothesized that individuals with shorter DUP would experience greater gains in mental health recovery and well-being than those with longer DUP.

2. Method

2.1. Participants and study design

The sample comprised 404 FEP participants who had experienced a single episode of non-affective psychosis (Table 1). See Kane et al. (2016) for full demographic and clinical characteristics. RAISE ETP utilized a cluster randomization design in which thirty-four community mental health clinics were randomly assigned to provide the active treatment, NAVIGATE (N = 17) or the control, Community Care (CC; N = 17).

Table 1
Demographic, clinical, and baseline characteristics.

	Community Care (n = 181)	NAVIGATE (n = 223)
Demographic characteristics		
Male, n (%)	120 (66)	173 (78)
Age (years), M (SD)	23.08 (4.90)	23.18 (5.21)
Race/Ethnicity, n (%)		
Caucasian	80 (44)	138 (62)
African American	89 (49)	63 (28)
Other	12 (7)	22 (10)
Ethnicity, n (%)		
Hispanic	18 (10)	55 (25)
Education, n (%)		
Some college or higher	54 (30)	71 (32)
Completed high school	58 (32)	75 (34)
Some high school	58 (32)	67 (30)
Some or completed grade school	11 (6)	9 (4)
Current student, n (%)	47 (26)	35 (16)
Clinical Characteristics		
Diagnosis, n (%)		
Schizophrenia	101 (56)	113 (51)
Schizoaffective bipolar	13 (7)	11 (5)
Schizoaffective depressive	25 (14)	32 (14)
Schizophreniform	24 (13)	43 (19)
Brief psychotic disorder	1 (1)	1 (1)
Psychotic disorder NOS	17 (9)	23 (10)
DUP (weeks), M (SD)	211.43 (277.49)	178.91 (248.73)
Baseline Characteristics, M (SD)		
SPWB Total Average	3.96 (0.78)	3.99 (0.81)
SPWB Environmental Mastery	4.07 (1.20)	4.14 (1.17)
SPWB Autonomy	4.54 (1.01)	4.39 (0.98)
SPWB Personal Growth	4.43 (1.08)	4.35 (1.14)
SPWB Positive Relationships	3.09 (1.24)	3.21 (1.30)
SPWB Purpose in Life	3.97 (1.15)	4.08 (1.18)
SPWB Self-Acceptance	3.64 (1.31)	3.72 (1.35)

Note. NOS = Not otherwise specified; DUP = duration of untreated psychosis; SPWB = Scales of Psychological Well-Being; MHRM = Mental Health Recovery Measure; QLS = Quality of Life Scale.

2.2. Intervention

NAVIGATE is a multi-element FEP treatment consisting of individualized medication management, family psychoeducation, individual resiliency training (IRT), and supported employment and education (Meyer et al., 2015; Mueser et al., 2015). NAVIGATE was designed to promote recovery through a focus on the client's strengths and positive attributes rather than solely on his/her symptoms (Mueser et al., 2015). IRT, in particular, was aimed at enhancing well-being through the integration of illness self-management, cognitive-behavioral therapy for psychosis, and psychiatric rehabilitation (Meyer et al., 2015; Mueser et al., 2015). Moreover, IRT was built on both a strengths-based and resiliency-focused model to promote a comprehensive understanding of recovery that emphasized well-being (Meyer et al., 2015).

2.3. Measures

Since the present study examined a subset of measures administered in the RAISE ETP study, only these measures are described in full detail. See Kane et al. (2016) for a full description of the methods and procedure.

The Scales of Psychological Well-Being – ETP Modification Version (SPWB) are an 18-item subset of the 84-item full scale developed by Carol Ryff (Ryff, 1989). The SPWB measures 6 facets of PWB including Environmental Mastery, Autonomy, Personal Growth, Positive Relationships, Purpose in Life, and Self-Acceptance. Items are rated from 1 (Strongly Disagree) to 6 (Strongly Agree) producing six subscale scores

and a total score (higher scores indicate better PWB; Ryff, 1989). In this modified version of the scale, subscales consisted of 3 items rather than of 14 items in the longer scale. An average score across all 18 items (SPWB Total Average) as well as average scores for each 3-item subscale were utilized in analyses. Internal consistency in the present study was calculated at baseline for the Total Average ($\alpha = 0.83$) and for each subscale: Environmental Mastery ($\alpha = 0.65$), Autonomy ($\alpha = 0.46$), Personal Growth ($\alpha = 0.53$), Positive Relationships ($\alpha = 0.60$), Purpose in Life ($\alpha = 0.56$), and Self-Acceptance ($\alpha = 0.72$). Due to the low internal consistency of many of these subscales, analyses including these measures should be considered exploratory.

The Mental Health Recovery Measure (MHRM; Young and Bullock, 2003) was designed to assess recovery for individuals with serious and persistent mental illnesses. A modified 15-item version of the 30-item full scale was utilized in the present study. The original scale uses a 5-point Likert scale (Strongly Disagree, Disagree, Not Sure, Agree, Strongly Agree); however, RAISE-ETP used a 7-point Likert scale for items where Disagree/Agree were subdivided into Moderately Disagree/Agree and Slightly Disagree/Agree. To capture overall mental health recovery, we created an average score across all 15 items (MHRM Total Average) after determining that this modified version had good internal consistency ($\alpha = 0.92$; measured at baseline). Participants completed the SPWB and MHRM along with several other self-report measures at baseline, 3, 6, 12, 18, and 24 months.

The Quality of Life Scale (QLS; Heinrichs et al., 1984) is a semi-structured interview consisting of 21 items covering rated on a 1–7 scale (higher scores reflect better quality of life). A total score and four domain scores are produced including: Interpersonal relationships, Instrumental role functioning, Intrapsychic foundations, and Common objects and activities. The QLS total score was used in analyses.

The Calgary Depression Scale for Schizophrenia (CDSS; Addington et al., 1993), a standardized semi-structured interview, was used to assess depressive symptoms in the present study. The CDSS total score was used in analyses.

2.4. Procedure

Enrollment occurred between July 2010 and July 2012 and participants could receive treatment for two years. The final participant completed 2 years of treatment in July 2014.

2.5. Data analysis

Multilevel modeling was utilized given the nested data structure (time nested within client nested within site). All analyses were conducted using SAS (version 9.3) and diagnostics were examined for all models. Time was linearized by a square root transformation and three covariates (student status, gender, and baseline symptoms) were included to adjust for baseline treatment group differences (Kane et al., 2016). To compare changes over time for PWB and mental health recovery between treatment groups (Aim 1), we fit a three-level conditional linear growth model with time (square root month in treatment) as a level 1 predictor and treatment group (NAVIGATE vs. CC) as a level 3 predictor. We included fixed effects for both predictors and the interaction term of time by treatment group. A random intercept and slope for time was included at both the site and subject level; however, in the case that any of the estimated covariance parameters were zero, the model was re-fit without the corresponding random effect(s). Finally, we probed the interaction term by calculating simple intercepts and slopes for both treatment groups (NAVIGATE vs. CC) and then graphically depicted these trajectories (Preacher et al., 2006; Rogosa, 1980).

To examine the impact of DUP on outcomes, we re-fit the models including the main effect of DUP, the 2-way interactions of DUP by time and DUP by treatment group, and the 3-way interaction of DUP by time by treatment group. To determine if DUP was a significant moderator of treatment response (Aim 2), we examined the 3-way interaction of DUP by time by treatment group. For significant 3-way interactions, we probed the interaction using the "pick a point approach" originally developed by Rogosa (1980). Specifically, we considered DUP as the focal predictor and calculated simple intercepts and slopes at the median (74 weeks), below the median (1st quartile), and above the median (3rd quartile). The median and quartiles (rather than mean and standard deviation) were chosen for these analyses given the skewed distribution of DUP (Kane et al., 2016; Preacher et al., 2006; Rogosa, 1980). This approach was chosen rather than a median split because it preserves the continuous nature of DUP and does not sacrifice statistical power (Rucker et al., 2015). Finally, to examine the relationships among PWB, mental health recovery, and quality of life (Aim 3), we calculated partial correlations among these variables at baseline controlling for depressive symptoms (so as not to confound the potential influence of depression on these variables).

3. Results

3.1. Effects of time and treatment on outcomes

The results revealed significant effects of time for the MHRM Total

Table 2
Model estimates for Psychological Well-Being and Mental Health Recovery.

Fixed effects by outcome	Fixed effects by outcome	Standard error
SPWB Total Average[a]		
Time	0.0717**	0.0164
Treatgrp	0.0935	0.1030
Time * TreatGrp	−0.0165	0.0212
SPWB Environmental Mastery[b]		
Time	0.0651*	0.0261
Treatgrp	0.0964	0.1437
Time * TreatGrp	−0.0291	0.0301
SPWB Autonomy[b]		
Time	0.0333	0.0181
Treatgrp	−0.1358	0.1101
Time * TreatGrp	0.0065	0.0276
SPWB Personal Growth[b]		
Time	0.0512**	0.0188
Treatgrp	0.0135	0.1371
Time * TreatGrp	−0.0102	0.0253
SPWB Positive Relationships[a]		
Time	0.0923**	0.0270
Treatgrp	0.2724*	0.1206
Time * TreatGrp	−0.0123	0.0359
SPWB Purpose in Life[b]		
Time	0.0981**	0.0236
Treatgrp	0.1724	0.1341
Time * TreatGrp	−0.0350	0.0300
SPWB Self-Acceptance[b]		
Time	0.0989**	0.0223
Treatgrp	0.1688	0.1578
Time * TreatGrp	−0.0319	0.0313
MHRM Total Average[a]		
Time	0.0766**	0.0232
Treatgrp	0.1178	0.1555
Time * TreatGrp	−0.0130	0.0285

Note. TreatGrp = treatment group (NAVIGATE vs. Community Care); SPWB = Scales of Psychological Well-Being; MHRM = Mental Health Recovery Scale. Empirical fixed effects SE method with between-within degrees of freedom was used. Time refers to square root month in treatment. In addition to effects noted in table, all models contain fixed effects for the intercept and grand-mean-centered covariates (student status, gender, and baseline Positive and Negative Syndrome Scale total scores).

* $p < 0.05$.

** $p < 0.01$.

[a] Includes random intercept and slope at subject and site levels.

[b] Includes random intercept and slope at subject level and random intercept at site level.

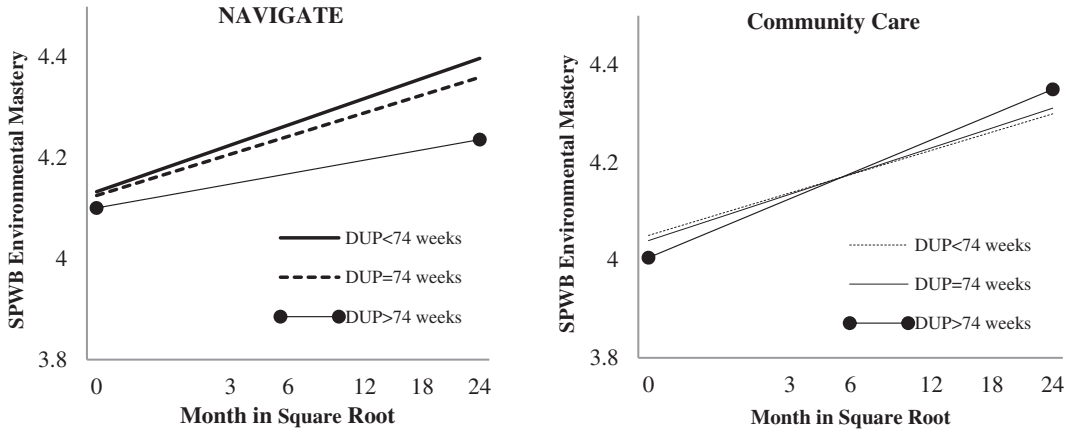

Fig. 1. Effect of DUP on Trajectories of Environmental Mastery Subscale of Psychological Well-Being. *Note*. In NAVIGATE, Individuals with a DUP at or below the median of 74 weeks (solid and dashed lines) experienced the significant improvements in Environmental Mastery (slope above the median is not significantly different from zero). In Community Care, DUP was a significant predictor only for individuals with a DUP above median of 74 weeks as illustrated by the straight line with circle ends (e.g. slopes at and below the median were not significantly different from zero).

Average ($t(1714) = 3.30$, $p = 0.001$), SPWB Total Average ($t(1780) = 4.38$, $p < 0.0001$) and SPWB subscale scores of Environmental Mastery ($t(1710) = 2.49$, $p = 0.013$), Personal Growth ($t(1713) = 2.72$, $p = 0.007$), Positive Relationships ($t(1712) = 3.42$, $p = 0.001$), Purpose in Life ($t(1713) = 4.16$, $p < 0.0001$), and Self-Acceptance ($t(1712) = 4.44$, $p < 0.0001$) indicating improvements over time (Table 2). The only SPWB subscale that did not increase significantly over time was Autonomy ($t(1711) = 1.84$, $p = 0.066$). In terms of treatment main effects, NAVIGATE participants reported significantly higher scores on the SPWB Positive Relationships subscale than those in CC ($t(32) = 2.26$, $p = 0.031$) independent of time. There were no additional significant main effects of treatment. None of the time by treatment group interactions were not significant indicating that improvements in PWB and mental health recovery over time did not differ between the treatment groups.

3.2. Effect of DUP on outcomes

The results indicated a significant 3-way interaction of DUP by time by treatment group on the SPWB Environmental Mastery Subscale ($t(1706) = -2.08$, $p = 0.038$). Results revealed significant simple slopes for time on Environmental Mastery above the median DUP in CC (Estimate = 0.069, $t(1706) = 2.62$, $p = 0.009$) as well as below the median DUP (Estimate = 0.053, $t(1706) = 2.74$, $p = 0.006$) and at the median DUP (Estimate = 0.047, $t(1706) = 2.74$, $p = 0.006$) in NAVIGATE. These results suggest that individuals with shorter DUP in NAVIGATE experienced significant improvements in Environmental Mastery over the course of treatment; however, CC individuals with higher DUP also experienced improvements in this outcome (see Fig. 1). Time was not significantly associated with Environmental Mastery at (Estimate = 0.054, $t(1706) = 1.76$, $p = 0.079$) or below the median (Estimate = 0.050, $t(1706) = 1.52$, $p = 0.130$) in CC or above the median DUP in NAVIGATE (Estimate = 0.027, $t(1706) = 1.88$, $p = 0.060$).

There was also a significant main effect of DUP on the SPWB Positive Relationships subscale ($t(396) = -3.68$, $p = 0.0003$) such that shorter DUP was associated with better Positive Relationships across both treatments. All other effects involving DUP (e.g. main effects, two-way and three-way interactions) were not significant (Table 3).

3.3. Relationships with quality of life

Partial correlations (controlling for CDSS total scores) revealed small significant positive associations between quality of life and PWB for the Total Average and three of six subscales including Personal Growth, Positive Relationships, and Purpose in Life (Table 4). Environmental Mastery, Autonomy, and Self-Acceptance subscales were not significantly correlated with quality of life. Quality of life was also significantly associated with mental health recovery. Finally, significant correlations were observed between mental health recovery and the PWB Total Average, as well as with all of the PWB subscales.

Table 3
Model estimates for Psychological Well-Being and Mental Health Recovery with DUP.

Fixed effects by outcome	Fixed effect estimate	Standard error
SPWB Total Average[a]		
DUP	−0.0003	0.0002
DUP * Time * TreatGrp	−0.0001	0.0001
SPWB Environmental Mastery[b]		
DUP	−0.0002*	0.0003
DUP * Time * TreatGrp	−0.0002	0.0001
SPWB Autonomy[b]		
DUP	0.0002	0.0002
DUP * Time * TreatGrp	−0.0001	0.0001
SPWB Personal Growth[b]		
DUP	−0.0003	0.0003
DUP * Time * TreatGrp	0.0001	0.0001
SPWB Positive Relationships[c]		
DUP	−0.0012**	0.0003
DUP * Time * TreatGrp	−0.0001	0.0001
SPWB Purpose in Life[b]		
DUP	−0.0007	0.0005
DUP * Time * TreatGrp	−0.0001	0.0001
SPWB Self-Acceptance[b]		
DUP	0.0002	0.0003
DUP * Time * TreatGrp	−0.0001	0.0001
MHRM Total Average[a]		
DUP	−0.0005	0.0004
DUP * Time * TreatGrp	−0.0001	0.0001

Note. TreatGrp = treatment group (NAVIGATE vs. Community Care); SPWB = Scales of Psychological Well-Being; DUP = Duration of untreated psychosis; MHRM = Mental Health Recovery Scale. Empirical fixed effects SE method with between-within degrees of freedom was used. Time refers to square root month in treatment and DUP was grand-mean-centered. In addition to effects noted in table, all models contain fixed effects for the intercept, Treatgrp, Time, Time * Treatgrp, DUP * Time, DUP * Treatgrp, and grand-mean-centered covariates (student status, gender, and baseline Positive and Negative Syndrome Scale total scores).

* $p < 0.05$.

** $p < 0.01$.

[a] Includes random intercept and slope at subject and site levels.

[b] Includes random intercept and slope at subject level and random intercept at site level.

[c] Includes random intercept and slope at subject level.

Table 4
Baseline Partial Correlations among Quality of Life, Psychological Well-Being and Mental Health Recovery Controlling for Depressive Symptoms.

	QLS TOT	SPWB TA	SPWB ENV	SPWB AUT	SPWB PG	SPWB PR	SPWB PL	SPWB SA	MHRM TA
QLS TOT	1	0.139**	0.063	−0.028	0.188**	0.147**	0.179**	−0.007	0.131**
SPWB TA	–	1	0.749**	0.459**	0.724**	0.496**	0.732**	0.721**	0.745**
SPWB ENV	–	–	1	0.376**	0.410**	0.171**	0.462**	0.499**	0.662**
SPWB AUT	–	–	–	1	0.226**	−0.053	0.083	0.267**	0.344**
SPWB PG	–	–	–	–	1	0.244**	0.589**	0.381**	0.511**
SPWB PR	–	–	–	–	–	1	0.300**	0.178**	0.208**
SPWB PL	–	–	–	–	–	–	1	0.415**	0.577**
SPWB SA	–	–	–	–	–	–	–	1	0.593**
MHRM TA	–	–	–	–	–	–	–	–	1

Note. QLS = Quality of Life Scale; TOT = total score; SPWB = Scales of Psychological Well-Being; TA = Total Average; ENV = Environmental Mastery; AUT = Autonomy; PG = Personal Growth; PR = Positive Relationships; PL = Purpose in Life; SA = Self-Acceptance; MHRM = Mental Health Recovery Measure. Calgary Depression Scale for Schizophrenia (CDSS) total scores was entered as the control variable.
** $p < 0.01$.

4. Discussion

PWB and mental health recovery improved over the course of the 24-month treatment period; however, this improvement did not differ by treatment group. Despite the lack of treatment effects, these findings provide initial evidence that both well-being and recovery are malleable in FEP. Previous research examining PWB in the context of treatment for mood disorders and FEP have also reported overall increases in PWB and lack of treatment effects (Fava et al., 1999; Penn et al., 2011). Thus, it appears that a variety of treatments may have the potential to impact PWB; however, the specific components of those interventions leading to meaningful changes in this construct are yet to be identified.

The examination of DUP as a potential moderator of treatment effects revealed that it was associated with two facets of PWB: Positive Relationships and Environmental Mastery. Shorter DUP was associated with improved Positive Relationships across both treatment groups and time. Though firm conclusions as to the directionality of this finding are not warranted at this time, it is possible that those with better relationships experience less isolation and are subsequently brought to the clinic for treatment sooner than those who have fewer and poorer quality relationships. Environmental mastery was differentially impacted by DUP in NAVIGATE versus CC. Specifically, individuals in NAVIGATE with low or median DUP experienced significant gains in Environmental Mastery whereas those with longer DUP did not experience significant improvements over time. This finding is somewhat consistent with the primary outcome results of RAISE ETP, which found that those with shorter DUP experienced most rapid gains in NAVIGATE (Kane et al., 2016), and further emphasizes the significance of DUP in FEP treatment (Marshall et al., 2005; Perkins et al., 2005). Yet, the opposite effect was observed in the CC condition such that those with longer DUP experienced the greatest benefits in this aspect of EWB. These findings should be interpreted with caution given the lack of consistency in the association of DUP with other subscales as well as the risk of these findings being a product of multiple hypothesis testing without correction.

Finally, PWB and mental health recovery were strongly associated with each other, suggesting that these constructs are quite similar. In terms of well-being subscales, Environmental Mastery, Personal Growth, Purpose in Life, and Self-Acceptance were all significantly associated with recovery at a moderate to large level. Autonomy and Positive Relationships subscales were significantly associated with recovery at a much smaller magnitude, thus highlighting that these aspects of PWB may be most distinct from mental health recovery. Correlations between the total scores on these outcomes and quality of life were quite small, demonstrating that PWB and mental health recovery are both related to and distinct from quality of life (Uzenoff et al., 2010). Overall, our results demonstrate that PWB and mental health recovery are not the same as quality of life; however, they may be difficult to tease apart from each other.

A number of limitations should be considered when interpreting the results. First, a subset of items from the longer scales comprised the SPWB and MHRM measures used in this study and both instruments are subject to the standard limitations of self-reports. Second, the scale and anchors of the MHRM were modified for use in RAISE ETP and many of the 3-item subscales of the SPWB had relatively low levels of internal consistency, thus potentially compromising construct validity. Third, there was a large range of DUP, which likely was not entirely captured by probing the 3-way interactions at the 1st quartile, median, and 3rd quartile through the "pick a point" approach (Rogosa, 1980). Fourth, it is possible that variables (e.g., demographics, symptoms) not included in the analyses could influence the relationship between DUP and outcomes.

In closing, the results of the present study demonstrated that PWB and recovery improved over the course of FEP treatment. Further, DUP was associated with Positive Relationships and Environmental Mastery aspects of PWB. Given that a principal aim of IRT was to enhance well-being, future research may consider examining the effect of participation in IRT on these outcomes. It is possible that individuals who attended more sessions of IRT experienced the greatest benefits in PWB and recovery. Moreover, given that a positive therapeutic alliance is associated with positive treatment outcomes for individuals with SMI (Priebe et al., 2011), its impact on PWB and recovery may be an important future direction. Overall, given these promising results, further exploration of the particular treatment components most relevant to PWB and recovery continue to be a critical avenue for future study on FEP.

Role of the Funding Source

This work was supported in whole or in part with funds from the American Recovery and Reinvestment Act and the National Institute of Mental Health (HHSN-271-2009-00019C). Additional support was provided by the National Institute of Mental Health Advanced Centers for Intervention and/or Services Research award (P30MH090590) to Dr. Kane.

Contributors

JK (Principal Investigator), DP, KM, SE, MB, CC, JR, RR, NS, DR, JA, and PM served on the RAISE ETP Executive Committee, which spearheaded the project. PMK was a key developer of Individual Resiliency Training (IRT), the individual therapy component provided in RAISE ETP. JB wrote the first draft, conducted all analyses, and certifies the accuracy of the results. All authors provided edits and revisions to the manuscript and are in agreement with the final version.

Conflict of interest

Dr. Kane has been a consultant for or received honoraria from Alkermes, Eli Lilly, EnVivo Pharmaceuticals (Forum), Forest (Allergan), Genentech, H. Lundbeck. Intracellular Therapeutics, Janssen Pharmaceutica, Johnson and Johnson, Otsuka, Reviva, Roche, Sunovion and Teva. Dr. Kane is also a Shareholder in MedAvante, Inc., Vanguard Research Group and LB Pharmaceuticals, Inc. All other authors declare no conflicts of interest pertinent to this study.

Acknowledgements

We thank all of our core collaborators and consultants for their invaluable contributions, without whom this study would not have been possible.

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Additional Collaborators: MedAvante for the conduct of the centralized, masked diagnostic interviews and assessments; the team at the Nathan Kline Institute for data management. Thomas Ten Have and Andrew Leon played key roles in the design of the study, particularly for the statistical analysis plan. We mourn the untimely deaths of both. We gratefully acknowledge the contributions of Haiqun Lin and Kyaw (Joe) Sint to statistical analysis planning and conduct.

We are indebted to the many clinicians, research assistants and administrators at the participating sites for their enthusiasm and terrific work on the project as well as the participation of the hundreds of patients and families who made the study possible with their time, trust and commitment.

The participating sites include:

Burrell Behavioral Health (Columbia), Burrell Behavioral Health (Springfield), Catholic Social Services of Washtenaw County, Center for Rural and Community Behavior Health New Mexico, Cherry Street Health Services, Clinton-Eaton-Ingham Community Mental Health Authority, Cobb County Community Services Board, Community Alternatives, Community Mental Health Center of Lancaster County, Community Mental Health Center, Inc., Eyerly Ball Iowa, Grady Health Systems, Henderson Mental Health Center, Howard Center, Human Development Center, Lehigh Valley Hospital, Life Management Center of Northwest Florida, Mental Health Center of Denver, Mental Health Center of Greater Manchester, Nashua Mental Health, North Point Health and Wellness, Park Center, PeaceHealth Oregon/Lane County Behavioral Health Services, Pine Belt Mental HC, River Parish Mental Health Center, Providence Center, San Fernando Mental Health Center, Santa Clarita Mental Health Center, South Shore Mental Health Center, St. Clare's Hospital, Staten Island University Hospital, Terrebonne Mental Health Center, United Services and University of Missouri-Kansas City School of Pharmacy.

Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.schres.2016.11.032.

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