Research Article

SYMPTOM BENCHMARKS OF IMPROVED QUALITY OF LIFE IN PTSD

Paula P. Schnurr, Ph.D.,[1,2]* and Carole A. Lunney, M.A.[1]

Background: ***Although research has shown that PTSD symptom change relates to improved quality of life, the question of how much improvement in PTSD symptoms is necessary to result in meaningful improvements in quality of life remains unanswered. We used data from a randomized clinical trial of psychotherapy for PTSD in female military veterans and active duty personnel to examine the correspondence between benchmarks of improvement in PTSD symptoms and changes in quality of life.*** **Methods:** ***Participants were 235 female veterans and Army soldiers who were randomized to 10 weekly sessions of Prolonged Exposure or Present-Centered Therapy. We operationalized PTSD symptom change in terms of four progressively stringent mutually exclusive definitions—No Response, Response, Loss of Diagnosis, and Remission—successively comparing each category to the prior one: No Response versus Response, Response versus Loss of Diagnosis, and Loss of Diagnosis versus Remission. Outcomes were clinically meaningful improvements and good endpoints in domains of clinician-rated and self-reported quality of life.*** **Results:** ***Response was associated with improvement on almost all measures, but with only one good endpoint. Loss of Diagnosis was associated with improvement on all measures except self-rated social functioning and with achieving a good endpoint on all measures. Remission was associated with improvement in clinician-rated social impairment and a good endpoint in clinician-rated occupational impairment.*** **Conclusions:** ***For most domains of quality of life, treating a patient until the patient no longer meets diagnostic criteria would be optimal. For some domains, further improvements may result by helping a patient achieve remission. Depression and Anxiety 33:247–255, 2016.***

Key words: ***posttraumatic stress disorder; veterans; women; cognitive behavioral therapy; quality of life***

INTRODUCTION

What should be the goal of treating mental health problems? The National Consensus Statement on Mental Health Recovery emphasizes outcomes other than symptoms, defining recovery "... as a journey of healing and transformation enabling a person with a mental health problem to live a meaningful life in a community of the person's choice while striving to achieve... full potential."[1] In their review on quality of life, Gladis et al.[2] asked, "Should clinicians and their patients feel that the job is not done (or not done well) if symptoms are alleviated but other areas of the patient's life are not fully satisfying?" (p. 328).

[1]**Executive Division, National Center for PTSD, White River Junction, Vermont**
[2]**Department of Psychiatry, Dartmouth Medical School, Hanover, New Hampshire**

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*Correspondence to: Paula P. Schnurr, National Center for PTSD (116D), VA Medical Center, White River Junction, VT 05009. E-mail: paula.schnurr@dartmouth.edu

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These statements reflect recognition of the importance of making a difference in patients' lives through treatment. To support this goal, we examined how response to treatment for PTSD relates to change in quality of life. Almost one in 15 US adults have had PTSD at some point in their lives.[3] The disorder is especially prevalent in women: lifetime prevalence is 3.6% in men versus 9.7% in women.[4] PTSD also is prevalent in populations with high exposure to traumatic events, such as military veterans.[5,6]

Definitions of quality of life vary. One comprehensive model[2] includes domains of functioning, satisfaction, and material indicators such as income. PTSD is an important health concern not only because of its prevalence but also because it is associated with wide-ranging negative effects in all three domains.[7–9] Helping a patient recover from PTSD (or any other mental disorder) thus requires attention to more than the patient's core symptoms. However, symptom reduction rather than attainment of clinically meaningful improvement is typically the primary outcome in treatment studies.[10–15]

Although treating PTSD results in improved quality of life,[10–12,16–19] the question of how much improvement in PTSD symptoms is necessary to effect meaningful improvements in quality of life remains unanswered. Therefore, we used data from a randomized clinical trial of Prolonged Exposure (PE)[20] for PTSD in female military veterans and soldiers to examine the correspondence between benchmarks of improvement in PTSD and quality of life. The trial found PE treatment was superior to present-centered treatment for reducing PTSD symptoms and increasing the likelihood of patients no longer meeting diagnostic criteria for PTSD and of remission.[15] PE was no better than present-centered treatment for improving aspects of quality of life. However, treatment response was associated with improvements in multiple domains of life satisfaction[21] and patients who no longer met diagnostic criteria had improved occupational functioning[22] and sexual functioning.[23]

Our study builds on work on measurement of clinically significant change, following recommendations[24–26] to conceptualize change in terms of real-world impact rather than amount of symptom change. Kazdin[25] asked "...will there be a way to provide a relatively simple, user-friendly, and hence feasible method(s) of assessing clinical significance for use in clinical research and practice?" (p. 460). We offer a proof-of-concept of how we can address this question and move closer to developing optimal strategies to determine whether we are making a difference in patients' lives. We operationalized PTSD symptom change in terms of four progressively stringent mutually exclusive definitions—No Response, Response, Loss of Diagnosis, and Remission—and examined how these definitions related to meaningful improvements in domains of clinician-rated and self-reported quality of life.

MATERIALS AND METHODS

Details about the study have been published previously.[15,27] An institutional review board at each site approved the research protocol. Participants provided written informed consent after being given a complete description of the study. Data were collected between August 2002 and October 2005.

PARTICIPANTS

Participants were 232 female veterans and three Army soldiers recruited from nine VA hospitals, two VA community Vet Centers, and one Army hospital.[15] Inclusion criteria were current PTSD according to the "1/2" rule and minimum severity ≥ 45 on the Clinician-Administered PTSD Scale (CAPS);[28] ≥3 months since experiencing trauma; a clear memory of the trauma that caused PTSD; agreement to not receive other psychotherapy for PTSD during treatment; and, for those on psychoactive medication, a stable regimen for the prior 2 months. Exclusion criteria were current psychotic symptoms, mania, bipolar disorder, or substance dependence; prominent current suicidal or homicidal ideation; cognitive impairment; current involvement in a violent relationship; and self-mutilation within the past 6 months.

Participants' mean age was 45.02 years ($SD = 9.41$, range = 22–78 years). Most had more than a high school education (87.2%, $n = 205$); 29.8% were married or living as married ($n = 70$). Just under half were non-White (45.5%, $n = 107$). Sexual trauma was the most commonly identified type of index event to address in treatment (68.5%, $n = 161$), followed by physical assault (14.9%, $n = 35$) and war-zone exposure (6.0%, $n = 14$). The index trauma occurred when participants were 21.18 years of age ($SD = 10.19$, range = 3–54 years). Women randomized to PE and Present-Centered Therapy (PCT) did not differ at baseline in demographic, exposure, or clinical characteristics.[15]

The 235 women were selected from the 284 enrolled in the trial because they participated in outcome measurement at posttreatment. The 235 did not differ from the 49 excluded women on PTSD symptom severity or any of the quality of life measures at pretreatment, nor on race, marital status, work status, or VA PTSD disability status.

MEASURES

PTSD and Other Axis I Diagnoses. We assessed PTSD using the CAPS,[28] a structured interview in which the frequency and intensity of the 17 DSM-IV PTSD symptoms are rated on a 5-point scale. Summing the scores yields a measure of severity (range = 0–136). For diagnosis, we required that symptoms occur at least monthly with moderate intensity (the "1/2" rule) and that overall severity was ≥45.[29] Other Axis 1 diagnoses were measured using the Structured Clinical Interview for DSM-IV (SCID).[30] Inter-rater reliability was high for both measures.[15]

Clinically meaningful PTSD outcomes on the CAPS were defined as in the original trial.[15] Participants were classified into one of four mutually exclusive categories based on symptom change at posttreatment: No Response, Response, Loss of Diagnosis, or Remission. Response was defined as a reduction of 10 or more points. Loss of Diagnosis was defined as Response plus no longer meeting "1/2" symptom criteria and having a severity score < 45. Remission was defined as Loss of Diagnosis plus a severity score < 20.

Quality of Life. There was no single definition of clinically meaningful improvement or good endpoint that applied to all of the quality of life measures. Instead, we used definitions from the manual for a measure or from past research, as described below. We took as our guiding principle Kazdin's[25] recommendation that endpoints "actually reflect important, practical, worthwhile, and genuine changes or levels of functioning in everyday life" (p. 459).

Clinicians rated social and occupational impairment on the CAPS using a 5-point scale (0 = *none*–4 = *extreme*). Meaningful improvement was defined as an increase of ≥1 at posttreatment. Five participants who had no occupational impairment at both pre- and posttreatment were coded as having meaningful improvement. (Sensitivity analysis excluding these participants showed no difference from analysis including them.) Because ratings of moderate (2) or higher are considered to indicate significant impairment,[31] we defined no or mild impairment (0 or 1) as a good endpoint because these scores would mean that a person was able to engage in social and occupational roles with little or no impairment.

Self-reported functional impairment was measured using the Role-Emotional, Role-Physical, and Social Functioning scales of the SF-36.[32] The standard error of measurement (SEM) has been shown to be a good method for assessing meaningful change in health-related quality of life measures.[33,34] Clinically meaningful improvement was defined as an increase of ≥1.0 SEMs from the pretreatment score. We defined a good endpoint as being within 1.0 SEM relative to the population norm for women in the same age range to reflect adequate or better functioning.

Life satisfaction was assessed using the Quality of Life Inventory (QOLI).[35] For each of 16 domains of life, satisfaction with that domain is rated on a scale from −3 = *very dissatisfied* to +3 = *very satisfied* and importance is rated on a scale from 0 = *not important* to 2 = *extremely important*. The overall QOLI score is computed as the sum of the importance-weighted satisfaction for all domains. Pre- and posttreatment scores can be categorized as High, Average, Low, and Very Low, relative to nonclinical norms. According to the QOLI manual, moving from a lower to a higher category is clinically significant.[35] We, therefore, defined meaningful improvement as moving to a higher category at posttreatment. Participants who started and stayed in the highest category ($n = 4$) were coded as having meaningful improvement. (Sensitivity analysis excluding these participants showed no difference from analysis including them.) We defined a good endpoint as an Average or High score at posttreatment, reasoning that these categories would be a meaningful endpoint because they reflect good to very good satisfaction with multiple domains of quality of life.

PROCEDURE

Referring clinicians provided information about potential participants to study staff, who then met with the referrals to explain the study and obtain consent. A master's- or doctoral-level clinician who was blind to participants' treatment assignment performed all assessments. Eligible women were randomized to receive 10 weekly sessions of PE[20] or Present-Centered Therapy.[27] Therapists were 52 female master's- or doctoral-level clinicians who were randomized to deliver one of the two treatments. All received specialized training in their assigned treatment. Sessions were videotaped and reviewed by an expert supervisor, who provided telephone supervision. Therapist adherence and competence, rated by an independent fidelity monitor, were excellent and equivalent across treatments.[15]

STATISTICAL ANALYSIS

Data are presented collapsed across treatment conditions because there were no differences between treatments in how change related to quality of life outcomes.[15] We applied the Tukey–Kramer adjustment for the post hoc pairwise comparisons of demographic and clinical characteristics among the four PTSD symptom change benchmark categories. We examined continuous change in symptoms and in each quality of life measure by predicting posttreatment quality of life in least-squares regression models that included pre- and posttreatment CAPS severity and pretreatment scores on that measure. We conducted logistic regressions predicting good endpoint or meaningful change in each quality of life measure from PTSD symptom change group, controlling for initial PTSD severity and the initial score on that measure. We used a sequential coding scheme[36] for PTSD symptom change categories to compare successive categories (Response vs. No Response, Loss of Diagnosis vs. Response, and Remission vs. Loss of Diagnosis).

RESULTS

Table 1 shows that most participants experienced clinically meaningful improvement in PTSD symptoms: 36% responded, 17% lost their PTSD diagnosis, and 12% experienced remission. The average symptom change on the CAPS ranged from an increase of 2.8 points in nonresponders to a decrease of 52.0 points for those who remitted.

Table 2 presents information about the pretreatment characteristics of the four groups. Groups did not differ in demographic characteristics. Regarding clinical characteristics, there were nonlinear patterns of differences across groups; the lowest clinical severity was not always associated with the greatest PTSD symptom response. Only participants in the Response group were more likely than those in the Remission group to have a current comorbid psychiatric diagnosis. PTSD symptom severity was higher in the Response group than in all other groups, and also higher in the No Response group than in the Remission group. Regarding quality of life, groups did not differ on the CAPS social and occupational impairment ratings or on the Role-Emotional scale. For Role-Physical, the No Response group had poorer functioning than the Loss of Diagnosis group. Both the No Response and Response groups had poorer Social Functioning than the Loss of Diagnosis and

TABLE 1. PTSD symptom change from pre- to posttreatment

PTSD symptom change	*n*	%	*M*	*SD*	Range
No Response	83	35.3	2.84	9.78	+33 to −9
Response	84	35.7	−22.33	10.57	−10 to −59
Loss of Diagnosis	39	16.6	−40.38	15.20	−12 to −67
Remission	29	12.3	−52.03	11.74	−36 to −80

PTSD symptom change was determined using CAPS. Response was defined as a reduction of 10 or more points. Loss of Diagnosis was defined as Response plus no longer meeting CAPS "1/2" symptom criteria and having a severity score < 45. Remission was defined as Loss of Diagnosis plus a severity score < 20.

TABLE 2. Pretreatment demographic and clinical characteristics of PTSD symptom change subgroups

	No Response		Response		Loss of Diagnosis		Remission	
	$N = 83$		$N = 84$		$N = 39$		$N = 29$	
	M/%	*SD*/*n*	*M*/%	*SD*/*n*	*M*/%	*SD*/*n*	*M*/%	*SD*/*n*
Age	46.81	9.64	43.55	8.94	43.33	8.34	46.41	10.68
Post high school education (%)	85.5	71	83.3	70	94.9	37	93.1	27
Non-White race (%)	41.0	34	50.0	42	43.6	17	48.3	14
Married/living as married (%)	24.1	20	32.1	27	43.6	17	20.7	6
Working full- or part-time (%)	39.8	33	40.5	34	41.0	16	34.5	10
VA PTSD service-connected disability (%)	26.5	22	15.7	13	32.4	12	10.3	3
Any current comorbid psychiatric disorder (%)	78.3[a,b]	65	83.3[a]	70	79.5[a,b]	31	55.2[b]	16
Any lifetime comorbid psychiatric disorder (%)	98.8	82	98.8	83	97.4	38	93.1	27
CAPS PTSD severity	78.05[a]	16.49	84.26[b]	14.38	72.90[a,c]	15.16	66.10[c]	11.82
CAPS social impairment	2.86	0.68	2.79	0.70	2.54	0.79	2.62	0.62
CAPS occupational impairment	2.34	0.98	2.56	0.81	2.15	0.99	2.31	0.93
SF-36 role-emotional	29.70	8.74	29.38	9.87	32.38	11.56	33.18	10.29
SF-36 role-physical	35.03[a]	10.48	36.96[a,b]	11.16	40.65[b]	11.72	39.66[a,b]	11.69
SF-36 social functioning	30.63[a]	11.34	30.77[a]	11.10	37.22[b]	11.98	37.34[b]	10.82
QOLI	−0.03[a,b]	1.91	−0.38[a]	2.01	0.68[b]	1.90	0.33[a,b]	1.52

SF-36, Short-Form (36) Health Survey.
PTSD symptom change was determined using the CAPS. Response was defined as a reduction of 10 or more points. Loss of Diagnosis was defined as Response plus no longer meeting CAPS "1/2" symptom criteria and having a severity score < 45. Remission was defined as Loss of Diagnosis plus a severity score < 20. Row means and percentages not sharing a common superscript differ at $P < .05$ or less after applying the Tukey–Kramer adjustment.

TABLE 3. Regression of CAPS severity on quality of life measures at posttreatment

Quality of life measure	*B*	*SE*	*t*
CAPS social impairment	0.03	0.002	12.55*
CAPS occupational impairment	0.03	0.002	12.01*
SF-36 role-emotional	−0.88	0.08	−10.43*
SF-36 role-physical	−0.58	0.10	−5.97*
SF-36 social functioning	−0.41	0.06	−7.37*
QOLI	−0.04	0.004	−8.93*

The unstandardized regression coefficient for each measure comes from a model that included CAPS severity and that measure at pretreatment.
*$P < .001$.

Remission groups. The Response group had lower satisfaction than the Loss of Diagnosis group on the QOLI satisfaction measure.

Table 3 describes relationships between change in symptoms and change in quality of life. Decreases on the CAPS were strongly associated with favorable changes on all quality of life measures, e.g., for each point of decrease on the CAPS, SF-36 Role-Emotional scores increased 0.88 points.

Figure 1 illustrates the percentage of participants in each symptom response group who had clinically meaningful improvement on each quality of life measure. For example, on the CAPS social impairment scale, there was a linear increase such that the percentage with clinically meaningful improvement increased across groups from 31.3, to 41.7, to 64.1, to 93.1%. There was a similar linear progression on the CAPS occupational impairment and SF-36 Social Functioning scales, whereas patterns were nonlinear for the other scales. The left half of Table 4 summarizes differences in improvement between successive pairs of groups. Response, versus No Response, had greater meaningful improvement on all measures except the SF-36 Role-Emotional scale and the QOLI. Loss of Diagnosis, versus Response, was associated with further improvement on all of these measures except the SF-36 Social Functioning scale, and also was associated with improvement on the Role-Emotional scale and the QOLI. Remission, versus Loss of Diagnosis, was associated with further improvement in CAPS social impairment only.

Figure 2 presents the percentage of participants in each symptom response group who achieved a good endpoint on each quality of life measure. Only 4.8–14.5% of participants who did not respond to treatment reached a good endpoint in any domain. In contrast, the percentage reaching a good endpoint ranged from 7.1–22.6% among those who responded, 47.4–64.1% among those who lost their diagnosis, and 44.8–86.2% among those who remitted. The results of between-group comparisons for achieving a good endpoint (right, Table 4) showed both similarities and differences from the analyses to predict clinically meaningful change. The most notable exception was that Response was associated with a good endpoint for only one outcome, CAPS occupational impairment. Loss of Diagnosis was associated with a good endpoint for all outcomes. Remission was associated with a good endpoint only for CAPS occupational impairment.

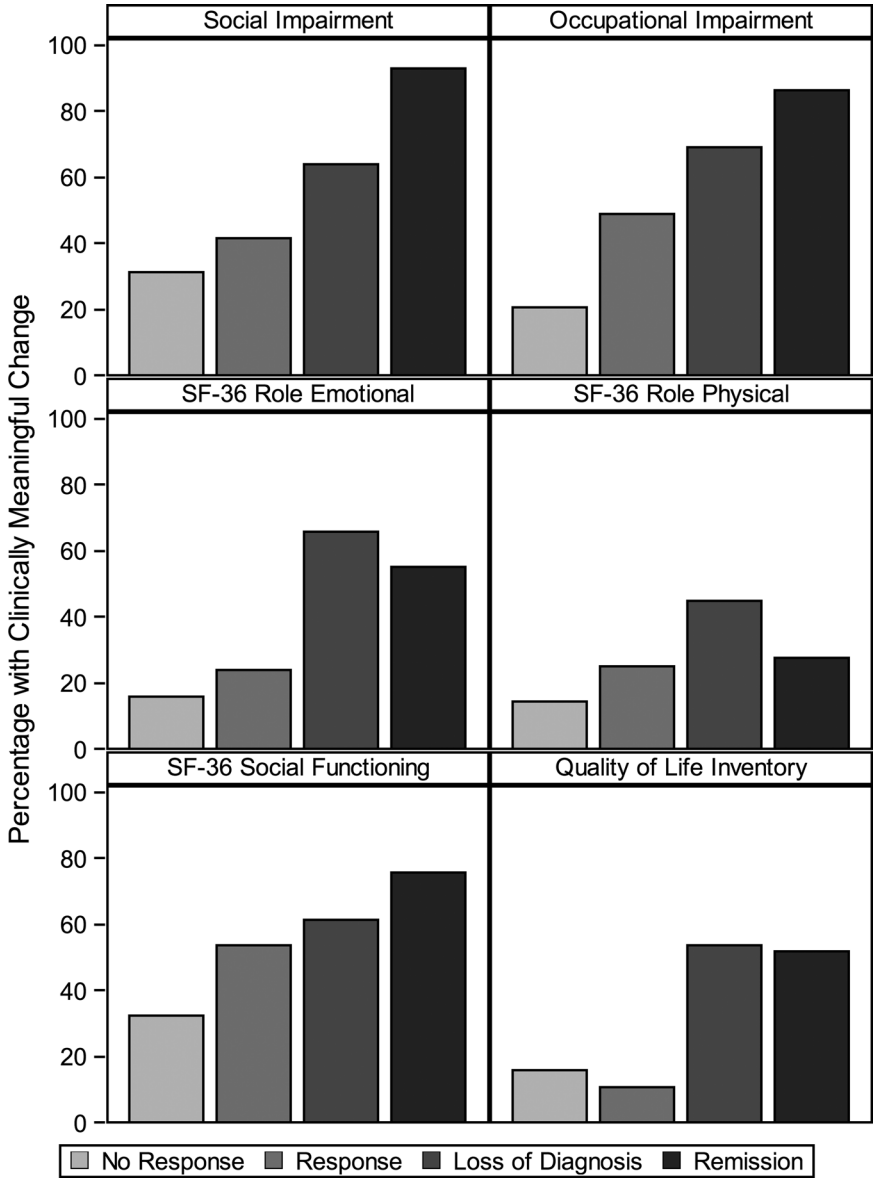

Figure 1. Percentage of participants in each symptom response group who had clinically meaningful improvement on each quality of life outcome.

DISCUSSION

We examined how symptom benchmarks of response to treatment for PTSD related to improvement in quality of life. In general, clinically meaningful symptom response was associated with improvement in multiple domains of quality of life but not with achieving good quality of life endpoints. No longer meeting PTSD diagnostic criteria after treatment was associated with further improvement in quality of life and also achieving good endpoints across all measures. Remission was associated only with additional improvement in clinician-rated social functioning and a good endpoint in clinician-rated occupational functioning.

Our finding that symptom improvement following PTSD treatment is associated with improved quality of life is consistent with findings of prior studies in veteran and nonveteran populations.[10–12],[16–19] One study had found that 10 points of decrease on the CAPS was associated with change in various domains of life satisfaction on the QOLI.[21] Our study provides additional validation of a 10-point decrease on the CAPS as a measure of clinically meaningful response. Future research needs to validate a cut-point for the DSM-5 version of the CAPS, which now includes 20 symptoms and ranges from 0–80.[37]

Despite the benefits associated with response, it was not enough. Our findings suggest that treatment for

TABLE 4. Adjusted odds of achieving good quality of life outcomes in PTSD symptom groups

	Clinically meaningful improvement			Good endpoint		
	Response versus No Response	Loss of Diagnosis versus Response	Remission versus Loss of Diagnosis	Response versus No Response	Loss of Diagnosis versus Response	Remission versus Loss of Diagnosis
CAPS social impairment	2.27* [1.07, 4.78]	4.64** [1.75, 12.36]	8.56* [1.49, 49.33]	1.30 [0.39, 4.38]	10.02*** [3.43, 29.29]	2.97 [0.96, 9.19]
CAPS occupational impairment	3.66*** [1.79, 7.51]	3.54** [1.44, 8.73]	2.61 [0.69, 9.87]	7.55*** [2.38, 23.97]	5.01*** [2.03, 12.35]	4.08* [1.08, 15.39]
SF-36 role-emotional	1.60 [0.72, 3.57]	10.38*** [3.84, 28.06]	0.67 [0.22, 2.04]	1.47 [0.38, 5.60]	12.85*** [4.10, 40.28]	0.83 [0.29, 2.36]
SF-36 role-physical	2.44* [1.06, 5.59]	3.69** [1.44, 9.45]	0.35 [0.11, 1.11]	1.13 [0.43, 2.95]	6.27*** [2.33, 16.85]	0.95 [0.32, 2.72]
SF-36 social functioning	2.82** [1.43, 5.55]	2.03 [0.85, 4.81]	1.98 [0.64, 6.11]	1.52 [0.40, 5.74]	9.55*** [3.19, 28.58]	0.92 [0.33, 2.57]
QOLI	0.73 [0.29, 1.84]	7.75*** [2.95, 20.38]	0.90 [0.33, 2.43]	1.00 [0.37, 2.75]	10.00*** [3.26, 30.69]	1.47 [0.47, 4.62]

SF-36 = Short-Form (36) Health Survey.

Table entries are odds ratios and 95% confidence intervals (below) from logistic regressions predicting each quality of life outcome from each successive PTSD symptom change category, adjusting for baseline PTSD symptoms and the baseline score for that outcome. PTSD symptom change was determined using the CAPS. Response was defined as a reduction of 10 or more points. Loss of Diagnosis was defined as Response plus no longer meeting CAPS "1/2" symptom criteria and having a severity score < 45. Remission was defined as Loss of Diagnosis plus a severity score < 20. Clinically meaningful improvement and good endpoints were defined individually for each measure (see Methods). Meaningful improvement at posttreatment was defined as: ≥ 1.0 decrease on the CAPS social and occupational impairment ratings; ≥ 1.0 SEM increase on the SF-36 scales; and moving to a higher category (e.g., from Low to Average) on the QOLI. A good endpoint at posttreatment was defined as: a score of mild (1) or none (0) on the CAPS social and occupational impairment ratings; being within 1.0 SEM on the SF-36 scales relative to the population norm for women in the same age range; and a scores categorized as average or high on the QOLI.

$^{*}P < .05$; $^{**}P < .01$; $^{***}P < .001$.

PTSD be continued at least until diagnostic criteria are no longer met in order to maximize recovery. Remission yielded limited further improvement or achieving a good endpoint in most domains. Does this mean that loss of diagnosis is "enough," responding to Gladis et al.'s[2] question about the goal of therapy? Not necessarily. Symptoms confer burden, so reducing them to the extent possible is still an important goal even if the change is not associated with tangible changes in quality of life.

Loss of diagnosis could be seen as an arbitrary distinction given that it would be theoretically possible to lose one's diagnosis by relatively little change in symptoms, e.g., according to DSM-IV, a person who had three B and four D symptoms at severe levels would no longer meet diagnostic criteria if the number of C symptoms dropped from three to two. We attempted to minimize this possibility by requiring that Loss of Diagnosis be accompanied by a 10-point decrease on the CAPS. We did not need to include this requirement, however, because everyone who no longer met diagnostic criteria had at least a 10-point decrease: the average was 40 points. This, along with our findings on quality of life, suggests that no longer meeting diagnostic criteria following treatment is a meaningful distinction. Whereas loss of diagnosis may be relatively easy to achieve in principle, in practice, it is not—at least among individuals with severe PTSD.

Although predicting PTSD symptom response was not our goal, analyses of baseline data identified factors associated with amount of improvement. Groups differed on several clinical characteristics, but not always in a linear pattern. Initial PTSD severity was highest in the Response group relative to all other groups, including the No Response group. Women who did not respond differed somewhat more at baseline from women who no longer met diagnostic criteria or who achieved remission, but nonresponders did not differ in other ways from the women who had a response only. These data, based on pairwise comparisons between successively stringent definitions of response, are not directly comparable to other studies of treatment response in PTSD because those studies tend to dichotomize response groups, e.g., by comparing individuals who remit with all others.[10,11] Although lower statistical power for comparisons involving the Remission and Loss of Diagnosis groups may explain some of the lack of differences observed, our findings are consistent with other studies that have found that baseline characteristics have limited effects on treatment outcome.[38,39] Additional process variables may be necessary to predict treatment response in PTSD, including therapeutic alliance, therapist and patient adherence, and patterns of initial response.[40–42]

Understanding how much symptom improvement is needed to see meaningful improvements in quality of life has important implications for research, treatment, and resource allocation. With respect to research, more complete reporting and use of standardized indicators of symptom response is essential to understanding the impact of treatment.[43] Remission on the CAPS has been defined as a score of <20,[28] but descriptions of remission vary, e.g., as no longer meeting diagnostic criteria.[44] Using more standard definitions would facilitate meta-analysis as well. Research also needs to determine if treating symptoms is the optimal way to improve quality of life.

In terms of treatment, patients and clinicians can use information about quality of life benchmarks to set treatment goals and tailor treatment to achieve those goals, e.g., it may be desirable to add sessions or additional treatment if a patient still meets diagnostic criteria after a standard protocol. Relatively little research has examined flexible dosing protocols, with few exceptions.[45,46] Of course, flexibility happens in practice, but more

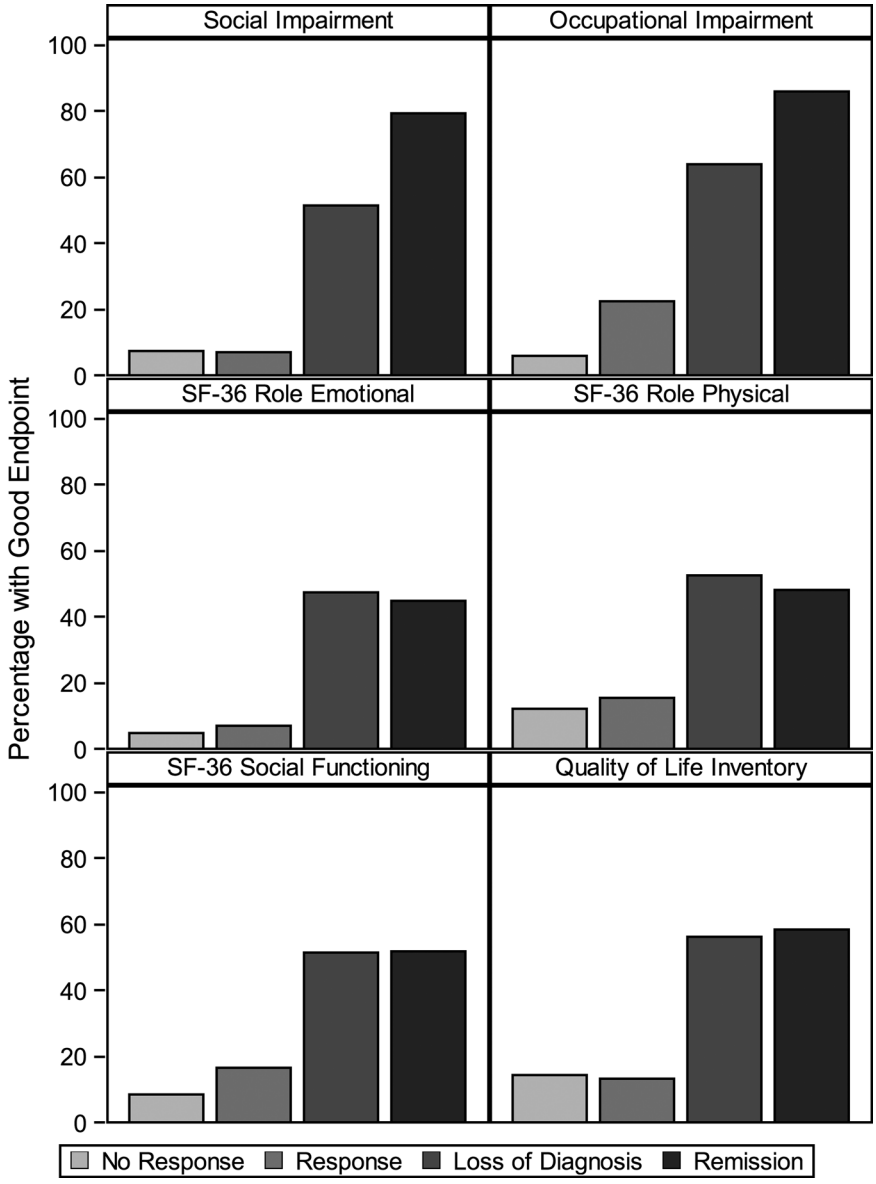

Figure 2. Percentage of participants in each symptom response group who achieved a good endpoint on each quality of life outcome.

precise information about the relationship between improvement in symptoms and in quality of life could enhance planning and decision-making. This kind of information would also support program planning for decision makers in organizations to project resource allocation and workload.

One implication of our findings is a need to increase the effectiveness of PTSD treatment. Whereas two thirds of the sample achieved at least meaningful response, only one third no longer met diagnostic criteria or achieved remission. A recent review calls attention to this as a problem in veteran and military samples,[47] but other analyses show that a number of nonveterans also do not achieve optimal endpoints.[44,48] However, a recent study shows that long-term meaningful improvement is possible. Resick et al.[49] found that 80% of a sample of women followed 6–10 years after treatment with PE or Cognitive Processing Therapy no longer met diagnostic criteria and had symptom severity consistent with remission on the CAPS.

CONCLUSION

Our findings should be replicated using other treatments and other populations. Generalizability may be limited because our sample did not include men or nonveterans, time since index trauma was over 20 years, and we examined only two treatments (which did not differ from each other for quality of life outcomes). It is possible that findings would differ in a more diverse

sample, particularly of nonveterans with less chronic PTSD, and that findings would differ if other treatments were studied. In addition, other ways of defining meaningful change and good endpoints in quality of life should be explored.

Our findings suggest that treating a PTSD patient until the patient no longer meets diagnostic criteria results in optimal gains and good quality of life endpoints. Achieving clinically meaningful response is not enough. Patients can achieve better quality of life if they also no longer meet diagnostic criteria. Remission does not yield much further benefit than loss of diagnosis, although remission is arguably the most desirable outcome for relieving PTSD symptom burden.

We do not offer our approach as the only way to understand how symptom benchmarks relate to quality of life. Kazdin[24] discusses a variety of strategies for assessing clinical significance and states that multiple domains may be important.[25] We agree, and hope that this study encourages investigation of how indicators of clinical significance map onto meaningful change in quality of life.

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