Use of the Psychosocial Index: A Sensitive Tool in Research and Practice

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Key Words
Psychosocial Index · Stress · Allostatic load · Well-being · Anxiety · Depression · Illness behavior · Quality of life · Clinimetrics · Patient-reported outcomes

Abstract
Background: The Psychosocial Index (PSI) is a self-rating scale based on clinimetric principles that is simple to use in a busy clinical setting. It can be integrated by observer-rated clinical judgment, providing a first-line, comprehensive assessment of stress, well-being, distress, illness behavior, and quality of life. By calculation of scores, it can be used for conventional psychological measurements. Its clinical applications and clinimetric properties are reviewed. The present version of the PSI has been slightly revised. In addition, a modified version for use in adolescents and young adults (PSI-Young; PSI-Y) is also included. Methods: Articles that involved the use of the PSI were identified by searching the Web of Science database from 1998 to February 2016 and by a manual search of the literature. Results: A total of 20 studies reporting results from the use of PSI were included. The PSI has been employed in various clinical populations in different countries and showed high sensitivity. It significantly discriminated varying degrees of psychosocial impairment in different populations. When subjects were identified by categorical criteria (presence of allostatic overload, psychosomatic syndromes, psychiatric disorders), the PSI scores were significantly different across subgroups. Conclusions: In clinical practice, scanning the list of symptoms allows clinicians to assess rapidly which symptoms and problems are perceived as most troublesome. In research settings, the use of scores makes the PSI a valid and sensitive tool in differentiating levels of psychosocial variables among groups.

Introduction

ThePsychosocialIndex(PSI)wasintroducedbySoninoandFava[1]in1998mainlytoprovideclinicianswithasimplescreeningtoolform stressandotherpsychosocialdimensionsinabusyclinicalpractice. Bytheevaluation of scores, it can be employed in research settings as well. It was developed according to clinimetric principles. The domain of clinimetrics is concerned with quantitative methods in the collection and analysis of clinical phenomena, such as type, severity and sequence of symptoms, problems of functional capacity, and reason for medical decisions, with emphasis on clinical judgment...
The clinimetric criteria for evaluating the clinical validity of a scale differ from those of the standard psychometric analyses [4, 9]. An essential difference is concerned with the discrimination properties (responsiveness/sensitivity) of an index, defined as the ability to differentiate between patients and controls. Unlike in psychometrics, homogeneity of components is not requested and single items may be weighed in different ways. What matters is the capacity of an index to discriminate between different groups of subjects and to reflect changes in experimental settings such as drug trials. In psychometrics, the same properties that give a scale a high score for homogeneity may obscure its ability to detect change, and redundant scale items may increase homogeneity but decrease sensitivity [4]. A high correlation is often regarded as evidence that the two scales measure the same factor. However, a high correlation does not indicate similar sensitivity: a common content of two scales may insure a high positive correlation between them, but the items they do not share may be important in determining their sensitivity [4]. A test of sensitivity is provided by the capacity of an index to discriminate between subgroups of subjects with the same disease (e.g., inpatients and outpatients with depression) [10].

Based on insights derived from studies performed in the past two decades, we here report a slightly modified version of the PSI and review the available data concerning its clinimetric properties and clinical applications.

**Description of the PSI**

This self-rating questionnaire (Appendix 1) includes 55 items, most of which are derived from previously validated instruments. Thirty-five items (1–20 and 37–51) were selected from the 118 of Kellner’s Screening List for Psychosocial Problems [11], eliminating all sources of redundancy. They constitute the sociodemographic and clinical data section, the psychological distress scale and part of the stress scale. The latter has been integrated with 10 items (21–30) derived from the Wheatley Stress Profile [12]. Six questions (31–36) were derived from Ryff’s Psychological Well-Being scales [13] and constitute the well-being section. Three questions (52–54) were selected from Kellner’s Illness Attitude Scales [14, 15] and compose the abnormal illness behavior scale.

The following domains are covered:

(a) **Sociodemographic and clinical data:** this part (items 1–12) includes largely routine information about medical and psychiatric history, the patient’s family, employment and habits. It may alert clinicians to some threats to health, such as alcohol or drug use.

(b) **Stress:** this section (items 13–20 and 22–30) is an integration of both perceived and objective stress, life events and chronic stress. It consists of 17 questions with a total score ranging from 0 to 17. These questions contain essential information for case identification of allostatic overload [16].

(c) **Well-being:** this section (items 31–36) covers different areas of well-being, i.e., positive relations with others (items 31, 32), environmental mastery (items 33, 34) and autonomy (items 35, 36), with a score ranging from 0 to 6.

(d) **Psychological distress:** this section (items 37–51) consists of a checklist of symptoms addressing sleep disturbances, somatization, anxiety, depression and irritability. The total score may range from 0 to 45. Questions 37–40 refer to sleep disturbances (range 0–12) and may also be scored separately from the other questions.

(e) **Abnormal illness behavior:** it allows the assessment of hypochondriacal beliefs and bodily preoccupations (items 52–54). The total score may range from 0 to 9.

(f) **Quality of life** (item 55): a simple direct question on quality of life is included, following the recommendation of Gill and Feinstein [17]. The score ranges from 0 to 4. The scores concerned with psychological well-being (0–6) and quality of life (0–4) can be added for obtaining a global well-being score (0–10).

The self-rating questionnaire (Appendix 1) provides a dimensional assessment of psychosocial features. Some questions involve specific responses, most require a yes/no answer, while others are rated on a Likert scale (0–3, from ‘not at all’ to ‘a great deal’); 1 item, quality of life, has 5 possible choices, from excellent to awful. For detailed scoring instructions, see Appendix 3. The PSI is not designed to calculate a total score.

A 51-item modified version of the PSI has recently been developed for assessing psychosocial factors among adolescents and young adults up to 21 years of age (PSI-Young; PSI-Y), with particular reference to studying activities, educational setting, peer relationships, and family environment (see online suppl. table 1, 2; see www.karger.com/doi/10.1159/000447760 for all online suppl. material). It has been used in a study aimed at providing a psychological characterization of hyperandrogenic states among late adolescent and young women [18].

The observer rating of the PSI (Appendix 2), by visually scanning the patient self-rated responses, allows the clinician to evaluate the PSI subscales directly on a 5-point Likert scale. Observer-rating scores may range from highly stressful life to nonstressful life for stress; from excellent to absent for well-being; from incapacitating to ab-
sent for psychological distress and abnormal illness behavior. Observer rating does not provide a total score. Question 55 on quality of life is self-rated by the patient, with no need for external judgment by the observer.

Methods

Data Source

Articles citing the original PSI reference [1] were identified by searching the Web of Science database, from 1998 to February 2016. In addition, potentially relevant papers were searched manually.

Study Selection

Two investigators (A.P. and E.O.) carried out the search independently; disagreements were resolved by consensus among raters and one senior investigator (N.S.). Articles were considered to be eligible if they reported research data with regard to administration of the PSI.

Data Extraction

Data were independently extracted with the use of a precoded form. The following data were extracted from the included studies: purpose of the study, number of subjects, design, tools administered and findings (online suppl. table 3).

Results

Characteristics of Included Studies

The literature search identified 37 relevant articles. Of these, 17 were excluded: 15 studies only cited the PSI and 2 were duplicates. A total of 20 investigations were included in the review (for a flow diagram of the search, see online suppl. fig. 1). Details of the 20 studies are summarized in online supplementary table 3 and the main findings are outlined here.

Use for Clinical Assessment

- The interrater reliability of the observer-rating part of the PSI (Appendix 2) was assessed in subjects with functional medical disorders evaluated by an internist and a psychiatrist. The PSI observer-rating part showed high interrater reliability, with intraclass correlation coefficients of 0.88 for rating stress, 0.94 for well-being, 0.89 for psychosocial distress, and 0.90 for illness behavior [1].
- The PSI was used to aid the clinical interview in three investigations concerned with the assessment of allostatic overload in the general population [19], in atrial fibrillation [20], and in congestive heart failure [21]. In these three studies, individuals who displayed allostatic overload were found to report significantly more psychological distress than subjects without allostatic overload. In another investigation [22], the determination of allostatic overload in healthy subjects was based on the responses to the PSI in conjunction with additional self-rated measures. This study showed that individuals with an allostatic overload differed from those without it in levels of some biological parameters [22].
- The PSI has been administered as a screening tool for psychosocial factors in a psychoneuroendocrinology clinic [23]. Data gathered from the PSI were used to evaluate the need of patients for further psychological assessments and to plan therapeutic strategies.

Use of Self-Rating Scores

The PSI consists of items of validated scales and its sections can thus be used for conventional psychological measurements.

- In clinical endocrinology, it detected significantly higher levels of stress and psychological distress, impaired well-being and maladaptive illness behavior in patients with pituitary disease compared to healthy controls [24]. The sensitivity of the PSI was also confirmed when a population suffering from a wide range of endocrine conditions [25] was analyzed as to the presence of psychiatric disorders according to the DSM-IV [26] and/or psychosomatic syndromes according to the Diagnostic Criteria for Psychosomatic Research (DCPR) [27–29]. Psychological distress identified by semistructured research interviews was confirmed by PSI self-rated scores. Such findings were similar to those obtained in a community sample [30], where significantly higher scores in the scales of stress and psychological distress and significantly lower scores in well-being were found in subjects with DCPR syndromes compared to those without. In another study [31], hypertensive subjects with primary aldosteronism showed significantly higher levels of stress and psychological distress and lower levels of well-being as compared to normotensive controls. Furthermore, patients with primary aldosteronism displayed significantly higher scores on PSI stress compared to patients with essential hypertension. Finally, in a recent study [18], adolescent females affected by isolated clinical hyperandrogenism (i.e., hirsutism) reported significantly lower levels of PSI-Y well-being and quality of life compared to their healthy counterparts.
- As to blood pressure, the PSI was used to evaluate the influence of psychosocial factors on changes in day-
time/nighttime blood pressure rhythm in normoten-

tive and hypertensive subjects [32]. In this investiga-
tion, the items concerned with sleep disturbances were
analyzed separately from the section of psychological
distress. Patients with essential hypertension who had
no nocturnal fall in blood pressure had a significantly
worse quality of sleep compared to those who had the
blood pressure physiological decline. Further, there
were significant correlations between the amount of
stress and nocturnal blood pressure levels in subjects
with normal blood pressure [32]. In another study on
hypertensive subjects [33], participants were classified
into three subgroups (affective disturbances, alexi-
thymia, and somatization) according to a cluster anal-
ysis based on DSM-IV [26] and DCPR [27–29] diag-
noses. The combined PSI score of stress and psycho-
logical distress discriminated among these subgroups.
Patients in the somatization group reported the high-
est combined score and those in the alexithymia group
showed the lowest score.

Subjects with medically unexplained syncope
showed significantly higher levels of PSI psychological
distress and lower levels of psychological well-being,
as compared to individuals with vasovagal syncope
[34]. This finding is consistent with previous studies
[35, 36].

In cardiology, a longitudinal study [37] evaluated
the psychological status of patients who underwent coro-
ary artery bypass grafting at 1 month and at 6–8 years
after surgery. The PSI section of abnormal illness be-
havior sensitively detected a decrease in worry about
physical conditions when the acute phase of the illness
abated. In patients with recent myocardial infarction
who participated in a cardiac rehabilitation program
[38], combined PSI scores did not predict subsequent
coronary events (death, myocardial infarction, or an-
gina pectoris). Among patients with congestive heart
failure [39], participants with DCPR diagnoses had sig-
ificantly higher scores on the PSI sections of stress and
psychological distress compared to those with no diag-
noses. In patients with an implantable cardioverter de-
fibrillator [40], the PSI was used to monitor psycho-
logical variables up to 1 year of follow-up.

Breast cancer survivors showed significantly higher
levels of PSI psychological distress as compared to
healthy controls reporting negative events other than
cancer [41]. In addition, breast cancer survivors with
a high posttraumatic growth score reported signifi-
cantly less psychological distress compared to those
with a low score. Posttraumatic growth is a feature that
indicates positive changes in many life domains as a
result of the personal, cognitive and emotional efforts
in dealing with traumatic events [42].

In the setting of a highly pathogenic avian influenza
in Nigeria, people whose farms had suffered avian influ-
enza H5N1 outbreaks had significantly higher PSI
scores of abnormal illness behavior and stress than
those whose farms had not been affected by the out-
break epidemics in poultry [43].

Discussion

The self-rating PSI may be employed in different
ways: (a) as a screening tool in the setting of medical eval-
uation and interviewing; (b) it can be integrated with
clinical judgment by applying a simple observer-rated
score, and (c) by calculation of scores, it can be used for
conventional psychological measurements [1]. In the
studies that we have reviewed, all these modalities have
been used.

In clinical assessment, using the PSI allows to scan the
list rapidly to determine which psychological and social
problems, and/or psychiatric symptoms the patient finds
distressing. By simply scanning the answers, the clinician
may understand the degree of stress, well-being, psycho-
logical distress, illness behavior and quality of life. It may
provide preliminary ground for specific questions as to
psychological distress during medical examination and
interviewing, leading to diagnostic and therapeutic deci-
sions or specialist referral [1, 23].

The simple observer-rating score, which emphasizes
clinical judgment [4], may result particularly useful for
clinical practice, due to the short time that is requested for
this rating. These issues are all of considerable impor-
tance for primary care, where psychological distress is
common but often remains undetected and inadequately
managed [44].

The PSI has some unique properties compared to oth-
er scales that are available [3]. According to clinimetric
principles, items that were included were selected on the
basis of the amount of clinical information they carried.
For instance, as to psychological distress, there are 4
items concerned with sleep (items 37–40, Appendix 1),
that cover difficulties falling asleep, restless sleep, early
morning awakening and feeling tired on waking up.
These are 4 key areas in the determination of sleep qual-
ity [45, 46].

The specific contribution of the PSI as to main clinical
domains deserves to be discussed.

Piolanti/Offidani/Guidi/Gostoli/Fava/Sonino
Due to its ability to provide a quick but comprehensive evaluation of stress, the PSI is a very suitable instrument for the screening of allostatic overload, especially in medical settings [20–22, 47]. Clinimetric criteria for the determination of allostatic overload include: (a) the presence of a stressor exceeding individual coping skills, and (b) clinical manifestations of distress, which may range from psychiatric to psychosomatic/subclinical symptoms, and from impairment in social and occupational functioning to decrease in well-being [16].

Well-Being
Stress, psychological distress and illness behavior may be linked to the individual’s potential for coping and social support (well-being). Several studies have suggested that psychological well-being plays a buffering role in coping with stress and has a favorable impact on disease course [13, 45, 48, 49].

Psychological Distress
Psychological distress is strongly associated with medical conditions. Depression, in particular, may affect functioning, quality of life and health care utilization [50, 51]. However, there is emerging awareness that also psychological symptoms that do not reach the threshold of a psychiatric disorder may affect quality of life and entail pathophysiological and therapeutic implications [29].

Illness Behavior
The concept of illness behavior was introduced to indicate the ways in which given symptoms may be perceived, evaluated and acted upon at an individual level [52]. Illness behavior may greatly vary according to illness-related, patient-related and doctor-related variables and their complex interactions. In the past decades, important lines of research have been concerned with illness perception, frequent attendance of medical facilities, health-care-seeking behavior, treatment-seeking behavior, delay in seeking treatment, and treatment adherence [53–55]. According to this review, the questions on abnormal illness behavior helped to discriminate between subgroups [24, 43]. They might show high sensitivity in populations where hypochondriasis or functional medical disorders are predominant aspects [15].

Quality of Life
Since measures of disease status alone are insufficient to describe the burden of illness, it has been proposed that the evaluation of disease outcomes by the clinician be integrated with appraisal of health and quality of life by the patient [56, 57]. A related aspect concerns patient-reported outcomes, any report coming directly from patients without interpretation by physicians or others about how they function or feel in relation to a health condition or its therapy [58, 59]. The PSI provides a global measure of well-being integrated with that of quality of life. The evidence from the studies included in this review suggests that well-being and quality of life are compromised in patients with cardiovascular and endocrine disorders [18, 24, 31, 32, 34].

Calculation of scores provides conventional psychological measurements. The findings suggest a high sensitivity of the PSI self-rating questionnaire. In all studies, the PSI displayed good sensitivity in discriminating between patients and controls. In particular, there were significant differences in stress, psychological distress and well-being between patients affected by endocrine disease, cardiovascular disorders, breast cancer and their matched healthy controls. In addition, the PSI discriminated between subjects with and without allostatic overload [19–22].

Another important clinimetric characteristic is incremental validity [4, 60]: each distinct aspect of measurement should deliver a unique increase in information in order to qualify for inclusion. Often a number of scales are used under the misguided assumption that nothing will be missed. On the contrary, violation of the concept of incremental validity leads to conflicting results [4]. Each of the five PSI sections yields an incremental increase in information that provides a comprehensive assessment of the main psychosomatic domains [16, 50, 61], where elements of redundancy were eliminated.

In conclusion, the PSI constitutes a clinimetric tool of high clinical utility and allows a comprehensive, sensitive appraisal of psychosomatic domains in different populations.

Disclosure Statement
None of the authors has any conflicts of interest to declare.
### Appendix 1. PSI, revised version (modified from Sonino and Fava [1])

**Self-rating items**

NAME____________________________SURNAME_________________________

1. Date of birth:_______day_______month_________year__________
2. Sex: Male □ Female □
3. Marital status: Single □ Married □ Divorced □ Separated □ Widowed □
4. Occupation_________________________________________________
   How many hours do you work per week?_________________________
   Occupation of spouse:________________________________________
5. Have you ever been hospitalized? YES NO
6. Please list illnesses, surgical operations and other treatments and give dates
   _____________________________________________________________
7. Are you allergic to any drug or substances? YES NO
   If yes, specify_________________________________________________
8. What medication are you taking at present?_________________________
9. Do you drink alcohol? YES NO
10. Do you smoke? YES NO
11. Do you take recreational drugs? YES NO
12. Do you drink coffee or tea? YES NO
   If yes, how many per day?________________________________________

**Did any of the following happen to you in the past year? (YES/NO)**

13. Death of a family member YES NO
14. Separation from spouse or long-time partner YES NO
15. Recent change of job YES NO
16. Financial difficulties YES NO
17. Moving within the same city YES NO
18. Moving to another city YES NO
19. Legal problems YES NO
20. Beginning of a new relationship YES NO

**Please answer the following questions (YES/NO)**

21. Do you have a job? YES NO
   If you have a job:
   22. Are you satisfied with your work? YES NO
   23. Do you feel under pressure at work? YES NO
   24. Do you have problems with your colleagues at work? YES NO
   If you do not have a job:
   22. Are you retired or student? YES NO
   23. Do you feel under pressure during the day? YES NO
   24. Are you unable to find a job? YES NO
   25. Do you have serious arguments with close relatives? YES NO
   26. Do you have serious arguments with other people? YES NO
   27. Has any close relative been seriously ill in the past year? YES NO
      If yes, specify:_________________________________________________
   28. Do you feel tension at home? YES NO
Appendix 2. PSI, revised version (modified by Sonino and Fava [1])

Observer-rating scores

<table>
<thead>
<tr>
<th>Stress</th>
<th>Highly stressful life</th>
<th>Stressful life</th>
<th>Non-stressful life</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Stressful life</td>
<td>Excellent</td>
<td>Good</td>
<td>Fair</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Psychological distress</td>
<td>Incapacitating</td>
<td>Severe</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Abnormal illness behavior</td>
<td>Incapacitating</td>
<td>Severe</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>
# How to score the PSI

**Stress:** the scale includes 17 questions (13–20; 22–30) with yes/no answers. In questions 13–20 and 23–30, ‘yes’ corresponds to a score of 1, indicating presence of stress, while ‘no’ corresponds to a score of 0, i.e., absence of stress. For question 22, answer ‘yes’ corresponds to a score of 0, while ‘no’ to a score of 1 (reverse score). Total scale score may range from 0 (absence of stress) to 17 (maximum stress).

**Well-being:** this scale is made of 6 questions (31–36), which have two possible choices (yes/no). In questions 31 and 32, ‘yes’ corresponds to a score of 1, while ‘no’ corresponds to a score of 0; for questions 33–36, the answer ‘yes’ corresponds to a 0 score, while ‘no’ to 1 (reverse score). Total score may range from 0 to 6.

**Psychological distress:** the scale consists of 15 questions (37–51), with four possible choices ranging from no psychological distress to high psychological distress (‘not at all’, ‘a little’, ‘somewhat’, ‘a great deal’). The attributable score to single items ranges from 0 to 3, with higher scores indicating greater distress. Total score may vary from 0 to 45. Questions 37–40 indicate sleep disturbances and high psychological distress (‘not at all’, ‘a little’, ‘somewhat’, ‘a great deal’). The attributable score to single items ranges from 0 to 3, with higher scores indicating greater distress. Total score may vary from 0 to 45. Questions 37–40 indicate sleep disturbances and high psychological distress (‘not at all’, ‘a little’, ‘somewhat’, ‘a great deal’).

**Abnormal illness behavior:** the scale consists of 3 questions (52–54), with four possible choices ranging from absent abnormal illness behavior to maximum (‘not at all’, ‘a little’, ‘somewhat’, ‘a great deal’). The attributable score to single items range from 0 to 3. Total score may range from 0 to 9.

**Quality of life:** question 55 ‘How do you rate the quality of your life?’ has 5 possible answers (‘excellent’, ‘good’, ‘fair’, ‘poor’, ‘awful’). Its attributable score ranges from 4 to 0, where 4 corresponds to ‘excellent’ and 0 to ‘awful’. Total score may range from 0 (awful quality of life) to 4 (excellent quality of life). The scores concerned with psychological well-being (0–6) and quality of life (0–4) can also be added for obtaining a global well-being score (0–10).

## References

The text is a reference page of a scientific journal article, containing multiple citations and references. It discusses various topics such as cardiovascular and psychiatric conditions, the role of psychological factors, and the use of diagnostic criteria in psychosomatic medicine. The references are formatted in APA style and cover a range of topics from psychological assessment to clinical evaluations. The page references a variety of journals and authors, emphasizing the interdisciplinary nature of psychosomatic research.