

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/23044> holds various files of this Leiden University dissertation

**Author:** Schulte-van Maaren, Yvonne W.M.

**Title:** NormQuest : reference values for ROM instruments and questionnaires

**Issue Date:** 2014-01-21

NormQuest

Reference Values for ROM  
Instruments and Questionnaires



# Chapter 6

## Reference values for the Body Image Concern Inventory (BICI), the Whitely Index (WI), and the Checklist Individual Strength (CIS-20R)

Yvonne W.M. Schulte-van Maaren  
Erik J. Giltay  
Albert M. van Hemert  
Frans G. Zitman  
Margot W.M. de Waal  
Yanda van Rood  
Ingrid V.E. Carlier

*(Submitted)*

## ABSTRACT

### **Background:**

The Body Image Concern Inventory (BICI), the Whitely Index (WI), and the Checklist Individual Strength (CIS-20R) are three questionnaires often incorporated in Routine Outcome Monitoring (ROM). Respectively, they assess symptom severity in patients with body dysmorphic disorder (BDD), hypochondriasis, and chronic fatigue syndrome (CFS). We aimed to generate reference values for a healthy population (ROM reference-group) and for a population of patients fulfilling diagnostic criteria for at least one of BDD, hypochondriasis, and CFS (ROM patient-group).

**Methods:** In the ROM reference-group we included 648 subjects recruited through general practitioners. These subjects were matched for age and sex with 823 psychiatric outpatients in the ROM patient-group. To define limits (i.e., cut-off-values) for one-sided reference intervals (5<sup>th</sup> percentile [ $P_5$ ] for ROM patient-group and 95<sup>th</sup> percentile [ $P_{95}$ ] for ROM reference-group) the outermost 5% of observations were used. Receiver Operating Characteristics (ROC) analyses were used to yield additional cut-off-values.

**Results:** Cut-off-values ( $P_{95}$  ROM reference-group) were 55 for the BICI, 6 for the WI, and 92 for the CIS-20R. These values differed for men and women, being mostly higher for women.  $P_5$  ROM patient-group assessments and ROC analyses yielded slightly lower reference values. The discriminative power of all three somatoform questionnaires was very high.

**Conclusions:** For the BICI, WI, and CIS-20R a comprehensive set of reference values was obtained. The reference values may facilitate responsible clinical decision-making with respect to adjusting or terminating therapy, and with respect to referring patients from specialized mental health care to primary care and vice versa.

## INTRODUCTION

Somatoform disorders are a group of psychiatric disorders in which the patient experiences physical symptoms that are inconsistent with, or cannot be fully explained by, any underlying general medical or neurological condition. The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) includes the following specific somatoform disorders: Somatization Disorder, Undifferentiated Somatoform Disorder, Conversion Disorder, Pain Disorder, Hypochondriasis, and Body Dysmorphic Disorder (BDD) [1]. Patients with these disorders tend to frequently consult general practitioners (GPs) or medical specialists rather than mental healthcare specialists [2]. In the Netherlands, however, such patients do find their way to specialized mental health care due to the availability of evidenced-based and patient-tailored treatment options. Relevant are the use of the maintenance model during intake and special outpatient clinics within the medical setting. Evidenced-based treatments are available for somatization disorder, some of the undifferentiated somatoform disorders (e.g., chronic fatigue syndrome (CFS) [3] and irritable bowel syndrome [4,5]), some of the pain disorders (e.g., low back pain [6] and fibromyalgia [7]), BDD [8,9], and hypochondriasis [10-13].

Routine Outcome Monitoring (ROM) is a system of routine psychometric assessments at baseline (i.e., pre-treatment) and at regular intervals to monitor patients' progress during treatment. DSM-IV-TR Axis I diagnoses are established using the Mini-International Neuropsychiatric Interview-Plus (MINI-Plus) [14]. Together with generic questionnaires, which are completed by all patients, disorder-specific questionnaires are administered to patients who meet the MINI-Plus criteria for a particular disorder [15,16]. These disorder-specific questionnaires assess the severity of symptoms, in order to facilitate the evaluation of treatment effect and clinical decisions about treatment termination. When symptom severity is equivalent to levels found in the general population, second-line treatment can be terminated and referral back to primary care may be indicated.

ROM instruments used to assess symptom severity for a specific disorder need to have good psychometric properties. Preferably, they are also widely used both in research and clinical settings. The availability of the questionnaires in the public domain is also required, given that they are offered to large numbers of patients on numerous occasions. Questionnaires, which fulfill these criteria, are available for the assessment of BDD, hypochondriasis, and CFS. Respectively, the questionnaires are the Body Image Concern Inventory (BICI) [17], the Whitely Index (WI) [18], and the Checklist Individual Strength (CIS-20R) [19].

Reliable ratings from reference populations are required if the ROM results are used for clinical decisions about continuing, altering or terminating treatment [20]. In the present study reference values were established for the BICI, the WI, and the CIS-20R. This set of questionnaires is particularly relevant because it is not easy to ascertain the severity of BDD, CFS and hypochondriasis, and BDD is not easily diagnosed. Some descriptive statistics

(means and standard deviations [SDs]) have been published for healthy controls (see Table 6.1) [17-19,21-23], but we are not aware of studies reporting clinically useful reference values for these scales when administered in the general population. Additionally, we studied a possible gender effect in the reference values.

## METHODS

### Participants

The reference values were based on two study samples, namely: 1) the ROM reference-group, a sample from the general population; and 2) the ROM patient-group, a sample of psychiatric outpatients diagnosed with BDD ( $n=130$ ), hypochondriasis ( $n=226$ ), or CFS ( $n=481$ ). The ROM patient-group included participants ( $n=14$ ) with two or more somatoform disorders.

The ROM reference-group is the reference group included in the ‘Leiden Routine Outcome Monitoring Study’ [16]. Participants in the ‘Leiden Routine Outcome Monitoring Study’ were randomly selected from the registration systems of eight GPs in the Leiden region, with the aim of recruiting a representative general population sample<sup>1</sup>. Sufficient mastery of the Dutch language and the ability to complete computerized and written questionnaires were required. The response rate was 37.1%, as described previously [16,25]. In all, 1295 participants were included in the ‘Leiden Routine Outcome Monitoring Study’ [16,16,25,26]. Because of time and financial constraints, 50% of these participants ( $n=648$ ) were administered the somatoform questionnaires [16]. This group was aged 18 to 65 years ( $M=40.0$  years;  $SD=12.6$ ) and 62.5% were females. Given that the aim of this study was to generate reference values that can be used to guide decision-making about the continuation or termination of therapy, we excluded those who received treatment for psychiatric disorders and/or were dependent on alcohol or drugs during the six months prior to assessment. The reference-group was matched for gender and age to the ROM patient-group, to ensure it was demographically comparable.

The ROM patient-group of the ‘Leiden Routine Outcome Monitoring Study’ consisted of a baseline sample of 7840 psychiatric outpatients. This constituted approximately 80% of the total number of referred patients with a tentative diagnosis of mood-, anxiety- and/or somatoform disorder [27]. Inclusion criteria were the diagnosis of at least one somatoform disorder, according to the MINI-Plus, and an age between 18 and 65 years. A sub-sample of 823 patients fulfilled the criteria (mean age=38.6,  $SD=11.7$ ), of whom 70.5% were females. Depending on their MINI-Plus diagnosis, patients completed the BICI ( $n=130$ ), the WI ( $n=226$ ), or the CIS-20R ( $n=481$ ). They were treated in the Leiden University Medical Center (LUMC) Department of Psychiatry or the Rivierduinen mental health care centres. At baseline, scores represented the severity of symptoms prior to the first treatment session.

---

<sup>1</sup>In the Netherlands, 99,9% of the general population is registered with a GP [24].



## Procedures

Procedures for the web-based ROM program of the LUMC Department of Psychiatry and mental health care centre Rivierduinen are described in detail elsewhere [15]. In short, the baseline ROM assessments comprised a standardized diagnostic interview (Dutch version of the Mini-International Neuropsychiatric Interview Plus, version 5.00-R: MINI-Plus) [14,28], the collection of sociodemographic data, and the administration of generic and disorder-specific instruments for mood, anxiety, and somatoform disorders. The MINI-Plus was used to establish the presence of Axis I symptoms according to the DSM-IV-TR. Disorder-specific self-rating questionnaires were selected on the basis of the MINI-Plus. Participants in the reference-group were assessed in a similar way to those in the patient-group, except that those in the ROM reference-group completed all three questionnaires whereas the participants of the ROM patient-group only completed those questionnaires relevant to their diagnosed disorder(s). The assessments were performed by specially trained and regularly (i.e., monthly) supervised research nurses in the outpatient clinics.

The general study protocol associated with ROM, in which ROM is administered as part of the routine treatment process for patients, was approved by the Medical Ethical Committee of the LUMC. This comprehensive protocol (titled “Psychiatric Academic Registration Leiden Database”) safeguards the anonymity of patients and reference-group participants and ensures proper handling of the ROM data. If patients object to the use of their outcome data for scientific purposes, the data are removed. Participants of the ROM reference-group signed informed consent for the purpose of this study.

## Questionnaires

### *Body Image Concern Inventory (BICI)*

The BICI measures concerns about appearance [17]. The 19 self-report items are answered on a 5-point Likert scale (1=‘never’, 5=‘always’) and the total score ranges between 19 and 95. Two factors have been identified. Factor 1 (12 items) relates to dissatisfaction and shame regarding one’s appearance. Factor 2 (7 items) relates to interference with functioning due to appearance concerns. Because the two factors are highly correlated, Littleton and colleagues [17] suggested using a single total score. A cut-off-value of 72 has been recommended, such that scores above 72 are regarded as clinical concerning. The time frame for the reported symptoms is the past week. The BICI can be used to assess symptom severity. Previous studies have not yielded percentile scores. Means and standard deviations (SDs) for healthy control groups were previously determined, ranging from 42.8 (SD=15.0) to 50.4 (SD=14.2) [17,21,22]. For a BDD patient-group a mean of 80.1 (SD=9.0) was reported [17]. Reliability, validity, and internal consistency (Cronbach’s alpha’s [ $C\alpha$ ] range from 0.91-0.94) of the English-language version are good [17,21,22], as is the  $C\alpha$  (0.93) for the Dutch version [29].

*Whitely Index (WI)*

The WI is a self-report questionnaire that assesses the severity of symptoms of hypochondriasis [18]. Scores for the 14 dichotomous items are summed to yield a total score (range 0-14). The WI is unifactorial [30]. The time frame for the symptoms is the past week. Previous studies have not assessed percentile scores but they have reported means and SDs for healthy control groups, which ranged from 1.7 (SD=2.4) to 3.0 (SD=2.5) [18,23]. For hypochondriacal patients the mean scores ranged from 7.6 (SD=3.0) to 8.9 (SD=5.2) [18,23]. Internal consistency ranged from 0.76-0.80), stability, concurrent and discriminative validity are adequate [30].

*Checklist Individual Strength (CIS-20R)*

The CIS-20R was designed to measure the severity of symptoms typical of CFS [19]. Each item is scored on a 7-point Likert scale (1 = 'yes, that is true'; 7 = 'no, that is not true'). The total score is the sum of all items (range 20-140). The four subscales are Subjective Fatigue (8 items), Concentration (5 items), Motivation (4 items), and Physical Activity (3 items). The time frame for the reported symptoms is the past two weeks. The recommended clinical cut-off-value for the CIS-20R is 35 [19]. No percentile scores have been reported yet. Means and SDs for healthy controls and CVA-patient related controls were 41.5 (SD=19.8) and 50.9 (SD=26.6), respectively [19]. Internal consistencies for the CIS-20R total scale and subscales are very good (0.90 for the total scale; from 0.83 to 0.92 for the subscales) [19,31] and psychometric properties (i.e., reliability and validity) are excellent [19].



**Table 6.1:** Somatoform questionnaires used in Routine Outcome Monitoring

| Questionnaire  | Domain                   | number of items | Rating                                                 | Range for score | Our sample sizes: | Range for sample sizes in previous studies<br>Reference/<br>Patient-group | References    |
|----------------|--------------------------|-----------------|--------------------------------------------------------|-----------------|-------------------|---------------------------------------------------------------------------|---------------|
| <b>BICI</b>    | Body dysmorphic disorder | 19              | 1 = never;<br>5 = always                               | 19-95           | 645<br>/ 130*     | 184-1043<br>/ 71                                                          | [17,21,22,32] |
| <b>WI</b>      | Hypochondriasis          | 14              | 0=no;<br>1=yes                                         | 0-14            | 644<br>/ 226+     | 15-204<br>/ 100-149                                                       | [18,23,30]    |
| <b>CIS-20R</b> | Chronic fatigue          |                 | 1 = yes, completely right;<br>7 = no, completely wrong |                 |                   |                                                                           | [19,33]       |
| Subj.fatigue   |                          | 8               |                                                        | 8-56            |                   |                                                                           |               |
| Concentration  |                          | 5               |                                                        | 5-35            |                   |                                                                           |               |
| Motivation     |                          | 4               |                                                        | 4-28            |                   |                                                                           |               |
| Activity       |                          | 3               |                                                        | 3-21            |                   |                                                                           |               |
| Total          |                          | 20              |                                                        | 20-140          | 643<br>/ 481‡     | 43-53<br>/ 758                                                            |               |

BICI denotes Body Image Concern Inventory; CIS-20R denotes Checklist Individual Strength; WI denotes Whitely Index.

\* Patients diagnosed with Body Dysmorphic Disorder (BDD)

+ Patients diagnosed with Hypochondriasis

‡ Patients diagnosed with Chronic Fatigue Syndrome (CFS)

Table 6.1 presents the sample sizes, disorder domains, subscales, ratings, and score ranges for each questionnaire, together with the reference values reported in previous studies.

## Statistical analyses

Descriptive statistics were derived for the sociodemographic variables and the psychiatric variables, including means and SDs for the continuous variables, and percentages for the categorical variables.

The internal consistency of the questionnaires was determined using Cronbach's alpha (with  $>0.70$  indicating adequate internal consistency).

The 5<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 95<sup>th</sup> percentiles were calculated. They were calculated for the entire ROM reference-group and for the sub-set of the ROM patient-group that completed the BICI, WI, or CIS-20R. Furthermore, percentiles were calculated separately for men and women. To facilitate comparability with the international literature, we also calculated means and SDs, although these reference values are less useful in skewed reference-group distributions [34]. Receiver Operating Characteristics (ROC) analyses were used to derive a cut-off-value for each instrument, indicating a neutral discrimination threshold between 'healthy' and 'diseased'. Sensitivity and specificity were chosen to be equal. In this way, an acceptable compromise was reached between as few false positives as possible, and as few false negatives as possible. The discriminatory power of the questionnaire total scales and subscales was assessed using the associated areas under the ROC curve (AUCs), where AUC values above 0.75 were considered clinically useful, with 0.85 showing moderate discriminatory power, and 0.95 showing very high power [35]. To assess the effects on the reference values of individuals in the ROM reference-group with a current psychiatric diagnosis, we performed a sensitivity analysis in the group while excluding participants with any psychiatric diagnosis.

When reference values are calculated and interpreted, attention needs to be paid to sensitivity and specificity, the definition of health, and required sample sizes. Firstly, in the assessment of cut-off-values, sensitivity (i.e., the proportion of actual positives which are correctly identified as such) and specificity (i.e., the proportion of negatives which are correctly identified) play a key role. The 95<sup>th</sup> percentile ( $P_{95}$ ) of the reference-group is recommended as a cut-off-value when considering referral back from secondary to primary care. The specificity to assess health is relatively high. The 5<sup>th</sup> percentile ( $P_5$ ) of the patient-group is recommended as a cut-off-value when considering referral from primary to secondary care. In this case, the sensitivity to assess disease is relatively high. The 5<sup>th</sup> percentile ( $P_5$ ) of the ROM reference-group is generally lower than the 95<sup>th</sup> percentile ( $P_{95}$ ) of the patient-group. Secondly, it is preferable that reference values [36] are established in healthy (normal) populations [34] with normality defined statistically rather than as a medical (ab)normality. This statistical definition of normality is based on the distribution of scores from the general population (including all individuals) [37]. Finally, (sub)sample sizes of at least 120 are needed to reduce the amount of uncertainty and error caused by potential outliers [38,39]. For all analyses, SPSS version 20.0 was used (SPSS Inc, Chicago, Illinois).

## RESULTS

### Sociodemographic and psychiatric characteristics

The sociodemographic and psychiatric characteristics of the ROM reference-group and patient-group are shown in Table 6.2. Characteristics per gender are given in Supplementary Table 6.1.

The ROM reference-group and patient-group were rather well matched for age ( $M=40.0$  years [ $SD=12.6$ ] and  $M=38.6$  years [ $SD=11.8$ ], respectively) and gender distribution (62.5% females and 70.5% females, respectively). Participants from the ROM reference-group were more often married than those from the ROM patient-group (70.5% versus 47.6%) and less often living alone (13.4% versus 16.8%), had higher levels of education (78.7% higher education versus 50.9%), had less work-related disability and unemployment (17.9% versus 52.2%), and were less often from non-Dutch ethnic origin (defined as oneself or both parents not being born in the Netherlands). In the ROM reference-group 5.0% had at least one somatoform disorder according to the MINI-Plus, compared to 100% of the subjects from the ROM patient-group (inclusion criterion). In the ROM reference-group 0.5% fulfilled criteria for BDD, 0.6% for Hypochondriasis, and 2.0% for Undifferentiated Somatoform Disorder. In the patient-group 15.8% fulfilled criteria for BDD, 27.5% for Hypochondriasis, 58.5% for Undifferentiated Somatoform Disorder (of whom 21.9% CFS), and 1.0% for Somatization Disorder. Comorbid BDD and CFS was seen in 0.7% of the patients, 2.9% had hypochondriasis and CFS, and no patients had BDD and hypochondriasis or three diagnoses. In the ROM patient-group, a high proportion of subjects (53.6%) had a co-morbid mood or anxiety disorder.

**Table 6.2:** Sociodemographic and psychiatric characteristics of the ROM reference (n=648) and patient (n=823) groups.

|                                                   | ROM reference group<br>(n= 1295) |        | ROM patient group<br>(n=4627) |        |
|---------------------------------------------------|----------------------------------|--------|-------------------------------|--------|
| <b>Gender: - n (%)</b>                            |                                  |        |                               |        |
| Male                                              | 243                              | (37.5) | 243                           | (29.5) |
| Female                                            | 405                              | (62.5) | 580                           | (70.5) |
| <b>Age in years: - mean (<math>\pm</math> SD)</b> |                                  |        |                               |        |
| Male                                              | 40.8                             | (12.6) | 38.0                          | (12.2) |
| Female                                            | 39.6                             | (12.6) | 38.9                          | (11.5) |
| <b>Marital status<sup>1</sup>: - n (%)</b>        |                                  |        |                               |        |
| Married/cohabitating                              | 457                              | (70.5) | 392                           | (47.6) |
| Divorced/seperated/widow                          | 34                               | (5.2)  | 96                            | (11.7) |
| No data available                                 |                                  |        | 119                           | (14.5) |
| <b>Housing situation<sup>1</sup>: - n (%)</b>     |                                  |        |                               |        |
| Living alone                                      | 87                               | (13.4) | 138                           | (16.8) |
| Living with partner                               | 462                              | (71.3) | 403                           | (49.0) |
| Living with family                                | 99                               | (15.3) | 163                           | (19.8) |
| No data available                                 |                                  |        | 119                           | (14.5) |
| <b>Educational status<sup>1,3</sup>: - n (%)</b>  |                                  |        |                               |        |
| Lower                                             | 138                              | (21.3) | 285                           | (34.6) |
| Higher                                            | 510                              | (78.7) | 419                           | (50.9) |
| No data available                                 |                                  |        | 119                           | (14.5) |
| <b>Employment status<sup>1</sup>: - n (%)</b>     |                                  |        |                               |        |
| Employed part-time                                | 256                              | (39.5) | 157                           | (19.1) |
| Employed full-time                                | 276                              | (42.6) | 117                           | (14.2) |
| Unemployed/retired                                | 101                              | (15.6) | 200                           | (24.3) |
| Work-related disability                           | 15                               | (2.3)  | 230                           | (27.9) |
| No data available                                 |                                  |        | 14                            | (1.7)  |
| <b>Ethnic background<sup>1</sup>: - n (%)</b>     |                                  |        |                               |        |
| Dutch                                             | 569                              | (87.8) | 590                           | (71.6) |
| Other ethnicity                                   | 79                               | (12.2) | 114                           | (13.9) |
| No data available                                 |                                  |        | 119                           | (14.5) |
| <b>MINI diagnoses: - n (%)</b>                    |                                  |        |                               |        |
| Currently None                                    | 590                              | (91.0) | 02                            |        |
| Somatoform disorder (single)                      | 25                               | (3.9)  | 382                           | (46.4) |
| Somatoform disorder (comorbidity)                 | 7                                | (1.1)  | 441                           | (53.6) |
| Other than somatoform disorder                    | 26                               | (4.0)  | 02                            |        |

<sup>1</sup> Data not available for 14 (1.7%) to 119 (14.5%) of patients<sup>2</sup> Selection criterion<sup>3</sup> Lower education: primary or vocational school; Higher education: college or university



## Reference values and internal consistencies

Table 6.3 presents the internal consistencies (Cronbach's alpha  $\alpha$ ) and results of the ROC analyses of the BICI, WI, and CIS-20R (sub-) scales for both the ROM reference-group and the patient-group. Table 6.4 presents the percentile scores and mean scores. Results of gender analyses are presented in Supplementary Tables 6.2 through 6.4.

For the ROM reference-group, the distributions of total scores and subscale scores were strongly positively skewed (Figure 6.1). Apparent health was also demonstrated by the substantial percentage of participants rating the lowest possible scores.

**Table 6.3:** Internal consistency and cut-off-values in the ROM reference (n=648) and patient (n=823) groups for Routine Outcome Monitoring somatoform disorder questionnaires. BICI denotes Body Image Concern Inventory; CIS-20R denotes Checklist Individual Strength; WI denotes Whitely Index.

|                | Nr of items | Cronbach's Alpha | Nr ref. | Nr of patients | ROC analysis cut off* | Area under Curve | Sensitivity / specificity |
|----------------|-------------|------------------|---------|----------------|-----------------------|------------------|---------------------------|
| <b>BICI</b>    | 19          | 0.96             | 645     | 130            | 49.5                  | 0.96             | 0.90 / 0.90               |
| <b>WI</b>      | 14          | 0.90             | 644     | 226            | 5.5                   | 0.98             | 0.95 / 0.93               |
| <b>CIS-20R</b> |             |                  | 643     | 481            |                       |                  |                           |
| Checking       | 8           | 0.97             |         |                | 42.5                  | 0.96             | 0.92 / 0.92               |
| Rumination     | 5           | 0.93             |         |                | 17.5                  | 0.89             | 0.83 / 0.83               |
| Precision      | 4           | 0.84             |         |                | 10.5                  | 0.85             | 0.79 / 0.76               |
| Total          | 3           | 0.90             |         |                | 9.5                   | 0.89             | 0.81 / 0.82               |
|                | 20          | 0.97             |         |                | 81.5                  | 0.97             | 0.92 / 0.92               |

\*The optimal cut-off derived by the ROC analysis is defined by equal sensitivity and specificity

### *Body Image Concern Inventory (BICI)*

The internal consistency of the BICI was excellent ( $\alpha=0.96$ ).

For the ROM reference-group, the  $P_{95}$  cut-off-value was 55 for the BICI: this is the recommended cut-off-value for the referral of patients in specialized mental health care back to primary care. The  $P_5$  value for the ROM patient-group was 39, which is the recommended cut-off-value when primary care patients should be referred to specialized mental health care. Stratified analyses according to gender indicated that, on average, healthy women reported more symptoms than men in relation to the BICI. reference values were also higher for women relative to men. ROC analyses yielded a BICI cut-off-value of 49.5. The AUC value indicated very high discriminatory power for the BICI. The discriminative power of the

BICI is depicted in Figure 1.

#### *Whitely Index (WI)*

The internal consistency of the WI was excellent ( $C\alpha=0.90$ ).

For the ROM reference-group, the WI total score showed a  $P_{95}$  value of 6, which is the recommended cut-off-value for referral back to primary care of patients in specialized mental health care. The  $P_5$  value for the ROM patient-group was 5. Again, the  $P_{95}$  and mean values were higher among healthy women than among healthy men. ROC analyses yielded a WI cut-off-value of 5.5. The AUC value indicated very high discriminatory power for the WI. The discriminative power of the WI is depicted in Figure 6.1.

#### *Checklist Individual Strength (CIS-20R)*

The CIS-20R showed excellent internal consistency ( $C\alpha= 0.97$ ).

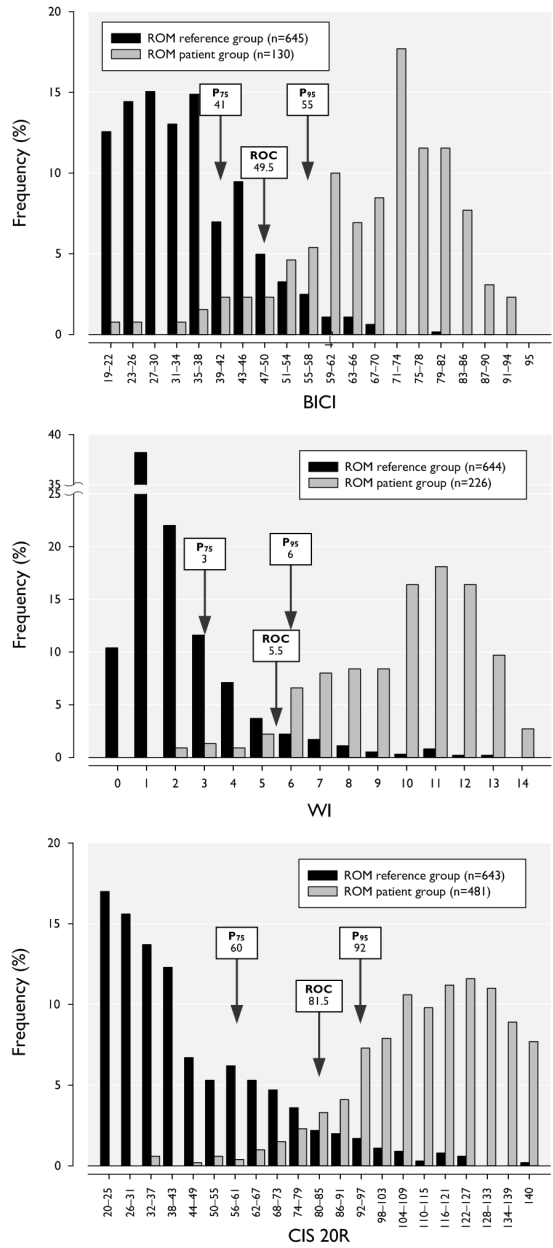
For the CIS-20R total score, the  $P_{95}$  cut-off-value for the ROM reference-group was 92. The cut-off-values for the subscales were as follows: 46 for Subjective Fatigue, 26 for Concentration, 20 for Motivation, and 15 for Activity. The  $P_5$  value for the ROM patient-group was 74 for the total score. The  $P_5$  values for the subscales were 38 for Subjective Fatigue, 6 for Concentration, 4 for Motivation, and 3 for Activity. Once again, stratified analyses according to gender indicated that, on average, healthy women reported more symptoms than did healthy men. However, for the CIS-20R subscale Activity, no gender difference was found. ROC analyses yielded a CIS-20R cut-off-value of 81.5. AUC values indicated very high discriminatory power for the CIS-20R total scale and moderate to very high discriminatory power for the subscales. The discriminative power of the CIS-20R total score is depicted in Figure 6.1.

In a sensitivity analysis, all 58 (9%) participants with any MINI-diagnosis were excluded from the ROM reference-group. Among the remaining 590 participants we found that the median of the changes of the mean scores of the three somatoform questionnaires decreased by 5% (interquartile range -4 to -5%). The median of the changes of the  $P_{95}$  scores decreased by 7% (interquartile range -4 to -8%). Thus, the inclusion of (non-healthy) participants with symptoms led to slightly higher reference values relative to reference values for a 'supernormal' (i.e., overly healthy) reference-group.

**Table 6.4:** Percentiles and mean values for Routine Outcome Monitoring somatoform disorder questionnaires in the ROM reference (n=648) and patient (n=823) groups.

|                    | ROM reference group |                 |                             |                 |                 |             | ROM patient group |                 |                             |                 |                 |              |  |
|--------------------|---------------------|-----------------|-----------------------------|-----------------|-----------------|-------------|-------------------|-----------------|-----------------------------|-----------------|-----------------|--------------|--|
|                    | P <sub>5</sub>      | P <sub>25</sub> | P <sub>50</sub><br>(median) | P <sub>75</sub> | P <sub>95</sub> | Mean ± SD   | P <sub>5</sub>    | P <sub>25</sub> | P <sub>50</sub><br>(median) | P <sub>75</sub> | P <sub>95</sub> | Mean ± SD    |  |
|                    | (n=645)             |                 |                             |                 |                 |             | n= 130            |                 |                             |                 |                 |              |  |
| BICI               | 20                  | 26              | 33                          | 41              | 55              | 34.4 ± 10.8 | 39                | 60              | 72                          | 78              | 87              | 68.4 ± 13.9  |  |
|                    | n= 644              |                 |                             |                 |                 |             | n= 226            |                 |                             |                 |                 |              |  |
| WI                 | 0                   | 1               | 2                           | 3               | 6               | 2.2 ± 2.0   | 5                 | 8               | 10                          | 12              | 13              | 9.8 ± 2.5    |  |
|                    | n= 643              |                 |                             |                 |                 |             | n= 481            |                 |                             |                 |                 |              |  |
| CIS-20R            |                     |                 |                             |                 |                 |             |                   |                 |                             |                 |                 |              |  |
| Subjective fatigue | 8                   | 9               | 16                          | 27              | 46              | 20.2 ± 12.6 | 38                | 50              | 54                          | 56              | 56              | 51.5 ± 7.0   |  |
| Concentration      | 5                   | 5               | 9                           | 14              | 26              | 11.0 ± 7.0  | 6                 | 22              | 29                          | 35              | 35              | 26.7 ± 8.9   |  |
| Motivation         | 4                   | 4               | 7                           | 10              | 20              | 8.4 ± 5.1   | 4                 | 12              | 17                          | 24              | 28              | 17.8 ± 7.3   |  |
| Activity           | 3                   | 3               | 4                           | 9               | 15              | 6.2 ± 4.3   | 3                 | 12              | 18                          | 21              | 21              | 16.0 ± 5.6   |  |
| Total              | 20                  | 28              | 38                          | 60              | 92              | 45.8 ± 23.3 | 74                | 100             | 116                         | 128             | 140             | 112.0 ± 20.4 |  |

ROM denotes Routine outcome monitoring. SD denotes standard deviation.  
BICI denotes Body Image Concern Inventory; WI denotes Whitely Index; CIS-20R denotes Checklist Individual Strength.



**Figure 6.1:** Distribution of the scores of the Body Image Concern Inventory (BICI), the Checklist Individual Strength (CIS-20R), and the Whitely Index (WI). Three types of cut-off-values are depicted: the 75<sup>th</sup> percentile score ( $P_{75}$ ), the 95<sup>th</sup> percentile score ( $P_{95}$ ) and the Receiver Operating Characteristics (ROC) cut-off-value defined by equal sensitivity and specificity.

## DISCUSSION AND CONCLUSION

The aim of this study was to determine reference values for the BICI, WI, and CIS-20R based on data from a large sample of 'healthy' participants (defined as not being in specialized mental health care treatment for a psychiatric disorder) and a large 'psychiatrically ill' population. Two clinically relevant types of cut-off-values were generated: the 95<sup>th</sup> percentile of the ROM reference-group and the 5<sup>th</sup> percentile of the ROM patient-group. We also derived an additional set of percentile scores and ROC-based cut-off-values for both the ROM reference-group and the patient-group. A gender-specific pattern in reference values was observed for the total scores of all three questionnaires, but not for the CIS-20R subscales. We therefore consider gender-specific reference values to be of clinical relevance for these somatoform questionnaires.

The prevalence rate of any somatoform disorder in the ROM reference-group (5.0%) was comparable to the 4-week prevalence rate (7.5%) in the German general population [40]. As could be expected, the point prevalence rate of BDD in the ROM reference-group (0.5%) was slightly lower than the previously reported 1-year prevalence rates ranging from 0.7 to 2.4 [41-44]. Similarly, the point prevalence rate of hypochondriasis in the ROM reference-group (0.6%) was slightly lower than a previously reported 1-year prevalence rate (4.5%) [41]. The prevalence rate for undifferentiated somatoform disorder in our reference-group was 2.0%, compared with 13.0% in the Dutch treatment-seeking population of De Waal [45]. Our GP population was not necessarily a consulting (i.e., treatment seeking) population. Rather, it was selected from the GP-registration system. The fact that people tend to visit their GP when they have complaints, and that many of these complaints can be classified as undifferentiated somatoform disorder, might explain the large difference in prevalence rate in both studies. Furthermore, it is indeed possible that the MINI-Plus under diagnosed somatoform and other disorders.

The internal consistency of the BICI (0.96) is in accordance with previous studies [17,21,22,29]. The cut-off-values reported in this study (50, P<sub>95</sub> reference-group; 49.5, ROC based cut-off-value; 39, P<sub>5</sub> patient-group) are substantially lower than the BICI cut-off-value of 72 reported by Littleton and colleagues [17]. This may be explained by Littleton's use of a sample of college students (80% females), where body image concerns appear to be more common [46]. Moreover, they were younger than our reference-group and patient-group and younger people have more body image concerns than older people [47]. The mean BICI score for our ROM reference-group (34) was similar to the mean BICI scores reported by Littleton and colleagues (32 to 43) [21], and lower than the means reported in other studies, ranging from 43 [22] to 50 [17]. This suggests that our reference-group was relatively healthy. However, consideration should be given to the fact that the comparison of mean values of variables with skewed distributions may reflect the strong impact of a few outliers. The internal consistency ( $\alpha=0.90$ ) of the WI is in accordance with a previous study [23]. The different types of cut-off-values reported in the current study (6, P<sub>95</sub> reference-group; 5.5,



ROC based cut-off-value; 5,  $P_5$  patient-group) were very similar. To our knowledge, no cut-off-values have previously been reported. The mean WI score of 2.2 for the ROM reference-group was comparable to the mean WI scores reported by Pilowsky (i.e., 1.7 for normal controls) [18]. The mean WI score of 9.8 for our patient-group (10) was very similar to the mean of 8.0 reported by Speckens and colleagues [23] and the mean of 8.5 as reported by Pilowsky [18].

The internal consistency ( $\alpha=0.97$ ) of the CIS-20R is in accordance with previous studies [19,31]. Vercoulen and colleagues [19] reported decile scores. The  $P_{50}$  value for our ROM reference-group of 38 is very close to Vercoulen's  $P_{50}$  values of 35 for healthy controls and 42 for controls who are related to somatic (CVA) patients. The mean CIS-20R total score was 46 for the ROM reference-group. The mean Subjective Fatigue score was 20, well below the cut-off of 35 for this subscale [19]. By contrast, the somatoform patient-group had a mean total score of 112 and a mean Subjective Fatigue score of 52. This latter score is well above the cut-off of 35, indicating psychopathology, as was expected.

Gender-effects were analyzed. For the BICI percentile scores were lower for men than for women: e.g., cut-off ( $P_{95}$ ) values were 45 for men and 57 for women. Luca and colleagues (2011;[22]) found a similar gender effect in their healthy Italian sample [22]. WI data showed that for the ROM reference-group,  $P_{95}$  cut-off-values were 5 for men and 7 for women. However, most reference values were equal or close to equal for men and women, both in the reference-group and the patient-group. Pilowski and colleagues (1967;[18]) did not test gender-effects in their healthy sample, but they also reported slightly less symptoms for male non-psychiatric cancer patients compared to their female counterparts [18]. A Dutch study reported no gender differences [30]. Regarding the CIS-20R, ROM reference-group  $P_{95}$  cut-off-values for the total score were 89 for men and 97 for women. However, no general gender effect was observed for the subscales. In the ROM reference-group, men reported slightly lower Subjective Fatigue than women, but there was no significant gender-effect for the Concentration, Motivation, and Activation subscales. The developers of the questionnaire found no significant gender-effect [19]. So, at this moment there is not enough evidence to recommend gender specific reference values for the BICI, the WI, nor the CIS-20R.

The excellent (illness-health) differentiating performance of the BICI, WI, and CIS-20R implies that the reference values can be used by clinicians in specialized mental health care to test whether their patient has recovered. Also, the reference values can be used by clinicians in primary care to assess whether referral to specialized mental health care is warranted. Regarding the first point about making decisions about treatment termination, specificity for the assessment of health has to be high. (This contrasts with the normal concept of specificity, which is generally used when ascertaining disorders or dysfunction.) If a treated patient in specialized mental health care displays symptom severity that is equivalent to levels found in the general population, termination of treatment is warranted and referral back to primary care is indicated. The remaining (subsyndromal) symptoms generally do not require specialized treatment anymore.

require specialized treatment anymore. The clinical threshold would be the 95<sup>th</sup> percentile score ( $P_{95}$ ) of the reference population (i.e., this results in few false positives). Regarding the second point, referral from primary care to specialized mental health care requires high sensitivity for ascertaining somatoform disorders. The GP has to decide whether the symptoms are so severe that they are equivalent to levels found in the psychiatrically ill population. So, the 5th percentile score ( $P_5$ ) of the patient population would be the clinical threshold. Severity measures for the BDD, hypochondriasis, and CFS are particularly relevant because these disorders are common but are often unrecognized [48-50].

The present study has several merits. Firstly, the ROM reference-group consisted of individuals without any psychopathological symptoms as well as individuals with psychopathology symptoms who were not receiving treatment in specialized mental health care. In this way, a non-realistic 'supernormal' (i.e., too healthy) reference-group [38] was avoided. This criterion is relevant when the reference values are used to make decisions about the continuation or termination of treatment. It is not necessary that the patient is symptom free; treatment can also be terminated if symptoms have reached a level for which no more specialized care is needed. Secondly, the size of the ROM reference-group sample was large (more than 600 cases). Moreover, the reference-group was clearly defined and it resembled the patient-group in relevant respects (age, gender, level of urbanization). Therefore, our reference values had rather good precision. Thirdly, the ROM reference-group likely represents the general population quite well, because of the very high GP registration rate in the Netherlands. Finally, the assessment procedures for both groups were standardized and of high quality (achieved by training and supervision).

The results should be interpreted in the light of some limitations. Firstly, of the persons (non-consulting GP patients) approached, 63.2% did not want to participate in the study [16]. This large non-response might be due to the extensiveness of the interview. The total time involved was 3 hours which were unpaid. The non-response rate implies potential selection bias, which may have resulted in slightly different (higher or lower) percentile and cut-off-values. Secondly, the patient samples completing the BICI and WI were relatively small in size compared to the reference-group, but they were nevertheless larger than 120. Thirdly, given that our ROM reference-group was aged between 18 and 65 years, Dutch, and taken from a sample of Leiden area GP's, reference values may not necessarily be applicable to children, the elderly, or other ethnic or cultural groups. Fourthly, some demographic data were not collected for about 15% of the ROM patient-group. Finally, only a selection of questionnaires was studied, and thus not every somatoform disorder was investigated.

In conclusion, this large-scale population-based study provides reference values for the BICI, WI, and CIS-20R. This helps improve their usability as ROM questionnaires to differentiate between clinically relevant conditions and normal conditions. These reference values facilitate clinical decisions regarding the continuation, adjustment, or termination of treatment. Additionally, the values allow for the identification of patients in specialized mental health care that have recovered enough in order to be referred back to primary care. Finally, the reference values allow also for the identification of primary care patients that may benefit from specialized mental health care.

## Reference List

1. American Psychiatric Association. (1994) Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. Washington,DC, American Psychiatric Association.
2. Hiller W, Rief W. (2005) Why DSM-III was right to introduce the concept of somatoform disorders. *Psychosomatics*, 46 (2), 105-108.
3. Reme SE, Archer N, Chalder T. (2012) Experiences of young people who have undergone the Lightning Process to treat chronic fatigue syndrome/myalgic encephalomyelitis - a qualitative study. *Br J Health Psychol*.
4. Ford AC, Talley NJ, Schoenfeld PS, Quigley EM, Moayyedi P. (2009) Efficacy of antidepressants and psychological therapies in irritable bowel syndrome: systematic review and meta-analysis. *Gut*, 58 (3), 367-378.
5. Zijdenbos IL, De Wit NJ, Van der Heijden GJ, Rubin G, Quartero AO. (2009) Psychological treatments for the management of irritable bowel syndrome. *Cochrane Database Syst Rev* (1), CD006442.
6. Hoffman BM, Papas RK, Chatkoff DK, Kerns RD. (2007) Meta-analysis of psychological interventions for chronic low back pain. *Health Psychol*, 26 (1), 1-9.
7. Van Koulil S, Effting M, Kraaimaat FW, Van Lankveld W, Van Helmond T, Cats H, Van Riel PL, De Jong AJ, Evers AW. (2007) Cognitive-behavioural therapies and exercise programmes for patients with fibromyalgia: state of the art and future directions. *Ann Rheum Dis*, 66 (5), 571-581.
8. Ipser JC, Sander C, Stein DJ. (2009) Pharmacotherapy and psychotherapy for body dysmorphic disorder. *Cochrane Database Syst Rev* (1), CD005332.
9. Williams J, Hadjistavropoulos T, Sharpe D. (2006) A meta-analysis of psychological and pharmacological treatments for Body Dysmorphic Disorder. *Behav Res Ther*, 44 (1), 99-111.
10. Greeven A, Visser S, Merkelbach JW, Van Rood YR, Van Dyck R, Zitman FG, Spinhoven P. (2007) Cognitive behavior therapy and paroxetine in the treatment of hypochondriasis: a randomized controlled trial. *Am J Psychiatry*, 164 (1), 91-99.
11. Allen LA, Escobar JI, Lehrer PM, Gara MA, Woolfolk RL. (2002) Psychosocial treatments for multiple unexplained physical symptoms: a review of the literature. *Psychosom Med*, 64 (6), 939-950.
12. Kroenke K. (2007) Efficacy of treatment for somatoform disorders: a review of randomized controlled trials. *Psychosom Med*, 69 (9), 881-888.
13. Raine R, Haines A, Sensky T, Hutchings A, Larkin K, Black N. (2002) Systematic review of mental health interventions for patients with common somatic symptoms: can research evidence from secondary care be extrapolated to primary care? *BMJ*, 325 (7372), 1082.
14. Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, Hergueta T, Baker R, Dunbar GC. (1998) The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J Clin Psychiatry*, 59 Suppl 20, 22-33.
15. De Beurs E, Den Hollander-Gijsman ME, Van Rood YR, Van der Wee NJ, Giltay EJ, Van Noorden MS, Van der Lem R, Van Fenema EM, Zitman FG. (2011) Routine outcome monitoring in the Netherlands: practical

experiences with a web-based strategy for the assessment of treatment outcome in clinical practice. *Clin Psychol Psychother*, 18, 1-12.

16. Schulte-van Maaren YWM, Carlier IVE, Giltay EJ, Van Noorden MS, De Waal MW, Van der Wee NJ, Zitman FG. (2012) Reference values for mental health assessment instruments: objectives and methods of the Leiden Routine Outcome Monitoring Study. *J Eval Clin Pract*.

17. Littleton HL, Axson D, Pury CL. (2005) Development of the body image concern inventory. *Behav Res Ther*, 43 (2), 229-241.

18. Pilowsky I. (1967) Dimensions of hypochondriasis. *Br J Psychiatry*, 113 (494), 89-93.

19. Vercoulen JH, Alberts M, Bleijenberg G. (1999) De Checklist Individual Strength. *Gedragstherapie*, 32, 131-136.

20. Kazdin AE. (2008) Evidence-based treatment and practice: new opportunities to bridge clinical research and practice, enhance the knowledge base, and improve patient care. *Am Psychol*, 63 (3), 146-159.

21. Littleton H, Bretkopf CR. (2008) The Body Image Concern Inventory: validation in a multiethnic sample and initial development of a Spanish language version. *Body Image*, 5 (4), 381-388.

22. Luca M, Giannini M, Gori A, Littleton H. (2011) Measuring dysmorphic concern in Italy: psychometric properties of the Italian Body Image Concern Inventory (I-BICI). *Body Image*, 8 (3), 301-305.

23. Speckens AE, Van Hemert AM, Spinhoven P, Bolk JH. (1996) The diagnostic and prognostic significance of the Whitely Index, the Illness Attitude Scales and the Somatosensory Amplification Scale. *Psychol Med*, 26 (5), 1085-1090.

24. Poortvliet MC, Lamkadden M, Deville W. Niet op naam ingeschreven (NONI) bij de huisarts. Inventarisatie en gevolgen voor de ziekenfondsverzekerden. Utrecht: NIVEL; 2005.

25. Schulte-van Maaren YWM, Carlier IVE, Zitman FG, Hemert AM, De Waal MW, Van Noorden MS, Giltay EJ. (2012) Reference values for generic instruments used in Routine Outcome Monitoring: the Leiden Routine Outcome Monitoring Study (in press). *BMC Psychiatry*.

26. Schulte-van Maaren YWM, Carlier IVE, Zitman FG, Van Hemert AM, De Waal MW, Van der Does AJW, Van Noorden MS, Giltay EJ. (2012) Reference values for major depression questionnaires: the Leiden Routine Outcome Monitoring Study (submitted). *Journal of Affective Disorders*.

27. Van Noorden MS, Giltay EJ, Den Hollander-Gijsman ME, Van der Wee NJ, Van Veen T, Zitman FG. (2010) Gender differences in clinical characteristics in a naturalistic sample of depressive outpatients: the Leiden Routine Outcome Monitoring Study. *J Affect Disord*, 125 (1-3), 116-123.

28. Van Vliet IM, De Beurs E. (2007) The MINI-International Neuropsychiatric Interview. A brief structured diagnostic psychiatric interview for DSM-IV en ICD-10 psychiatric disorders. *Tijdschr Psychiatr*, 49 (6), 393-397.

29. Van Rood YR, Mulken S, Bouman T. (2013) Psychometrie van body dysmorphic disorder. Denys D, Vulink N, editors. *Body dysmorphic disorder*. [11], 163-182. Assen, NL, Van Gorcum.

30. Speckens AE, Spinhoven P, Sloekers PP, Bolk JH, Van Hemert AM. (1996) A validation study of the Whitely Index, the Illness Attitude Scales, and the Somatosensory Amplification

Scale in general medical and general practice patients. *J Psychosom Res*, 40 (1), 95-104.

31. De Vree B, Van der Werf SP, Prins J, Bazelmans E, Servaes P, De Vries M, Bleijenberg G. (2002) Meetinstrumenten bij chronische vermoeidheid. *Gedragstherapie*, 35 (2), 157-164.

32. Dingemans AE, Van Rood YR, De Groot I, Van Furth EF. (2012) Body dysmorphic disorder in patients with an eating disorder: prevalence and characteristics. *Int J Eat Disord*, 45 (4), 562-569.

33. Vercoulen JH, Swanink CM, Fennis JF, Galama JM, Van der Meer JW, Bleijenberg G. (1994) Dimensional assessment of chronic fatigue syndrome. *J Psychosom Res*, 38 (5), 383-392.

34. Solberg HE. (2008) Establishment and use of reference values. Burtis CA, Ashwood ER, Bruns DE, editors. *Fundamentals of clinical chemistry*. 6[14], 229-238. St. Louis, Missouri, Saunders Elsevier.

35. Barnabei L, Marazia S, De CR. (2007) Receiver operating characteristic (ROC) curves and the definition of threshold levels to diagnose coronary artery disease on electrocardiographic stress testing. Part I: The use of ROC curves in diagnostic medicine and electrocardiographic markers of ischaemia. *J Cardiovasc Med (Hagerstown)*, 8 (11), 873-881.

36. Solberg HE. (1989) Reference values. *Adv Clin Chem*, 27, 1-79.

37. Zimmerman M, Chelminski I, Posternak M. (2004) A review of studies of the Montgomery-Asberg Depression Rating Scale in controls: implications for the definition of remission in treatment studies of depression. *Int Clin Psychopharmacol*, 19 (1), 1-7.

38. Kendall PC, Marrs-Garcia A, Nath SR, Sheldrick RC. (1999) Normative comparisons for the evaluation of clinical significance. *J Consult Clin Psychol*, 67 (3), 285-299.

39. Reed AH, Henry RJ, Mason WB. (1971) Influence of statistical method used on the resulting estimate of normal range. *Clin Chem*, 17 (4), 275-284.

40. Jacobi F, Wittchen HU, Holting C, Hofler M, Pfister H, Muller N, Lieb R. (2004) Prevalence, co-morbidity and correlates of mental disorders in the general population: results from the German Health Interview and Examination Survey (GHS). *Psychol Med*, 34 (4), 597-611.

41. Faravelli C, Salvatori S, Galassi F, Aiazzi L, Drei C, Cabras P. (1997) Epidemiology of somatoform disorders: A community survey in Florence. *Social Psychiatry and Psychiatric Epidemiology*, 32 (1), 24-29.

42. Koran LM, Abuiaoude E, Large MD, Serpe RT. (2008) The prevalence of body dysmorphic disorder in the United States adult population. *Cns Spectrums*, 13 (4), 316-322.

43. Otto MW, Wilhelm S, Cohen LS, Harlow BL. (2001) Prevalence of body dysmorphic disorder in a community sample of women. *American Journal of Psychiatry*, 158 (12), 2061-2063.

44. Rief W, Buhlmann U, Wilhelm S, Borkenhagen A, Brahler E. (2006) The prevalence of body dysmorphic disorder: a population-based survey. *Psychological Medicine*, 36 (6), 877-885.

45. De Waal MW, Arnold IA, Eekhof JA, Van Hemert AM. (2004) Somatoform disorders in general practice: prevalence, functional impairment and comorbidity with anxiety and depressive disorders. *Br J Psychiatry*, 184, 470-476.

46. Bohne A, Keuthen NJ, Wilhelm S, Deckersbach T, Jenike MA. (2002) Prevalence of symptoms of body dysmorphic disorder and its correlates: a cross-cultural comparison. *Psychosomatics*, 43 (6), 486-490.
47. Cororve MB, Gleaves DH. (2001) Body dysmorphic disorder: a review of conceptualizations, assessment, and treatment strategies. *Clin Psychol Rev*, 21 (6), 949-970.
48. Fink P, Sorensen L, Engberg M, Holm M, Munk-Jorgensen P. (1999) Somatization in primary care. Prevalence, health care utilization, and general practitioner recognition. *Psychosomatics*, 40 (4), 330-338.
49. Li CT, Chou YH, Yang KC, Yang CH, Lee YC, Su TP. (2009) Medically unexplained symptoms and somatoform disorders: diagnostic challenges to psychiatrists. *J Chin Med Assoc*, 72 (5), 251-256.
50. Mergl R, Seidscheck I, Allgaier AK, Moller HJ, Hegerl U, Henkel V. (2007) Depressive, anxiety, and somatoform disorders in primary care: prevalence and recognition. *Depress Anxiety*, 24 (3), 185-195.



## Supplementary Tables

**Supplementary Table 6.1:** Sociodemographic and psychiatric characteristics of the ROM reference (n=648) and patient (n=823) groups per gender.

**Supplementary Table 6.2:** Percentile scores and mean values in the ROM reference (n=645) and patient (n=130) groups for the subscales and total score of the Body Image Concern Inventory (BICI)

**Supplementary Table 6.3:** Percentile scores and mean values in the ROM reference (n=644) and patient (n=226) groups for the subscales and total score of the Whitely Index (WI)

**Supplementary Table 6.4:** Percentile scores and mean values in the ROM reference (n=643) and patient (n=481) groups for the subscales and total score of the Checklist Individual Strength (CIS-20R)

**Supplementary Table 6.1:** Sociodemographic and psychiatric characteristics of the ROM reference (n=648) and patient (n=823) groups per gender.

|                                                  | ROM reference group<br>(n=648) |                |                | ROM patient group<br>(n=823) |                |                |
|--------------------------------------------------|--------------------------------|----------------|----------------|------------------------------|----------------|----------------|
|                                                  | females                        | males          | total          | females                      | males          | total          |
| <b>Gender: - n (%)</b>                           | 405<br>(62.5)                  | 243<br>(37.5)  | 648<br>(100)   | 580<br>(70.5)                | 243<br>(29.5)  | 823<br>(100)   |
| <b>Age in years: mean (± SD)</b>                 | 39.6<br>(12.6)                 | 40.8<br>(12.6) | 40.0<br>(12.6) | 38.9<br>(11.5)               | 38.0<br>(12.3) | 38.6<br>(11.7) |
| <b>Marital status<sup>1</sup>: - n (%)</b>       |                                |                |                |                              |                |                |
| Married/cohabitating                             | 285<br>(70.4)                  | 172<br>(70.8)  | 457<br>(70.5)  | 285<br>(49.1)                | 107<br>(44.0)  | 392<br>(47.6)  |
| Divorced/separated/widow                         | 28<br>(6.9)                    | 6<br>(2.5)     | 34<br>(5.2)    | 79<br>(13.6)                 | 17<br>(7.0)    | 96<br>(11.7)   |
| Single                                           | 92<br>(22.7)                   | 65<br>(26.7)   | 157<br>(24.2)  | 137<br>(23.6)                | 79<br>(32.5)   | 216<br>(26.2)  |
| <b>Housing situation<sup>1</sup>: - n (%)</b>    |                                |                |                |                              |                |                |
| Living alone                                     | 55<br>(13.6)                   | 32<br>(13.2)   | 87<br>(13.4)   | 98<br>(16.9)                 | 40<br>(16.5)   | 138<br>(16.8)  |
| Living with partner                              | 287<br>(70.9)                  | 175<br>(72.0)  | 462<br>(71.3)  | 291<br>(50.2)                | 112<br>(46.1)  | 403<br>(49.0)  |
| Living with family                               | 63<br>(15.6)                   | 36<br>(14.8)   | 99<br>(15.3)   | 112<br>(19.3)                | 51<br>(21.0)   | 163<br>(19.8)  |
| <b>Educational status<sup>1,3</sup>: - n (%)</b> |                                |                |                |                              |                |                |
| Lower                                            | 90<br>(22.2)                   | 48<br>(19.8)   | 138<br>(21.3)  | 204<br>(35.2)                | 81<br>(33.3)   | 285<br>(34.6)  |
| Higher                                           | 315<br>(77.8)                  | 195<br>(80.2)  | 510<br>(78.7)  | 297<br>(51.2)                | 122<br>(50.2)  | 419<br>(50.9)  |
| <b>Employment status<sup>1</sup>: - n (%)</b>    |                                |                |                |                              |                |                |
| Employed part-time                               | 211<br>(52.1)                  | 45<br>(18.5)   | 256<br>(39.5)  | 135<br>(23.3)                | 22<br>(9.1)    | 157<br>(19.1)  |
| Employed full-time                               | 111<br>(27.4)                  | 165<br>(67.9)  | 276<br>(42.6)  | 42<br>(7.2)                  | 75<br>(30.9)   | 117<br>(14.2)  |
| Unemployed/retired                               | 73<br>(18.0)                   | 28<br>(11.5)   | 101<br>(15.6)  | 157<br>(27.1)                | 43<br>(17.7)   | 200<br>(24.3)  |
| Work-related disability                          | 10<br>(2.5)                    | 5<br>(2.1)     | 15<br>(2.3)    | 167<br>(28.8)                | 63<br>(25.9)   | 230<br>(27.9)  |
| <b>Ethnic background<sup>1</sup>: - n (%)</b>    |                                |                |                |                              |                |                |
| Dutch                                            | 348<br>(85.9)                  | 221<br>(90.9)  | 569<br>(87.8)  | 417<br>(71.9)                | 172<br>(70.8)  | 590<br>(71.6)  |
| Other ethnicity                                  | 57<br>(14.1)                   | 22<br>(9.1)    | 79<br>(12.2)   | 83<br>(14.3)                 | 31<br>(12.8)   | 114<br>(13.9)  |
| <b>MINI diagnoses: - n (%)</b>                   |                                |                |                |                              |                |                |
| Currently None                                   | 362<br>(89.4)                  | 228<br>(93.8)  | 590<br>(91.0)  | 0 <sup>2</sup>               | 0 <sup>2</sup> | 0 <sup>2</sup> |
| Somatoform disorder (single)                     | 15<br>(3.7)                    | 10<br>(4.1)    | 25<br>(3.9)    | 294<br>(50.7)                | 88<br>(36.2)   | 382<br>(46.4)  |
| Somatoform disorder (comorbidity)                | 6<br>(1.5)                     | 1<br>(0.4)     | 7<br>(1.1)     | 286<br>(49.3)                | 155<br>(63.8)  | 441<br>(53.6)  |
| Other psychiatric disorder without somatoform    | 22<br>(5.4)                    | 4<br>(3.6)     | 26<br>(4.0)    | 0 <sup>2</sup>               | 0 <sup>2</sup> | 0 <sup>2</sup> |

<sup>1</sup> No data from 119 (14%) patients; <sup>2</sup> Selection criterion; <sup>3</sup> Lower education: primary or vocational school; Higher education: college or university

**Supplementary Table 6.2:** Percentile scores and mean values in the ROM reference (n=645) and patient (n=130) groups for the subscales and total score of the Body Image Concern Inventory (BICI)

|                                     | ROM reference group (645) |                 |                 |                 |                 | ROM patient group (130) |                |                 |                 |                 |                 |             |
|-------------------------------------|---------------------------|-----------------|-----------------|-----------------|-----------------|-------------------------|----------------|-----------------|-----------------|-----------------|-----------------|-------------|
|                                     | P <sub>5</sub>            | P <sub>25</sub> | P <sub>50</sub> | P <sub>75</sub> | P <sub>95</sub> | Mean ± SD               | P <sub>5</sub> | P <sub>25</sub> | P <sub>50</sub> | P <sub>75</sub> | P <sub>95</sub> | Mean ± SD   |
| Body Image Concern Inventory (BICI) |                           |                 |                 |                 |                 |                         |                |                 |                 |                 |                 |             |
| All participants                    | 20                        | 26              | 33              | 41              | 55              | 34.4 ± 10.8             | 39             | 60              | 72              | 78              | 87              | 68.4 ± 13.9 |
| - Men                               | 19                        | 23              | 27              | 34              | 45              | 29.0 ± 8.4              | 29             | 56              | 67              | 73              | 80              | 63.1 ± 14.3 |
| - Women                             | 22                        | 30              | 36              | 43              | 57              | 37.4 ± 10.8             | 45             | 63              | 74              | 80              | 90              | 71.6 ± 12.7 |

SD denotes standard deviation.

**Supplementary Table 6.3:** Percentile scores and mean values in the ROM reference (n=644) and patient (n=226) groups for the subscales and total score of the Whitley Index (WI)

|                    | ROM reference group (644) |                 |                 |                 |                 | ROM patient group (226) |                |                 |                 |                 |                 |            |
|--------------------|---------------------------|-----------------|-----------------|-----------------|-----------------|-------------------------|----------------|-----------------|-----------------|-----------------|-----------------|------------|
|                    | P <sub>5</sub>            | P <sub>25</sub> | P <sub>50</sub> | P <sub>75</sub> | P <sub>95</sub> | Mean ± SD               | P <sub>5</sub> | P <sub>25</sub> | P <sub>50</sub> | P <sub>75</sub> | P <sub>95</sub> | Mean ± SD  |
| Whitley Index (WI) |                           |                 |                 |                 |                 |                         |                |                 |                 |                 |                 |            |
| All participants   | 0                         | 1               | 2               | 3               | 6               | 2.2 ± 2.0               | 5              | 8               | 10              | 12              | 13              | 9.8 ± 2.5  |
| - Men              | 0                         | 1               | 1               | 3               | 5               | 1.9 ± 1.6               | 6              | 7               | 10              | 12              | 13              | 9.5 ± 2.5  |
| - Women            | 0                         | 1               | 2               | 3               | 7               | 2.4 ± 2.2               | 5              | 9               | 10              | 12              | 13              | 10.1 ± 2.5 |

SD denotes standard deviation.

**Supplementary Table 6.4:** Percentile scores and mean values in the ROM reference (n=643) and patient (n=481) groups for the subscales and total score of the Checklist Individual Strength (CIS-20R)

|                                                | ROM reference group (644) |                 |                 |                 |                 |             | ROM patient group (226) |                 |                 |                 |                 |              |
|------------------------------------------------|---------------------------|-----------------|-----------------|-----------------|-----------------|-------------|-------------------------|-----------------|-----------------|-----------------|-----------------|--------------|
|                                                | P <sub>5</sub>            | P <sub>25</sub> | P <sub>50</sub> | P <sub>75</sub> | P <sub>95</sub> | Mean ± SD   | P <sub>5</sub>          | P <sub>25</sub> | P <sub>50</sub> | P <sub>75</sub> | P <sub>95</sub> | Mean ± SD    |
| <b>Checklist Individual Strength (CIS-20R)</b> |                           |                 |                 |                 |                 |             |                         |                 |                 |                 |                 |              |
| <b>Subjective fatigue</b>                      |                           |                 |                 |                 |                 |             |                         |                 |                 |                 |                 |              |
| All participants                               | 8                         | 9               | 16              | 27              | 46              | 20.2 ± 12.6 | 38                      | 50              | 54              | 56              | 56              | 51.5 ± 7.0   |
| - Men                                          | 8                         | 8               | 14              | 25              | 42              | 18.1 ± 11.3 | 33                      | 50              | 55              | 56              | 56              | 50.8 ± 8.7   |
| - Women                                        | 8                         | 10              | 18              | 29              | 50              | 21.4 ± 13.2 | 38                      | 50              | 54              | 56              | 56              | 51.8 ± 6.4   |
| <b>Concentration</b>                           |                           |                 |                 |                 |                 |             |                         |                 |                 |                 |                 |              |
| All participants                               | 5                         | 5               | 9               | 14              | 26              | 11.0 ± 7.0  | 6                       | 22              | 29              | 35              | 35              | 26.7 ± 8.9   |
| - Men                                          | 5                         | 5               | 9               | 14              | 29              | 10.9 ± 7.1  | 13                      | 23              | 29              | 35              | 35              | 27.6 ± 7.5   |
| - Women                                        | 5                         | 5               | 9               | 14              | 26              | 11.1 ± 7.0  | 5                       | 21              | 29              | 35              | 35              | 26.5 ± 9.2   |
| <b>Motivation</b>                              |                           |                 |                 |                 |                 |             |                         |                 |                 |                 |                 |              |
| All participants                               | 4                         | 4               | 7               | 10              | 20              | 8.4 ± 5.1   | 4                       | 12              | 17              | 24              | 28              | 17.8 ± 7.3   |
| - Men                                          | 4                         | 4               | 7               | 10              | 20              | 8.1 ± 5.0   | 10                      | 16              | 22              | 25              | 28              | 19.9 ± 6.2   |
| - Women                                        | 4                         | 4               | 7               | 11              | 20              | 8.7 ± 5.2   | 4                       | 10              | 16              | 24              | 28              | 17.3 ± 7.4   |
| <b>Activity</b>                                |                           |                 |                 |                 |                 |             |                         |                 |                 |                 |                 |              |
| All participants                               | 3                         | 3               | 4               | 9               | 15              | 6.2 ± 4.3   | 3                       | 12              | 18              | 21              | 21              | 16.0 ± 5.6   |
| - Men                                          | 3                         | 3               | 5               | 9               | 15              | 6.5 ± 4.4   | 8                       | 15              | 19              | 21              | 21              | 17.3 ± 4.3   |
| - Women                                        | 3                         | 3               | 4               | 8               | 15              | 6.0 ± 4.2   | 3                       | 10              | 18              | 21              | 21              | 15.6 ± 5.9   |
| <b>Total</b>                                   |                           |                 |                 |                 |                 |             |                         |                 |                 |                 |                 |              |
| All participants                               | 20                        | 28              | 38              | 60              | 92              | 45.8 ± 23.3 | 74                      | 100             | 116             | 128             | 140             | 112.0 ± 20.4 |
| - Men                                          | 20                        | 26              | 37              | 57              | 89              | 43.5 ± 22.5 | 73                      | 104             | 122             | 129             | 140             | 115.5 ± 19.6 |
| - Women                                        | 20                        | 28              | 41              | 61              | 97              | 47.2 ± 23.6 | 74                      | 98              | 114             | 128             | 140             | 111.1 ± 20.5 |

SD denotes standard deviation.