LEIPAD, an Internationally Applicable Instrument to Assess Quality of Life in the Elderly

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A questionnaire to assess quality of life in the elderly was developed under the auspices of the European office of the World Health Organization. Stages in construction of the instrument, which was designed for international application, particularly at the primary level, are described. The latest version of the questionnaire is composed of 49 self-assessment items, 31 of which can be grouped into 7 subscales: Physical Function, Self-Care, Depression and Anxiety, Cognitive Functioning, Sexual Functioning, and Life Satisfaction. The remaining 18 items serve as moderators for assessing the influence of social desirability factors and personality characteristics on the individual scores for the 7 core instrument subscales. The questionnaire has been administered to 586 individuals aged 65 years and over recruited in communities in Italy (Padua and Brescia), the Netherlands (Leiden), and Finland (Helsinki). The main psychometric characteristics of the instrument, together with its concurrent validity with the Rotterdam Questionnaire, are illustrated.

Index Terms: aging, assessment, elderly, primary healthcare, quality of life, Rotterdam Questionnaire

Over the last 20 years, the study of the quality of life (QOL) has assumed central importance in assessing outcomes of medical and social interventions. QOL in the elderly appears to be particularly important in view of the increasing number of over-65-year-olds in the industrialized world, although the characteristics peculiar to older adults make it difficult to define the concept of QOL in this segment of the population.

In its widest sense, the expression quality of life encompasses all aspects of human life, including each person’s material, physical, social, emotional, and spiritual well-being. However, because the literature has shown particular interest in QOL measures related to medical intervention, the “global” concept of QOL, encompassing the sum of human experience, has generally been limited to concrete measures of the effects of pathologies and related treatments on the individual’s health-related behavior and moods.

In the elderly, this type of approach has proved inadequate. Many situations for this age group can be considered a normal part of the aging process. Others are psychosocial
conditions closely linked with old age itself. At this time of life, physical abilities decline and pharmacokinetic responses to treatment are slower. The elderly also experience particularly important events—retirement, institutionalization, drop in income combined with fewer occasions for social intercourse—that may lead to an increased probability of their feeling (and being) isolated or lonely.

The elderly are more prone to experiencing various adverse events simultaneously. As a consequence, physical, mental, social, and economic well-being become closely interrelated to a much greater extent than among other age groups. The elderly may also have communication difficulties that could be linked with cognitive impairment. Therefore, this specific domain should be assessed, both in relation to subjective perceptions of memory functions by the individual, and, where possible, with the help of objective comparative instruments.

Past research on QOL in the elderly was restricted to rest-home residents. Clearly, it is difficult to extend rest-home findings to non-institutionalized settings. More recent literature demonstrates the importance of assessing well-being of the elderly in multidimensional terms. An assessment of this type should include objective elements, such as the functional, mental, and social status of the individual, in addition to subjective elements, such as morale, life satisfaction, and self-esteem.

A multidimensional evaluation instrument should also (a) permit a short, but exhaustive, assessment of the various QOL domains; (b) allow subjective assessment and an understanding of the hierarchy of importance given to these domains by the individual being tested; (c) be specific to the elderly; (d) possess cross-cultural validity; (e) have a modular structure (eg, separate subscales for the various QOL domains); (f) emphasize the importance of individual personality characteristics; and (g) be sensitive to changes brought about by medical or social treatment.

Many QOL instruments, both general and pathology specific, have been developed (eg, studies of reactions to such diseases as cancer, cardiovascular disorders, AIDS, and surgery). The principle uni- or multidimensional instruments are discussed in reviews published in recent years. Fillenbaum listed the most important instruments specific to the elderly as the Older Americans Resources and Sciences (OARS), the Comprehensive Assessment and Referral Evaluation (CARE), and the Multilevel Assessment Instrument (MAI). Most of these have the disadvantage of being very long and time-consuming to administer and requiring onerous interviewer training.

The most widely used multidimensional instruments discussed in subsequent reviews seem to be the Sickness Impact Profile (SIP), the Nottingham Health Profile (NHP), and the brief version of the Medical Outcomes Study, the 36-item short form (MOS/SF-36) recently proposed for adapted use with the elderly.

None of these scales, however, not even versions specifically adapted to the elderly, takes into consideration cognitive function. The instrument we discuss in this article, on the other hand, includes questions specifically developed for the purpose. The suitability of these previously listed scales has not been assessed in long-term and acute care situations. Moreover, these scales have not been generally validated for use in different settings—in homes, communities, rest homes, or hospitals—or for primary healthcare or in transcultural settings. The instrument we developed is specifically designed to take these situations into account.

The aim of our questionnaire is to respond to the need for a QOL assessment instrument for the elderly that meets the specific requirements of this age group. In particular, the main objective of this project was to develop an instrument that was not only valid and reliable, but also very practical (easily implemented in clinical assessment, especially in primary healthcare), and that possessed good cross-cultural potential and comprehensive coverage. Pursuing this objective has enabled us to develop an instrument that has been adopted internationally because it is sufficiently discriminative to be applied to highly varied cultural settings, despite its standard, basic structure.

The LEIPAD is a subjective assessment questionnaire specifically designed to appraise quality of life in the elderly. Its name is an acronym deriving from the first two of the three most involved universities: LEIDen (the Netherlands), PADua (Italy), and Helsinki (Finland). The project has been conducted under the auspices of WHO/EURO. Copies of the technical report can be obtained from the European office of WHO in Copenhagen. The questionnaire was developed in accordance with the criteria outlined above and was drawn up in English. It was then translated into Dutch, Finnish, and Italian and back translated into English to ensure perfect correspondence between the various versions.

The LEIPAD considers various domains of daily life, such as physical, mental, social, and occupational status. The physical dimension includes self-assessments of health status and perceptions by the elderly individual being interviewed. Attention is also paid to the concept of pain. The subjective aspects of emotional functioning are assessed in terms of feelings of self-esteem, confidence in one's own capabilities and optimism, appraisal of states of anxiety or depression, and the presence of a mood disorder.

We focused special attention on cognitive functions,
which are subjectively assessed by the elderly person through judgment of mnemonic performance and ability to concentrate. These aspects are considered fundamental for the evaluation and self-assessment of QOL in the aged.

Interpersonal functions assessed include information both on interpersonal relationships (including sexuality), friendships, acquaintances, and on subjective feelings of happiness and solitude. Socio-economic aspects are gauged through questions concerning income and housing situation. The LEIPAD questionnaire, tested in field trials in different countries, has been developed to allow QOL assessment in older patients attending primary healthcare facilities. The instrument has also been designed to be sensitive enough to pick up changes in patients’ QOL resulting from any kind of intervention, be it medical, surgical, or psychosocial.

METHOD

Development of the Instrument

The original version (1.0) of the instrument considered a series of dimensions; it was composed of 37 items that were partly created ad hoc and partly taken from existing questionnaires. The work was done by the senior researchers of the study group (Drs De Leo, Diekstra, Grigolotto, Lonqvist, and Trabucchi), especially those with major expertise in psychogeriatrics. Ten areas were initially covered by the instrument: self-perceived physical health, mental health, and emotional health status, self-esteem, expectations for the future, activities of daily living (including the Instrumental Activities of Daily Living [IADL]), interpersonal and social functions, recreational activities, financial position, and religiousness/spirituality.

The instrument was initially developed with a single scoring design for all of the items (the responses available were not at all, a little, somewhat, much, very much) with a corresponding 5-point scale ranging from 0 (high level of well-being) to 4 (low level of well-being). In regard to perceived physical, mental and emotional health, self-esteem, and expectations for the future, participants were asked to assess various aspects of their well-being.

Revising the LEIPAD

The instrument subsequently underwent a series of revisions before we arrived at the final version. We added 2 items to version 1.1: “Do you suffer from insomnia?” “Do you have sexual relations?” Our aim was to assess the importance of perceptions of sleep disorders and of sexual relations, where present, in relation to the elderly person’s QOL. The second version included 39 items; we simplified scoring to a 4-point scale ranging from 0 to 3.

We conducted a pilot study with this 39-item version on 229 elderly people aged 65 years or older (29 in Helsinki, 100 in Leiden, 50 in Padua, and 50 in Brescia). The ratio of women to men was 55:45. Participants were recruited consecutively by several general practitioners in urban areas in Italy, invited by general practitioners to take part in a study on memory in the Netherlands, and were outpatients attending a hospital in Finland. Inclusion criteria were age and willingness to take part in the study. Exclusion criteria were inability to understand the questions because of dementia or other pathologies and residence in a nursing home. All the participants gave informed consent orally.

Approval of the preliminary study was provided by the local ethical board in every center. The examiners were physicians, psychologists, and health professionals with specific training in administering psychological tests. The questionnaire was generally self-administered; in exceptional cases only (eg, the subject did not have his or her spectacles), the examiner read the questions to the participant and marked the answers for the individual.

Testing for Reliability

During this stage, we assessed the feasibility and linguistic comprehension of the items. Our test-retest for reliability was based on 50 questionnaires collected from participants from the Italian sample within 14 days of the initial assessment. The reliability level measured .81. At this stage in the process, we also conducted a preliminary factor analysis.

The development of subsequent versions (2.1 and 2.2) entailed adjustment of several items. With a view to improving validity and reliability, we tested social desirability with 3 items from the Crowne and Marlowe scale and used 5 questions from the Personality Diagnostic Questionnaire- Revised (PDQR) to test for personality characteristics.

We also sought more appropriate assessment measures for aspects linked to personality structure, sexuality, and satisfaction with one’s own standard of living and state-provided healthcare. An increase in the number of items to 51 (version 2.2) led to the inclusion of the following additional questions: “Do you feel tired, without energy?” “Do you have difficulties concentrating?” “Are you easily annoyed or irritated?” “Do you have temper outbursts that you cannot control?” “Do you get into arguments with others?” “Do you tend to be resentful?” “Do you tend to have a negative opinion of yourself?” “Do you feel emotionally satisfied in your relationships with other people?” “How often do you feel you cannot trust most people?” “Are you interested in sex?” “Do you feel you cannot afford the standard of living
you would like?" "Are you satisfied with the healthcare provided by the state?"

We subsequently decided to eliminate 2 items, one concerning incontinence, the other concerning satisfaction with state-provided healthcare. These issues appeared to have a negligible role in assessing QOL of elderly participants.

**Administration of the 49-Item Version**

We then carried out a second study in which the 49-item questionnaire was administered to 586 elderly people over 65 years of age living at home. Respondents were recruited from the same countries as before: Italy (Padua and Brescia), the Netherlands (Leiden), and Finland (Helsinki). For sociodemographic characteristics of the samples, see Table 1. Our recruitment was based on the same criteria we had used in the first pilot study. All participants gave oral informed consent, and the appropriate ethical committees authorized participation in this phase of the study.

The Helsinki participants were a consecutive series of patients attending five outpatient clinics in the nearby town of Vantaa between January 1, 1992, and December 2, 1992. The data collectors were three nurses who had attended a training session and had been provided with a package of written instructions. Supervision was provided by Arja R. Aro from the Helsinki center. The data collectors recorded the process of admission, selection, collection or responses, and refusals according to agreed-upon criteria.

In Leiden, participants were elderly people who had taken part in a memory training program on the invitation of their personal physicians. Clinical psychologists who had received written instructions interviewed the elderly participants, and the questionnaire was administered before the memory training program began.

Recruitment in Padua and Brescia was always at general practitioners’ units. In Padua, the interviews were carried out by two physicians and two medical students. The interviewers in both cases had received preparatory training.

The percentage of elderly participants who refused to take part was 19.6% in Helsinki, 8.3% in Italy, and 0% in Leiden. This variation was probably related to the different recruitment methods in the three countries. In Helsinki, where data collection was carried out in a physician’s waiting room, refusals were partially attributable to lack of time, either because the patients were called into the doctor’s surgery or because someone else was waiting.

Our aim at this stage was to (a) test reliability; (b) assess conformity with the English version of the questionnaire by comparing it with the back translation; (c) confirm test–retest reliability on roughly 50% of participants; and (d) study the internal structure of the instrument, using item and factor analysis, and test for convergent validity by comparing our findings with data from the Rotterdam Questionnaire.27

We also conducted an analysis of covariance (ANCOVA) to assess how important gender, age, and number of years of schooling were in influencing the findings. It was possible to conduct covariance analysis for the Italian sample only. We compared scores on the LEIPAD with scores achieved on Folstein’s Mini-Mental State Examination (MMSE),28 which we administered to check the reliability of the self-reported cognitive status of interviewed participants.

**RESULTS**

**Modular Structure: Internal Consistency**

Version 3.0 of the instrument consisted of 49 items, 31 of which could be grouped into seven core instrument scales (see Appendix). Other items were taken from already available instruments24,25 for assessing how such factors as personality characteristics and social desirability might influ-

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**TABLE 1**

<table>
<thead>
<tr>
<th>Sociodemographic Characteristics of Samples From Three Centers</th>
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<tbody>
<tr>
<td><strong>Variable</strong></td>
</tr>
<tr>
<td>Sex</td>
</tr>
<tr>
<td>Male</td>
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<tr>
<td>Female</td>
</tr>
<tr>
<td>Age <strong>M</strong> (years)</td>
</tr>
<tr>
<td>Education <strong>M</strong> (years)</td>
</tr>
</tbody>
</table>

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20 Behavioral Medicine
ence an individual’s score or were developed ad hoc to measure self-esteem and anger. These 18 items could be grouped into five further scales referred to as moderator scales. Each item in the instrument is scored from 0 to 3, with 0 referring to the best condition and 3 to the worst. Administration does not generally take longer than 15 or 20 minutes. The introduction is short and is written in simple, accessible language similar to the wording of the items so that it can easily be used by participants with primary school education. The 49-item LEIPAD questionnaire has been designed to measure seven main QOL dimensions or domains. The following are short definitions of the scales (see Table 2 and the Appendix):

The Physical Function Scale is composed of 5 items (1, 6, 7, 9, 12) that examine the elderly person’s perception of his or her physical status at the time of the interview. The scores range from 0 (positive situation) to 15 (negative situation). Cronbach’s alpha was .74.

The Self-Care Scale consists of 6 items (2, 3, 4, 5, 10, 11) that analyze ability to perform daily activities without the help of others. A score of 0 indicates no dependence, and the highest score indicates almost total dependence. Cronbach’s alpha was .74.

The Depression and Anxiety Scale is composed of 4 items (17–20) designed to examine subjective feelings of anxiety and participants’ perceptions of feeling depressed. Scores range from no symptom of anxiety or depression (0) to extreme depression or anxiety (12). The alpha value was .78.

The Cognitive Functioning Scale deals with problems concerning such functions as ability to concentrate, feelings of confusion, and memory problems. It consists of 5 items (8, 13–16). A score of 0 signifies no problems, and 15 indicates a high presence of problems declared by the subject. Alpha was equal to .79.

The Social Functioning Scale consists of 3 items (21–23) and assesses level of social integration and satisfaction, examining whether the elderly person has friends, whether or not he or she can confide in others, and whether he or she finds these relationships satisfactory. Scores range from 0, indicating high satisfaction, to 9, indicating high dissatisfaction; Cronbach’s alpha was .61.

The Sexual Functioning Scale consists of items 24 and 25, which consider both the existence of sexual activity and interest in sex. Scores range from 0, indicating that sexual interest is present to 6, indicating that interest is absent. Because it is composed of 2 items, only the correlation between the items can be calculated; in our experience that correlation appeared to be sufficient. Pearson’s \( r \) was .43.

The Life Satisfaction Scale reflects the individual elderly person’s satisfaction with his or her financial situation and standard of living. It is also useful for assessing levels of satisfaction compared with the past and with expectations for the future. The scale consists of 6 items (26–31); scores range from 0, indicating high satisfaction, to 18, indicating extreme dissatisfaction. We deemed the alpha of .61 sufficient, considering that the items concern satisfaction in various life domains.

Moderator scales were taken from existing scales or developed ad hoc to assess the following aspects of participants’ lives. Responses to all are yes or no, so scores are either 0 or 1.

1. Self-perceived personality disorders (Items 92–96 from the PDQ-R of Hyler et al)\(^{25}\) is composed of 5 questions (39, 45–49) with possible scores from 0 (no problem) to 6 (serious problems); Cronbach’s alpha was .63.

2. A scale for assessing anger, resentment, and irritability (ad hoc items) consists of 4 items (32–35) with scores from 0 (no problem) to 4 (serious problems); Cronbach’s alpha was .62.

3. Social desirability, which assesses the tendency to give socially desirable answers, includes 3 items (42–44) taken from the Crowne and Marlowe questionnaire.\(^{24}\) Scores range from 0 (no problem) to 3 (serious problems); Cronbach’s alpha was .60.

4. Faith in God is composed of two items (40, 41) that we created ad hoc. Scores range from 0 (not religious) to 2 (religious); The correlation between the two items was .62, which we considered sufficient.

5. Self-esteem is composed of 3 items (36–38) developed ad hoc; Cronbach’s alpha was .63.

We proposed a global index for the basic scales that constitute the core of the instrument. Such an index provides an idea of overall impairment. The score ranges from 0 to 93, with the highest score corresponding to the greatest level of impairment.

<table>
<thead>
<tr>
<th>Table 2</th>
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<tr>
<td>Rotated Factor Matrix for LEIPAD Scales</td>
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<tr>
<td>Scale</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>Social Functioning</td>
</tr>
<tr>
<td>Life Satisfaction</td>
</tr>
<tr>
<td>Depression/Anxiety</td>
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<tr>
<td>Cognitive Functioning</td>
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<tr>
<td>Self-Care</td>
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<tr>
<td>Physical Function</td>
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<tr>
<td>Sexual Functioning</td>
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</table>

Vol 24, Spring 1998
Factor Structure of the LEIPAD Questionnaire

We conducted factorial analysis, first on the entire international sample of 586 elderly participants, then later for each of the three centers separately. In a previous step, we examined the eigenvalues of a principal component analysis on the seven LEIPAD scales for the entire (aggregated) sample. The first two factors had eigenvalues greater than 1; the third factor was exactly 1.00.

Some tentative explorations of the three-factor solutions (for the three samples together and separately) showed that the stability of the three-factor solution over the different samples was insufficient. The most effective model to interpret, which accounted for more than 50% of the total variance, was the solution to two factors (using principal component analysis with varimax rotation; see Table 2).

The first factor characterizes psychosocial functioning. It is defined by the Life Satisfaction Scale, the Depression and Anxiety Scale, and the Cognitive Functioning Scale. The second factor describes physical functions. It consists of scales that measure abilities or disabilities; namely, the Self-Care and Physical Function Scales.

Concurrent Validity With the Rotterdam Questionnaire

To assess concurrent validity of the LEIPAD Questionnaire, we analyzed the correlations with the Rotterdam Questionnaire. This is a validated scale that is well documented in the literature and widely used in Europe. Its use to assess concurrent validity with the LEIPAD Questionnaire was authorized by the authors of the Rotterdam document. This instrument seemed appropriate for our purposes because it requires about the same amount of time as the LEIPAD; may be self-administered; and is designed, as is the LEIPAD, to provide a subjective assessment.

The Rotterdam Questionnaire consists of three scales measuring psychological stress, physical stress, and daily activity. The three scales exhibit good internal consistency (mean Cronbach alpha of about .85), which has also been confirmed by analyses conducted at the three centers separately.

The correlation matrices reported in Table 3 show high correlations between Physical Distress scores in the Rotterdam Questionnaire and the LEIPAD Physical Function scale. Moreover, the Psychological Distress scale of the Rotterdam Questionnaire was highly correlated with the LEIPAD mental health scales (aggregating in the Social Factor generated through factorial analysis) and with the Physical Function Scale. In addition, the Activities of Daily Living Scale in the Rotterdam Questionnaire was highly correlated with the LEIPAD Physical Function and Self-Care Scales. Further assessments, through factorial analysis of the psychometric structure of the two instruments, corroborated moderate convergence of close areas of factor space between the Rotterdam Questionnaire and the LEIPAD.

### TABLE 3

Concurrent Validity of LEIPAD With Rotterdam Questionnaire Scales

<table>
<thead>
<tr>
<th>LEIPAD Scale</th>
<th>Physical Function</th>
<th>Self-care</th>
<th>Depression Anxiety</th>
<th>Cognitive Function</th>
<th>Social Function</th>
<th>Sexual Function</th>
<th>Life Satisfaction</th>
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<tbody>
<tr>
<td>Physical Distress</td>
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</tr>
<tr>
<td>r</td>
<td>.70</td>
<td>.38</td>
<td>.44</td>
<td>.39</td>
<td>.19</td>
<td>.13</td>
<td>.38</td>
</tr>
<tr>
<td>N</td>
<td>573</td>
<td>571</td>
<td>547</td>
<td>554</td>
<td>577</td>
<td>573</td>
<td>539</td>
</tr>
<tr>
<td>p</td>
<td>.0005</td>
<td>.0005</td>
<td>.0005</td>
<td>.0005</td>
<td>.0005</td>
<td>.0005</td>
<td>.0005</td>
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<tr>
<td>Psychological Distress</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>r</td>
<td>.52</td>
<td>.24</td>
<td>.71</td>
<td>.48</td>
<td>.27</td>
<td>.10</td>
<td>.45</td>
</tr>
<tr>
<td>N</td>
<td>584</td>
<td>581</td>
<td>556</td>
<td>564</td>
<td>587</td>
<td>584</td>
<td>548</td>
</tr>
<tr>
<td>p</td>
<td>.0005</td>
<td>.0005</td>
<td>.0005</td>
<td>.0005</td>
<td>.0005</td>
<td>.014</td>
<td>.0005</td>
</tr>
<tr>
<td>Activities/Daily Living</td>
<td></td>
<td></td>
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<tr>
<td>r</td>
<td>.62</td>
<td>.79</td>
<td>.33</td>
<td>.22</td>
<td>.14</td>
<td>.25</td>
<td>.35</td>
</tr>
<tr>
<td>N</td>
<td>590</td>
<td>589</td>
<td>560</td>
<td>565</td>
<td>593</td>
<td>588</td>
<td>553</td>
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<tr>
<td>p</td>
<td>.0005</td>
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<td>.0005</td>
<td>.001</td>
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<td>.0005</td>
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</table>

*Note. r = Pearson’s r.*
The Role of Moderator Variables on QOL Measurements

Most of the moderator scales we used and have presented in this study appear to have sufficient internal consistency. With a view to examining the role of moderator scales on LEIPAD scores, we carried out ANCOVAs by introducing each of the scales in turn as a dependent variable. Center, gender, and age of the participants were independent variables; the five moderator scales were introduced as covariates, and we assessed the explained variance from each factor (see Table 4).

Some definite relationships between personal style, beliefs, and other variables, in particular self-esteem and anger, can be inferred from these data. Nonetheless, most of these moderators have relatively little influence. We have therefore decided not to reuse these scales, should a brief version of LEIPAD be developed, because they do not seem to have a determining effect on the quality of life of elderly people.

Comparisons Among the Centers

Participants' mean scores on the individual scales from the three centers are shown in Table 5. To assess whether scores were influenced in any way by confounding factors, such as age, education level, and center of origin, we conducted an ANCOVA for each of the instrument's scales; results from these analyses are discussed in detail elsewhere. Differences remained relatively small. The percentage of variance for each of the scales used in a model, including center of origin as a confounding factor as well as age and schooling of the participants tested, was found to range between 6% and 13%.

In the case of the factorial analysis of the instrument for each individual center, we found that the psychometric structure based on the two factors was essentially corroborated for each individual center, with only very slight differences between them.

DISCUSSION

This multicentric study was designed to develop an effective, multidimensional, subjective assessment of quality of life of the elderly. Cronbach's alpha generally showed good or at least acceptable values, ranging from .55 to .79. We identified no important differences among scores from the three countries with respect to internal consistency.

The Physical Functions Scale exhibited good internal consistency. However, we deemed it appropriate to eliminate the item concerning sleeping problems, which contributed only slightly to the scale and could not be appropriately placed in any other scale. A higher number of years of schooling seemed to be more positively correlated with lower impairment in physical functions. The Physical Functions scale was most highly correlated with the Rotterdam Physical Distress Scale and was moderately correlated with the Psychological Distress and Activities of Daily Living Scales. It appeared to reflect overall distress.

Internal consistency in the Self-Care Scale was good, but we decided to omit the continence item. This scale was closely correlated with the Activities of Daily Living Scales of the Rotterdam Questionnaire. The Depression and Anxiety Scale showed good internal consistency. The individuals in the Leiden sample had fewer complaints than respondents from the other two centers. The Depression and Anxiety Scale was correlated with the LEIPAD Cognitive and Physical Functioning Scales and with the Rotterdam Psychological Distress Scale.

<table>
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<th>TABLE 4</th>
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Percentage of Variance of LEIPAD Scale Scores Explained by Moderators, After Correction for Center, Sex, and Age Group

<table>
<thead>
<tr>
<th>Moderator</th>
<th>Physical Function</th>
<th>Self-care</th>
<th>Depression/Anxiety</th>
<th>Cognitive Function</th>
<th>Social Function</th>
<th>Sexual Function</th>
<th>Life Satisfaction</th>
<th>Sum Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soc Desir</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td>Anger</td>
<td>3.5</td>
<td>ns</td>
<td>6.7</td>
<td>4.2</td>
<td>2.0</td>
<td>ns</td>
<td>ns</td>
<td>5.0</td>
</tr>
<tr>
<td>Self-Esteem</td>
<td>2.1</td>
<td>3.6</td>
<td>6.2</td>
<td>5.2</td>
<td>3.6</td>
<td>ns</td>
<td>ns</td>
<td>9.3</td>
</tr>
<tr>
<td>PersDiscord</td>
<td>ns</td>
<td>ns</td>
<td>2.4</td>
<td>1.4</td>
<td>1.4</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td>Religious</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>1.2</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
</tr>
</tbody>
</table>

Note: Only significant proportions of variance are shown. The abbreviation ns = not significant.
We found several differences between center scores for Cognitive Functioning. The scale was rather closely correlated with the LEIPAD Depression and Anxiety Scale and only moderately correlated with the Rotterdam Psychological Distress Scale. The level of satisfaction expressed by the participants from Helsinki was greater than that of other elderly people with similar sociodemographic variables. We noted a moderate correlation between the LEIPAD Life Satisfaction Scale and the Rotterdam Psychological Distress Scale.

The scores on sexual functioning indicated a significant difference between men and women, with women declaring less interest in sexual activity. Nonetheless, we found no significant correlations, or only low correlations, with the other LEIPAD scales, whereas the correlation with the Rotterdam Activities of Daily Living Scale was statistically significant (but small). Because the scale seemed to be influenced by social desirability and cultural aspects, it appeared to play a marginal role in actual assessment of QOL in the elderly.

Essentially, therefore, the results of the Rotterdam Questionnaire were correlated moderately but appropriately with the findings reported by LEIPAD participants. The Physical Distress Scales were closely correlated in terms of both concept and scoring patterns.

The differences between the centers were confirmed for both questionnaires, with the women in this case, too, expressing fewer complaints than the men. In both cases, superior education level was correlated with reports of a lower number of health problems. For the LEIPAD Psychological Distress and Depression and Anxiety Scales, the Leiden sample registered fewer problems than the samples from the other two countries did, and the women reported fewer problems than the men did.

In the case of the Activities of Daily Living and Self-Care Scales, we found differences between Leiden and the other centers, with persons in the Leiden sample proving to be less physically impaired. The more elderly participants exhibited less ability to care for themselves, but we noted no important differences between the sexes. The relationships between the subscales appeared to be basically similar for all the samples. In the Italian sample, however, the Activities of Daily Living Scale proved to be more independent of both the Physical and Psychological Distress Scales. Moreover, analysis of the LEIPAD and Rotterdam Questionnaire scales together produced an image coherent with the Psychological Distress and Depression and Anxiety Scales, which dominated the first and most important factor (psychosocial functioning).

The second factor is dominated by the LEIPAD Self-Care and Rotterdam Activities of Daily Living Scales. The scales relating to physical well-being (the Physical Functions Scale and Rotterdam Physical Distress Scale) were correlated in both dimensions.

The differences in the mean scores between one center and another are difficult to explain. Cultural differences among the three countries may have been important. Other factors, including the limits inherent to conducting this multicenter study that are not easy to avoid and are rather difficult to identify, may also have played a role. One of these factors may have been the problem of translation into the various languages. That is, differences may exist in the "intensity" of the translation of some terms. We attempted to avoid this problem by performing back translations into English made by translators who were not involved in the study.

Responses may also have been influenced by differences in methods of collecting data in the three countries. The presence or absence of the interviewer may have introduced an element of social desirability into the responses given.
Furthermore, the recruitment procedure for the three samples differed: The elderly participants from Leiden were generally invited to fill in the questionnaire by their primary physicians, without the presence of an interviewer. The Dutch respondents may have been in better health than the elderly people from other centers, who were recruited in waiting rooms and had gone to their physicians on their own initiative. Apart from these considerations, it is possible that the QOL of the elderly in the south of Europe is, in fact, lower than that of the elderly people who live in the north. We should also note that because the Padua sample exhibited higher mean scores and greater variability for a higher number of scales, it is likely that some scales played a more important role in the multivariate analysis of findings from the Italian sample for reasons that differ from the other two centers.

On the whole, however, our results suggest that the QOL data produced by the LEIPAD core scales adequately cover the range of quality of life domains and that stability between the various countries seems acceptable.

In the future, we intend to administer the questionnaire to populations of elderly participants other than those attending general practitioners’ units. Elderly people with more severe handicaps, living at home or in institutions or hospitals, could also be tested, as could participants undergoing special treatments that are likely to affect their individual quality of life. It may also be appropriate in the future to use a reduced version of the questionnaire based chiefly on the core scales, eliminating other items that prove to be of minor importance (e.g., the items on sexuality). As a consequence, the instrument would be even easier to use, although an assessment of feasibility would still be required to produce an instrument of the same validity as the one we have described in this article. Such orientation is increasingly important in developing directives for guiding attending staff members toward a better understanding of the needs of the aged and, hence, better management of their requirements.29, 30

**APPENDIX**

The LEIPAD Questionnaire

The instruments should be administered following the order of the figures indicated for each item.

**Core Instrument (31 items)**

A. Physical Functioning Scale
1. How would you rate your overall physical health?
2. How much do your physical health problems (if any) stand in the way of doing the things you want to do?
3. Are you able to get up and down the stairs without help?
4. Are you able to dress all by yourself?
5. Are you able to eat by yourself?
6. Are you able to bathe or take a shower by yourself?
7. Can you shop all by yourself?
8. Can you travel by public transport?

B. Self-Care Scale
9. How much do your feelings of anxiety (if any) stand in the way of doing the things you want to do?
10. Taking everything into consideration, how anxious do you feel?
11. Taking everything into consideration, how depressed (blue) do you feel?
12. How much do your depressed feelings (if any) stand in the way of doing the things you want to do?

C. Depression and Anxiety Scale
13. How often does it happen that you are not able to think clearly or that you are confused?
14. How much do your problems with thinking (if any) stand in the way of doing the things you want to do?
15. How good is your memory?
16. How much do your memory problems (if any) stand in the way of doing the things you want to do?

D. Cognitive Functioning Scale
17. How satisfied are you with your social ties or relationships?
18. How satisfied are you with your financial situation?
19. Do you feel that you cannot afford the standard of living you would need?
20. Do you feel that you cannot afford the standard of living you would need?
21. Is there someone to talk with about personal affairs when you want to?

E. Social Functioning Scale
22. Do you feel emotionally satisfied in your relationships with other people?
23. Are you interested in sex?
24. How often do you have sexual contact?
25. Is there someone to talk with about personal affairs when you want to?

F. Sexual Functioning Scale
26. Taking everything into consideration, how do you expect things to go in the future?
27. How much do your expectations of the future stand in the way of doing or initiating the things you want to do?

G. Life Satisfaction Scale
28. “Over the past several years, I am often troubled by the difficulties I have dealing with others.”

**Moderators (18 items)**

A. The Perceived Personality Disorder Scale
29. How often do you feel that most people cannot be trusted?
ASSESSING QUALITY OF LIFE IN THE ELDERLY

46. “Over the past several years, I am bothered by the kind of person I am.”
47. “Over the past several years, the way I behave often gets me into trouble at work, at home, or elsewhere.”
48. “Over the past several years, other people often seem bothered by the things I do or say.”
49. “I haven’t gotten as far as I’d like to because of the kind of person I am.”

B. The Anger Scale
32. I feel easily annoyed or irritated.
33. I have temper outbursts that I cannot control.
34. I get into arguments with others.
35. I tend to be resentful.

C. The Social Desirability Scale
42. “I am always ready to go out of my way to help someone else.”
43. “I like to gossip at times.”
44. “There have been times when I was quite jealous of the good fortune of others.”

D. Self-Esteem Scale
36. Taking everything into consideration, do you feel inferior to other people?
37. How often do you avoid things (refrain from doing things) because you feel inferior?
38. “I tend to have a negative opinion of myself.”

E. Trust in God Scale
40. Do you trust in God or some superior being?
41. Do you find comfort or support in such a belief?

NOTE
Funding for this study was provided by FIDIA Pharmaceutical Company with a “moral grant” (a grant given to non-profit-making projects) and by the Italian Ministry of Public Health contract 500.7/c5/93 AG 4/89.

Copies of the complete technical report are available upon request through the WHO European Office, 8 Scherfigsvej, DK-2100, Copenhagen, Denmark.

REFERENCES
26. Hyler SE, Rieder RO. PDQ–R: Personality Diagnostic Ques-


CORRECTION

Unfortunately, the table shown below was dropped from the published version of “Dynamics of Stress-Related Decrease of Salivary Immunoglobulin A (sIgA): Relationship of Symptoms of the Common Cold and Studying Behavior” by Renate Deinzer, PhD, and Natalija Schüller. (Behav Med. 1998;23 [4]:161–169). The reference to the table appeared on page 167 and the table should have appeared near the reference. Readers may wish to photocopy the table and insert it in their copies of the Winter 1998 issue. The editors regret the error.

TABLE 1
Prediction of Examination sIgA Concentrations by Studying Behavior

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<th>Independent variable</th>
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<td>.65</td>
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<td>.043</td>
<td>–.25</td>
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</table>

*Note. The dependent variables sIgA written examination and sIgA oral examination have been included in the order they were presented. When time spent studying was in the equation, number of breaks did not explain any additional variance.*