

## Brief Methodological Report

# Validation of the French Version of the Integrated Palliative Care Outcome Scale



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## Abstract

**Context.** The Integrated Palliative care Outcome Scale (IPOS) is a widely used tool for assessing patient needs in palliative care.

**Objectives.** The aim of this study was to provide a validated version of the patient and staff IPOS for French-speaking Switzerland (IPOS-Fr) and assess its psychometric properties.

**Methods.** The validation took place in 12 palliative care units and mobile teams. At baseline (T1) and three days later (T2), patients' general health status, palliative care needs (IPOS-Fr), and quality of life (McGill Quality of Life Scale—Revised) were assessed by patients and staff.

**Results.** We included 173 patients (mean age: 68.8; 92 women; 85% oncologic disease). IPOS internal consistency was high for the total score (0.69 and 0.71). Staff-patient interrater agreement was good to moderate for 13 items (intraclass correlations  $>0.516$ ). Results indicated strong correlations between IPOS-Fr and McGill Quality of Life Scale—Revised for the total score ( $-0.623$  at T1) and the psychological domain (Item 11:  $-0.601$  at T1; Item 13:  $-0.633$  at T2). Regarding sensitivity to change, there was a significant difference between T1 and T2 for patients with an improved health condition ( $z = -2.326$ ;  $P = 0.020$ ).

**Conclusion.** IPOS-Fr has fair to good validity, especially with regard to interrater agreement and construct validity, is sensitive to positive change, and has good interpretability and acceptability for patients and staff. IPOS-Fr is not optimal in terms of internal consistency and structure when using subscale scores, except for the emotional subscale. *J Pain Symptom Manage* 2019;58:886–890. © 2019 American Academy of Hospice and Palliative Medicine. Published by Elsevier Inc. All rights reserved.

## Key Words

*IPOS, palliative care, French, psychometric validation, missing data, end-of-life care*

## Introduction

The Palliative care Outcome Scale (POS) was designed for evaluating essential outcomes in palliative care and has demonstrated validity.<sup>1</sup> The Integrated Palliative care Outcome Scale (IPOS),<sup>2</sup> an advancement of POS,<sup>3</sup> is composed of 10 questions and exists in patient and staff versions, to be completed within a three- or seven-day recall period. IPOS embraces a holistic perspective by evaluating patients' physical, emotional, spiritual, and communicational needs. A

Rasch analysis of IPOS supported its use as a clinical and research measure.<sup>4</sup>

IPOS's 17 items are scored with a Likert scale (from “0”, not affected, to “4”, extremely affected). For Items 14–16, the Likert scale options were reversed and data were rescaled. According to the POS development team, items can be considered independently, as subscales (physical symptoms, Items 1–10; emotional symptoms, Items 11–14; problems and communication, Items 15–17), or summed to yield a total score (range 0–68). Open comments about

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additional symptoms, a question assessing how the patient filled the questionnaire, and the staff Likert option “cannot assess” are not considered for score calculation.

IPOS already has several translations.<sup>2,5,6</sup> French is ranked the fifth most widely spoken language in the world.<sup>7</sup> Having already performed its cross-cultural adaptation to French,<sup>7,8</sup> our aim was to provide a psychometrically validated version of IPOS in French (IPOS-Fr).

## Methods

### *Participants and Procedure*

The study was performed between January 2017 and February 2018 in seven palliative care units (PCUs) and five mobile palliative care teams in French-speaking Switzerland. Inclusion criteria were patients  $\geq 18$  years old, good comprehension of French, stable condition over the past day. Exclusion criteria were impaired mental capacity according to the clinical judgment of the referring physician or existing diagnosis and evidence of psychiatric disease affecting decision-making capacity.

Eligible patients provided informed consent and filled IPOS-Fr three or more days after admission for palliative treatment (T1). In parallel, staff IPOS-Fr was completed by a referring palliative specialist (physician, nurse, psychologist, or specialized nursing auxiliary). If possible, a second assessment was performed three days after (T2).

### *Missing Data Strategies*

Psychometric analysis was performed according to seven scenarios for dealing with missing data (MD) and estimated that the best strategy for calculating subscale and total score was the subscale median imputation for up to one MD per subscale (see [Appendix I Supplementary Material](#)). Admitting more MD would require too much interpretation. This strategy allowed us to include most participants (169/160 valid cases at T1 for patients/staff, 108/102 at T2) and corresponded to the nonnormal distribution of the data set (after performing the Shapiro-Kolmogorov test).

### *Reliability*

For reliability measures, we considered only values at T1, given that at T2 patients might have been biased by prior knowledge of the items. The internal structure of patient and staff IPOS-Fr was tested with a factorial analysis using varimax rotation. The internal consistency of patient and staff IPOS-Fr versions was measured by calculating Cronbach's alpha for the total scales at T1 and for the factors revealed in the factorial analysis. Cronbach alpha was recalculated by excluding each item one at a time, to evaluate the precise influence of each item on

the identified subscale. Acceptable values range from 0.7 to 0.95.<sup>9</sup> We then compared these results with the Cronbach's alphas calculated from the subscales proposed by the original version.

For interrater agreement, we calculated intraclass correlations (ICCs) between IPOS-Fr staff and patient scores at T1 on individual and subscale scores. Using the averaged reliability of different raters, we considered values  $< 0.5$ , between 0.5 and 0.75, between 0.75 and 0.9, and  $> 0.9$  as indicative of poor, moderate, good, and excellent reliability, respectively.<sup>10</sup>

### *Construct Validity*

Construct validity was tested through Pearson correlations between IPOS and the McGill Quality of Life Scale—Revised version (MQOL-R). It contains 14 items forming four subscales: physical, psychological, existential, and relationship. We checked correlations between IPOS individual and total scores, and MQOL-R subscale and total scores. We considered values  $r > 0.50$  as indicator of strong to exceptional association;  $0.40 < r < 0.50$  as indicator of medium association; and  $r < 0.40$  as indicator of poor to in-existent association.<sup>11</sup> We expected negative correlations because IPOS-Fr displays need for palliative care and MQOL-R displays patients' quality of life.

### *Sensitivity to Change*

We compared the consistency of patient and staff IPOS-Fr scores at T1 and T2 with the consistency of their evaluation of the patients' condition (“How do you evaluate your general health state?”) using Wilcoxon's nonparametric test. This allowed categorizing patients in a “stability,” “improvement,” or “deterioration” group. The hypothesis was that IPOS-Fr score would not change for patients of the “stability” group, but would for the others.

### *Interpretability and Acceptability*

These two aspects were assessed through analysis of the free text in IPOS-Fr comments and through measure of required time to complete IPOS-Fr.

## Results

### *Descriptive Results*

One hundred seventy-three patients and 169 staff completed IPOS-Fr at T1, and 108 patients and 102 staff at T2. The difference in numbers between T1 and T2 is due to worsening state or departure (see [Appendix II Supplementary Material](#)). Recruitment and participation was higher in PCUs.

At baseline, mean item scores ranged from 0.4 for Item 5 to 2.3 for Item 12 for patients, and from 0.3 to 2.5 for the same items for staff (see [Table 1](#)).

Table 1  
Mean Symptom Intensity and Scores According to IPOS

| Item No. | Item   | T1 Patient<br>Mean (SD) <i>n</i> = 169 | T1 Staff Mean (SD)<br><i>n</i> = 160 | T2 Patient<br>Mean (SD) <i>n</i> = 106 | T2 Staff Mean (SD)<br><i>n</i> = 100 |
|----------|--|--|--------------------------------------|--|--------------------------------------|
| 1        | Pain   | 1.7 (1.1)                              | 1.7 (1.1)                            | 1.6 (1.0)                              | 1.5 (1.1)                            |
| 2        | Shortness of breath  | 1.0 (1.1)                              | 1.0 (1.1)                            | 0.9 (1.0)                              | 1.0 (1.0)                            |
| 3        | Weakness or lack of energy                                       | 2.2 (1.1)                              | 2.4 (1.0)                            | 2.0 (1.2)                              | 2.2 (1.1)                            |
| 4        | Nausea   | 0.6 (1.0)                              | 0.6 (1.0)                            | 0.6 (1.0)                              | 0.5 (0.8)                            |
| 5        | Vomiting   | 0.4 (0.9)                              | 0.3 (1.0)                            | 0.3 (0.7)                              | 0.2 (0.6)                            |
| 6        | Poor appetite  | 1.6 (1.3)                              | 1.8 (1.2)                            | 1.5 (1.2)                              | 1.5 (1.2)                            |
| 7        | Constipation   | 1.2 (1.2)                              | 1.1 (1.1)                            | 1.1 (1.2)                              | 0.9 (0.9)                            |
| 8        | Sore or dry mouth  | 1.8 (1.3)                              | 1.0 (1.1)                            | 1.4 (1.2)                              | 1.0 (1.0)                            |
| 9        | Drowsiness   | 1.6 (1.2)                              | 1.2 (1.0)                            | 1.3 (1.1)                              | 1.1 (1.1)                            |
| 10       | Poor mobility  | 2.0 (1.2)                              | 2.2 (1.1)                            | 1.7 (1.2)                              | 2.2 (1.1)                            |
| 11       | Patient feeling anxious or worried<br>about illness or treatment | 1.7 (1.2)                              | 2.2 (1.1)                            | 1.8 (1.1)                              | 2.0 (1.1)                            |
| 12       | Family or friends been anxious or<br>worried about patient       | 2.3 (1.2)                              | 2.5 (1.1)                            | 2.1 (1.4)                              | 2.1 (1.1)                            |
| 13       | Patient feeling depressed  | 1.2 (1.2)                              | 1.6 (1.1)                            | 1.1 (1.1)                              | 1.4 (1.1)                            |
| 14       | Patient feeling at peace   | 1.3 (1.2)                              | 1.8 (1.1)                            | 1.1 (1.0)                              | 1.7 (1.2)                            |
| 15       | Patient ability to share as much as<br>wanted                    | 0.9 (1.1)                              | 1.5 (1.1)                            | 0.9 (1.0)                              | 1.4 (1.1)                            |
| 16       | Patient access to information                                    | 0.7 (1.0)                              | 0.6 (0.7)                            | 0.8 (1.0)                              | 0.5 (0.7)                            |
| 17       | Practical problems   | 1.0 (1.3)                              | 1.3 (1.3)                            | 1.1 (1.4)                              | 1.2 (1.3)                            |
|          | Total IPOS score (0–68)  | 23 (8.1)                               | 24.9 (7.6)                           | 21.4 (7.8)                             | 22.53 (7.9)                          |
|          | Physical subscale score (0–40)                                   | 13.9 (5.6)                             | 13.2 (4.9)                           | 12.4 (5.7)                             | 12.11 (5.2)                          |
|          | Emotional subscale score (0–16)                                  | 6.6 (3.4)                              | 8.2 (3.5)                            | 6.1 (3.2)                              | 7.1 (3.8)                            |
|          | Communication and problems<br>subscale score (0–12)              | 2.6 (2.4)                              | 3.4 (2.0)                            | 2.8 (2.3)                              | 3.2 (2.2)                            |

IPOS = Integrated Palliative care Outcome Scale.

### Missing Data

At T1, 78% of patients and 69% of staff had no MD; at T2, 60% and 72%, respectively (see [Appendix III](#) Supplementary Material).

Items 12, 15, and 17 had most MD; the first two were highlighted during the cross-cultural adaptation as potentially difficult to understand<sup>8</sup> (see [Appendix IV](#) Supplementary Material).

### Reliability

**Internal Structure.** The factorial analysis with varimax rotation revealed six factors with an eigenvalue  $\geq 1$  explaining 61% of the total variance for patient IPOS-Fr, and five such factors explaining 59% for staff IPOS-Fr (see [Appendix V](#) and [VI](#) Supplementary Material). The three-subscale pattern of IPOS was not confirmed. However, for patients, Factor 4 is identical to the problems and communication subscale, and for staff, Factor 1 to the emotional subscale.

**Internal Consistency.** Cronbach's alpha was 0.69 and 0.71 for total scores. Cronbach's alpha for Factors 4, 5, and 6 for patients and 4 and 5 for staff were lower than 0.70. No single item was essential to guarantee the subscales' consistency (see [Appendix VII](#) Supplementary Material).

For the subscales, Cronbach's alpha varied between 0.34 and 0.81 (see [Appendix VIII](#) Supplementary Material).

**Interrater Consistency.** ICC coefficients indicated good reliability for Item 2, moderate for Items 1, 3–7, 9–11, 13, 14, 17, and for the three subscales, and poor for Items 8, 12, 15, 16 (see [Appendix IX](#) Supplementary Material).

### Construct Validity

At T1, our results indicate strong correlations between MQOL-R and patient IPOS-Fr for the total score, the psychological domain (IPOS-Fr Items 11 and 13), and the social subscale (Item 15). At T2, correlations were medium to weak for the physical subscale, the existential domain (IPOS-Fr Item 14) and the social domain (IPOS-Fr Item 15) (see [Appendix X](#) Supplementary Material).

### Sensitivity to Change

The data show a significant difference between T1 and T2 for the “improvement” group, but not for the “stability” and “deterioration” groups (see [Appendix XI](#) Supplementary Material).

### Mobile Team Versus PCU Setting

Regarding Cronbach's alpha, in the mobile team setting, patient IPOS-Fr systematically scored lower than in PCU; for staff, it was the opposite. Stronger ICCs were found for the emotional subscale (PCUs) and the problems and communication subscale (mobile team). Correlations between IPOS-Fr and MQOL-R did not change for PCUs, whereas for the mobile setting, the only significant correlations were

between MQOL-R psychological subscale and Items 13 (T1 and T2) and 11 (at T1).

### *Interpretability and Acceptability*

Patients completed IPOS-Fr in one day, mostly in one time (97% at T1), in less than 20 minutes (68%), aided by staff (56% at T1).

At T1 and T2, 45 patients made overall comments regarding IPOS-Fr: 23 noted its usefulness and clarity, while 33 made precisions concerning the assessment of symptoms.

At T1 and T2, 20 staff members reported comments about IPOS-Fr. Three noted that questions are useful and interesting. Four considered IPOS-Fr too long or inadequate for patients, three found the Likert scale imprecise, seven noted the difficulty in evaluating items, three suggested more attention to goals of care.

### *Discussion*

Our study reports results on IPOS-Fr's psychometric validation based on a large sample of patients representative of the French-speaking palliative care context.

Regarding IPOS's internal reliability, the three-subscale structure of the original IPOS was not, originally, backed by a psychometric validity and was not confirmed by a Rasch analysis that highlighted the existence of several "super-items."<sup>3</sup> The factorial analysis that we performed on patient and staff IPOS-Fr revealed six and five main factors, respectively, and therefore did not confirm the three subscale structure of IPOS, although Factor 4 for patients corresponded to the problems and communication subscale (Items 15–17) and Factor 1 for staff corresponded to the emotional subscale (Items 11–14). Although some items could be removed to create new subscales, this is impossible due to their clinical importance but also because as a translated version, IPOS-Fr cannot significantly differ in items from the original version. Regarding our factors, additional elements do not speak in favor of their validity: i) the fact that the reduction of the information is not very important (from 17 items to 6 and 5 factors, respectively, leaving approximately 40% of the variance unexplained), ii) the heterogeneity of the items' number per factor, iii) the fact that a common point between items is sometimes difficult to highlight, and iv) finally the fact that several factors clearly focus on the same aspect (three factors concern the physical area in both IPOS patient and staff).

In addition, when looking at the internal consistency of our factors, half of them showed insufficient values (below 0.45) from the patient IPOS-Fr, which is also a reason not to recommend the use of our subscales. Similar results were obtained with the staff IPOS-Fr. Results were better when considering the

internal consistency calculated from the original three-subscale structure but, once again, this structure was not confirmed by our factorial analysis. We therefore conclude that the use of any subscale is not advisable for IPOS-Fr and we recommend the use of either the total score or individual items.

In terms of interrater agreement, our results showed that staff and patient views on symptoms and outcomes are globally similar, except for Item 8 ("sore or dry mouth"), two items involving the relatives (Items 12 "anxiety of close ones" and 15 sharing of feelings"), and interestingly, the Item 16 assessing the satisfaction with the transmitted information. Differences in staff and patient interpretation were revealed during the adaptation phase.<sup>8</sup>

In terms of construct validity, similar to the POS<sup>1</sup> and its translations,<sup>12,13</sup> IPOS showed good patient-staff agreements. Patient IPOS-Fr showed strong correlations<sup>11</sup> with the MQOL-R for the total score and the psychological domain. Weaker but still moderate correlations were found for the physical domain, the existential domain, and the social domain at T2. These lower correlations may be explained by the fact that IPOS-Fr does not allow for a complete and in-depth evaluation of these dimensions, except perhaps for the emotional dimension which evaluates both depression and anxiety outcomes, the most frequent psychiatric manifestations in the palliative care context.<sup>14</sup>

Results showed that patient and staff IPOS-Fr are sensitive enough to detect improvement of patient's condition. This is encouraging knowing that the formed groups have a relatively similar profile in terms of palliative care needs and that there is overall little evolution of their health state. As reflected through the difference in patient population at T1 and T2, it remains challenging to assess sensitivity to change in this context.

Results in terms of interpretability and acceptability are rather encouraging within this francophone population and their staff. Nevertheless, its clinical applicability might be affected by the fact that some specific items showed more missing data than others (Items 12, 15, 17) and that most patients required the aid of a member of the staff. Moreover, the clinical applicability might also be affected by the context, as mobile teams reported more difficulty than PCUs in recruiting patients (only 18% of patients were recruited through mobile teams) and in ensuring that the questionnaire was filled in on the same day by patient and staff. A possible cause of this disparity resides on the fact that mobile teams are smaller and therefore had less opportunities for ensuring that, during an intervention, one professional can aid the patient to complete the patient IPOS and another one can fill in the staff IPOS. In



addition, most of the time, mobile teams intervene in critical moments, so fewer of their patients met the “stability” inclusion criteria.

This study has several limitations. First, we had to use a missing data strategy, which requires a degree of interpretation. Tolerating one MD per subscale meant that the total score was calculated with up to three MD, which is not optimal because it means that we have accepted up to 17.5% of MD (three items out of 17 in total). Second, we could only include patients who had been in a stable condition over the past day, generating a selection bias and floor effect in a pool of relatively well-faring patients. Scant data for the mobile context and lack of inclusion of other settings limit the generalizability of the results.

## Conclusions

IPOS-Fr demonstrated fair to good interrater agreement and construct validity, is sensitive to positive change, and has good interpretability and acceptability. IPOS-Fr is not optimal in terms of internal consistency and structure when using subscale scores. We recommend the use of total or single item scores in both research and clinical settings. Health care professionals should be familiar with this tool, but also aware of its limitations.

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## Supplementary Materials

### Appendix I Scenarios for Dealing With Missing Data

| Scenarios for Dealing With Missing Data | Description  |
|---|--|
| i) Complete case scenario               | No missing data tolerated  |
| ii) Best case scenario                  | One missing data for the whole scale tolerated and replaced with the value "zero"    |
| iii) Worst case scenario                | One missing data for the scale tolerated and replaced with the value "four"          |
| iv) Total scale mean imputation         | One missing data for the scale tolerated and replaced with the mean of the scale     |
| v) Total scale median imputation        | One missing data for the scale tolerated and replaced with the median of the scale   |
| vi) Subscale mean imputation            | One missing data per subscale tolerated and replaced with the mean of the subscale   |
| vii) Subscale median imputation         | One missing data per subscale tolerated and replaced with the median of the subscale |

### Appendix II Participants' Sociodemographic, Medical Characteristics, and Setting

| Variables                                    | Mean/Number/<br>Percentages |
|--|-----------------------------|
| Age, yrs (mean $\pm$ SD)                     | 68.8 $\pm$ 12.9             |
| Gender, men/women, <i>n</i>                  | 81/92                       |
| Education, <i>n</i> (%)                      |                             |
| Compulsory                                   | 46 (27.5)                   |
| Vocational education                         | 69 (41.3)                   |
| High school                                  | 12 (7.2)                    |
| University of Applied Sciences               | 40 (24.0)                   |
| Marital status, <i>n</i> (%)                 |                             |
| Single (never married)                       | 14 (8.2)                    |
| Married/in partnership                       | 89 (52.4)                   |
| Divorced/separated                           | 41 (24.1)                   |
| Widowed                                      | 26 (15.3)                   |
| Nationality, <i>n</i> (%)                    |                             |
| Swiss  | 146 (85.4)                  |
| Italian                                      | 9 (5.3)                     |
| Portuguese                                   | 4 (2.3)                     |
| Other  | 12 (7)                      |
| Main diagnosis, <i>n</i> (%)                 |                             |
| Oncologic disease                            | 143 (85.1)                  |
| Advanced cardiac disease                     | 5 (3.0)                     |
| Chronic obstructive pulmonary disease        | 4 (2.4)                     |
| ALS  | 3 (1.8)                     |
| Other  | 13 (7.7)                    |
| Existing anticipated decisions Y/N, <i>n</i> | 67 (44.3)/84 (55.7)         |
| Patient setting                              |                             |
| Mobile, <i>n</i> (%)                         | 31 (17.9)                   |
| PCU, <i>n</i> (%)                            | 142 (82.1%)                 |

ALS = amyotrophic lateral sclerosis; PCU = palliative care unit.

*Appendix III*  
**MD at T1 and T2 per Type of Participant**

| Number of MD | T1 Patient ( <i>n</i> = 173) | T1 Staff ( <i>n</i> = 169) | T2 Patient ( <i>n</i> = 108) | T2 Staff ( <i>n</i> = 102) |
|--------------|------------------------------|----------------------------|------------------------------|----------------------------|
| No MD        | 135                          | 117                        | 86                           | 74                         |
| 1 MD         | 27                           | 25                         | 16                           | 20                         |
| 2 MD         | 4                            | 17                         | 2                            | 5                          |
| 3 or more MD | 7                            | 10                         | 4                            | 3                          |

MD = missing data; T1 = time 1; T2 = time 2.

*Appendix IV*  
**Frequency of MD at T1 per Item and Type of Participant**

| Item Number | Item  | Patient T1 <i>n</i> MD, (%) | Staff T1 <i>n</i> MD, (%) |
|-------------|---|-----------------------------|---------------------------|
| 1           | Pain  | 3 (1.7)                     | 7 (4.1)                   |
| 2           | Shortness of breath   | 1 (0.6)                     | 7 (4.1)                   |
| 3           | Weakness or lack of energy                                    | 2 (1.2)                     | 10 (5.9)                  |
| 4           | Nausea  | 1 (0.6)                     | 6 (3.5)                   |
| 5           | Vomiting  | 4 (2.3)                     | 5 (2.9)                   |
| 6           | Poor appetite   | 3 (1.7)                     | 7 (4.1)                   |
| 7           | Constipation  | 5 (2.9)                     | 7 (4.1)                   |
| 8           | Sore or dry mouth   | 1 (.06)                     | 6 (3.5)                   |
| 9           | Drowsiness  | 2 (1.2)                     | 6 (3.5)                   |
| 10          | Poor mobility   | 1 (0.6)                     | 8 (4.7)                   |
| 11          | Patient feeling anxious or worried about illness or treatment | 2 (1.2)                     | 6 (3.5)                   |
| 12          | Family or friends been anxious or worried about patient       | 15 (8.7)                    | 34 (20.1)                 |
| 13          | Patient feeling depressed                                     | 4 (2.3)                     | 8 (4.7)                   |
| 14          | Patient feeling at peace                                      | 6 (3.5)                     | 7 (4.1)                   |
| 15          | Patient ability to share as much as wanted                    | 4 (2.3)                     | 24 (14.2)                 |
| 16          | Patient access to information                                 | 6 (3.5)                     | 7 (4.1)                   |
| 17          | Practical problems  | 7 (4.0)                     | 24 (14.2)                 |
|             | Total participant, <i>N</i>                                   | 173                         | 169                       |

MD = missing data; T1 = time 1; T2 = time 2.

## Appendix V

## Factorial Analysis With Varimax Rotation (Extraction Method: Principal Component Analysis)

## Total Variance Explained—Patient

| Factors      | Initial Eigenvalues |               |              | Rotation Sums of Squared Loadings |               |              |
|--------------|---------------------|---------------|--------------|-----------------------------------|---------------|--------------|
|              | Total               | % of Variance | Cumulative % | Total                             | % of Variance | Cumulative % |
| For patients |                     |               |              |                                   |               |              |
| 1            | 3.1                 | 17.9          | 17.9         | 2.3                               | 13.7          | 13.7         |
| 2            | 2.1                 | 12.2          | 30.1         | 2.1                               | 12.6          | 26.3         |
| 3            | 1.8                 | 10.4          | 40.5         | 1.9                               | 10.9          | 37.3         |
| 4            | 1.3                 | 7.4           | 47.9         | 1.5                               | 9.0           | 46.3         |
| 5            | 1.3                 | 7.4           | 55.3         | 1.4                               | 8.2           | 54.4         |
| 6            | 1.0                 | 6.0           | 61.4         | 1.2                               | 6.9           | 61.3         |
| For staff    |                     |               |              |                                   |               |              |
| 1            | 3.5                 | 20.4          | 20.4         | 3.1                               | 18.3          | 18.3         |
| 2            | 2.4                 | 13.9          | 34.3         | 1.9                               | 11.4          | 29.7         |
| 3            | 1.7                 | 9.8           | 44.1         | 1.9                               | 10.9          | 40.6         |
| 4            | 1.3                 | 7.9           | 52.0         | 1.6                               | 9.3           | 49.9         |
| 5            | 1.2                 | 7.0           | 59.0         | 1.6                               | 9.1           | 59.0         |

## Appendix VI

## Correlations Between Items of the Patients and Staff IPOS-Fr and the Factors Found by the Principal Component Analysis With Varimax Rotation

| IPOS Items | Factors      |              |              |              |              |              |
|------------|--------------|--------------|--------------|--------------|--------------|--------------|
|            | 1            | 2            | 3            | 4            | 5            | 6            |
| Patients   |              |              |              |              |              |              |
| Item 1     | −0.044       | 0.184        | 0.047        | −0.082       | <b>0.768</b> | 0.016        |
| Item 2     | 0.208        | −0.064       | −0.143       | 0.298        | −0.198       | <b>0.700</b> |
| Item 3     | <b>0.717</b> | 0.107        | 0.181        | 0.083        | −0.029       | 0.092        |
| Item 4     | 0.127        | 0.015        | <b>0.897</b> | 0.058        | −0.026       | 0.040        |
| Item 5     | 0.020        | −0.004       | <b>0.855</b> | 0.025        | 0.129        | −0.118       |
| Item 6     | <b>0.542</b> | −0.030       | 0.392        | 0.040        | 0.248        | 0.122        |
| Item 7     | 0.164        | −0.063       | 0.081        | 0.192        | <b>0.655</b> | −0.089       |
| Item 8     | <b>0.631</b> | −0.086       | −0.108       | 0.058        | 0.305        | 0.151        |
| Item 9     | <b>0.689</b> | 0.030        | 0.122        | 0.027        | −0.070       | 0.026        |
| Item 10    | <b>0.705</b> | 0.206        | −0.172       | −0.127       | −0.022       | −0.168       |
| Item 11    | −0.029       | <b>0.710</b> | 0.105        | 0.138        | 0.022        | 0.160        |
| Item 12    | −0.043       | 0.450        | 0.118        | −0.199       | 0.222        | <b>0.608</b> |
| Item 13    | 0.232        | <b>0.832</b> | −0.005       | 0.101        | −0.063       | −0.138       |
| Item 14    | 0.051        | <b>0.746</b> | −0.138       | 0.242        | 0.169        | 0.036        |
| Item 15    | −0.002       | 0.109        | 0.013        | <b>0.748</b> | 0.026        | 0.068        |
| Item 16    | −0.007       | 0.112        | 0.118        | <b>0.621</b> | 0.254        | −0.349       |
| Item 17    | 0.056        | 0.231        | 0.019        | <b>0.542</b> | −0.060       | 0.218        |
| Staff      |              |              |              |              |              |              |
| Item 1     | 0.153        | −0.066       | −0.022       | 0.178        | <b>0.789</b> |              |
| Item 2     | 0.020        | −0.106       | −0.129       | <b>0.484</b> |              | −0.434       |
| Item 3     | 0.095        | <b>0.809</b> | −0.028       | 0.102        |              | 0.022        |
| Item 4     | 0.115        | 0.117        | <b>0.907</b> | 0.110        |              | 0.017        |
| Item 5     | 0.005        | 0.065        | <b>0.916</b> | 0.068        |              | 0.133        |
| Item 6     | −0.016       | <b>0.535</b> | 0.243        | 0.420        |              | −0.126       |
| Item 7     | 0.027        | 0.051        | 0.243        | <b>0.630</b> |              | 0.208        |
| Item 8     | 0.087        | <b>0.360</b> | 0.117        | 0.097        |              | 0.093        |
| Item 9     | −0.010       | <b>0.822</b> | −0.007       | −0.093       |              | 0.018        |
| Item 10    | −0.057       | 0.336        | 0.057        | <b>0.540</b> |              | −0.025       |
| Item 11    | <b>0.771</b> | 0.084        | −0.041       | 0.219        |              | 0.138        |
| Item 12    | <b>0.550</b> | 0.072        | −0.038       | 0.445        |              | 0.057        |
| Item 13    | <b>0.778</b> | 0.164        | 0.046        | 0.198        |              | 0.184        |
| Item 14    | <b>0.847</b> | 0.017        | 0.107        | −0.039       |              | 0.007        |
| Item 15    | <b>0.578</b> | −0.014       | 0.083        | −0.261       |              | 0.090        |
| Item 16    | 0.011        | 0.101        | 0.113        | −0.070       |              | <b>0.718</b> |
| Item 17    | <b>0.704</b> | −0.029       | −0.008       | −0.220       |              | −0.269       |

IPOS = Integrated Palliative care Outcome Scale.  
Correlations higher than 0.500 are indicated in bold.



*Appendix VII*  
**Cronbach's Alpha for Factors**

| Factors  | Patients       |                  | Staff                  |                  |
|----------|----------------|------------------|------------------------|------------------|
|          | Items          | Cronbach's alpha | Items                  | Cronbach's alpha |
| Factor 1 | 3, 6, 8, 9, 10 | 0.70             | 11, 12, 13, 14, 15, 17 | 0.80             |
| Factor 2 | 11, 13, 14     | 0.74             | 3, 6, 8, 9             | 0.61             |
| Factor 3 | 4, 5           | 0.78             | 4, 5                   | 0.85             |
| Factor 4 | 15, 16, 17     | 0.44             | 2, 7, 10               | 0.30             |
| Factor 5 | 1, 7           | 0.33             | 2, 7, 10               | 0.42             |
| Factor 6 | 2, 12          | 0.05             |                        |                  |

*Appendix IX*  
**Intraclass Correlations Between Patient and Staff Scores for Items and Subscales**

| IPOS Items and Subscales            | Intraclass Correlation | 95% CI<br>(Average Measures) |             |
|-------------------------------------|------------------------|------------------------------|-------------|
|                                     | Average Measures       | Lower Bound                  | Upper Bound |
| Item 1                              | 0.721                  | 0.622                        | 0.794       |
| Item 2                              | 0.765                  | 0.681                        | 0.827       |
| Item 3                              | 0.605                  | 0.464                        | 0.709       |
| Item 4                              | 0.665                  | 0.546                        | 0.753       |
| Item 5                              | 0.733                  | 0.638                        | 0.803       |
| Item 6                              | 0.534                  | 0.367                        | 0.656       |
| Item 7                              | 0.538                  | 0.372                        | 0.659       |
| Item 8                              | 0.397                  | 0.181                        | 0.556       |
| Item 9                              | 0.535                  | 0.368                        | 0.657       |
| Item 10                             | 0.650                  | 0.525                        | 0.742       |
| Item 11                             | 0.542                  | 0.377                        | 0.662       |
| Item 12                             | 0.380                  | 0.158                        | 0.543       |
| Item 13                             | 0.548                  | 0.386                        | 0.667       |
| Item 14                             | 0.579                  | 0.428                        | 0.690       |
| Item 15                             | 0.342                  | 0.102                        | 0.519       |
| Item 16                             | 0.195                  | -0.095                       | 0.409       |
| Item 17                             | 0.516                  | 0.338                        | 0.646       |
| Physical subscale                   | 0.673                  | 0.556                        | 0.759       |
| Emotional subscale                  | 0.642                  | 0.514                        | 0.737       |
| Communication and problems subscale | 0.511                  | 0.331                        | 0.643       |

IPOS = Integrated Palliative care Outcome Scale.

*Appendix VIII*  
**Cronbach's Alpha for Original Subscales**

| Original IPOS Subscales             | Items | Patients         | Staff            |
|-------------------------------------|-------|------------------|------------------|
|                                     |       | Cronbach's alpha | Cronbach's alpha |
| Physical subscale                   | 1-10  | 0.64             | 0.60             |
| Emotional subscale                  | 11-14 | 0.70             | 0.81             |
| Communication and problems subscale | 15-17 | 0.44             | 0.34             |

IPOS = Integrated Palliative care Outcome Scale.

*Appendix X*  
**Pearson's Correlations Between Patient IPOS-Fr and MQOL-R Items and Subscales**

| IPOS Items/<br>Subscales and<br>MQOL-R Subscales | Time of<br>Evaluation | Pearson's<br>Correlation (sig.) |
|--|-----------------------|---------------------------------|
| IPOS total score and                             | T1                    | -0.623 <sup>a</sup>             |
| MQOL-R total score                               | T2                    | -0.628 <sup>a</sup>             |
| IPOS physical subscale                           | T1                    | -0.461 <sup>a</sup>             |
| and MQOL-R physical subscale                     | T2                    | -0.463 <sup>a</sup>             |
| IPOS Item 11 and MQOL-R                          | T1                    | -0.601 <sup>a</sup>             |
| psychological subscale                           | T2                    | -0.630 <sup>a</sup>             |
| IPOS Item 13 and MQOL-R                          | T1                    | -0.633 <sup>a</sup>             |
| psychological subscale                           | T2                    | -0.799 <sup>a</sup>             |
| IPOS Item 14 and MQOL-R                          | T1                    | -0.331 <sup>a</sup>             |
| existential subscale                             | T2                    | -0.459 <sup>a</sup>             |
| IPOS Item 12 and MQOL-R                          | T1                    | -0.007                          |
| social subscale                                  | T2                    | -0.119                          |
| IPOS Item 15 and MQOL-R                          | T1                    | -0.511 <sup>a</sup>             |
| social subscale                                  | T2                    | -0.372 <sup>a</sup>             |

MQOL-R = McGill Quality of Life-Revised questionnaire; IPOS = Integrated Palliative care Outcome Scale.

<sup>a</sup>P = 0.000.

*Appendix XI***Sensitivity to Change Between T1 and T2 Based on IPOS-Fr Total Score**

| Change Between<br>T1 and T2     | Mean T1 (SD) | Mean T2 (SD) | <i>z</i> | <i>P</i> |
|---------------------------------|--------------|--------------|----------|----------|
| No change<br>( <i>n</i> = 26)   | 22.8 (7.4)   | 21.2 (8.7)   | -1.467   | 0.142    |
| Improvement<br>( <i>n</i> = 41) | 22.2 (8.8)   | 19.5 (7.1)   | -2.326   | 0.020    |
| Worsening<br>( <i>n</i> = 36)   | 21.8 (7.8)   | 22.8 (7.8)   | -0.947   | 0.344    |

IPOS = Integrated Palliative care Outcome Scale; T1 = time 1; T2 = time 2.