A feasibility study of systematic symptom assessment in palliative care using the PERS2ON score

Katharina Tscherny
Medical University of Vienna

Jürgen Grafeneder
Medical University of Vienna

Bettina Wandl
Department of Nursing Science and Gerontology, UMIT TIROL

Maximilian Niederer
Department of Anesthesiology and Intensive Care Medicine, Scheibbs

Martina Haider
Department of Anesthesiology and Intensive Care Medicine, Scheibbs

Eva Katharina Masel
Medical University of Vienna

Dominik Roth (dominik.roth@meduniwien.ac.at)
Medical University Vienna

Alexander Egger
Department of Anesthesiology and Intensive Care Medicine, Scheibbs

Research Article

Keywords: Palliative Care, Cancer, Symptom Assessment, Self-assessment Questionnaire, End-of-life Care

Posted Date: August 14th, 2023

DOI: https://doi.org/10.21203/rs.3.rs-3242624/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License
Abstract

PURPOSE

A comprehensive and standardized assessment of symptoms is fundamental for individualized palliative care (PC). Numerous scoring systems are available, but they are often cumbersome and hence unsuitable for routine use. The PERS2ON score has been developed to provide a short, and feasible score to evaluate symptom burden. We performed an external evaluation of the feasibility of this score in a rural hospital.

METHODS

Patients admitted to the palliative care unit (PCU) of a rural hospital were rated according to the seven criteria of the PERS2ON score, pain, eating, rehabilitation, social situation, O₂ and nausea/emesis, on a scale ranging from 0 to 10, with higher scores indicating greater symptom load. The assessments were performed on admission, seven days after admission, and on the day of discharge. We calculated symptom intensity scores and evaluated the change over time for each patient.

RESULTS

40 patients met inclusion criteria, nine died, a re-assessment after seven days was therefore possible for 35 patients, and an assessment at discharge for 31 patients. The mean PERS2ON Score declined from 28 (SD 12) on admission to 21 (SD 11) after seven days (absolute difference 7, 95% CI: 3–11, p = 0.002) and further to 17 (SD 10) at discharge (absolute difference 11, 95% CI: 6–15, p < 0.001).

CONCLUSION

Assessment of the PERS2ON score was feasible in all patients during their stay. The implementation of the PERS2ON score might be useful to direct clinical practice and targeted symptom management even at smaller PCUs.

Key Messages

This monocenter feasibility study systematically assessed symptoms in PC. The evaluation and testing of the PERS2ON score demonstrated its suitability as a user-friendly symptom assessment tool that can be integrated into routine practice in rural PCUs. It serves as valuable guide for treatment decisions and contributes to rapid symptom relief.

INTRODUCTION
Malignancy is currently the second most common cause of death in Austria after cardiovascular disease. Every year, more than 40,000 people are diagnosed with cancer (1). According to the current data report of the organization Dachverbandes Hospiz- und Palliative Care, 7,962 patients were treated in 43 palliative wards and palliative care facilities across Austria in 2020. Seventy-two per cent of these suffered from a malignancy (2).

Quality of life (QoL) has become an increasingly medically important concept over the last few decades. However, there is no uniform definition and no generally accepted assessment to measure QoL. Health-related QoL is a subjective perception of mental, physical, spiritual, social, family, and work-related dimensions. Measuring instruments for self-assessment of the QoL of patients allow medical and therapeutic successes to be assessed. These have thus developed into important tools for successful patient management (3, 4).

The assessment of symptoms in patients who are receiving best supportive care (BSC) is a challenging task for clinicians. Traditional clinical assessment often misses target symptoms and may underestimate significant problems in patients undergoing palliative care (PC) (5, 6). However, therapy options that focus on individual needs and symptom relief require an assessment of the patient’s medical history to provide the best possible symptom relief. The assessment of patients admitted to a palliative care unit (PCU) differs considerably from traditional assessment, as it mainly focuses on distressing symptoms and psychosocial issues (7–11).

In PC, simple, rapid, and feasible measurement instruments are needed to assess individual needs and to evaluate changes. Patients in PCUs mostly have a high symptom burden and should therefore not be exposed to time-consuming assessment instruments. A simple risk screening of patients in a PC inpatient setting, which could possibly be integrated into the basic assessment on admission to hospital, is of high importance (12). Specially developed assessment tools help to document and evaluate the effectiveness of medical, nursing, and therapeutic measures in PCUs to define and adapt individualized, symptom-oriented treatment strategies for patients (13). Best practice in PC needs to be continuously adapted to specific patient-centered needs and values (14).

In addition to psychosocial and spiritual support for patients and their caregivers, symptom assessment is a central aim of PC. Several structured assessment methods have been evaluated (9, 10, 15–19).

Nevertheless, some of these assessments do not seem feasible, as they are time-consuming and require specific training to perform adequately.

A widespread tool is the Edmonton Symptom Assessment System (ESAS) for self-assessment of symptom intensity of nine common symptoms in PC. The ESAS-Revised (ESAS-r), a revised version of the ESAS, has been demonstrated to be more easily understood and preferred by patients due to its clarity and layout (20).
Neither the ESAS nor the ESAS-r contain an assessment of the social situation of patients, which is an essential part of PC.

The use of an assessment tool must be combined with a careful physical examination and clinical conversation to determine the details of each symptom.

The aim of this study was to implement and evaluate the feasibility of a previously developed structured palliative assessment tool in a rural PCU. Using a numeric rating scale from 0–10, the PERS\textsuperscript{2}ON (P: pain, E: eating, R: rehabilitation, S\textsuperscript{2}: social situation; suffering, O: O\textsubscript{2}, N: nausea/ emesis) score can be used to explore patient-reported symptom burden. It was developed for medical and nursing staff in PC (13), but even less specialized PC staff or medical students can use it. It was developed explicitly to be carried out in a short time and to be easily integrated into daily clinical practice.

**METHODS**

The study was conducted at the PCU of the Landesklinikum Scheibbs, a rural hospital. The PCU consists of eight beds, this was however reduced to six beds during the whole study period due to the Covid-19 pandemic.

All patients with a malignant disease admitted to the PCU between September 2020 and March 2021 were eligible. Exclusion criteria were a life expectancy on admission of less than three weeks according to the attending physician, as well as the lack of ability to provide informed consent.

**The PERS\textsuperscript{2}ON score**

The PERS\textsuperscript{2}ON score includes the following items:

- Pain
- Eating (cachexia/loss of appetite/weight loss)
- Rehabilitation (physical impairment)
- Suffering (anxiety/burden of disease/depression)
- Social situation (possibility for home care/out of hospital care)
- $O_2$ – dyspnea
- Nausea/Emesis

Each item is rated on a numeric scale between 0 (no burden) and 10 (worst imaginable burden). All seven points are summed resulting in an overall score between 0 and 70, with higher scores representing higher symptom burden. The scoring sheet is provided in Fig. 1.
At inclusion, we recorded patient characteristics including demographics and primary disease. Symptom burden was rated using the PERS²ON score at admission, seven days after administration and on the day of discharge. On the day of admission, the attending PCU physician explained the PERS²ON score to the patients, and they completed it together. Seven days after admission and at the day of discharge, nurses or physicians handed the PERS²ON scoring sheet to the patients, and they completed it alone.

On admission, the Karnofsky Performance Status Scale (KPS) was assessed as previously published (21).

**Sample Size**

We did not perform a formal sample size calculation for this study as it was designed as a feasibility study.

**Analysis**

We tabulated overall PERS²ON score as well as its seven sub scores by time (admission, seven days, discharge) using means and standard deviation. The same was done for the Karnofsky Performance Status Scale at admission.

We then calculated absolute and relative frequencies of improvement and deterioration of the PERS²ON score as well as absolute differences (including 95% confidence intervals) between the score on admission and the two later measurements. We also compared differences using a paired t-test with a two-tailed significance level of 0.05.

Statistical analysis was conducted using the Statistical Package for the Social Sciences (SPSS) 20.0 software (SPSS, Chicago, IL, USA).

The study was approved by the local Ethics Committee LAND NÖ GSK (GS4-EK-4/670–2020).

**RESULTS**

**Patient characteristics**

During the study period, a total of 60 patients were admitted to the PCU. As depicted in the CONSORT diagram (Fig. 2), 40 patients met inclusion criteria. Of the remaining 20 patients, five lacked an oncologic disease, 14 had a life expectancy of less than three weeks and one patient did not provide consent for inclusion.

All 40 eligible patients were included in the study. Although inclusion required a minimum expected life expectancy of three weeks upon admission, nevertheless nine individuals died during their stay in the PCU, including five within the first seven days.
Of the 40 included patients, 27 (68%) were female, overall mean age was 70 years (SD 10). The age range of the participants varied from 36 to 87 years, encompassing the youngest and oldest individuals, respectively. The largest age group consisted of 17 individuals (43%) in the 60–69 years category, followed by 10 individuals (25%) in both the 70–79 and 80–89 age groups. Among the study participants, three individuals (8%) were under 60 years of age upon admission to the PCU.

The average total length of stay was 15 days (SD 9) in the PCU. The minimum length of inpatient admission was three days, while the maximum length reached 36 days.

As shown in Table 1, the study participants had 18 different types of cancer. The most common diagnosis was breast cancer with 15% (n = 6), followed by lung cancer and pancreatic cancer with 12.5% each (n = 5). Other cancer types of the participating patients were rectal cancer with 12.5% (n = 5), followed by 7.5% (n = 3) cervical cancer and 5% each (n = 2) people with ovarian, prostate, and cecal cancer and chronic myeloid leukemia. The remaining nine cancer types are shown in detail in Table 1.

The baseline evaluation using the PERS\textsuperscript{2}ON score took approximately 10 minutes for completion during the initial assessment. On the day of admission, the attending PCU physician explained the score to the patients. Subsequently, 34 patients (85%) required assistance and completed the assessment together with the physician.

The mean baseline PERS\textsuperscript{2}ON score was 28 (SD 12) on admission to the PCU. The highest mean subscores were observed for rehabilitation (mean 6, SD 3) followed by loss of appetite (mean 5, SD 4) and suffering (mean 5, SD 3). Table 2 lists details on the mean scores of all PERS\textsuperscript{2}ON items. KPS on admission was 53% (SD 13).
### Table 1. Patients’ characteristics

<table>
<thead>
<tr>
<th></th>
<th>Entire cohort (n= 40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Mean age, years (range)</td>
<td>70 (36-87)</td>
</tr>
<tr>
<td><strong>Primary tumor</strong></td>
<td></td>
</tr>
<tr>
<td>Breast cancer</td>
<td>6  15</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>5  12,5</td>
</tr>
<tr>
<td>Pancreatic cancer</td>
<td>5  12,5</td>
</tr>
<tr>
<td>Colorectal cancer</td>
<td>5  12,5</td>
</tr>
<tr>
<td>Cervical cancer</td>
<td>3  7,5</td>
</tr>
<tr>
<td>CML (chronic myeloid leukemia)</td>
<td>2  5</td>
</tr>
<tr>
<td>Cecal cancer</td>
<td>2  5</td>
</tr>
<tr>
<td>Ovarian cancer</td>
<td>2  5</td>
</tr>
<tr>
<td>Prostate cancer</td>
<td>2  5</td>
</tr>
<tr>
<td>Carcinoma of unknown primary (CUP)</td>
<td>1  2,5</td>
</tr>
<tr>
<td>Liver cancer</td>
<td>1  2,5</td>
</tr>
<tr>
<td>Lymphoma</td>
<td>1  2,5</td>
</tr>
<tr>
<td>Gastric cancer</td>
<td>1  2,5</td>
</tr>
<tr>
<td>Melanoma</td>
<td>1  2,5</td>
</tr>
<tr>
<td>Multiple Myeloma</td>
<td>1  2,5</td>
</tr>
<tr>
<td>Renal cell carcinoma</td>
<td>1  2,5</td>
</tr>
<tr>
<td>Thyroid cancer</td>
<td>1  2,5</td>
</tr>
</tbody>
</table>

**Table 2.** PERS\(^2\)ON Score at baseline, 7 days after admission and at the day of discharge
Repeated measurements of the PERS²ON score

Seven days after admission and at the day of discharge completion of the PERS²ON score took approximately five minutes.

The mean PERS²ON score seven days after admission was 22 (SD 11). The highest sub-scores were observed for potential of rehabilitation (mean 5, SD 2), followed by eating (mean 4, SD 3) and suffering (mean 4, SD 3).

Mean PERS²ON score at day of discharge was 17 (SD 10).

Highest sub-scores were observed for the potential of rehabilitation (mean 5, SD 3), followed by suffering (mean 3, SD 3) and eating (mean 2, SD 3).

### Change of PERS²ON score

The mean change of the overall PERS²ON score within the first 7 days of admission was 7 (95% CI: 3–11). 24/32 (75%) patients presented with an improvement in the PERS²ON score; 5/32 (15.6%) patients experienced a deterioration reflected in a higher PERS²ON score; 3/32 (9.3%) patients reported no change in PERS²ON Score.

Compared to the baseline PERS²ON Score, the PERS²ON Score 7 days after admission showed significantly lower values (mean 28, SD 12 vs. mean 21, SD 11, p = 0.002). Figure 3 displays the change in the PERS²ON Score (Fig. 3A) as well as the change in each item (Fig. 3B) from baseline to 7 days after admission.
The mean change of PERS\textsuperscript{2}ON Score from baseline to the day of discharge was 11 (95% CI: 6–15). 12/13 (92%) patients presented with improvement of PERS\textsuperscript{2}ON Score from baseline compared to the day of discharge compared to only 1/13 (8%) patient reporting with a decline of PERS\textsuperscript{2}ON Score.

Compared to the baseline PERS\textsuperscript{2}ON Score, the PERS\textsuperscript{2}ON Score on the day of discharge presented with significantly lower values (mean 28, SD 12 vs. mean 17, SD 10, p < 0.001). Figure 3 displays the change in the PERS\textsuperscript{2}ON Score (Fig. 3A) as well as the change in each item (Fig. 3B) from baseline to the day of discharge.

**DISCUSSION**

Getting to know the patient as a "person" is the basis for determining individual distress. In this prospective cohort study, the assessment of the PERS\textsuperscript{2}ON score over the stay at the PCU was possible in all patients meeting the inclusion criteria. Whereas most patients needed assistance when completing the score for the first time on admission, all were able to do so unaided at later reassessments.

The mean observed PERS\textsuperscript{2}ON score in our cohort was 32, with the highest observed score reaching 54 out of a total of 70 points. These findings emphasize the critical need to address the substantial symptom burden experienced by patients upon admission to a PCU.

Structured assessment and classification of distressing symptoms is the basis for appropriate, individualized symptom management for patients with advanced diseases (22). The PERS\textsuperscript{2}ON score as an easy-to-remember multiple symptom assessment score was easy to use, and patients were able to answer all questions at the specified assessment time.

Most patients (75%) presented with a significant improvement in the PERS\textsuperscript{2}ON Score after 7 days. Our data show that the highest symptom improvement was observed in rehabilitation (physical impairment), eating (cachexia/loss of appetite/weight loss) and alleviating suffering (anxiety/ burden of disease/depression).

To illustrate the practical implications of implementing the PERS\textsuperscript{2}ON score, specific interventions were promptly initiated based on the identified symptomatology. For instance, in cases where patients exhibited signs of physical impairment, a physiotherapist provided targeted physical training. Patients experiencing severe cachexia, loss of appetite, or weight loss received an early intervention from a dietician in the form of dietary advice or, if necessary, parenteral nutrition. Psychological or psychiatric symptom burden prompted regular therapy sessions conducted by the PC unit’s psychologist, with the addition of psychopharmacological medication if indicated. These examples demonstrate the potential benefits of using the PERS\textsuperscript{2}ON score for tailored interventions and to improve the overall management of patients admitted to a PCU.

This is well in line with other studies showing the potential benefit of PC interventions (23, 24).
Compared to other assessment tools, the PERS\textsuperscript{2}ON score also considers the possibility of home care. Social and economic needs of patients can hinder discharge and home care and lead to self-perceived burden as well as stress for caregivers (25–28).

The PERS\textsuperscript{2}ON score was used to identify patients with a weak social network for whom outpatient care was unlikely. Thus, a mobile palliative team and family members were involved at an early stage to discuss possible pathways of care with the patients.

The experience of suffering is multidimensional and includes body image, desires, meaning of the illness, relationships, values, and spiritual beliefs. It cannot be classified by symptom assessment alone but requires interaction with the patient’s individual experience (29). Psychological distress has been reported to decrease with adequate pain relief (30, 31), while mortality rates have been shown to be up to 25% higher in people whom or their carers experience depressive symptoms (32–34).

The results of our study reflect that the multidisciplinary and comprehensive approach of a PC team leads to significant symptom relief even in the very short time span of only 7 days, facilitated by the systemic symptom assessment with the PERS\textsuperscript{2}ON score. Furthermore, the use of a patient questionnaire is not essential when using the PERS\textsuperscript{2}ON score, as it is easy to memorize.

Based on the results of this study, the PERS\textsuperscript{2}ON score can be effectively used. It provides a quick, efficient, and structured assessment of symptom burden. Its self-explanatory style highlights the potential for its use not only for specialized staff, but also for less specialized personnel such as medical students and non-PC professionals. Its applicability extends beyond assessing symptom burden and proved valuable in facilitating a structured medical history-taking process. By incorporating the PERS\textsuperscript{2}ON score into clinical practice, diverse healthcare professionals can gather comprehensive information and better understand the multifaceted needs of patients receiving PC. Inconsistencies between patient-reported and clinician-documented symptoms are a common pitfall (35–37), therefore we want to highlight the PERS\textsuperscript{2}ON score as a structured, patient-reported assessment that avoids misunderstandings. It proved easy to implement in clinical practice and was appreciated by both clinicians and patients as.

The limitations of this study should be addressed. This was a single-center assessment with a small sample size. There is a potential of reporting bias (e.g., “wanting to please the experimenter”). Furthermore, in this feasibility study, we did not compare the PERS\textsuperscript{2}ON score with other existing assessment tools. We did not screen for spiritual needs, which is usually done by the pastoral care team of the PCU in an open dialogue.

**CONCLUSION**

In conclusion, the evaluation and testing of the PERS\textsuperscript{2}ON score demonstrated its suitability as a user-friendly symptom assessment tool that can be integrated into the routine practice of rural PCUs. By providing an accessible scale, it serves as a valuable guide for treatment decisions and contributes to
prompt symptom alleviation. The implementation of the PERS\textsuperscript{2}ON score has great potential to enhance the quality of care and facilitate rapid improvements in symptom management within PC settings.

**Declarations**

**Acknowledgments**

We want to thank Stephen Humphreys for providing linguistic help and proofreading.

**Ethical Approval**

The study was approved by the local Ethics Committee LAND NÖ GSK (GS4-EK-4/670-2020).

**Competing interests**

The authors have no conflicts to disclose.

**Authors’ contributions**

M.H., M.N. and K.T. performed the measurements, B.W., E.M., D.R. and A.E. were involved in planning and supervised the work, M.H., J.G. and K.T. processed the data, performed the analysis, drafted the manuscript, and designed the figures and tables. J.G. performed the calculations. E.M., A.E. und D.R. aided in interpreting the results and worked on the manuscript. All authors discussed the results and commented on the manuscript.

**Funding**

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Availability of data and materials**

The data that support the findings of this study are available on request from the corresponding author, [D.R.].

**References**


**Figures**
### Pers$^2$on Score

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pain</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notes:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Eating</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notes:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rehabilitation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notes:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Social Situation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notes:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Suffering</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notes:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>O²</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notes:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Nausea/Emesis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notes:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Score</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

0 = absence of burden; 10 = worst imaginable burden; social situation: 0 = high possibility of out of hospital care; 10 = no possibility of out of hospital care

---

**Figure 1**

The PERS2ON scoring sheet.
Figure 2

Consort-Diagram

Figure 3

Change in the PERS2ON score. (A) Change of the PERS2ON score from baseline to 7 days after the admission and day of discharge. (B) Change of each item of the PERS2ON score from baseline to 7 days after the admission and day of discharge.