Evaluation of quality of life related to nutritional status

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Systematic Review

Evaluation of quality of life related to nutritional status

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The way in which the quality of life related to health (HRQoL) is affected by the nutritional status of the patient is a subject of constant interest and permanent debate. The purpose of the present paper is to review those studies that relate HRQoL to nutritional status and examine the tools (questionnaires) that they use to investigate this relationship. A critical review of published studies was carried out via an investigation of the following databases: MEDLINE (via PubMed); EMBASE; The Cochrane Library; Cumulative Index to Nursing and Allied Health Literature (CINAHL); Institute for Scientific Information (ISI) Web of Science; Latin American and Caribbean Health Sciences Literature (LILACS); Spanish Health Sciences Bibliographic Index (IBECS). The search was carried out from the earliest date possible until July 2007. The medical subject heading terms used were ‘quality of life’, ‘nutritional status’ and ‘questionnaires’. The articles had to contain at least one questionnaire that evaluated quality of life. Twenty-eight documents fulfilling the inclusion criteria were accepted, although none of them used a specific questionnaire to evaluate HRQoL related to nutritional status. However, some of them used a combination of generic questionnaires with the intention of evaluating the same. Only three studies selectively addressed the relationship between nutritional status and quality of life, this evaluation being performed not by means of specific questionnaires but by statistical analysis of data obtained via validated questionnaires.

Quality of life: Nutritional status: Nutritional sciences: Questionnaires: Healthcare evaluation mechanisms

The concept of quality of life related to health (HRQoL) is defined with regard to the way in which illness (as a source of pain, physical dysfunction and discomfort) imposes limitations or alterations on everyday behaviour, social activities and psychological wellbeing, as well as in other aspects of personal daily life1-3.

The measurement of quality of life brings a holistic dimension to the burden of a clinical state or to the response to an operation. The relationship between quality of life and nutritional status is not well studied. Furthermore, measuring HRQoL is a complex process, being, as it is, a subjective, multifactor construct responsive to individual expectations in different facets of life. The way in which HRQoL is affected by the nutritional status of the patient is a subject of constant interest and permanent debate. It is all too well known that an impoverishment of nutritional status leads to a decrease in physiological function, increasing the risk of complications and septic death(2,3), that there is a significant correlation between nutrition and alterations in muscular, immune and cognitive functions(4) and therefore that an improvement in nutritional status is an influencing factor in the improvement of physiological function(5,6).

The necessity and importance of the measurement of HRQoL, both general and specific, tied to a definite concept, can be justified on the basis of studies which show that perceived health is independently associated with medium-term mortality(7,8). These specific instruments, designed to relate a patient’s HRQoL to a specific pathology, have grown in importance in recent years. They also provide a subset of relevant data which point to a positive causality(9).

Abbreviation: HRQoL, quality of life related to health.

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Consequently, the purpose and objective of the present study is to bring together those studies that relate HRQoL with nutritional status and examine the tools (questionnaires) that they use to investigate this relationship.

**Methods**

**Bibliographic search**

Given the hierarchical structure of medical subject heading (MeSH) terms, the terms ‘quality of life’, ‘nutritional status’ and ‘questionnaires’ were chosen and used in conjunction with the Boolean link ‘AND’.

The search was carried out from the earliest date possible (according to each database) until July 2007, the latest date considered in the present study.

In the only databases that permitted it, MEDLINE and EMBASE, the major (Majr) topic terms were used. These represent the most important concepts of an article and help to eliminate less relevant studies from the results, thereby increasing the sensitivity of the search (‘quality of life’ [Majr] AND ‘nutritional status’ [Majr] AND ‘questionnaires’ [MeSH]).

‘Humans’ was used in all databases as a search limit.

Additionally, as a secondary search, the bibliographies of the selected articles were reviewed in order to identify studies not found by the primary search.

The databases MEDLINE (via PubMed), EMBASE, The Cochrane Library, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Institute for Scientific Information (ISI) Web of Science, Latin American and Caribbean Health Sciences Literature (LILACS) and Spanish Health Sciences Bibliographic Index (IBECS) were consulted.

**Selection of the articles**

The articles were selected via inclusion and exclusion criteria previously defined in a written protocol\(^{(10,11)}\.\)

Inclusion criteria were:

1. Use of at least one questionnaire that evaluates quality of life;
2. Nutritional status of the studied individuals is, by whatever means, taken into account;
3. Original articles published in peer-reviewed journals.

Excluded were studies that measured HRQoL using only clinical indicators.

**Validity check**

The studies, with no indication of the authors, journal or database origin, were checked for relevance by the three experts in nutrition (C. W.-B., J. M. Culebras and J. Alvarez) using a yes/no checklist\(^{(11)}\.\)

Concordance analysis between the experts in nutrition (gold standard) and the obtained results gave the following results: observed agreement 90.00 (95% CI 80.70, 99.30)%; κ 75 (95% CI 52, 98)%; significance test 4.74 (P<0.001); sensitivity 93.10 (95% CI 83.88, 100)%; specificity 81.82 (95% CI 59.03, 100)%.

The silent percentage (relevant articles not found) and the noisy percentage (non-relevant articles found) were 5 (95% CI 0, 11.75)% in both cases.

Special characteristics of the study

Although it is preferable to base a systematic review on prospective studies or studies with adequate follow-up periods, it was decided to include cross-sectional studies or studies with short follow-up periods if HRQoL had been studied using a valid questionnaire and the nutritional status of the observed patients had been taken into account. This limitation will be discussed later.

**Results**

Twenty-nine papers from MEDLINE, twenty-one from EMBASE, six from the Cochrane Library and thirteen from CINAHL were obtained. All the papers found in the bibliographic database ISI Web of Science had been previously collected. No articles were found in the databases LILACS or IBECS. After eliminating redundant papers, forty documents were obtained.

Agreement between the scientific documentation experts (J. S.-V., V. Juan-Quilis and R. Ballester Añón; applying the most sensitive search formula) and the experts in nutrition reduced the number of studies to thirty-one\(^{(13)}\.\)

A further study was discarded for measuring user satisfaction with nutrition services, rather than quality of life, and for not using a questionnaire that evaluated quality of life. Finally, twenty-eight documents on quality of life related to nutritional status were accepted\(^{(12)}\)-\(^{(30)}\) (Table 1).

It is worth noting how recent the studies are; the average age is 3.85 (95% CI 2.62, 5.02) years, and the average obsolescence gives a value of 3 years and a Price index of 75% (percentage of articles 5 years old or less).

The designs of the studied articles were: eight (28.57%) clinical trials; eleven (39.29%) prospective; seven (25.00%) cross-sectional; two (7.14%) retrospective. The disparity in design can be seen in the wide diversity of follow-up periods. The number of patients also varied widely, from a minimum of twelve to a maximum of 367.

**Quality of life related to health and nutritional status**

Although there are a considerable number of published studies on HRQoL, those that truly evaluate quality of life related to nutritional status are scarce. However, it is worth noting that of the articles relating HRQoL to nutritional status, eleven (39.27%) had cancer as a pathological base\(^{(13,16,17,21,27,29,30,33,35,37,38)}\.\)

The review found no specific questionnaire that determined a direct link between HRQoL and nutritional status. However, three papers (10.71%) detailed a significant correlation between nutritional status and HRQoL using a valid method for measuring quality of life\(^{(19,23,29)}\.\) Another article (3.57%) referred to a possible relationship between HRQoL and nutritional status\(^{(25)}\), but drew attention to other important factors, such as the risk of depression. A different study (3.57%) mentioned how the ingestion of foodstuffs affects HRQoL\(^{(15)}\), although a further paper\(^{(33)}\) (3.57%) found no significant effect between the results obtained using The Short Form-36 Health Survey (SF-36) questionnaire and nutritional intervention. In another, an association between a deteriorating HRQoL and severe malnutrition was seen\(^{(34)}\.\)
Table 1. Summary of the twenty-eight reviewed studies in chronological order according to year of publication

<table>
<thead>
<tr>
<th>Reference</th>
<th>Study design</th>
<th>QoL questionnaire</th>
<th>Patients included</th>
<th>Follow-up</th>
<th>Relationship between QoL and nutritional status in study results</th>
</tr>
</thead>
<tbody>
<tr>
<td>O’Keefe et al. (2007)</td>
<td>Prospective</td>
<td>Subjective assessment of QoL (transplantation)</td>
<td>Group 1: transplant patients, n 46, M/W 26/21, age range 22–66 years Group 2: total parenteral nutrition patients, n 13, M/W 10/3, age range 31–80 years</td>
<td>Mean 21 (range 12–36 months)</td>
<td>QoL not evaluated in respect of nutritional status</td>
</tr>
<tr>
<td>Oates et al. (2007)</td>
<td>Prospective</td>
<td>EORTC QLQ-C-30 and EORTC QLQ-H&amp;N35</td>
<td>Fourteen patients with nasopharyngeal carcinoma Age range 27–71 years</td>
<td>2 years</td>
<td>These results emphasise the need for early nutritional intervention before commencing chemoradiotherapy</td>
</tr>
<tr>
<td>Kalaitzakis et al. (2006)</td>
<td>Prospective</td>
<td>SF-36</td>
<td>128 adult patients with cirrhosis Control group: 299 age- and sex-matched reference sample from general population</td>
<td>6 months</td>
<td>Prospective follow-up studies are needed to fully clarify the role of gastrointestinal symptoms in HRQoL and nutritional status in liver cirrhosis</td>
</tr>
<tr>
<td>Trabal et al. (2006)</td>
<td>Cross-sectional</td>
<td>EORTC QLQ-C-30</td>
<td>Fifty cancer patients M/W 28/22, mean age 61 (sd 14) years</td>
<td>3d</td>
<td>The results point out that poor food intakes can affect QoL by themselves</td>
</tr>
<tr>
<td>Murawa et al. (2006)</td>
<td>Prospective</td>
<td>Troidl</td>
<td>Thirty-one patients with stomach cancer-related total gastrectomy M/W 20/11, mean age 56.9 (sd 10.05) years</td>
<td>49–127 months after surgery (mean 79.61 (sd 23.41) months)</td>
<td>QoL was independent of the time elapsed from the surgery</td>
</tr>
<tr>
<td>Izutsu et al. (2006)</td>
<td>Cross-sectional</td>
<td>WHOQOL-BREF</td>
<td>187 boys and 137 girls from urban non-slum area 157 boys and 121 girls from urban slum area Age range 11–18 years</td>
<td>QoL was not evaluated in respect of nutritional status</td>
<td></td>
</tr>
<tr>
<td>Gramignano et al. (2006)</td>
<td>Prospective</td>
<td>QoL-OS and EuroQoL-5D</td>
<td>Twelve patients who had advanced solid tumours and reported fatigue M/W 2/10, age range 42–73 years</td>
<td>4 weeks</td>
<td>QoL was not evaluated in respect of nutritional status</td>
</tr>
<tr>
<td>Eriksson et al. (2005)</td>
<td>Cross-sectional</td>
<td>SF-36</td>
<td>128 non-institutionalised individuals M/W 40/88, age range 70–75 years, mean age 72.9 (sd 1.5) years</td>
<td>QoL was not evaluated in respect of nutritional status</td>
<td></td>
</tr>
<tr>
<td>Allen (2005)</td>
<td>Retrospective</td>
<td>OHIP-EDENT</td>
<td>Thirty-five edentulous adults who requested new complete dentures</td>
<td>Past 3 months</td>
<td>Low values of SF-36 could also be used as predictors of risk of malnutrition</td>
</tr>
<tr>
<td>Ravasco et al. (2005)</td>
<td>Clinical trial</td>
<td>EORTC QLQ-C-30</td>
<td>111 colorectal cancer out-patients referred for radiotherapy M/W 66/45, age range 32–88 years, mean age 58 (sd 15) years Group 1 (n 37): individualised dietary counselling based on regular foods Group 2 (n 37): high-protein liquid supplement in addition to their usual diet Group 3 (n 37): the control group, patients were instructed to maintain their ad libitum intake</td>
<td>3 months</td>
<td>There was no association between diet and oral-related QoL</td>
</tr>
<tr>
<td>Scott et al. (2005)</td>
<td>Clinical trial</td>
<td>SF-36</td>
<td>112 adult patients were recruited Intervention group: n 55, mean age 67.4 (sd 17) years Control group: n 57; mean age 68.6 (sd 17) years</td>
<td>12 months after PEG</td>
<td>QoL was not evaluated in respect of nutritional status</td>
</tr>
<tr>
<td>Reference</td>
<td>Study design</td>
<td>QoL questionnaire</td>
<td>Patients included</td>
<td>Follow-up</td>
<td>Relationship between QoL and nutritional status in study results</td>
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<tr>
<td>Keller (2004) (23)</td>
<td>Cross-sectional</td>
<td>Non-validated author design</td>
<td>367 frail seniors (73.6% women) Age range 54–100 years, mean age 79.3 (SD 7.9) years</td>
<td>Nutritional risk appears to be a significant and important factor associated with HRQoL nutritional risk as measured by SCREEN appears to be a significant covariate in explaining differences in HRQoL among frail older adults</td>
<td>Both study groups rated global QoL and loneliness at average or moderate levels, with no group differences QoL was not evaluated in respect of nutritional status</td>
</tr>
<tr>
<td>Gollub &amp; Weddle (2004) (24)</td>
<td>Retrospective</td>
<td>Vailas et al.</td>
<td>Two groups Breakfast group: received a home-delivered breakfast and lunch, 5d per week, n 167, age range 63–100 years, mean age 79.8 (SD 8.1) years Comparison group: received a home-delivered lunch 5d per week, n 214, age range 60–100 years, mean age 77.7 (SD 9.1) years</td>
<td>Past 6 months</td>
<td>Study data suggest that a link exists between QoL and nutrition, but it may not be direct, and is influenced by other factors, especially a high risk of depression The SF-36 QoL questionnaire did not reveal any convincing significant effect of nutritional intervention</td>
</tr>
<tr>
<td>Hickson &amp; Frost (2004) (25)</td>
<td>Cross-sectional</td>
<td>EuroQoL-5D</td>
<td>233 patients: M/F 104/129, age interquartile range 75–86 years. Two age groups Group 1: 65–74 years Group 2: 75 years and older</td>
<td>Nutritional risk appears to be a significant and important factor associated with HRQoL nutritional risk as measured by SCREEN appears to be a significant covariate in explaining differences in HRQoL among frail older adults</td>
<td>Both study groups rated global QoL and loneliness at average or moderate levels, with no group differences QoL was not evaluated in respect of nutritional status</td>
</tr>
<tr>
<td>Johansen et al. (2004) (26)</td>
<td>Prospective</td>
<td>SF-36</td>
<td>212 patients identified as being nutritionally at risk Group 1: intervention, n 108, M/W 54/54, mean age 62.0 (SD 1.6) years Group 2: control, n 104, M/W 48/56, mean age 62.4 (SD 1.7) years</td>
<td>&gt; 4 d</td>
<td>The SF-36 QoL questionnaire did not reveal any convincing significant effect of nutritional intervention</td>
</tr>
<tr>
<td>Kennedy et al. (2004) (27)</td>
<td>Prospective</td>
<td>POQOLS</td>
<td>103 children and adolescents with acute lymphoblastic leukaemia Age range 1–18 years, mean age 6.7 years Group 1 (standard risk protocol): n 68, M/W 41/27, mean age 4.7 (SD 2.6) years Group 2 (high-risk protocol): n 35, M/W 19/16, mean age 10.5 (SD 4.6) years</td>
<td>6 months after diagnosis</td>
<td>QoL was not evaluated in respect of nutritional status</td>
</tr>
<tr>
<td>Steptoe et al. (2004) (28)</td>
<td>Prospective</td>
<td>SF-36</td>
<td>271 adults Group 1 (behavioural counselling): n 136, M/W 54/82, mean age 43.3 (SD 13.8) years Group 2 (nutritional education counselling): n 135, M/W 51/84, mean age 43.2 (SD 14.0) years</td>
<td>12 months</td>
<td>Physical health status, mental health status and self-rated health all improved over the course of the study Few changes were observed in any of the QoL domains</td>
</tr>
<tr>
<td>Isenring et al. (2003) (29)</td>
<td>Prospective</td>
<td>EORTC QLQ-C-30</td>
<td>Sixty cancer patients M/W 51/9, age range 24–85 years, mean age 61.9 (SD 14.0) years</td>
<td>4 weeks</td>
<td>There was a significant correlation between PG-SGA score and global QoL A significant correlation was also observed between the change in PG-SGA score and change in global QoL after 4 weeks of radiotherapy Significant benefit in appetite was found by VAS and QLQ-C30 questionnaire QoL was not evaluated in respect of nutritional status</td>
</tr>
<tr>
<td>Tomiska et al. (2003) (30)</td>
<td>Clinical trial</td>
<td>EORTC QLQ-C-30 and VAS</td>
<td>Nineteen patients with far-advanced cancer suffering from anorexia and more than 5% weight loss M/W 15/4, age range 44–78 years, mean age 59 years</td>
<td>2 months</td>
<td>Significant benefit in appetite was found by VAS and QLQ-C30 questionnaire QoL was not evaluated in respect of nutritional status</td>
</tr>
<tr>
<td>Reference</td>
<td>Study design</td>
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</tbody>
</table>
| Tidermark (2003)\(^{(31)}\) | Clinical trial | EuroQoL-5D, SF-36 and Nottingham Health Profile | Patients with femoral neck fracture  
Studies I and II: n 90, > 65 years, M/W 24/66, mean age 89 (SD 7) years  
Studies III and IV: n 110, ≥ 70 years, M/W 13/87, mean age 80 (SD 6) years  
Studies V and VI: n 24, ≥ 70 years, M/W 0/24, mean age 83 (SD 5) years | Study I: 12 months  
Study II: minimum 24 months  
Studies III and IV: 24 months  
Study V: in hospital  
Study VI: 12 months | QoL was not evaluated in respect of nutritional status |
| Ohtsuka et al. (2002)\(^{(32)}\) | Prospective | Kurihara (modified) | Thirty-one Japanese patients who underwent pylorus-preserving pancreato-duodenectomy  
M/W 15/16, age range 39–85 years, mean age 62 years  
Group 1 (Imanaga): n 18, M/W 11/7, mean age 62.2 (SD 2.7) years  
Group 2 (Traverso): n 13, M/W 4/9, mean age 60.8 (SD 2.7) years | 1 year after surgery | Prospective QoL and nutritional status were not different between Imanaga or Traverso reconstructions  
The postoperative change was similar in the objective nutritional factors and physical QoL scores |
| Ribaudo et al. (2000)\(^{(33)}\) | Clinical trial | FAACT and BACRI | 213 patients  
Group 1: n 155 cancer patients, M/W 87/68, mean age 64.1 (SD 12.3) years  
Group 2: n 58, HIV infected, M/W 57/1, mean age 39.2 (SD 8.7) years | 12 weeks | QoL was not evaluated in respect of nutritional status |
| Laws et al. (2000)\(^{(34)}\) | Cross-sectional | Not validated | 64 patients  
Group 1 (well nourished): n 41, M/W 21/20, age range 40–85 years, mean age 64-5 years  
Group 2 (mynamnourished): n 15, M/W 6/9, age range 37–73 years, mean age 61-8 years  
Group 3 (severely malnourished): n 8, M/W 4/4, age range 66–84 years, mean age 73-1 years | In haemodialysis for less than 1 month | Malnutrition is associated with poorer QoL  
when the degree of malnutrition becomes severe |
| Van Bokhorst-de Van der Schuer et al. (2000)\(^{(35)}\) | Clinical trial | EORTC QLQ-C-30 and COOP-WONCA | Forty-nine malnourished (weight loss > 10 %) head and neck cancer patients (thirty-one patients filled in both questionnaires)  
Group 1 (no preoperative nutritional support): n 11, M/W 7/4, mean age 56-6 years, age range 42–76 years  
Group 2 (standard enteral nutrition) n 10, M/W 3/7, mean age 58-6 years, age range 43–69 years  
Group 3 (isonitrogenous enteral nutrition): n 10, M/W 6/4, mean age 61-4 years, age range 43–83 years | 6 months after surgery | Enteral nutrition improves QoL of severely malnourished head and neck cancer patients in the period preceding surgery  
No benefit of preoperative enteral feeding on QoL could be demonstrated 6 months after surgery |
| Callahan et al. (2000)\(^{(36)}\) | Prospective | Quality of Well Being Scale | 150 patients receiving PEG  
M/W 66/84, age range 60–98 years, mean age 78-9 (SD 8-1) years | Over 14-month period | QoL was not evaluated in respect of nutritional status |
| Bruera et al. (1998)\(^{(37)}\) | Clinical trial | FLIC and VAS | Patients with advanced cancer  
M/W 47/37, mean age 62 (SD 11) years  
Group 1 (Megestrol group): n 62  
Group 2 (placebo): n 60 | 21 d | No significant difference was observed in any of the values assessed before and after Megestrol or placebo  
QoL was not evaluated in respect of nutritional status |
Among the reviewed papers, ten (35.71%) found no type of relationship between nutritional status, or any type of nutrition, and HRQoL. Nine articles (32.14%) recommended, or considered necessary, future prospective studies in order to completely clarify the correlation between HRQoL and nutritional status.

It is important to emphasise the study of Ravasco et al. where the existence of a linear association (P<0.05) between an increase in HRQoL and an improvement in nutritional status was demonstrated. The research of Isenring et al. determined that 26% (P<0.001) of the appreciated variation in HRQoL is explained by changes observed in nutritional status measured with the 'Patient-Generated Subjective Global Assessment' (PG-SGA). By means of multivariate analysis Keller showed that the association between nutritional risk and HRQoL is consistent, explaining the 44% variation.

Questionnaire description and use

The questionnaires that were used in more than one article are: the European Organisation for Research and Treatment of Cancer Quality of Life questionnaire (EORTC-QLQ-C-30) and SF-36 on six occasions each; the Euro Quality of Life 5 Dimensions (EuroQoL-5D) on three occasions; linear analogue scale assessment (LASA) or visual analogue scales (VAS) on three occasions. In two studies, non-validated instruments were used to evaluate quality of life. The rest of the questionnaires were only used once.

It was observed that in one article (3.57%) six different questionnaires were used to measure quality of life, in another (3.57%) three questionnaires, in five articles (17.86%) two were used and in the rest only one.

Most of the questionnaires described in the studies measured quality of life in a generic way (SF-36; EuroQoL-5D; Dartmouth Primary Care Cooperative Information Project-World Organization of National Colleges, Academies, and Academic Associations of General Practitioners/Family Physicians (COOP-WONCA); LASA or VAS; Nottingham Health Profile; Physician Global Assessment (MD global); Quality of Well Being Scale; Sickness Impact Profile; Time Trade-off Technique; Vailas; WHO Quality of Life-BREF (WHOQOL-BREF)). Several were specific for cancer (EORTC QLC-C-30; EORTC Head and Neck questionnaire (QLQ-H\&N35); Functional Living Index-Cancer; Kurihara; Quality of Life focused on symptoms of oxidative stress) or for gastrointestinal pathology (Subjective Assessment of Quality of Life (Transplantation); Troidl; Visick scale).

Only three questionnaires that can be related to quality of life could be retrieved, two of them specific for anorexia and cachexia (Bristol-Myers Anorexia Cachexia Recovery Instrument; Functional Assessment of Anorexia/Cachexia Therapy) and one specific for patients with permanent home parenteral nutrition (Direct Questioning of Objectives) (Table 2).

Discussion

In the documentary study the validity of the articles must be emphasised. The validity was confirmed both by the good
<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Abbreviation</th>
<th>Times used</th>
<th>Design</th>
<th>Domains</th>
</tr>
</thead>
</table>
| European Organisation for Research and Treatment of Cancer Quality of Life   | EORTC QLQ-C-30 | 6          | Cancer    | Global quality of life scale  
Five functional scales: physical, role, emotional, cognitive, social  
Nine symptom scales: fatigue, pain, nausea/vomiting, dyspnoea, insomnia, appetite loss, constipation, diarrhoea, financial difficulties |
| Short Form-36 Health Survey                                                 | SF-36        | 6          | Generic   | Thirty-six items organised in eight domains: physical functioning, role limitations caused by physical health problems, bodily pain, general health perceptions, vitality, social functioning, role limitations caused by emotional problems, mental health  
Visual analogue scale (quality of life perceived)  
Change of health perceived  
Five dimensions: mobility, self-care, usual activity, pain or discomfort, anxiety or depression  
Lines of a standard length (usually 10 cm), with the extremes of a variable. The patient marks the point that corresponds to their perceived status. Sometimes status is images |
| Euro Quality of Life 5 Dimensions                                            | EuroQol-5D   | 3          | Generic   | Visual analogue scale (quality of life perceived)  
Change of health perceived  
Five dimensions: mobility, self-care, usual activity, pain or discomfort, anxiety or depression  
Lines of a standard length (usually 10 cm), with the extremes of a variable. The patient marks the point that corresponds to their perceived status. Sometimes status is images |
| Linear analogue scale assessment or visual analogue scale                    | LASA or VAS  | 3          | Generic   | Visual analogue scale (quality of life perceived)  
Change of health perceived  
Five dimensions: mobility, self-care, usual activity, pain or discomfort, anxiety or depression  
Lines of a standard length (usually 10 cm), with the extremes of a variable. The patient marks the point that corresponds to their perceived status. Sometimes status is images |
| Non-validated questionnaire                                                  | BACRI        | 2          | Anorexia and cachexia | An eight-item questionnaire: BACRI 7 (seven items), subjective recovery from symptoms of anorexia or cachexia; BACRI 1 (one item), patient perception of benefit |
| Dartmouth Primary Care Cooperative Information Project World Organization of National Colleges, Academies, and Academic Associations of General Practitioners/Family Physicians | COOP-WONCA   | 1          | Generic   | Six dimensions: physical fitness, mental health, daily activities, social activities, change in health, overall health |
| Direct Questioning of Objectives                                            | DQO          | 1          | Home parenteral nutrition | A category scale used for three life objectives: working full time, enjoying recreation, travel |
| European Organisation for Research and Treatment of Cancer Quality of Life – Head and Neck | EORTC QLQ-H&N35 | 1          | Head and neck cancer | Designed to be used together with EORTC QLQ-C-30  
Six symptom scales: pain, swallowing, senses (taste/smell), speech, social eating, social contacts  
Seven single items: sexuality, teeth problems, problems opening mouth, dry mouth, sticky saliva, cough, feeling ill |
| Functional Assessment of Anorexia/Cachexia Therapy                          | FAACT        | 1          | Anorexia and cachexia | Four subscales: physical wellbeing, social/family wellbeing, emotional wellbeing, functional wellbeing  
Also twelve items (additional concerns) |
| Functional Living Index-Cancer                                              | FLIC         | 1          | Cancer     | Five domains (linear analogue scale): physical wellbeing and ability, emotional state, sociability, family situation, nausea |
| Gastrointestinal Quality of Life Index                                       | GIQLI        | 1          | Gastrointestinal | Five domains: symptoms, physical dysfunction, emotional dysfunction, social dysfunction, effects of the medical treatment carried out |
| Kurihara questionnaire                                                      | Kurihara     | 1          | Cancer     | Twenty-three items categorised into two domains: physical and psychosocial aspects  
Part 1: energy level, pain, emotional reaction, sleep disturbance, social isolation, physical abilities  
Part 2: seven items about life affected areas  
Part 3: the impact of cancer on wellbeing  
Part 4: the impact of cancer on psychological functioning  
Part 5: the impact of cancer on social functioning |
| Nottingham Health Profile                                                  | NHP          | 1          | Generic    | Nine items grouped into seven domains: functional limitation, pain, psychological discomfort, physical disability, psychological disability, social disability, handicap |
| Oral Health Impact Profile – EDENT                                          | OHIP-EDENT   | 1          | Bucodental health | Assessment of wellbeing using 10 cm visual analogue scale  
Five subscales: functional, physical, emotional, social and family, fatigue |
| Physician Global Assessment Quality of Life focused on symptoms of oxidative stress | MD global   | 1          | Cancer     | Three scales of functioning with a measure of symptoms and problems. The model separates aspects of health status and quality into distinct components. These are life expectancy (mortality), functioning and symptoms (morbidity), preference for observed functional states (utility) and duration of stay in health states (prognosis) |
| Quality of Well Being Scale                                                | QWB          | 1          | Generic    | Two overall domains (physical and psychosocial). Twelve categories (sleep and rest, eating, work, home management, recreation and pastimes, ambulation, mobility, body care and movement, social interaction, alertness behaviour, emotional behaviour, communication) |
| Sickness Impact Profile                                                    | SIP          | 1          | Generic    | Two overall domains (physical and psychosocial). Twelve categories (sleep and rest, eating, work, home management, recreation and pastimes, ambulation, mobility, body care and movement, social interaction, alertness behaviour, emotional behaviour, communication) |
results given by measuring the obsolescence, and by the excellent result of the Price index. The excellence and the current importance of the research articles are complementary, but nevertheless important factors, in those studies referring to the health sciences.

It must be underlined that the evaluation of HRQoL is circumscribed specifically within the scope of the investigation. Its use in common medical practice would help to obtain validated information about the impact of the illness or the treatment of the patient in daily life, both of which could be useful in decision making(40). Knowing HRQoL does not substitute the symptomatic, analytic and morphological evaluations, but complements them, introducing something as important as the patient’s point of view about their perception of their own health(41). Quality of life assessment measuring the patient’s experiences of the impact of disease and therapy, expectations and satisfaction should be the ‘gold standard’ as an independent end point in clinical trials(21,42).

The undertaking of prospective studies of HRQoL in clinics improves the information about the patient, which, along with the diagnosis, provides important information about the patient’s perception of the effect of treatment(13,43). Neither must it be forgotten that the objective is also to prioritise resources. Mathematical methods are applied to try to quantify the quality of life in relation to its usefulness (quality-adjusted life years) as a self-profit concept(44).

The review proves that HRQoL has been studied as a variable in the health-illness process(45,46), and not only, as is frequently the case, as a covariable in pathological(14,47–51) or surgical(52–54) process studies, in pharmacological follow-ups(55), in relation to somatic(56,57) or social(58,59) aspects, or to support future recommendations(60–62).

Limitations to the identified studies

The present review exposes the lack of homogeneity of the studies found, produced by certain limitations, namely the different questionnaires used, the diversity of pathologies, sample sizes, methodology and variation in follow-up, all of which do not permit meaningful meta-analysis, thus making direct comparison awkward, especially those studies that apply non-validated HRQoL questionnaires. Furthermore, two studies are retrospective in design and are susceptible to bias.

It is fundamental when designing these studies that possibly confusing variables are controlled, that interaction effects are recognised and that HRQoL is evaluated at different points in the evolution of the illness, the period in which patients are having the treatment or that these are matched up with a control group(63).

Limitations due to the questionnaires

No mention of the patient’s acceptance of the HRQoL questionnaires used has been found in the studies reviewed. The complexity of these tools or their use can be the cause of disinterestedness, partial fulfilment or desertion on the part of the participants. This conformity is a crucial methodological requisite for avoiding skewed results(64). It is possible that the structure and appearance of the questionnaires about HRQoL are considered less important than the final results, but if this circumstance is not properly managed, it will never be known.
if the results are influenced by the tool’s design. On the other hand, it is convenient to limit the number of questionnaires used; some studies recommend not using more than three, if possible, or up to five in extreme cases. The use of validated and reliable measurements of HRQoL is essential. Ideally, any generic measurement of HRQoL should be replaced with a specific measurement that reflects the sensitivity to the changes produced by the illness or by the influences related to the treatment. These questionnaires should not only have to be sensitive to the changes produced in the desired variable, but should also be acceptable to the patients.

**Quality of life and nutritional status**

The relationship existing between nutritional status and HRQoL is becoming an important question not only in the study of oncological patients, but also in other pathologies and interventions. The improvement of this relationship, as a consequence of an appropriate nutritional intervention, enables the reduction of the number of post-surgical complications, shortens the recovery time and the length of hospital stay, improves tolerance to the treatment and even increases the rate of survival, and with it a general decrease in morbidity. On the other hand, as has been seen in the reviewed studies, the advice and nutritional follow-up given by professionals is related directly to the improvement in nutritional status, which will be related to the improvement in HRQoL. It has been demonstrated, in head and neck neoplasm, that nutritional advice enables improvements in quality of life greater than those obtained by nutritional supplementation without advice. Now, the efficacy of nutritional advice as a positive influence on HRQoL depends on the possibility of adapting intervention to the specific need of each type of patient. Therefore, nutritional advice should be given by dedicated, specialised groups. Of special importance is the need for future studies that clarify the relationship between nutritional status and quality of life. This importance is recognised by studies included in the present review and also in other publications that highlight the need to explore the relationship in greater detail.

Hence, the measurement of HRQoL with generic tools requires large sample sizes in order to demonstrate statistically significant differences and, in the majority of cases, these types of questionnaires are affected by uncontrolled external factors. Ultimately, valid HRQoL measurement tools are dependent upon patient perception, the impact of the illness, the treatment, expectations and wellbeing. There should be an independent gold standard for all research projects and everyday medical practice.

A specific tool is needed: one that is sensitive to the measurement of HRQoL and can be self-administered quickly and easily on a regular basis. Nevertheless, it must be recognised that the development of a tool to detect, evaluate and monitor the influence of the pathological base is not an easy task.

**Conclusion**

Only three studies selectively focused on the relationship between nutritional status and quality of life, this evaluation being performed not by means of specific questionnaires but by statistical analysis of data obtained via validated questionnaires.

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**References**


