Reference values of oesophago-gastric symptoms (EORTC QLQ-OG25) in a population-based setting

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ABSTRACT

Aim: Health-related quality of life (HRQL) has been recognised as an important outcome in clinical cancer research. A problem in HRQL studies is the lack of true baseline measures since patients already suffer from symptoms at time of diagnosis. The aim of this study is to provide valid reference values regarding symptoms common among oesophageal and gastric cancer patients, based on an unselected adult population.

Methods: In 2008 the EORTC QLQ-OG25 questionnaire was sent to randomly selected people in the adult Swedish population. Mean scores with standard deviation were calculated. Frequencies of symptoms were categorised into ‘symptoms’ or ‘no symptoms’. The analyses were subcategorised for age groups, gender, and cancer diagnosis.

Results: In total, 4910 (70.5%) people responded to the questionnaire. Reflux was reported by 22.5% of the population, 25.6% reported pain and discomfort in the stomach area, 25.5% dry mouth and 32.0% had trouble with coughing. Other symptoms were dysphagia (3.5%), odynophagia (5.1%), and trouble eating with others (2.9%). Reflux, pain and discomfort and dry mouth were more often reported among women, while trouble with coughing was overrepresented among men. The symptoms dry mouth and trouble with coughing increased with age in both sexes.

Conclusion: This comprehensive study is the first to provide reference values for the EORTC QLQ-OG25 questionnaire. These can be used as baseline surrogate in clinical research in oesophago-gastric cancer patients.

1. Introduction

Health-related quality of life (HRQL) has been recognised as an important outcome in clinical cancer research. Oesophageal and gastric cancer patients often suffer from severe symptoms and a decrease in HRQL.1–3 There are validated questionnaires available to assess HRQL in cancer patients, of which one of the most frequently used is the core cancer-specific questionnaire developed by the European Organisation for Research and Treatment of Cancer (EORTC), the EORTC QLQ-C30.4 This questionnaire is often supplemented with disease-specific modules. It is difficult to interpret patients’ self-reported HRQL, but one way to facilitate interpretation is to compare the patient’s value with received reference values from an unselected general population. Another problem in HRQL studies is the lack of true baseline measures, since the patients already suffer from symptoms caused by the tumour and are affected by being newly diagnosed with a life-threatening cancer at time of diagnosis. Therefore, reference values from the general population, which can be used as a surrogate for individual baseline measures, are needed. There are existing reference values for the...
EORTC QLQ-C30,5–8 but to the best of our knowledge there are no reference values published for any of the EORTC disease-
specific modules. Consequently there is a lack of values for 
oesophageal and gastric-specific symptoms measured with 
the EORTC QLQ-OG25 module.9 The aim of this study was 
therefore to provide valid reference values regarding symp-
toms common among patients suffering from oesophageal 
or gastric cancer, based on an unselected adult population.

2. Methods

2.1. Study design and data collection

A nationwide population-based study was performed in 2008 
to assess the prevalence of oesophageal and gastric-specific 
symptoms in a randomly selected sample of the Swedish 
adult population. Eligible for inclusion were adults between 
the ages of 40 and 79. The sample was frequency-matched 
to resemble the age and gender distribution of patients with 
oesophageal or gastric cancer. Between April and June 2008, 
the EORTC QLQ-OG25 questionnaire was sent out to a ran-
domly selected sample of the Swedish adult population, to-
gether with questions addressing socio-demographic details 
and health. Up to two reminders were sent to non-respond-
ers. Some data, such as age and gender, were extracted di-
rectly from the Swedish Total Population Register; which 
enabled double-checking of the identity of those who re-
plied to the questionnaire.

2.2. The QLQ OG25 questionnaire

The EORTC QLQ-OG259 is a recently developed module with 
questions addressing oesophageal and gastric-specific symp-
toms, intended to complement the core questionnaire, EORTC 
QLQ-C30.4 The new module has demonstrated good reliability 
and the ability to distinguish between tumour site and stage 
of oesophageal and gastric tumours.9 The module consists 
of six scales: dysphagia (three items), eating restrictions (four 
items), reflux (two items), odynophagia (two items), pain and 
discomfort (two items) and anxiety (two items), as well as 10 
single items: eating in front of others, dry mouth, trouble 
with taste, body image, trouble swallowing saliva, choked when 
swallowing, trouble with coughing, trouble talking, weight 
loss and hair loss. The anxiety scale and the items ‘body im-
image’ and ‘hair loss’ were not included in this study since they 
are specific to cancer treatment and do not apply to the gen-
eral population. The response alternatives for each item are 
grouped into four categories: (1) ‘not at all’, (2) ‘a little’, (3) 
‘quite a bit’ and (4) ‘very much’.

2.3. Statistical analysis

All responses to the QLQ-OG25 questionnaire were linearly 
transformed to a 0–100 scale according to the EORTC scoring 
instruction for the module. Mean scores with standard devia-
tions (SD) were calculated. Frequencies of symptoms were 
categorised into ‘symptoms’ and ‘no symptoms’ based on a 
response of at least two (‘a little’) in any question within a 
scale or relating to a single item. The analyses were subcate-
gorised into age groups (40–49, 50–59, 60–69 and 70–79 years), 
gender (male or female) and occurrence of any cancer diagno-
sis (current or previous). All statistical analyses were per-
formed using STATA 11.

3. Results

3.1. Study participants

The questionnaire was sent out to 6969 persons, of whom 
4910 (70.5%) responded. Among non-participants, 27.1% 
chose not to respond to the questionnaire and, for 2.4%, the 
home address was unknown, the questionnaire was returned 
blank, or the wrong person responded. Some characteristics 
of the participants are presented in Table 1. The frequency 
matching to patients with oesophageal or gastric cancer pro-
vided a sample with male predominance (69.9%) and a mean 
age of 65 years (range 40–79). Most participants were married, 
about half had finished primary school, and one fourth had 
education at university level. Half of the population was re-
tired, while 39.3% was gainfully employed or self-employed.

3.2. Oesophageal and gastric-specific symptoms

Mean scores of oesophageal and gastric-specific symptom 
scales and individual items are presented in Tables 2–4. The 
most common symptoms were heartburn or regurgitation 
(representing reflux), pain in the stomach area 
(representing pain and discomfort), dry mouth and trouble 
with coughing, which were all found among about one quar-
ter of the population. At least slight symptoms in one item 
regarding reflux were reported by 22.5% of the population, 
corresponding to a mean score of 6.7 points. There was a 
slightly higher prevalence of reflux among women (24.7%) 
than men (21.3%) and women reported a higher mean score 
(7.8 points) for reflux than men (6.2 points). Reflux seemed 
to increase with advancing age in women, but not in men (Ta-
bles 3 and 4, Fig. 1A). At least slight symptoms in one item 
regarding pain and discomfort were reported by 25.6%, cor-
responding to a mean score of 7.6 points with a higher preva-
ience among women (30.4%), which corresponded to a 
higher mean score (9.7 points) than for men (6.5 points) 
(Tables 2–4, Fig. 1B). At least slight symptoms of a dry mouth 
were reported by 25.5% of the population, with a higher prev-
ance among women (30.4%) than for men (23.2%) and 10.2 points, respectively). The occurrence 
of dry mouth increased with age for both genders (Tables 3 
and 4, Fig. 1C). At least slight symptoms of coughing were re-
ported by 32.0% of the study population and were the symp-
toms with the highest mean score (13.7 points). Symptoms 
of coughing were slightly more often seen in men (33.9%) 
than in women (28.5%) corresponding to a slightly higher 
mean score in men (14.3 points) than in women (12.5 points). 
Mean scores and percentage of symptoms increased with age 
(Tables 3 and 4, Fig. 1D).

3.3. Current and former cancer diagnosis

In total, 192 (3.9%) participants were diagnosed with a current 
cancer and 221 (4.5%) reported a former cancer diagnosis. 
The types of cancer are listed in Table 5. The items with the
highest mean score among people with a former cancer diagnosis or a current cancer diagnosis were pain and discomfort (mean score 10.3 and 11.1, respectively) dry mouth (mean score 16.0 and 19.0, respectively) and trouble with coughing (mean score 13.9 and 16.9, respectively). These were also the most common oesophago-gastric symptoms in both people with a former cancer diagnosis and a current cancer diagnosis (Table 6). Odynophagia, pain and discomfort, dry mouth, trouble with taste and weight loss, were overrepresented in the current cancer group compared to the former cancer group (Table 6).

### 4. Discussion

This study is the first to present reference values for oesophagogastric symptoms measured by the EORTC QLQ-OG25 questionnaire. Symptoms of reflux, pain and discomfort, dry mouth and trouble with coughing were reported in about 25% of the background adult population. Participants with current or former cancer diagnoses were linked to a higher prevalence of several symptoms compared with participants without any such diagnosis.
Some methodological issues deserve attention. The sample was randomly selected using the individual’s national registration number, a unique identification number assigned to every resident in Sweden. A threat to questionnaire surveys is selection bias due to non-participation or missing data. The response rate was high (70.5%), however, and there were only a few missing values. This contradicts such bias. The HRQL measurement has been validated with good results. However, it has not been tested for use in a general population. Since the questionnaire was developed for cancer patients, there is a possibility that healthy persons assess similar symptoms differently. Another limitation is that all scales...

### Table 3 – Mean scores with standard deviation (SD) and frequency and percentage (%) of oesophago-gastric specific symptoms (QLQL-OG25) presented in age groups in a random sample of 3224 males in the Swedish population aged 40–79 years.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>40–49</th>
<th>50–59</th>
<th>60–69</th>
<th>70–79</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dysphagia</td>
<td>0.9 (7.7)</td>
<td>8 (3.8)</td>
<td>0.8 (5.2)</td>
<td>24 (3.7)</td>
</tr>
<tr>
<td>Eating restrictions</td>
<td>2.9 (9.9)</td>
<td>31 (14.7)</td>
<td>3.1 (9.6)</td>
<td>99 (15.1)</td>
</tr>
<tr>
<td>Reflux</td>
<td>6.2 (14.5)</td>
<td>42 (20.0)</td>
<td>6.1 (13.9)</td>
<td>143 (22.0)</td>
</tr>
<tr>
<td>Odynophagia</td>
<td>1.6 (6.7)</td>
<td>13 (6.1)</td>
<td>1.8 (8.7)</td>
<td>41 (6.2)</td>
</tr>
<tr>
<td>Pain and discomfort</td>
<td>8.5 (17.2)</td>
<td>60 (28.3)</td>
<td>6.4 (15.0)</td>
<td>142 (21.6)</td>
</tr>
<tr>
<td>Eating in front of others</td>
<td>0.8 (5.1)</td>
<td>5 (2.4)</td>
<td>1.5 (9.8)</td>
<td>19 (2.9)</td>
</tr>
<tr>
<td>Dry mouth</td>
<td>7.3 (18.1)</td>
<td>35 (16.6)</td>
<td>6.4 (16.3)</td>
<td>102 (15.6)</td>
</tr>
<tr>
<td>Trouble with taste</td>
<td>1.9 (8.4)</td>
<td>11 (5.2)</td>
<td>3.6 (16.2)</td>
<td>48 (7.3)</td>
</tr>
<tr>
<td>Trouble swallowing saliva</td>
<td>0.9 (6.4)</td>
<td>5 (2.4)</td>
<td>0.9 (6.5)</td>
<td>15 (2.3)</td>
</tr>
<tr>
<td>Choked when swallowing</td>
<td>1.1 (6.0)</td>
<td>7 (3.3)</td>
<td>2.1 (9.6)</td>
<td>35 (5.4)</td>
</tr>
<tr>
<td>Trouble with coughing</td>
<td>12.4 (20.2)</td>
<td>65 (31.0)</td>
<td>13.1 (22.4)</td>
<td>196 (29.9)</td>
</tr>
<tr>
<td>Trouble talking</td>
<td>1.1 (6.0)</td>
<td>7 (3.3)</td>
<td>1.5 (8.5)</td>
<td>24 (3.7)</td>
</tr>
<tr>
<td>Weight loss</td>
<td>2.4 (13.4)</td>
<td>8 (3.8)</td>
<td>1.7 (10.0)</td>
<td>21 (3.2)</td>
</tr>
</tbody>
</table>

a ‘Symptoms’ refers to people who answered ‘a little’, ‘quite a bit’ or ‘very much’ to any question within a scale or to a single item. Others are categorised as having ‘no symptoms’.

### Table 4 – Mean scores with standard deviation (SD) and frequency and percentage (%) of oesophago-gastric specific symptoms (QLQ-OG25) presented in age groups in a random sample of 1686 females in the Swedish population aged 40–79 years.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>40–49</th>
<th>50–59</th>
<th>60–69</th>
<th>70–79</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dysphagia</td>
<td>0.7 (6.0)</td>
<td>8 (4.0)</td>
<td>0.7 (5.5)</td>
<td>10 (2.4)</td>
</tr>
<tr>
<td>Eating difficulties</td>
<td>4.4 (13.4)</td>
<td>36 (18.5)</td>
<td>3.3 (11.0)</td>
<td>61 (14.7)</td>
</tr>
<tr>
<td>Reflux</td>
<td>6.2 (16.1)</td>
<td>36 (18.5)</td>
<td>8.0 (15.7)</td>
<td>97 (23.4)</td>
</tr>
<tr>
<td>Odynophagia</td>
<td>2.2 (10.3)</td>
<td>16 (8.0)</td>
<td>1.8 (8.5)</td>
<td>29 (7.0)</td>
</tr>
<tr>
<td>Pain and discomfort</td>
<td>9.1 (17.7)</td>
<td>57 (28.8)</td>
<td>10.2 (19.0)</td>
<td>130 (31.3)</td>
</tr>
<tr>
<td>Eating in front of others</td>
<td>1.5 (10.8)</td>
<td>5 (2.5)</td>
<td>1.5 (10.1)</td>
<td>11 (2.7)</td>
</tr>
<tr>
<td>Dry mouth</td>
<td>5.9 (17.3)</td>
<td>25 (12.7)</td>
<td>8.2 (10.7)</td>
<td>77 (18.6)</td>
</tr>
<tr>
<td>Trouble with taste</td>
<td>2.4 (12.4)</td>
<td>9 (4.6)</td>
<td>2.1 (10.7)</td>
<td>19 (4.6)</td>
</tr>
<tr>
<td>Trouble swallowing saliva</td>
<td>2.0 (9.9)</td>
<td>9 (4.6)</td>
<td>1.8 (15.1)</td>
<td>12 (2.9)</td>
</tr>
<tr>
<td>Choked when swallowing</td>
<td>1.2 (7.8)</td>
<td>5 (2.5)</td>
<td>2.9 (10.7)</td>
<td>32 (7.7)</td>
</tr>
<tr>
<td>Trouble with coughing</td>
<td>12.6 (21.7)</td>
<td>59 (20.1)</td>
<td>11.4 (21.1)</td>
<td>111 (26.8)</td>
</tr>
<tr>
<td>Trouble talking</td>
<td>2.5 (12.1)</td>
<td>9 (4.6)</td>
<td>1.6 (9.1)</td>
<td>19 (4.6)</td>
</tr>
<tr>
<td>Weight loss</td>
<td>0.8 (7.1)</td>
<td>3 (1.5)</td>
<td>0.9 (7.8)</td>
<td>7 (1.7)</td>
</tr>
</tbody>
</table>

a ‘Symptoms’ refers to people who answered ‘a little’, ‘quite a bit’ or ‘very much’ to any question within a scale or to a single item. Others are categorised as having ‘no symptoms’.
and single items were not measured in this study. Nevertheless, it was not appropriate to ask healthy people questions in more detail related to cancer patients. The percentages of the HRQL measures might be slightly misleading since they only indicate the number of people responding at least with ‘a little’ in at least one of the items.

Some oesophageal and gastric-specific symptoms occur often in the general population. Gastrooesophageal reflux is a known risk factor for oesophageal adenocarcinoma\textsuperscript{10,11} and affects between 10–23\% of the adult population.\textsuperscript{12,13} This is confirmed by this study. The subjective sensation of a dry mouth is obviously another common problem.\textsuperscript{14,15} Dry mouth affects the patients at an emotional and social level and lowers the HRQL.\textsuperscript{15} The current study showed that almost one third of the population reports at least a little trouble with coughing. But this is comparable with former studies on the incidence of coughing in the general population.\textsuperscript{16}

Higher age and female gender are associated with poorer HRQL scores.\textsuperscript{5,6,17,18} Therefore, HRQL scores in this study have

### Table 5 – Current and former cancer diagnoses in a random sample of 4910 persons in the adult Swedish population.

<table>
<thead>
<tr>
<th>Type of cancer</th>
<th>Current cancer diagnosis</th>
<th>Former cancer diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number (%)</td>
<td>Number (%)</td>
</tr>
<tr>
<td>Prostate</td>
<td>96 (50.0)</td>
<td>42 (19.0)</td>
</tr>
<tr>
<td>Breast</td>
<td>29 (15.1)</td>
<td>43 (19.5)</td>
</tr>
<tr>
<td>Urogenital\textsuperscript{b}</td>
<td>17 (8.9)</td>
<td>9 (4.0)</td>
</tr>
<tr>
<td>Female genital</td>
<td>2 (1.0)</td>
<td>30 (13.6)</td>
</tr>
<tr>
<td>Leukaemia and lymphoma</td>
<td>13 (6.8)</td>
<td>6 (2.7)</td>
</tr>
<tr>
<td>Lung</td>
<td>3 (1.6)</td>
<td>1 (0.5)</td>
</tr>
<tr>
<td>Upper gastrointestinal</td>
<td>4 (2.1)</td>
<td>9 (4.0)</td>
</tr>
<tr>
<td>Lower gastrointestinal\textsuperscript{b}</td>
<td>8 (4.2)</td>
<td>37 (16.7)</td>
</tr>
<tr>
<td>Skin\textsuperscript{c}</td>
<td>9 (4.7)</td>
<td>30 (13.6)</td>
</tr>
<tr>
<td>Brain</td>
<td>2 (1.0)</td>
<td>3 (1.4)</td>
</tr>
<tr>
<td>Other</td>
<td>4 (2.1)</td>
<td>11 (4.9)</td>
</tr>
<tr>
<td>Metastasis</td>
<td>5 (2.6)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Total</td>
<td>192 (100)</td>
<td>221 (100)</td>
</tr>
</tbody>
</table>

\textsuperscript{a} Cancer of the bladder, testicles and kidneys.

\textsuperscript{b} Cancer of the colon, small intestine and rectum.

\textsuperscript{c} Basal cell carcinoma and malignant melanoma.

Some oesophageal and gastric-specific symptoms occur often in the general population. Gastrooesophageal reflux is a known risk factor for oesophageal adenocarcinoma\textsuperscript{10,11} and affects between 10–23\% of the adult population.\textsuperscript{12,13} This is confirmed by this study. The subjective sensation of a dry mouth is obviously another common problem.\textsuperscript{14,15} Dry mouth affects the patients at an emotional and social level and lowers the HRQL.\textsuperscript{15} The current study showed that almost one third of the population reports at least a little trouble with coughing. But this is comparable with former studies on the incidence of coughing in the general population.\textsuperscript{16}

Higher age and female gender are associated with poorer HRQL scores.\textsuperscript{5,6,17,18} Therefore, HRQL scores in this study have

### Table 6 – Current and former cancer diagnoses and oesophago-gastric-specific symptoms compared with people in the background population without a history of cancer diagnosis. Mean scores with standard deviations (SD) and frequency symptoms\textsuperscript{a} with percentages (\%).

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Current cancer Number = 192</th>
<th>Former cancer Number = 221</th>
<th>No cancer Number = 4497</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean score (SD)</td>
<td>Symptoms (%)\textsuperscript{a}</td>
<td>Mean score (SD)</td>
</tr>
<tr>
<td>Dysphagia</td>
<td>2.4 (11.0)</td>
<td>17 (8.6)</td>
<td>1.2 (5.3)</td>
</tr>
<tr>
<td>Eating restrictions</td>
<td>5.9 (14.7)</td>
<td>44 (23.3)</td>
<td>5.0 (13.2)</td>
</tr>
<tr>
<td>Reflux</td>
<td>9.8 (19.2)</td>
<td>54 (28.7)</td>
<td>7.2 (15.1)</td>
</tr>
<tr>
<td>Odynophagia</td>
<td>3.3 (10.8)</td>
<td>25 (13.0)</td>
<td>3.6 (16.3)</td>
</tr>
<tr>
<td>Pain and discomfort</td>
<td>11.1 (22.0)</td>
<td>63 (32.8)</td>
<td>10.3 (25.0)</td>
</tr>
<tr>
<td>Eating in front of others</td>
<td>3.5 (15.4)</td>
<td>12 (6.5)</td>
<td>1.4 (7.3)</td>
</tr>
<tr>
<td>Dry mouth</td>
<td>19.0 (26.0)</td>
<td>78 (41.7)</td>
<td>16.0 (26.1)</td>
</tr>
<tr>
<td>Trouble with taste</td>
<td>6.7 (18.6)</td>
<td>26 (13.8)</td>
<td>2.9 (13.0)</td>
</tr>
<tr>
<td>Trouble swallowing saliva</td>
<td>3.0 (14.1)</td>
<td>11 (5.8)</td>
<td>2.7 (10.7)</td>
</tr>
<tr>
<td>Choked when swallowing</td>
<td>6.5 (17.5)</td>
<td>28 (14.8)</td>
<td>6.2 (17.1)</td>
</tr>
<tr>
<td>Trouble with coughing</td>
<td>16.9 (30.3)</td>
<td>66 (34.9)</td>
<td>13.9 (22.7)</td>
</tr>
<tr>
<td>Trouble talking</td>
<td>6.4 (26.2)</td>
<td>19 (10.1)</td>
<td>3.5 (12.5)</td>
</tr>
<tr>
<td>Weight loss</td>
<td>4.3 (16.2)</td>
<td>15 (8.0)</td>
<td>1.4 (8.6)</td>
</tr>
</tbody>
</table>

\textsuperscript{a} ‘Symptom’ refers to people who answered ‘a little’, ‘quite a bit’ or ‘very much’ to any question within a scale or any individual item. Others are categorised as having ‘no symptoms’.

![Fig. 1 – (A–D) Mean scores of scales and items of the QLQ-OG25. Mean scores for scales and individual items divided by sex (triangle = man, square = woman) and age group.](image-url)
been corrected for age and gender by the creation of subgroups. Former and current cancer diagnoses were also taken into account because it was expected that participants with a cancer diagnosis have more symptoms and suffer from treatment-related symptoms.

In HRQL research, it is common to use HRQL assessment shortly after the diagnosis has been confirmed as ‘baseline’. A true baseline HRQL would have to be collected among people before their cancer develops, which is not feasible. A surrogate would be reference values among people in general. Such surrogate assessment is probably better than the use of patients shortly after diagnosis if age and gender are taken into account before comparing the scores. Furthermore, some symptoms are common in the general population (e.g. reflux) and it is valuable to know the level of expected symptoms when measuring recovery.

In conclusion, this study, based on a large, random sample of the Swedish adult population, is the first to provide reference values of the EORTC QLQ-OG25. The study shows that some oesophageal and gastric-specific symptoms are common in the background population, while other symptoms are less common. The results provide reference values that can be used as a surrogate for a ‘true baseline’ and facilitate the interpretation of oesophageal and gastric cancer specific symptoms in HRQL research.

Conflict of interest statement

None declared.

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REFERENCES